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THE PATCHWORK FIELDS AS A RESULT OF CHANGES IN AGRARIAN STRUCTURE IN POLAND AFTER ACCESSION TO THE EUROPEAN UNION

Processes of transformation of economic system in Poland and accession to the European Union resulted in the changes in agrarian structure. Such changes were tended towards increase of level of economic activity of farms, however, other processes as decrease of number of farms and polarization of structure occurred in brighter extent. The aim of the study is to present changes in agrarian structure in Poland after accession to the European Union. Authors use statistical data, scientific and professional literature, reports of research institutes for the analysis. The analysis also is performed at regional level taking into account new definition of farm offered by the Central Statistical Office in Poland what provides new insight in the issue. Research results indicate that changes in agrarian structure differ across regions. In general, significant transformations in the structure of land use in Polish farms may be observed, particularly changes in scale of land use. The smallest farms were eliminated from economic environment, while medium-sized holdings became stronger. From the competitiveness standpoint, this change is beneficial. However, negative result may also be observed, i.e. increase in patchiness of fields what worsen spatial structure of lands.

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Keywords: agrarian structure, changes, patchiness, Poland.

Sadrumstaloti lauki kā rezultāts lauksaimniecības struktūras izmaiņām Polijā pēc pievienošanās Eiropas Savienībai

Ekonomiskās sistēmas transformācijas procesi Polijā un valsts pievienošanās Eiropas Savienībai veicināja izmaiņas Polijas lauksaimniecības struktūrā. Šādas izmaiņas bija vērstas uz lauksaimniecību ekonomiskās aktivitātes palielinājumu, kaut gan, citi procesi kā lauksaimniecību skaita izmaiņas un struktūras polarizācija notika daudz spilgtāk. Pētījuma mērķis ir raksturot izmaiņas lauksaimniecības struktūrā Polijā pēc pievienošanās Eiropas Savienībai. Analīzei autori izmanto statistiskus datus, zinātnisku un profesionālu literatūru, zinātnisko institūtu atskaites. Analīze tiek veikta arī reģionālajā līmenī, ņemot vērā Polijas Centrālā statistikas ofisa piedāvāto lauksaimniecību jauno definīciju, kura nodrošina jaunu skatījumu uz pētāmo jautājumu. Pētījuma rezultāti parāda, ka izmaiņas lauksaimniecības struktūrā atšķiras starp reģioniem. Kopumā, Polijas lauksaimniecībās var tikt novērotas nozīmīgas izmaiņas zemju plātību izmantošanā, īpaši izmaiņas zemes platību izmantošanas mērogā. Mazākas saimniecības pazuda no ekonomiskās vides, kamēr vidēja lieluma saimniecības kļuva stiprākas. No konkurētspējas viedokļa šādas izmaiņas ir izdevīgas. Tomēr, var novērot arī izmaiņu negatīvu rezultātu, t.i. lauku sadrumstalotības palielinājumu, kas pasliktina zemes platību teritoriālo struktūru.

Pētījuma rezultāti balstās Jean Monnet Networks projekta No. 564651-EPP-1-2015-1-SK-EPPJMO-NETWORK "Zemes platību ilgtspējīgas pārvaldības tīkls" pētījuma uzdevumos.

Atslēgas vārdi: lauksaimniecības struktūra, izmaiņas, sadrumstalotība, Polija.

