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# The size of the external patchwork of fields as an indicator of the need for land consolidation and exchange in the villages of the commune of Drzewica

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## Abstract

Land consolidation and exchange have a significant impact on improving the spatial structure of rural areas in Poland. Given the fact that agricultural areas in different regions of Poland are characterized by different spatial and technical parameters and different legal and land-ownership-related conditions, it is necessary to conduct investigations and analyses focused on selecting the optimum features describing a given area. As demonstrated by previous studies, the areas located in central Poland are characterized by a defective land ownership pattern with an external patchwork of fields. Therefore, it is necessary to carry out studies to determine the size of that external patchwork of land ownership and to propose solutions for its liquidation. The analyses reported in this article clearly show that in the area studied, priority should be given to land exchange followed by land consolidation.

**Key words:** *land consolidation, land exchange, land owned by non-residents, patchwork of fields*

## INTRODUCTION

The approach to land consolidation projects should be complex, as these are multifunctional actions related to the improvement of inadequate agricultural land use structure and the implementation of sustainable multifunctional rural development policy [STAŃCZUK-GALWIACZEK 2016] inter alia in the economic, social or environmental sphere [TRYSTUŁA 2008].

In central Poland, the spatial structure of rural areas has been shaped by historical factors and socio-economic and demographic processes [WÓJCIK, LEŃ 2015], with the last two still having an important impact on on-going changes. The faulty land ownership structure makes land use in rural areas problematic, translating into poor agricultural development of these areas. In the Łódź Province, farms are mostly owned

by individual farmers. Due to the large fragmentation of farm-holdings, agricultural production is associated with high costs, which, among others, are a consequence of inefficient use of agricultural machines and poor access from homestead to fields. Ownership of land by people who live in a different village than the one in which their fields are situated leads to a growing need to consolidate, and, above all, exchange land, in order to improve agricultural production.

The Polish countryside occupies more than 93% of the surface area of our country [SOBOLEWSKA-MIKULSKA 2015]. About 3 million hectares of agricultural land in Poland are characterised by a faulty pattern of land ownership. The land ownership patchwork is one of the key factors that have a negative impact on the organization and level of agricultural production. Fields in a patchwork may be located either in the same village where the owners live

or outside this area. In most cases, this unfavourable situation is a result of migration of rural residents to larger towns and cities which are administrative, industrial and cultural-educational centres as well as important sources of employment. Non-resident owners are mostly people who have inherited farmland from their parents, or, less frequently, people who have migrated to cities. There is also a group of non-resident owners who have no family connection with the village in which they own land, but who have bought a plot in a rural area for building purposes because they found the localization of the plots attractive or appreciated the low prices of such plots [LEŃ 2012]. This state of affairs has led to a situation in which a large part of land is fallowed or used in an informal way.

Measures should be taken to eliminate both internal and external patchworks of farmland. Two such agricultural land management land consolidation and land exchange are measured. Rural areas in Poland are in need of profound structural changes related to agricultural production, the size of agricultural holdings, the distribution of farmland in an agricultural holding, as well as the demographic, spatial and institutional structure of those areas [SOBOLEWSKA-MIKULSKA 2009; SOBOLEWSKA-MIKULSKA, WÓJCIK 2012; WÓJCIK 2012]. Consolidation and exchange of land can not only improve a farmer's living and working conditions, but also contribute to enhancing the environmental and cultural assets of a village. Agricultural land management interventions can play an important role in the protection of landscape and the environment, development of rural areas and agriculture, as well as preservation of traditions and cultural heritage. The economic and environmental benefits of agricultural land management are indisputable [NOGA, KRÓL 2016].

Previous studies have demonstrated that land located in an external patchwork of fields is a very large problem in rural areas in central Poland. An analysis carried out in the villages of the commune of Sławno (district of Opoczno, Łódź Province) showed that 40.9% of the total surface area of farmland belonging to individual holdings was located in external patchworks, which represented 43.1% of the total number of privately owned plots [LEŃ, MIKA 2016a]. A preliminary study in the village of Brzustowiec, located in the commune of Drzewica showed that 26.9% of the total number of privately owned plots of land (23.8% of all private farmland) in that village belonged to out-of-village owners [LEŃ, MIKA 2016b].

