

SPATIAL DIVERSITY OF FARMS BY SIZE AND REGION IN POLAND AND GERMANY

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Abstract. The aim of the article is to present spatial differentiation of changes in the agrarian structure of Poland against changes in the agrarian structure of Germany, with more attention paid to East Germany due to its socialist past. An important element of the paper is to show the nature, pace and direction of changes in the agrarian structure as well as development trends of farms in Poland and East Germany. The time scale of the study covers 2002-2010. The studies show that the agrarian structure in Poland is more fragmented than in Germany. Very small farms (1-5 ha) in northern and western Poland, which make up to 40.0% of the total, do not have the conditions for the efficient use of labour and an adequate income to keep a family and support development. Poland's adoption of the EU's Common Agricultural Policy and the implementation of the Rural Development Programme (2007-13) influenced changes in farm size in northern and western Poland, and - above all - provoked a decline in the number of small farms (by 24%) while increasing average farm size (from 12 to 16 ha). Slow changes in Polish agriculture are the result of the clash of two forces. On the one hand, economic trends seek to concentrate farmland and make better use of its internal potential, while on the other, psycho-social trends put an emphasis on providing jobs in rural areas.

Key words: agriculture, agrarian structure, rural development, Poland, Germany

JEL code: N5, N53

Introduction

A characteristic feature of Poland's agriculture is excessive agrarian fragmentation, much higher than in West European countries. As a result, most farms are not able to generate the economic strength which would allow adjustment to the new conditions of the agricultural commodity market of the European Union. Small farms (on average 9.6 ha of agricultural land) are weaker economically, which significantly affects the scale and volume of their production. According to the Agricultural Census of 2010, small farms up to 5 ha accounted for as much as 58% of all farms and comprised 20% of agricultural land; such farms were most numerous in the voivodeships of Podkarpackie, Malopolskie and Swietokrzyskie. Medium-sized farms (over 20 ha) accounted for 7% of farms covering 26% of agricultural land. The consequences of agrarian fragmentation include small scales of production, high employment in agriculture and low profitability of agricultural production. Poland's accession to the European Union meant that Polish agriculture became a part of the Single European Market. The liberalisation of the agricultural market intensified competition and thus forced agricultural production to be undertaken at an appropriate scale. To cope with the new challenges of the agricultural market, the size structure of Polish farms should change in favour of larger ones. Meanwhile, the agrarian structure in Poland is pejoratively referred to as "archaic and outdated, not

congruent with the requirements of the food industry" (Jezierska-Thöle, 2012).

Agronomics plays an important role in the national economy of Germany, although its share is only 0.6% of the GDP (half of the EU average). Agriculture is an important branch in the weaker eastern federal states of Germany, from where 26.6% of the German agricultural production comes. Furthermore, German agriculture shows a high concentration of agricultural land, especially in the eastern federal states (Mecklenburg-Vorpommern, Sachsen). The dominance of large-scale farms makes Germany (after France) the most important agricultural producer in the EU (EUR 50 billion annually), while exports of agricultural products make up 5.4% of German exports.

The aim of the article is to present spatial differentiation of changes in the agrarian structure of Poland against changes in the agrarian structure of Germany, with more attention paid to East Germany due to its socialist past. An important element of the paper is to show the nature, pace and direction of changes in the agrarian structure as well as development trends of farms in Poland and East Germany.

1. Area of study and research assumptions

In order to capture structural changes in Polish agriculture, and determine the nature and pace of development, a comparative analysis was conducted with Germany, a country which has a high proportion of

the EU's agricultural production (13.1%). The choice of East Germany for a comparative analysis was associated with similar natural as well as political and historical conditions. Both in Poland and in Germany, farmland accounts for more than half of the country's area (Poland 59.7%, Germany 52%). Poland and the eastern federal states in Germany belonged to the bloc of "eastern countries" pursuing a socialist model of farming, which aimed to enlarge the area of socialised farms in the form of cooperatives and state farms. In the former German Democratic Republic (GDR) this objective was achieved, as 94.5% of agricultural land was in the socialised sector. The private sector accounted only for 5.5% (Brem, 2001). Poland was the only country (besides the former Yugoslavia) which retained private farm property (78% privately owned). Political changes after 1989 in Poland and in the former East Germany contributed to profound changes in the structure of the agricultural economy. New processes to privatise state and cooperative farms, unheard in the economic history of Europe were put into action (Hoffman, 1993). The unification of Germany into a single state in July 1990 within the framework of Economic and Monetary Union triggered a series of measures to improve the economy of the agricultural sector, including the adoption of a new privatisation law and the introduction of the funding system under the EU's agricultural policy. In Poland, the implementation