Раздробленные поля как результат изменений структуры сельского хозяйства в Польше после присоединения к Европейскому Союзу

Процессы трансформации экономической системы в Польше и присоединение страны к Европейскому Союзу способствовали изменениям в её структуре сельского хозяйства. Такого рода изменения в сельском хозяйстве были направлены на увеличение экономической активности, хотя, другие процессы, такие как изменение численности сельских хозяйств и поляризация структуры, произошли намного ярче. Цель исследования — охарактеризовать изменения в структуре сельского хозяйства в Польше после присоединения к Европейскому Союзу. Для анализа авторы используют статистические данные, научную и профессиональную литературу, отчёты научных институтов. Анализ также проводится на региональном уровне, учитывая новую дефиницию сельских хозяйств, предложенную Центральным статистическим офисом Польши, что обеспечивает новый взгляд на исследуемый вопрос. Результаты исследования показывают, что изменения в структуре сельского хозяйства в регионах отличаются. В общем, в польских хозяйствах можно наблюдать значительные изменения в использовании сельскохозяйственных угодий, особенно изменения в масштабах использования. Маленькие хозяйства исчезли из экономического пространства, в то время как хозяйства средних размеров стали сильнее. С точки зрения конкурентоспособности такого рода изменения являются выгодными. Однако, можно наблюдать и отрицательный результат изменений, т. е. увеличение раздробленности полей, что ухудшает их территориальную структуру.

Результаты исследования основываются на исследовательских задачах проекта Jean Monnet Networks No. 564651-EPP-1-2015-1-SK-EPPJMO-NETWORK “Сеть долгоспособного управления сельскохозяйственными угодьями”.

Ключевые слова: структура сельского хозяйства, изменения, раздробленность, Польша.

Introduction

Polish agriculture underwent a very dynamic process of political and economic transformation. Initially, in the early 1990s, the transition from a regulated (socialist) to the purely market economy was of utmost significance. Another important moment affecting the changes in agriculture was the Polish accession to the European Union (EU), which radically changed the conditions of farms functioning. Farmers started to use the system of subsidies, which has mobilized a large group of them to become more economically active. In general, the use of subsidies provides significant tool for economic sustainability of agriculture in the New EU Member States (for example, Nagyová et al. 2016). The changes in circumstances in which farms operate resulted in significant shift in structure of land use, thus confirming popular statement that structural transformations in agriculture consist of two processes, i.e. absolute decrease in number of farms and the polarization of structure. However, negative results may also be observed, expressly, increase in patchiness of fields.

The aim of the paper is presentation of the process of changes in agrarian structure in Poland during the period of the integration with European Union, with particular focus on the issue of field patchiness.

Scientific experience in Poland concerning this issue was analyzed by other scientists. Some of them highlighted that process of integration with EU caused significant changes in structure of agricultural holdings (Mickiewicz 2013; Sadowski 2014;

Mioduszewski 2015). Some researchers emphasize regional differences occurring in these changes (Głębocki 2014; Sadowski 2014). However, the issue of patchiness is taken up only by a few authors. For instance, M Dudzińska considers the patchiness as a factor affecting rural space (Dudzińska 2012). However, Z. Król and P. Leń are analyzing the issue as a premise for consolidation works (Król, Leń 2016). The authors of National Agricultural Census (Użytkowanie gruntów. Powszechny Spis Rolny 2011) also highlight intensification of these adverse trends. The issue of patchiness perceived from the point of view of changes in agrarian structure is still a subject to only a few researchers. This article fills this gap.

The paper is based mainly on statistical data, professional literature, reports of research institutes, statistical yearbooks as well as other sources available on the Internet. Noteworthy, since 2010 the Central Statistical Office (GUS) applied the new definition of a farm, according to which farms do not include holders of agricultural land who do not undertake any agricultural activities and holders of less than 1 ha of agricultural land engaged in agricultural activities on a small scale (Central Statistical Office 2017). This results in significant changes in values of some indices for the same years. The analysis was conducted on regional level because the process of polarization of the farms' structure is still characteristic. It should be emphasized that full information on the agrarian structure in Poland can only be provided on the basis of data collected as part of the National Agricultural Censuses (PSR). They are of comparable nature and have recently been carried out in 2002 and 2010. Data for later years (after 2010) in relation to the agrarian structure in Poland are estimates, based on generalized results of a representative survey of farms of natural persons and on the basis of a full examination of farms of legal persons and organizational units without legal personality. Therefore, the analysis of the land chessboard could be carried out on the basis of data from the PSR.