The fragmentary results obtained for the commune of Drzewica became an incentive for further studies of this area. The aim of the present article was to determine the degree of fragmentation of farmland in the villages of the commune of Drzewica using checkerboard tables and to discuss the possibilities of eliminating this problem.

## MATERIALS AND METHODS

Fragmentation studies were carried out in 17 villages of the commune of Drzewica, located in the district of Opoczno. A map showing the geographical situation of the commune of Drzewica is presented in Figure 1.

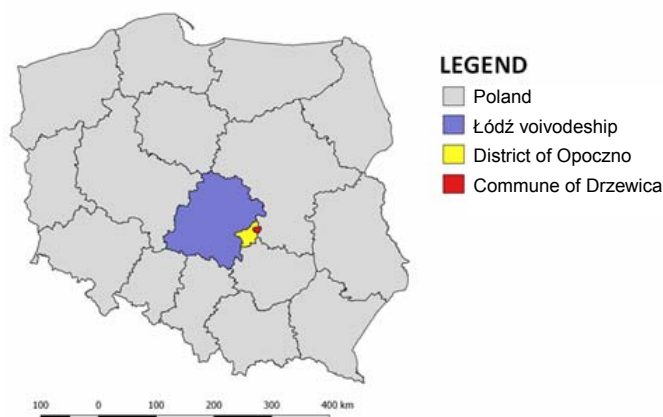


Fig. 1. The geographical situation of the commune of Drzewica on the map of Poland; source: own elaboration

As data in Table 1 show, the total number of out-of-village non-resident owners in the commune of Drzewica is 2 587 persons. These owners possess a total of 8 993 parcels occupying a surface area of 2 813.09 ha, i.e. 31.1% of the total area of the commune. The average area of a plot is 0.31 ha, and the average plot area per owner is 1.09 ha.

The study of the number of plots owned by out-of-village non-resident owners shows that in Radzice Małe, 2,589 parcels are owned by 431 people who are not inhabitants of the village; these plots represent 58.9% of the total number of plots in the private sector in the commune of Drzewica. Their total area is 642.11 ha, i.e. 49.6% of the total surface area of privately owned land. It is worth noting that such a high percentage of land belonging to out-of-village owners presents a barrier to undertaking any attempts at land consolidation, because in such a situation it is impossible to collect the declarations of over 50.0% of landowners required for making a decision on consolidation and exchange of land.

The data presented in Table 2 show that in the commune of Drzewica, 3,358 plots, out of the total of 25,531 parcels belonging to 896 owners, are owned by local non-residents. This corresponds to an area equal to 907.87 hectares, which constitutes 10.0% of the total area of the commune.

The greatest number of plots belonging to local non-residents was recorded for the village of Radzice Duże. The study shows that 972 plots in that locality belong to this group of owners, representing 67.2% of all parcels in the private sector. The total surface area of these plots is 240.68 ha (33.9% of the surface area of privately owned land). The smallest number of

**Table 1.** Farmland belonging to out-of-village non-resident owners in the commune of Drzewica

Name of village	Surface area of privately owned farmland	Number of privately owned plots	Farmland belonging to out-of-village owners						
			owners number	plots		mean surface area of a plot	surface area		mean surface area of a plot per owner
				number	%		ha	%	
Brzustowiec	610.49	1 909	153	423	22.2	0,30	128.15	21.0	0.84
Brzuza	284.05	1 199	87	398	33.2	0,22	86.71	30.5	1.00
Dąbrówka	469.63	1 060	171	356	33.6	0,38	135.51	28.9	0.79
Domaszno	965.07	2 095	83	411	19.6	0,40	163.13	16.9	1.97
Gielzów	324.68	866	90	351	40.5	0,34	119.16	36.7	1.32
Idzikowice	735.96	2 170	194	798	36.8	0,31	249.92	34.0	1.29
Jelnia	500.18	1 026	166	349	34.0	0,44	154.78	30.9	0.93
Krzczonów	782.21	2 127	159	543	25.5	0,40	216.63	27.7	1.36
Radzice Duże	709.33	1 446	137	499	34.5	0,37	183.72	25.9	1.34
Radzice Małe	1 293.65	4 392	431	2589	58.9	0,25	642.11	49.6	1.49
Strzyżów	144.14	844	67	148	17.5	0,19	27.87	19.3	0.42
Świerczyna	259.73	510	48	110	21.6	0,54	59.86	23.0	1.25
Trzebina	542.72	1 076	141	292	27.1	0,51	147.62	27.2	1.05
Werówka	340.92	1 283	136	422	32.9	0,23	95.41	28.0	0.70
Zakościele	435.83	1 998	295	675	33.8	0,28	191.61	44.0	0.65
Żardki	422.43	1 037	116	405	39.1	0,30	123.36	29.2	1.06
Żdźary	225.88	493	91	224	45.4	0,39	87.54	38.8	0.96
<b>Total</b>	<b>9 046.90</b>	<b>25 531</b>	<b>2 587</b>	<b>8 993</b>	<b>35.2</b>	<b>0,31</b>	<b>2 813.09</b>	<b>31.1</b>	<b>1.09</b>