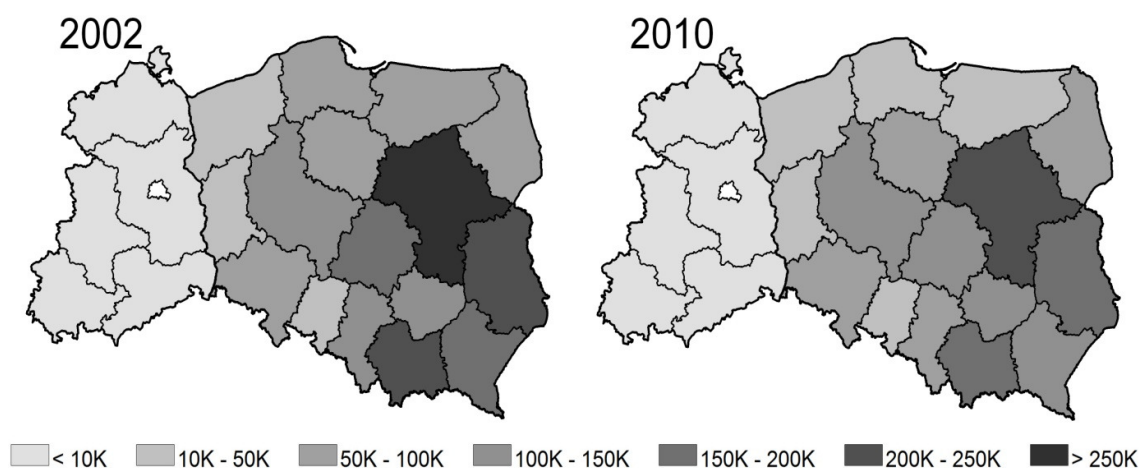
of the Common Agricultural Policy started only upon entry into the EU in 2004 (Jeziarska-Thöle, 2010).

The time scale of the study covers 2002-2010, i.e. both the preparation of Polish agriculture for accession to the EU and, since 2004, the period of commissioning and implementing Common Agricultural Policy tools.

2. Changes in the number of farms by size groups

In 2010, the total number of farms in Poland (including those with up to 1 ha of agricultural land) was 2 277 613. In comparison with 2002 the number had fallen by 22.8%. Farms occupied 15 503 000 ha of agricultural land. The number of farms over 1 ha decreased by 20% to 1 562 605. According to Banski (2006) and Rudnicki (2010), the improvement in the size of farms has been very slow because the pace and nature of the changes are affected by both the economic and the social situation, as well as state agricultural policy and the Common Agricultural Policy. In Germany, as in Poland, during the study period there was a decrease in the total number of farms from 420 697 to 299 134, i.e. by 28%. In 2010, the agrarian structure showed that very large farms formed the largest group (25.8%) (Figure 1).

Another big group were large farms (25.5%). The proportion of small farms accounted for just 9%. The farm size structure in Germany is inversely proportional to Poland.



Source: author calculations based on previous original research (Janzen, Jeziarska-Thöle & Rudnicki, 2014)

Fig. 1. The number of farms in Poland and East Germany in 2002 and 2010 (in thousands) by region

A comparative analysis of changes in the number of farms shows a decrease; this occurred more strongly in northern and western Poland (76 pts). The number of farms dropped from 817 100 to 620 600 i.e. by 24%.