The paper presents a theoretical approach to directions and dynamics of changes in agrarian structure in Poland. Subsequently, the results of analysis of changes in agrarian structure are demonstrated, both in terms of the dynamics and regional diversification. On this basis, the issue of patchiness of fields is analysed. The paper is closed with conclusions stemming from the considerations.

Theoretical background for the paper

In an attempt to define the condition of agricultural structure, a conclusion can be made that Poland possesses large amounts of agricultural land. The total territory of Poland spans 31269 thousand ha, 18208 thousand ha (58.2%) of which is agricultural land, forests cover 9200 thousand ha (29.4%), whereas developed areas, water bodies and other areas together stand for 3861 thousand ha (12.4%) (Józwiak, Ziętara 2013). The characteristic feature of Polish agriculture is great number of very small agricultural holdings with very little yields (Runowski 2013).

Polish agriculture is characterized by a family system of production organization and traditional production methods. Particularly in Poland, one of the priorities for rural areas development is to increase the competitiveness through optimization of

the use of production factors. Increase of the economic potential depends on enlarging of the cultivated area. Currently, the condition of Polish farms depends on the fragmented agriculture. The specific characteristic of changes in the area structure of family agricultural holdings is that the progress in land concentration is accompanied by a fall in the number of holdings and a strong polarization of the area structure. It is possible that the trends in the number and area structure of the farms observed from 2000 will continue in the following years (Chmieliński and Karwat-Woźniak 2009).

According to main premises of Polish agricultural policy, a family farm considered a central point (Maśniak 2011). However, the area structure of farms demonstrates a great diversification. Before the political and structural changes, the proportion of state-owned holdings were significant in the Western and Northwestern part of the country, while the small family holdings were dominant in the Southern and Eastern part of Poland (Sadowski, Takács-György 2005; Mickiewicz 2013). The largest number of individual farms appears in the Southern provinces (with average acreage of ca. 2 hectares) particularly the biggest average area characterized farms in the northern provinces (over 14 hectares) (Sadowski 2014).

The area structure of farms in Poland is highly diversified. The structure of farms is dominated by small farms with total acreage of 1–5 hectares. Moreover we must state that ca. one million farms have less than one ha. In the structure of the farm we can observe two opposite processes: decrease in the number of the small farms and increase in the number of the big farms. An especially intensive process of losing farms was situated in the group of farms with 1–2 ha of land. For only six years (2003–2009), their number decreased by ca. 13%. In the group of farms with 1–15 hectares of land, the number of the farms decreased by ca. 6.1%. More stabilized group was farms with 15–20 ha of land (Ziętara 2013). As should be noted, the dynamics of the transformation is different in various regions. For the most part this is a result of historical development disparities, which go back for many decades. The biggest changes in the structure of land use in Poland occurred in the first years after accession to the EU (Mickiewicz A. and Mickiewicz B. 2013).

Significant fragmentation of land decreases competitiveness of farms. Therefore, land should be consolidated, however, this process in Poland is characterized by somewhat low dynamics (Markuszczyńska 2013).

Transfer of land between individual persons usually goes in one direction – from agriculture to non-agriculture areas. Land can now be considered a good of special importance with its social and economical function. Data clearly indicate that in Poland significant part of the privately-owned land is not used for agricultural activities but serves as a capital investment or security asset. Currently, legal definition of a farmer is based not on the criterion of employment and source of income, but on form of ownership. Fragmented agrarian structure leads to a large number of agricultural holdings, poorly equipped with production factors but numerous manpower with relatively small income. Due to the fragmentation, the number of agricultural holdings in Poland accounts for 17.5% of all agricultural holdings in EU-27 (Sikorska 2010).

The share of non-farming families in the population of rural households has been increasing for several years. The dynamics of this index was highest in the Southeastern

and Southwestern regions. After Polish accession to the EU, agricultural holdings were challenged to operate in highly competitive market. On the other hand, increase in agrarian fragmentation (characteristic for Polish agriculture) encouraged a growing number of families to change their status from farming to non-farming (Chmieliński and Otłowska 2010).