Source: own elaboration.

**Table 2.** Farmland belonging to local non-resident owners in the villages of the commune of Drzewica

Name of village	Farmland belonging to local non-resident owners						
	owners number	plots		mean surface area of a plot	surface area		mean surface area of a plot per owner
		number	%		ha	%	
Brzustowiec	39	113	5.9	0.33	37.65	6.2	0.97
Brzuza	102	391	32.6	0.26	102.13	36.0	1.00
Dąbrówka	33	121	11.4	0.21	25.03	5.3	0.76
Domaszno	44	119	5.7	0.31	37.71	3.9	0.86
Gielzów	26	89	10.3	0.28	25.42	7.8	0.98
Idzikowice	51	197	9.1	0.19	37.47	5.1	0.73
Jelnia	75	150	14.6	0.31	47.31	9.5	0.63
Krzczonów	21	34	1.6	0.31	10.57	1.4	0.50
Radzice Duże	163	972	67.2	0.24	240.68	33.9	1.48
Radzice Małe	42	157	3.6	0.25	39.99	3.1	0.95
Strzyżów	61	228	27.0	0.20	46.72	32.4	0.77
Świerczyna	40	86	16.9	0.42	36.3	14.0	0.91
Trzebina	30	82	7.6	0.43	35.84	6.6	1.19
Werówka	59	171	13.3	0.29	50.55	14.8	0.86
Zakościele	71	158	7.9	0.19	30.13	6.9	0.42
Żardki	24	237	22.9	0.37	89.26	21.1	3.72
Żdźary	15	53	10.8	0.28	15.04	6.7	1.00
<b>Total</b>	<b>896</b>	<b>3 358</b>	<b>13.2</b>	<b>0.27</b>	<b>907.87</b>	<b>10.0</b>	<b>1.01</b>

Source: own elaboration.

plots belonging to local non-residents was found in the village of Krzczonów. Twenty one owners own 34 cadastral plots there (1.6% of group 7 plots), with a total surface area of 10.57 ha (1.4% of the surface area of privately owned land).

The research showed that a very important factor affecting the size of land owned by out-of village non-residents is the location of the commune of Drzewica. It is situated in central Poland, in close proximity to the district town of Opoczno (20 km), the capital of the province, Łódź (90 km), and the capital of the country, Warsaw (100 km). The range of non-resident land ownership is much broader, because many inhabitants of the investigated area have found em-

ployment in other towns and cities of the Łódź Province and neighbouring provinces.

Detailed studies of land ownership by out-of village non-residents from the town of Drzewica, which is the seat of commune authorities and the major cultural centre, showed (Tab. 3) that 360 inhabitants of this town are proprietors of 978 cadastral plots with a total area of 295.60 hectares, representing 3.3% of the total surface area of private farm holdings. The analyses showed that the majority of plots in the hands of the inhabitants of Drzewica are located in villages directly adjacent to this town (Zakościele, Dąbrówka, Brzustowiec, Jelnia, Strzyżów) and in the largest village in the commune (Radzice Małe).