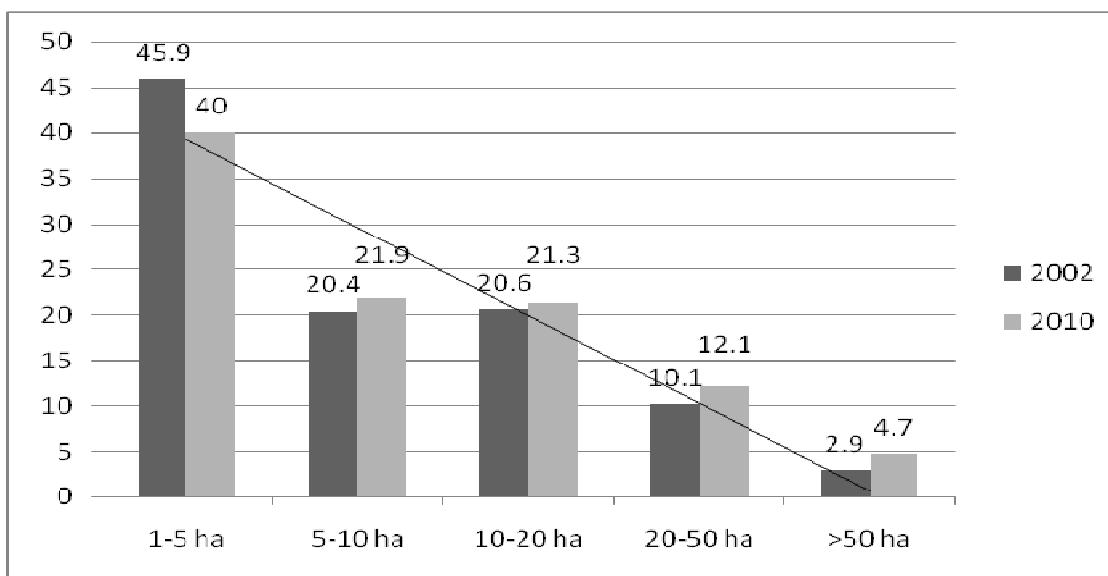
In East Germany, the number of farms decreased from 30 100 to 24 400, i.e. by 19%. The decrease in the number of farms varied spatially. By voivodeship, the biggest changes were recorded in Opolskie (60 pts) and

Zachodniopomorskie (68 pts), followed by the federal state of Thüringen (72 pts). Moreover, the region of Zachodniopomorskie recorded the highest increase in private farms, which could be a result of the incorporation of small individual farms into larger ones. The smallest decline was recorded in the federal states of Mecklenburg (90 pts) and Sachsen-Anhalt (85 pts), in which economically strong stabilised farms have an average area of 286 and 278 ha respectively. A smaller rate of change was recorded in the voivodeships of Wielkopolskie and Warminsko-Mazurskie (81 pts each), where the average farm size was 14.2 ha and 19.4 ha, respectively.

An important element for the economic development of farms is to improve the agrarian structure of agricultural holdings. Meanwhile, on the basis of Figure 2, it can be noted that individual size groups show a declining trend in northern and western Poland, while increasing in East Germany.

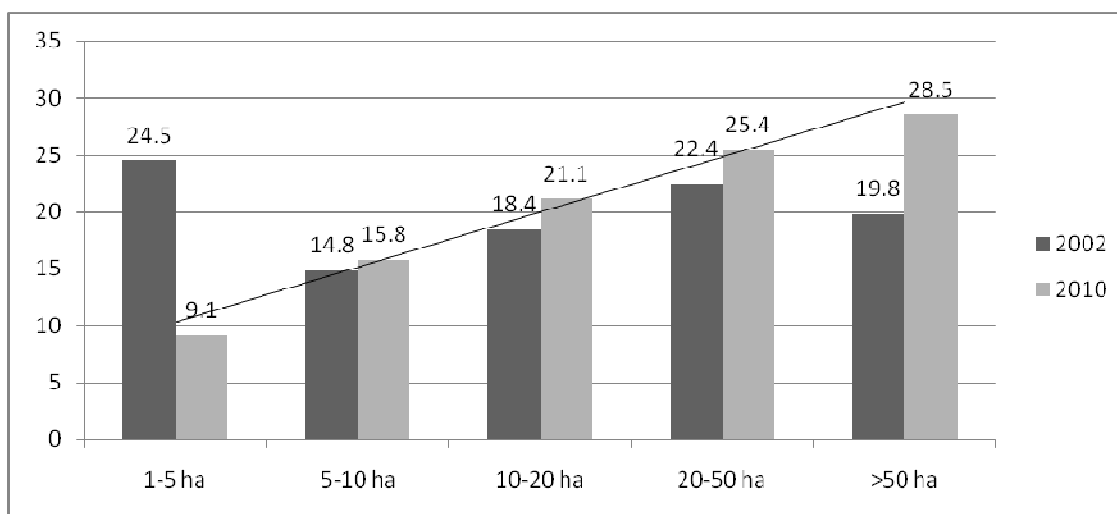
In 2002-10, in northern and western Poland little change was recorded in the number of farms in each size group. A decrease in the number of farms (-5.9%) was recorded for small farms (1-5 ha). Despite the decline in number, their proportion in the total number of farms in Poland is high and many small farms are used as a source of capital investment and intended for commercial non-agricultural purposes, e.g. for housing, recreation or different types of services. In the other groups a slight increase is noted, the largest (+2.0%) for 20-50 ha. A positive manifestation of the changes in northern and western Poland is an increase very large farms (>50 ha) by 1.8% (Figure 3).