Structural changes in agriculture

In general, after Polish accession to the EU, in years 2004–2016 (Table 1), a systematic decrease in total acreage of farmland occurred in Poland, from 16.3 million ha in 2004 to 14.4 million ha in 2016. The pace of decrease of acreage was similar in case of permanent grasslands, from 3.4 million ha in 2004 to less than 3.1 million in 2016 as well as in case of arable land, from 12.6 million ha in 2004 to 10.7 million in 2016. In analysed period of 13 years, a considerable increase was occurring in total acreage of perennial crops, particularly fruit plants. However, this process was only significant in first 5 years after accession to the EU, whereas in later years it slowed down. The most symptomatic sign of changes occurring in methods of using farmlands in Poland after accessing the European Union is huge and very dynamic decrease in acreage of fallow lands. In 2004, almost 1.8 million ha were fallow, while by 2009 acreage of fallow lands decreased to only a third of the initial number (528 thousand ha), falling steadily and reaching only 165 thousand ha in 2016, less than 10% of value from before the accession. Intensive process of land development led to decrease of percentage of fallow land in farmlands total from 10.79% to 1.15%. This may indicate vital interest shown by farmers in including more and more lands because of possibility of receiving payments. On the other hand, it may be result of allocating fallow lands to non-agricultural purposes.

Table 1

Use of agricultural land in Poland

Years	Farmland and grassland	Meadows and grassland	Arable land	Perennial crops	Gardens	Fallow
1	2	3	4	5	6	7
2004	16 327 411	3 365 157	12 684 614	282 439	39 102	1 761 708
2005	15 905 965	3 387 502	12 084 719	350 760	75 440	1 062 010
2006	15 957 290	3 215 648	12 357 372	338 505	37 579	1 025 407
2007	16 177 081	3 271 236	11 748 025	375 017	74 932	440 939
2008	16 154 250	3 184 383	11 972 709	374 101	70 164	491 525
2009	16 119 584	3 179 687	11 997 844	372 987	67 783	528 248
Change year 2004=100	98.7	94.5	94.6	132.1	173.3	30.0

Sequel to Table 1 see on the next page

Sequel to Table 1

1	2	3	4	5	6	7
2010	14 859 652	3 229 508	10 797 513	389 682	31 074	431 628
2011	15 133 932	3 290 975	11 044 398	390 388	54 471	468 403
2012	14 969 200	3 206 463	10 871 437	397 990	53 529	439 867
2013	14 609 161	3 206 312	10 759 573	412 150	31 835	446 537
2014	14 558 389	3 119 756	10 895 121	376 048	33 316	475 208
2015	14 545 270	3 092 834	10 887 021	390 979	27 377	134 068
2016	14 375 898	3 088 109	10 734 453	387 590	31 055	165 169
Change year 2010=100	96.74	95.62	99.42	99.46	99.94	38.27

Source: Own elaboration based on Central Statistical Office data.

Table 2

Total number of farms in Poland

Territorial unit	2000	2010	Change 2000= 100	2010	2011*	2012	2013	Change 2010= 100
Poland	2859196	2277613	79.7	1509148	1656701	1477852	1429006	94.7
Central Region	550244	445625	81.0	359386	*	364743	340468	94.7
Southern Region	594419	446803	75.2	218516	*	216979	201855	92.4
Eastern Region	905176	764625	84.5	509539	*	485077	480282	94.3
North-western Region	333069	253700	76.2	178364	*	174322	173106	97.1
South-western Region	201608	152171	75.5	90271	*	87931	86297	95.6
Northern Region	274680	214688	78.2	153072	*	148800	146999	96.0

Note: *- Data for 2011 was generalised to national level due to small sample size.

Source: Own elaboration based on Central Statistical Office data.