**Table 3.** Farmland belonging to out-of-village non-resident owners from the town of Drzewica

Name of village	Farmland belonging to out-of-village owners						
	owners	plots		mean surface area of a plot	surface area		mean surface area of a plot per owner
	number	number	%		ha	%	
Brzustowiec	60	144	7.5	0.25	35.94	5.9	0.60
Brzuza	1	6	0.5	0.37	2.19	0.8	2.19
Dąbrówka	64	120	11.3	0.36	42.72	9.1	0.67
Domaszno	13	38	1.8	0.45	17.13	1.8	1.32
Gielzów	5	5	0.6	0.81	4.07	1.3	0.81
Idzikowice	0	0	0.0	0.00	0.00	0.0	0.00
Jelnia	31	62	6.0	0.47	29.27	5.9	0.94
Krzczonów	9	17	0.8	0.47	7.96	1.0	0.88
Radzice Duże	12	81	5.6	0.29	23.46	3.3	1.95
Radzice Małe	16	137	3.1	0.24	32.30	2.5	2.02
Strzyżów	18	41	4.9	0.20	8.11	5.6	0.45
Świerczyna	1	1	0.2	1.06	1.06	0.4	1.06
Trzebina	1	2	0.2	0.08	0.15	0.0	0.15
Werówka	11	28	2.2	0.22	6.28	1.8	0.57
Zakościele	98	208	10.4	0.30	63.35	14.5	0.65
Żardki	11	35	3.4	0.25	8.76	2.1	0.80
Żdźary	9	53	10.8	0.24	12.87	5.7	1.43
<b>Total</b>	<b>360</b>	<b>978</b>	<b>3.8</b>	<b>0.30</b>	<b>295.60</b>	<b>3.3</b>	<b>0.82</b>

Source: own elaboration.

287 owners from the town of Drzewica own land in these 6 villages (79.7% of the total number of non-resident owners). They are proprietors of 712 plots (72.7% of the total number of plots) with a surface area of 211.68 ha (71.6% of the total surface area of land belonging to out-of-village owners residing in Drzewica).

Detailed studies of land ownership by out-of-village non-residents from the district town of Opoczno showed (Tab. 4) that 144 inhabitants of Opoczno own 542 cadastral plots in 15 villages of the commune of Drzewica. These plots occupy an area of 198.30 ha, which constitutes 2.2% of privately owned land. The largest number of plots belonging to out-of-village non-resident owners from the district town are located

in the village Radzice Małe, where 19 owners have 122 plots with a total area of 38.43 ha. In the village of Krzczonów, 21 inhabitants of Opoczno own 75 cadastral plots occupying a total area of 35.99 ha. In the villages of Idzikowice, Gielzów and Radzice Duże owners from Opoczno are in the possession of a considerable percentage of privately owned land.

Another important urban centre whose inhabitants own land in the commune of Drzewica is the capital of the province, Łódź. Located at a distance of approx. 90 km from the commune, it still exerts an important impact on out-of-village ownership of farmland in Drzewica. The results of a study conducted for the city of Łódź are presented in Table 5.

**Table 4.** Farmland belonging to out-of-village non-resident owners from the town of Opoczno

Name of village	Farmland belonging to out-of-village owners						
	owners	plots		mean surface area of a plot	surface area		mean surface area of a plot per owner
	number	number	%		ha	%	
Brzustowiec	7	25	1.3	0.21	5.47	0.9	0.78
Brzuza	5	20	1.7	0.21	4.27	1.5	0.85
Dąbrówka	5	6	0.6	0.4	2.45	0.5	0.49
Domaszno	0	0	0.0	0.00	0.00	0.0	0.00
Gielzów	12	64	7.4	0.23	15.29	4.7	1.27
Idzikowice	19	78	3.6	0.45	35.36	4.8	1.86
Jelnia	9	30	2.9	0.58	17.55	3.5	1.95
Krzczonów	21	75	3.5	0.47	35.99	4.6	1.71
Radzice Duże	12	39	2.7	0.50	19.53	2.8	1.63
Radzice Małe	19	122	2.8	0.31	38.43	3.0	2.02
Strzyżów	8	13	1.5	0.11	1.54	1.1	0.19
Świerczyna	4	8	1.6	0.36	2.91	1.1	0.73
Trzebina	9	31	2.9	0.37	11.73	2.2	1.30
Werówka	6	14	1.1	0.26	3.73	1.1	0.62
Zakościele	7	13	0.7	0.19	2.56	0.6	0.37
Żardki	1	4	0.4	0.37	1.50	0.4	1.50
Żdźary	0	0	0.0	0.00	0.00	0.0	0.00
<b>Razem</b>	<b>144</b>	<b>542</b>	<b>2.1</b>	<b>0.36</b>	<b>198.30</b>	<b>2.2</b>	<b>1.38</b>

Source: own elaboration.