A similar trend was observed in East Germany. Relatively big changes occurred in very large (>50 ha) and large (20-50 ha) farms where an increase was recorded, 8.7% and 3.0% respectively. However, the biggest changes were observed in very small farms (1-5 ha) in which there was a decrease by 15.4% (Situationsbericht..., 2012).



Source: author calculations based on data from the Agricultural Census, Statistical Yearbook

Fig. 2. Changes in the proportion (in %) of farms greater than 1 ha in northern and western Poland in 2002 and 2010



Source: author calculations based on data from the Agricultural Census, Statistical Yearbook

Fig. 3. Changes in the proportion (in %) of farms greater than 1 ha in East Germany in 2002 and 2010

Analysis of the proportions of farms of different sizes by voivodeship in 2010 showed large spatial variations (Table 1). The greatest proportion of small farms (1-5 ha), i.e. more than 50%, was recorded in Lubuskie and Dolnoslaskie. The smallest (below 10%) was recorded by three federal states of East Germany, i.e. Mecklenburg-Vorpommern, Brandenburg and

Sachsen-Anhalt. The greatest proportion of very large farms (over 50 ha) was registered in Sachsen-Anhalt (59.2%) and in Mecklenburg (56.6%). For comparison, in northern and western Poland, the highest proportions were only 9.8% (Zachodniopomorskie) and 7.1% (Warminsko-Mazurskie) (Tab. 1).

Table 1

Changes in the proportion of farms by size by region in 2002 and 2010

Voivodeship/ Länders	2002	2010	%	2002	2010	%	2002	2010	%	2002	2010	%	2002	2010	%
	1-5 ha			5-10 ha			10-20 ha			20-50 ha			>50 ha		
Lubuskie	63.0	52.2	-10.8	15.2	18.4	3.2	12.1	14.6	2.4	6.6	8.8	2.3	3.1	6.1	3.0
Wielkopolskie	41.3	38.4	-2.9	23.6	24.5	0.8	23.9	23.5	-0.4	9.3	10.8	1.5	1.9	2.9	1.0
Zachodnio-pomorskie	49.6	41.0	-8.6	16.0	17.9	1.8	18.0	18.5	0.5	10.6	12.9	2.3	5.8	9.8	4.1
Dolnoslaskie	58.2	52.1	-6.2	19.9	21.4	1.5	13.3	14.4	1.1	6.1	7.7	1.7	2.6	4.4	1.8
Opolskie	56.2	45.8	-10.4	19.2	20.5	1.3	14.3	17.1	2.8	7.8	11.6	3.8	2.5	5.0	2.5
Kujawsko-pomorskie	35.2	32.1	-3.0	24.0	24.3	0.3	25.9	25.2	-0.7	12.8	14.9	2.1	2.2	3.5	1.3
Pomorskie	43.8	37.7	-6.1	19.9	22.2	2.4	22.3	23.0	0.7	10.8	12.3	1.5	3.3	4.8	1.5
Warminsko-mazurskie	35.9	30.8	-5.1	15.1	17.2	2.1	26.5	25.6	-0.9	17.9	19.4	1.5	4.6	7.1	2.4
North-Western Poland	45.9	40.0	-5.9	20.4	21.9	1.5	20.6	21.3	0.6	10.1	12.1	2.0	2.9	4.7	1.8
Brandenburg	23.5	8.1	-15.4	11.2	12.8	1.6	12.3	14.7	2.4	14.5	16.6	2.2	38.5	47.7	9.2
Meklenburg - Vorpommern	16.9	5.8	-11.1	9.6	11.1	1.5	11.0	12.5	1.5	11.9	13.9	2.0	50.6	56.6	6.1
Sachsen	33.4	12.1	-21.3	13.9	18.9	5.0	14.6	18.7	4.1	12.7	16.3	3.6	25.4	34.0	8.6
Sachsen-Anhalt	20.6	7.2	-13.4	8.0	9.1	1.1	9.4	10.6	1.2	11.1	13.9	2.9	51.0	59.2	8.3
Türingen	33.9	11.1	-22.8	15.2	17.5	2.3	12.9	19.1	6.2	9.3	13.6	4.3	28.7	38.7	10.0
East Germany	26.3	9.0	-17.3	11.8	14.1	2.3	12.3	15.2	2.9	12.1	15.1	3.0	37.4	46.5	9.1