In general, in years 2000–2010 total number of agricultural holdings in Poland decreased by ca. 30%. In next three years, 2010–2013, pace of decrease in number of such holdings slowed down to level of ca. 5% per three years, which extended to a 10-year period (as before) means ca. 15% decrease. Synthetic proprieties of dynamics of number of agricultural households in analysed period (particularly in pre-accession and shortly after the accession) were not visible for individual regions of Poland. In three regions, i.e. Southern Region, Northwestern Region and Southwestern Region,

the pace of decrease in number of agricultural holdings observed was higher than nationwide, whereas in Central Region and, particularly, in Eastern Region, the pace was lower in comparison to dynamics observed nationwide and in three aforementioned regions. Presented analyses indicate that most beneficial changes in agrarian structure occurred in western and southern part of Poland. However, as should be marked, conditions of these processes were different. In western Poland, the process of land concentration ensued due to privatization of state agricultural farms occurring after 1989 and, later, due to rational land consolidation and purchasing land from weaker and waning farmers. On the other hand, relative reduction of number of farms in southern Poland is a natural process rather than merely an economic one, being a result of strong fragmentation of agrarian structure in this part of country in comparison to other regions. Relatively slow decrease of number of farms in eastern region might be explained with high diversity of condition of agriculture in this part of the country. Both intensive agriculture with large, economically strong milk farms and much more fragmented and less intensive are present in the area. In the whole, eastern region of Poland, the agricultural holdings are mostly historically familiar and that tradition-ownership circumstance hinders the processes of rational consolidation and purchasing of land from weaker and waning farmers. Unfortunately, this process is not beneficial for further development of agriculture in eastern Poland.

Table 3

**Average size of an individual farm with an area exceeding
1 ha of agricultural land**

	2003	2004	2005	2006	2007	2008	2009	2010	2010	2011	2012	2013
Poland	7.4	7.5	7.6	7.7	7.8	7.8	8.0	8.6	8.9	8.4	9.3	9.5
Central Region	6.9	7.1	7.3	7.2	7.4	7.3	7.4	7.8	8.0	*	8.1	8.5
Southern Region	3.5	3.5	3.5	3.6	3.7	3.7	3.8	4.1	4.4	*	4.3	4.6
Eastern Region	5.9	6.1	6.1	6.1	6.2	6.2	6.5	6.7	6.9	*	7.3	7.3
North-western Region	11.4	11.8	12.4	12.2	12.4	12.5	12.6	13.7	14.0	*	15.1	14.8
South-western Region	9.8	10.1	9.9	9.8	10.3	10.0	10.5	12.2	12.5	*	13.1	13.7
Northern Region	13.8	13.4	13.8	14.1	14.4	14.6	14.6	15.8	16.1	*	16.7	17.1

Note: *- Data for 2011 was generalised to national level due to small sample size.

Source: Own elaboration based on Central Statistical Office data.

Dynamics of average acreage of agricultural holding in Poland and individual region in years 2003–2013 is presented in Table 3. Nationwide average acreage per farm rose steadily in this period from 7.4 ha to 9.5 ha. The average acreage of farm was strongly varying between regions, whereas pace of increase in size was also different. The positive correlation between size of holdings in given region and dynamics of increase in average acreage was confirmed and illustrated. Therefore, the lowest change in average size of farm (ca. 1 ha) was observed in southern and eastern regions, where smallest holdings exist, whereas the fastest increase in average acreage (over 3 ha) occurred in north-western, south-western and northern regions, where largest holdings are located.

The issue of patchiness

Process of system transformation as well as conveying (dividing) farms through inheritance led to significant changes in land use in Poland. Negative phenomena in structure of land use, recorded in years 2002–2010, consist mostly of deterioration of spatial organization of farms and occurrence of patchiness. Privatization of public agricultural holdings was accompanied by land transfers to other users, usually in form of leasing or purchasing transactions. Moreover, turn of 20th century in agriculture was a time of intensive, unrestricted process of conveying farms to descendants. In many cases this involved dividing existing holdings into several smaller ones, non-productive in nature, as well as dividing agricultural plots into smaller ones with recreational purpose. Decrease in number of agricultural holdings and increase in their acreage usually leads to deterioration of their spatial layout. Hence, number of farms is increasing that have plots of land in several and even in dozens of locations, frequently in significant distance from the main premises.