**Table 5.** Farmland belonging to out-of-village non-resident owners from the city of Łódź

Name of village	Farmland belonging to out-of-village owners						
	owners	plots		mean surface area of a plot	surface area		mean surface area of a plot per owner
	number	number	%		ha	%	
Brzustowiec	7	55	2.9	0.11	6.37	1.0	0.91
Brzuza	1	1	0.1	0.19	0.19	0.1	0.19
Dąbrówka	10	16	1.5	0.46	7.40	1.6	0.74
Domaszno	9	47	2.2	0.35	16.83	1.7	1.87
Gielzów	4	13	1.5	0.41	5.42	1.7	1.36
Idzikowice	3	18	0.8	0.32	5.75	0.8	1.92
Jelnia	3	7	0.7	0.23	1.66	0.3	0.55
Krzczonów	6	17	0.8	0.19	3.33	0.4	0.56
Radzice Duże	9	24	1.7	0.47	11.37	1.6	1.26
Radzice Małe	11	38	0.9	0.25	9.72	0.8	0.88
Strzyżów	2	4	0.5	0.17	0.71	0.5	0.36
Świerczyna	0	0	0.0	0.00	0.00	0.0	0.00
Trzebina	4	7	0.7	0.40	2.80	0.5	0.70
Werówka	2	2	0.2	0.25	0.50	0.2	0.25
Zakościele	16	57	2.9	0.15	8.61	2.0	0.54
Żardki	4	26	2.5	0.26	6.76	1.6	1.69
Żdźary	3	4	0.8	0.55	2.20	1.0	0.73
<b>Razem</b>	<b>94</b>	<b>336</b>	<b>1.3</b>	<b>0.27</b>	<b>89.69</b>	<b>1.0</b>	<b>0.95</b>

Source: own elaboration.

As is clear from the study, 94 inhabitants of Łódź own 336 plots in Drzewica with a total area of 89.69 ha, which represents 1.0% of the total area of the commune. The largest numbers of owners from Łódź were recorded in the villages of Zakościele (16 people), Radzice Małe (11) Dąbrówka (10), Domaszno and Radzice Duże (9 owners each). The numbers of plots and their surface areas were different for the different localities: Zakościele – 57 plots, 8.61 ha; Brzustowiec – 55 plots, 6.37 ha; Domaszno – 47 plots, 16.83 ha); Radzice Małe – 38 plots, 9.72 ha; Żardki – 26 plots, 6.76 ha; Radzice Duże – 24 plots, 11.37 ha. In the villages of Idzikowice, Krzczonów, Dąbrówka and Gielzów, the share of farmland in the hands of out-of-village owners from the city of Łódź

was much smaller, and in the remaining villages of the commune, it was negligible.

The last of the cities analysed for their effect on the share of farmland belonging to out-of-village owners was the Polish capital, Warsaw. Despite the 100 km distance of the capital from the area studied, some farmland in the villages of the commune of Drzewica is owned by inhabitants of Warsaw, as shown in Table 6.

As evident from the analyses, 65 out-of-village owners from Warsaw are in the possession of 180 cadastral plots in 14 villages of the commune of Drzewica. The total surface area of these plots is 71.94 ha, i.e. 0.8% of the total surface area of the commune. The largest number of cadastral plots (29)