- decrease; + growth; 0 - no change

Source: author calculations based on data from the Agricultural Census, Statistical Yearbook

In 2010, in northern and western Poland small and very small farms (1-10 ha) dominated (42.6%), while in East Germany it was large and very large (>50 ha) farms constituted 46.5%. For medium-sized farms (10-

20 ha), the largest proportion was recorded in the northern voivodeships: in Warminsko-Mazurskie (25.6%), Kujawsko-Pomorskie (25.2%), Pomorskie (23.0%) and Wielkopolskie (23.5%). Nationally, the

proportion of these farms was 23.5%. The proportion of large farms (20-50 ha) in the agrarian structure of Poland was 6.2%, greatest in the northern part of Poland: Warminsko-Mazurskie (19.4%), Kujawsko-Pomorskie (14.9%) and Pomorskie (12.3%); as well as in western Poland - Zachodniopomorskie (12.9%). For very large farms (>50 ha), the greatest proportion (over 50%) was recorded in East Germany in the federal states of Sachsen-Anhalt (59.2%) and Mecklenburg-Vorpommern (56.6%). A relatively high proportion of these farms was recorded in Brandenburg (47.7%) and Thuringia (38.7%). In Poland, however, the proportion of very large farms was recorded within the former Prussian partition and in the area which had the large proportion of socialised agriculture in the previous period, i.e. in Zachodniopomorskie (9.8%), Warminsko-Mazurskie (7.1%), Lubuskie (6.1%) and Pomorskie (4.8%), as well as in Opolskie (5%) and Dolnoslaskie (4.4%).

3. Changes in farm size

In 2010 the area of agricultural land in Poland amounted to 15.5 million ha. Compared with 2002, this

had decreased by 7.6%. In Germany farms covered 16.7 million ha; compared to 2002 this had decreased by 1.8%. Comparative analysis of changes in farm sizes in 2002-10 shows a decrease in the total area of agricultural holdings in northern and western Poland by 5.0%. In East Germany the decrease was insignificant and amounted to 0.1%. The greatest rate of change was recorded for very small farms. Here there was a decrease in all the surveyed voivodeships in Poland and federal states in East Germany, and was highest in Opolskie (-37.2%) and Zachodniopomorskie (-32.0%). Similarly, a decrease was recorded by medium-sized farms (5-10 ha), with the exception of Mecklenburg and Sachsen, in which increases by 5.2% and 4.5% respectively were recorded. Northern and western Poland also recorded a decline in this group of farms (10-20 ha) by -11.2%. The increase in the proportion of very large (>50) and large (20-50) farms was observed across the entire study area, with the exception of Brandenburg (-5.1%), Sachsen (-1.0%) and Pomorskie (-1.0%) (Table 2).