Table 4
Agricultural holdings and acreage of farmland by number of plots
in 2002 and 2010

	Holdings owning farmlands					Acreage of farmlands				
	2002		2010		Dynamics 2002= 100	2002		2010		Dynamics 2002= 100
	number	%	number	%		number	%	number	%	
<i>total</i>	2916260	100.0	2264657	100.0	77.7	16899297	100.0	15502975	100.0	91.7
1 plot	1232676	42.3	684123	30.2	55.5	2603617	15.4	895313.6	5.8	34.4
2–3	944333	32.4	678922	30.0	71.9	4546057	26.9	2637255	17.0	58.0
4–5	378672	13.0	365138	16.1	96.4	3251595	19.2	2655061	17.1	81.7
6–9	243226	8.3	308453	13.6	126.8	3008377	17.8	3241083	20.9	107.7
10+	117353	4.0	228021	10.1	194.3	3489650	20.7	6074262	39.2	174.7

Source: Głębocki 2014, page 59.

The phenomenon of escalating patchiness in Poland in years 2002–2010 is well illustrated in Table 4. Quantitative and size structure of agricultural holdings broken down by number of plots in the holding in 2012 indicates much higher percentage of farms with increasing number of plots (4–5, 6–9 and, particularly 10+) in comparison to structure 8 years earlier, in year 2002. At the same time, percentage of holdings having only one plot, i.e. with optimal layout decreased in analysed period by 12 percentage points. The highest dynamics of patchiness escalation in analysed period was observed in areas where large amounts of land were owned by State Treasury, agricultural production cooperatives and other actors of real estate market.

The scope of patchiness phenomenon and its negative economic and organizational effects make initiating large-scale consolidation works one of the most important tasks for Polish agriculture.

Conclusion

Transformations that occurred in agrarian structure in Poland in years 2002–2016 are huge. These changes were multidimensional, leading mostly to decrease in amount of land owned by State Treasury for increase in private ownership. State Treasury assets decreased mostly through leasing and subsequent sale of land. The main reason for relatively dynamic changes in private farms was freedom of dividing agricultural holdings into smaller parts with commercial purposes with some of them losing their agricultural holding status (below 1 ha of farmlands). Despite significant decrease in total amount of farmlands owned by farmers, increase in average acreage of holding occurred.

As should also be noted, a considerable diversification of agriculture exists between regions. Larger and thus more competitive farms are located in northern and western parts of Poland. Agricultural holdings located in southern and, partially, eastern Poland tend to have lower potential due to their fragmentation.

Positive changes in ownership and size structure of agricultural holdings are accompanied by deterioration of layout of their lands. Dividing farms into smaller parts because of familial or commercial reasons, particularly around cities and in areas with attractive natural features, worsen spatial structure of farms, intensify patchiness and significantly decrease total acreage of farmlands. This phenomenon is a result of increasing demand on real estate raised by city residents attempting to improve their living condition by moving out to the countryside. Apart from individual buyers, increase in demand for agricultural real estate dedicated to housing or other economic purposes is also a result of large investment and development companies.

The smallest farms were eliminated from economic environment, while medium-sized holdings became stronger. From the competitiveness standpoint, this change is beneficial. However, negative results may also be observed, i.e. increase in patchiness of fields.

The improvement of the competitiveness of Polish agriculture will depend on the development of those farms, that already have achieved a relatively significant economic potential and will continue that way. The number of Polish farms with ability to compete can be established at ca. 220 thousand (Chmieliński, Karwat-Woźniak 2009).

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