**Table 6.** Farmland belonging to out-of-village non-resident owners from the capital city of Warsaw

Name of village	Farmland belonging to out-of-village owners						
	owners	plots		mean surface area of a plot	surface area		mean surface area of a plot per owner
	number	number	%		ha	%	
Brzustowiec	5	13	0.7	0.41	5.41	0.9	1.08
Brzuza	2	13	1.1	0.21	2.83	1.0	1.41
Dąbrówka	8	29	2.7	0.41	11.90	2.5	1.48
Domaszno	4	12	0.6	0.52	6.28	0.7	1.57
Gielzów	0	0	0.0	0.00	0.00	0.0	0.00
Idzikowice	7	20	0.9	0.30	6.07	0.8	0.86
Jelnia	4	6	0.6	0.95	5.72	1.2	1.43
Krzczonów	4	10	0.5	0.46	4.64	0.6	1.16
Radzice Duże	8	21	1.5	0.34	7.32	1.0	0.91
Radzice Małe	5	16	0.4	0.37	5.95	0.5	1.19
Strzyżów	0	0	0.0	0.00	0.00	0.0	0.00
Świerczyna	0	0	0.0	0.00	0.00	0.0	0.00
Trzebina	3	4	0.4	0.60	2.40	0.4	0.80
Werówka	2	2	0.2	1.34	2.69	0.8	1.34
Zakościele	8	17	0.9	0.20	3.50	0.8	0.43
Żardki	4	15	1.5	0.45	6.84	1.6	1.71
Żdźary	1	2	0.4	0.17	0.34	0.2	0.34
<b>Razem</b>	<b>65</b>	<b>180</b>	<b>0.7</b>	<b>0.39</b>	<b>71.94</b>	<b>0.8</b>	<b>1.10</b>

Source: own elaboration.

with a total area of 11.90 ha belonging to 8 owners are located in the village of Dąbrówka. In the village of Radzice Duże, 8 owners have 21 plots occupying an area of 7.32 ha. In the village of Zakościele, 8 inhabitants of Warsaw own 17 plots with a total area of 3.50 ha. In the village of Idzikowice 7 owners from the capital city have 20 plots with an area of 6.07 ha. The figures for the remaining villages are as follows: Brzustowiec (5 owners, 13 plots, 5.41 ha), Radzice Małe (5 owners, 16 plots, 5.95 ha), Domaszno (4 owners, 12 plots, 6.28 ha). In other villages, the share of farmland belonging to owners from Warsaw is small.

## RESULTS AND DISCUSSION

The use of checkerboard tables [NOGA 1985] in the analysis and assessment of a checkerboard (patchwork) pattern of land ownership allows one to create a matrix of any degree for one or several villages or an entire commune, depending on the territorial scope of the patchwork of fields. The resultant matrix is ordered so that the highest values are situated along the diagonal, which allows one to identify areas of the greatest concentration of checkerboarded farmland. An ordered matrix makes it possible to determine not only the above-mentioned regularities but also the degree of fragmentation and scope of the patchwork of fields, both between villages and subsets of villages, but also for an entire commune. By using this method for studying, balancing and analysing a patchwork of fields, one can establish, in a clear and simple way, the degree of fragmentation of land belonging to agricultural holdings [NOGA 2001]. Detailed data are given in Table 7, and a spatial image of the clustering of villages is shown in Figure 2.

The method of checkerboard tables used in this study helped us to establish in a clear way the degree of fragmentation of land in the villages of the studied commune. On the basis of the obtained matrix, we can determine precisely the surface area of plots of land which could be brought closer together or for which an exchange programme could be developed (Tab. 7). As the results show, there are regularities concerning the clustering of villages situated in the immediate

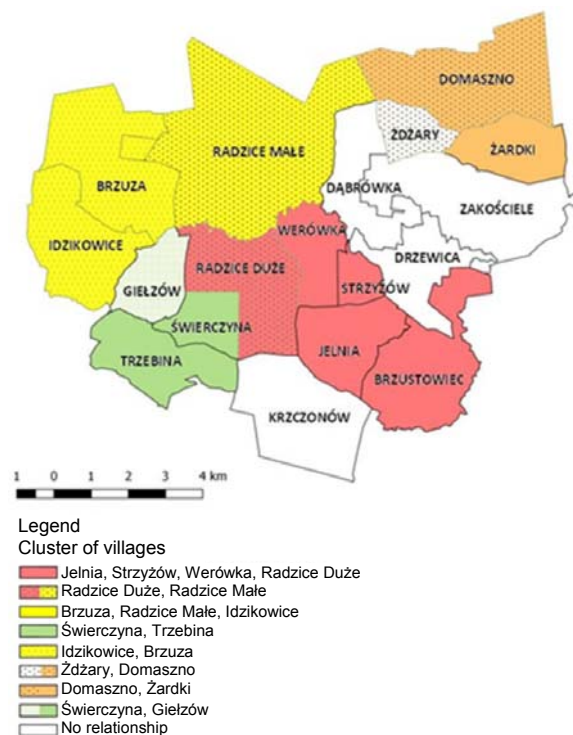


Fig. 2. A map of clustering of villages in the commune of Drzewica; source: own elaboration