Table 2

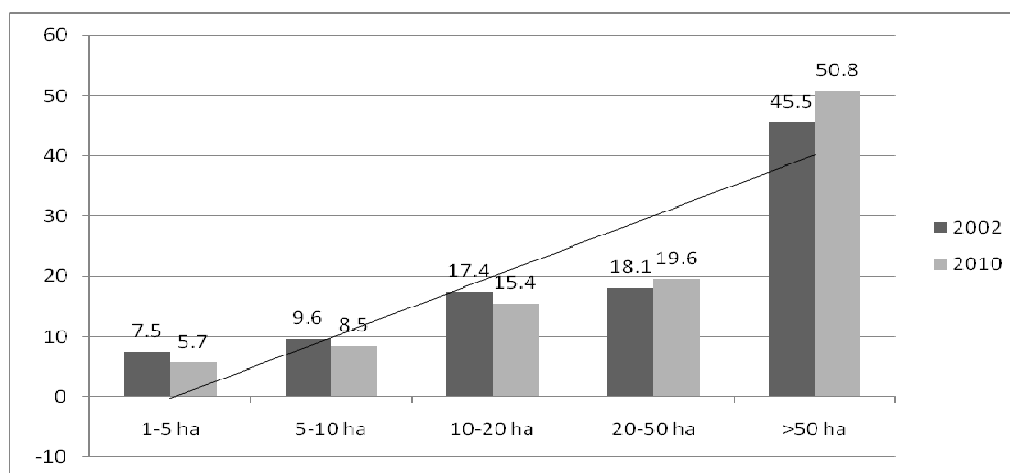
Changes in the proportion of farms by size and region in 2002 and 2010

Voivodeship/ Länders	2002	2010	%	2002	2010	%	2002	2010	%	2002	2010	%	2002	2010	%
	1-5 ha			5-10 ha			10-20 ha			20-50 ha			> 50 ha		
Lubuskie	9.1	6.6	-27.2	7.4	7.0	-5.1	11.0	10.7	-3.0	14.0	14.2	1.6	56.1	61.5	9.6
Wielkopolskie	8.0	6.8	-15.1	13.6	12.5	-8.1	25.1	22.7	-9.6	19.9	22.0	10.6	31.8	35.8	12.4
Zachodnio-pomorskie	5.0	3.4	-32.0	4.8	4.4	-7.8	10.8	8.7	-19.4	12.2	13.4	9.7	65.8	70.1	6.5
Dolnoslaskie	10.6	8.5	-19.9	11.4	10.3	-9.7	14.1	13.1	-7.2	13.8	15.7	13.6	47.3	52.4	10.7
Opolskie	10.0	6.3	-37.2	10.5	8.2	-21.9	14.7	13.3	-9.6	16.8	19.6	16.6	45.1	52.5	16.4
Kujawsko-pomorskie	6.6	5.2	-20.8	13.1	11.2	-14.8	25.5	22.3	-12.7	25.9	27.7	6.9	27.3	33.4	22.3
Pomorskie	6.7	5.1	-23.9	9.7	8.7	-10.6	19.6	17.2	-12.3	19.7	19.5	-1.0	43.0	49.3	14.7
Warminsko-mazurskie	3.7	3.3	-11.7	6.4	5.4	-16.0	18.2	15.5	-14.9	22.4	24.6	9.9	47.8	51.2	7.1
North-Western Poland	7.5	5.7	-24.3	9.6	8.5	-12.0	17.4	15.4	-11.2	18.1	19.6	8.3	45.5	50.8	11.5
Brandenburg	0.3	0.3	-6.3	0.4	0.4	-4.8	0.9	0.9	-0.4	2.4	2.3	-5.1	96.0	96.4	0.4
Meklemburg - Vorpommern	0.2	0.2	-4.5	0.3	0.3	5.2	0.6	0.6	1.3	1.5	1.6	5.5	97.4	97.5	0.0
Saksen	0.7	0.7	-7.4	0.9	0.9	4.5	1.9	1.9	-0.6	3.6	3.5	-1.0	92.9	93.5	0.6
Saksen-Anhalt	0.2	0.2	-9.2	0.2	0.2	-3.1	0.6	0.6	-2.5	1.6	1.6	5.0	97.4	97.5	0.1
Turingen	0.6	0.6	-4.2	0.7	0.6	-17.1	1.2	1.3	6.3	1.9	2.0	5.9	95.6	96.1	0.5
East Germany	0.4	0.4	-6.2	0.5	0.5	-3.0	1.0	1.0	0.8	2.2	2.2	2.0	95.9	96.2	0.3

- decrease; + growth; 0 - no change

Source: author calculations based on data from the Agricultural Census, Statistical Yearbook

A characteristic feature of changes in farm size in northern and western Poland is a drop in farms from 1 to 20 ha and an increase of those over 20 ha (Figure 4).



Source: author calculations based on data from the Agricultural Census, Statistical Yearbook

Fig. 4. Changes in the proportion (in %) of farms greater than 1 ha in northern and western Poland in 2002 and 2010

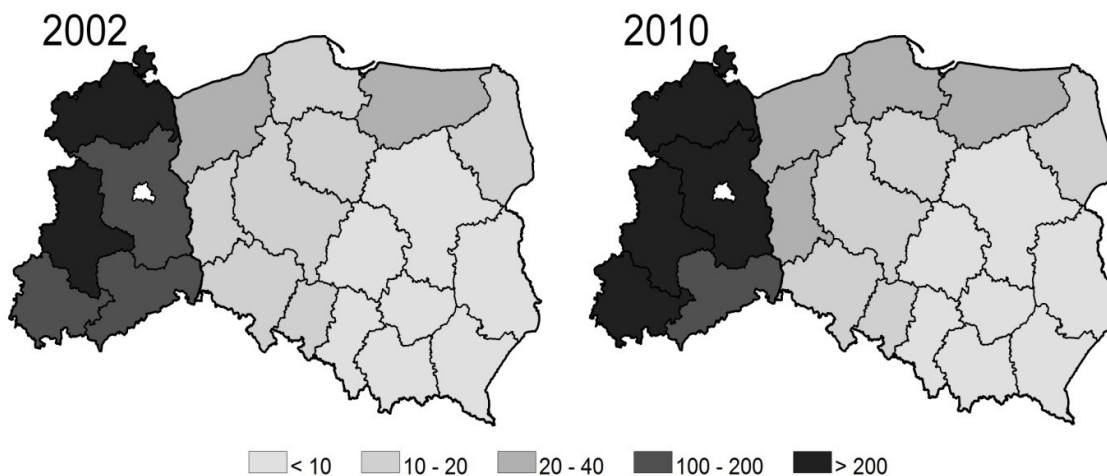
In 2010, the structure of farms in northern and western Poland showed that more than half, i.e. 50.8%, constituted very large farms (over 50 ha). The proportion of large farms (20-50 ha) was relatively big, i.e. 19.6%. In East Germany very large farms occupied 96.2% of the total agricultural area. Very small farms (1-5 ha) covered only 0.4%. Spatial analysis of the agricultural area by region shows that in all federal states the proportion of very large farms (<50 ha) exceeded 90%, and was largest in Sachsen-Anhalt (97.5%). The proportion of very small farms was negligible and did not exceed 1%. In northern and western Poland, a proportion of farms larger than 50 ha was recorded in Zachodniopomorskie (70.0%) and Lubuskie (61.5%). While for very small farms the biggest proportion was recorded in Dolnoslaskie (8.5%) and Wielkopolskie (6.8%).

4. Changes in the average size of farms

In 2010, the average area of farms in Poland amounted to 9.8 ha. Compared to 2002, this figure had increased by 1.4 ha. Changes in the average size in 2002-10 show an increase in all categories with the exception of very large farms (>50 ha). The average farm size over 50 ha decreased from 218.4 ha to

170.3, i.e. by 48.1 ha. This decrease was associated with the transfer of agricultural land from large to family farms. The vast majority of agricultural land belongs to small and medium sized farms, which means that Polish agriculture is characterised by low productivity of labour and capital. In 2010 in Germany the average size of agricultural land per farm increased from 41.2 ha to 55.8 ha. The increase in average size occurred in all categories apart from small farms. The highest increase was observed in farms of over 50 ha from 144.2 to 150.5 ha, i.e. by 6.3 ha (Figure 5)

In 2002-2010, there was an increase in the average size of farms in the study area; in East Germany the increase was much higher and amounted to 24.4 ha, while in northern and western Poland it was by 4.0 ha. By contrast, the growth rate was higher in northern and western Poland (133 pts), which indicates possibilities for the development of agriculture. The greatest rate of change was recorded in Opolskie (148 pts) and Zachodniopomorskie (149 pts), in which the increase in average farm sizes was from 8.5 to 12.6 and from 16.6 ha to 24.8 ha, respectively. Third place went to Thuringia (139 pts) with an increase in the average area from 165.9 to 227.0 ha (Table 3).