Table 7. Matrix of the patchwork of farmland in the commune of Drzewica

Villages where non-resident owners live	Brzustowiec	Jelnia	Strzyżów	Werówka	Radzice Duże	Radzice Małe	Brzuza	Idzikowice	Trzebina	Świerczyna	Gielżów	Krzczonów	Żardki	Domaszno	Żdźary	Zakościele	Dąbrówka
Brzustowiec	×	8.16	2.60	0.53	3.48	2.91	–	–	–	–	–	0.19	2.69	0.34	–	1.75	–
Jelnia	10.10	×	6.19	2.11	4.66	3.42	–	–	0.58	–	0.22	0.84	–	3.02	–	0.66	–
Strzyżów	0.04	3.03	×	4.73	0.28	–	–	–	–	–	–	0.00	–	–	–	–	–
Werówka	0.50	6.67	18.33	×	10.44	1.58	1.52	–	–	–	–	0.19	–	–	0.20	0.74	0.36
Radzice Duże	0.48	9.83	0.98	8.55	×	13.17	3.01	2.94	1.70	9.74	0.81	–	–	–	0.42	–	1.07
Radzice Małe	1.37	3.15	13.64	14.04	194.61	×	36.78	4.04	1.32	–	12.28	0.26	1.20	–	0.57	3.52	19.66
Brzuza	–	0.40	–	–	1.58	1.78	×	23.99	–	0.29	0.28	–	–	–	–	–	–
Idzikowice	–	–	–	–	0.96	2.12	43.85	×	0.91	0.76	0.63	–	–	–	–	–	–
Trzebina	2.17	–	–	0.81	0.87	0.89	–	1.81	×	22.27	2.73	2.50	0.58	–	–	–	–
Świerczyna	–	–	–	0.35	5.63	3.72	1.56	–	13.58	×	7.05	–	–	–	–	–	1.05
Gielżów	–	–	1.38	2.02	8.07	0.18	15.42	4.29	8.02	2.91	×	0.66	–	–	–	–	–
Krzczonów	19.28	13.73	–	–	1.59	3.02	–	–	9.73	0.33	0.97	×	2.04	–	–	–	–
Żardki	–	–	0.39	2.69	0.53	0.29	–	–	–	–	–	1.26	×	17.39	6.53	8.41	1.51
Domaszno	2.72	1.23	0.70	–	4.08	–	–	–	–	–	–	0.21	9.29	×	6.33	0.47	1.36
Żdźary	–	–	–	–	–	–	–	–	–	–	–	1.00	20.47	14.26	×	12.49	–
Zakościele	0.10	0.71	1.07	0.52	1.42	–	–	–	–	–	–	0.49	53.00	2.71	0.99	×	0.03
Dąbrówka	0.89	0.39	1.45	14.21	2.49	6.91	–	0.40	–	–	0.45	2.98	–	–	–	2.10	×

Source: own elaboration.

vicinity of one another. Such relationships were found among the villages of Jelnia, Strzyżów, Werówka and Radzice Duże. Large dependencies regarding the cadastral surface area were also found between the villages of Radzice Duże and Radzice Małe, as well as between Świerczyna – Gielzów and Świerczyna – Trzebinia. In the north-eastern part of the commune, relationships obtained between the villages of Domaszno – Żdżary and Domaszno – Żardki.

Considering the fact that the external patchwork of land in Drzewica which requires consolidation is so large, the inhabitants of the commune should first be offered a land exchange programme, as it is difficult to cover the entire area of the commune with a consolidation programme. Such a programme will allow to bring farmland belonging to owners from other villages of the commune closer to their farm homesteads.

## CONCLUSIONS

The investigations of the external patchwork of farmland in the villages of the commune of Drzewica revealed serious defects in the pattern of land ownership. The analysis showed that 2,587 owners were in the possession of 8,993 cadastral plots, which constituted 35.2% of the total number of privately owned plots in the commune. These plots occupied an area of 2,813.09 ha, i.e. 31.1% of the total surface area of farmland belonging to individual holdings. The whole situation was exacerbated by the fact that as many as 3,358 plots (13.2% of privately owned plots) belonged to local non-resident owners. They occupied a surface area of 907.87 ha, which represented 10.04% of privately owned farmland.