Source: author calculations based on previous original research (Janzen, Jezierska-Thole & Rudnicki, 2014)

Fig. 5. Changes in average farm size in Poland and Germany in 2002 and 2010

Table 3

Changes in average farm size in 2002 and 2010

Voivodeship/ Länder	2002	2010	Changes in ha	2002=100 pts
Lubuskie	10.7	13.6	2.9	127
Wielkopolskie	10.9	14.2	3.3	130
Zachodniopomorskie	16.6	24.8	8.2	149
Dolnoslaskie	7.9	10.7	2.8	135
Opolskie	8.5	12.6	4.1	148
Kujawsko-Pomorskie	11.3	15.4	4.2	137
Pomorskie	13.8	17.4	3.7	127
Warminsko-Mazurskie	16.3	19.4	3.1	119
Northern and western Poland	12.0	16.0	4.0	133
Brandenburg	195.4	235.6	40.2	121
Meklemburg – Vorpommern	266.6	294.1	27.6	110
Saksen	b.d	148.0	.	.
Saksen-Anhalt	243.3	286.2	42.9	118
Türingen	165.9	227.0	61.1	137
East Germany	217.8	238.2	20.4	109

Source: author calculations based on data from the Agricultural Census, Statistical Yearbook

The wide spatial variation in average farm size is a weakness of Poland's agricultural policy since 1989, which has further cemented the historical diversity of the agrarian structure. There were no incentive measures to increase land resources in agriculture, such as through the transfer of land from state farms. Only since 2004 have land concentration processes on a large scale been found. They were backed by CAP instruments and led to the formation of a relatively favourable agrarian structure.

Conclusions

1) The studies show that the agrarian structure in Poland is more fragmented than in Germany. Very small farms (1-5 ha) in northern and western Poland, which make up to 40.0% of the total, do not have the conditions for the efficient use of labour and an adequate income to keep a family and support development. Analysis of individual farm size categories by land use show that 40.0% of small farms (1-5 ha) utilised 5.7% of the total agricultural area, while 4.7% of very large farms (>50 ha) used 50.8%. The fragmented agrarian structure does not go with the high incomes and

demands of the food industry and commerce, namely large quantities of products of appropriate quality (Zegar, 2009).

2) Keeping pace with the average farm size in Germany would require a reduction in the number of farms in Poland to about 370 000. In practice, this would mean the elimination of more than a million farms, which is impossible because of the dire social and economic impacts on rural areas which are poorly industrialised. To a large extent small farms in Poland act as a security in case of a loss of other sources of income. Additionally, land ownership raises social prestige and is a good capital investment.

3) Poland's adoption of the EU's Common Agricultural Policy and the implementation of the Rural Development Programme (2007-13) influenced changes in farm size in northern and western Poland, and - above all - provoked a decline in the number of small farms (by 24%) while increasing average farm size (from 12 to 16 ha). Slow changes in Polish agriculture are the result of the clash of two forces. On the one hand, economic trends seek to concentrate farmland and make

better use of its internal potential, while on the other, psycho-social trends put an emphasis on providing jobs in rural areas.

4) In East Germany changes in the agrarian structure have occurred since the early 1990s and on a much larger scale. Land concentration processes supported by CAP instruments have led to the formation of a relatively favourable agrarian structure.

5) Therefore, there is a need for further changes, as land use in Poland differs significantly from that in western and northern countries of the EU where the product structure is similar. According to J. Zegar, changes in the agrarian structure in Poland are primarily aimed at increasing the competitiveness of agriculture on the European market, increasing farm incomes, as well as

contributing to the sustainable development of rural areas by maintaining agriculture and contributing to socio-economic development. A chance to increase the competitiveness of small farms stems from the concentration of productive forces in the form of various cooperatives and associations, e.g. production cooperatives, producer groups and companies. Such forms of cooperation allow the shortcomings of small farm agronomics to be overcome and make better use of their own potential. In addition, they retain multi-directional production which is a guarantee for sustainable rural development. Small farmers produce organic products sold in local niche markets. Small farms, together with small food processing plants, can successfully work together in an integrated local food system.

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