The study also showed that farmland owners from towns and cities had a significant share in non-resident owned farmland. 360 owners from the town of Drzewica, which is the seat of the commune authorities and the main cultural centre of the commune, were in the possession of 978 cadastral plots, with a total area of 295.60 ha, i.e. 3.3% of the total surface area of farmland belonging to individual holdings. 144 owners of 542 cadastral plots (198.30 ha, 2.2% of the surface area of the commune) lived in the district town of Opoczno. 94 owners of 336 cadastral plots (89.69 ha, 1.0% of privately owned land in the commune) lived in Łódź. 180 cadastral plots with an area of 71.94 hectares, i.e. 0.8% of the total surface area of the commune belonged to inhabitants of Warsaw. The fact that residents of towns and cities own land in the villages of the commune of Drzewica is due to the migration of rural people to urban areas and inheritance of land. Another factor is the financial benefits offered by urban centres and their large labour market as well as the fact that young people move to cities to study at higher education institutions. However, this can work the other way, too. City dwellers buy plots in rural areas to settle there in the future or for recreational purposes. The favourable conditions for tourist

activities and the good location of the commune in terms of access from towns and cities encourage inhabitants of cities to buy attractive recreational plots there.

Particularly noteworthy is ownership of plots by city-dwellers. A detailed study should be carried out regarding the surface area of these plots of land and their current use (recreational plots, building plots, plots not used for agricultural purposes, plots informally used for agricultural purposes). These plots of land, if unused, could be leased to local farmers. Regulations related to land lease are provided in Articles 693–709 of the Civil Code [Ustawa... 1964] and the Act of 5 August 2015 on the Structuring of the Agricultural System [Ustawa... 2015]. As of 2016, lease contracts not concluded in writing are deemed invalid. Moreover, a lease on agricultural property or part thereof concluded for a period of more than 5 years requires a notarised lease contract. Such an agreement must include a description of the leased out property specifying its surface area, its condition, land class and the condition of the buildings and other facilities, if they are the object of the lease contract. The conclusion of a lease agreement is beneficial to farmers, because according to Art. 9.1. of the Act of 5 August 2015 on Structuring of the Agricultural System, in the event of vending of agricultural property by a natural or a legal person other than the Agency for Restructuring and Modernisation of Agriculture (ARMA), the tenant is entitled under the law to exercise the right of pre-emptive purchase, provided that two conditions are met. The first condition is that the lease agreement must be in writing in the form of a notarial deed and that it has been executed for at least 3 years from the date of submission of the contract to the branch manager of ARMA.

The second condition is that the property purchased must become part of the tenant's family farm. The signing of the lease agreement explicitly solves the problem of who is entitled to submit applications for direct payments to ARMA. The agreement protects farmers against sanctions, should the owner or another applicant submit a direct payment application for the same plot of land. The case is then clear and ARMA does not have to conduct evidentiary proceedings to determine whether an oral lease agreement has truly been concluded, whether it is in force and, finally, who is eligible for subsidies.

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## Przemysław LEŃ

### Rozmiary zewnętrznej szachownicy gruntów wskaźnikiem potrzeb prac scalenia i wymiany gruntów we wsiach gminy Drzewica

#### STRESZCZENIE

Prace scalenia i wymiany gruntów mają znaczący wpływ na poprawę struktury przestrzennej obszarów wiejskich w Polsce. Zważywszy że różne obszary Polski na obszarach rolnych charakteryzują się odmiennymi parametrami przestrzenno-technicznymi, warunkami prawnowłasnościowymi do gruntu, konieczne jest przeprowadzenie badań i analiz nad dobraniem optymalnych cech opisujących dany teren. Jak wykazały przeprowadzone badania, obszary centralnej Polski charakteryzują się bardzo wadliwą zewnętrzną szachownicą gruntów. Dlatego też konieczne jest przeprowadzenie analiz w celu określenia rozmiarów zewnętrznej szachownicy gruntów i pozycji jej likwidacji. Jak wynika z przeprowadzonych badań na analizowanym obszarze w pierwszej kolejności powinno się podjąć próbę wymiany gruntów, natomiast kolejnym etapem powinno być przeprowadzenie prac scalenia gruntów.

**Słowa kluczowe:** *grunty różniczan, scalenie gruntów, szachownica gruntów, wymiana gruntów*