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THE ISSUE OF INVENTORYING THE ACTUAL STATE OF THE AREA STRUCTURE OF FARMS IN THE PROCESS OF LAND CONSOLIDATION

Abstract: A field studies illustrating the current condition of the consolidation area are carried out as a part of the general land consolidation project. One of the field studies is the area structure of farms, which presents the land area in particular area ranges of farms, e.g. scope 1 (up to 1 ha), scope 2 (1 – 5 ha), scope 3 (5 – 10 ha), scope 4 (10 – 15 ha), range 5 (15 – 50 ha), range 6 (above 50 ha). In order to prepare the area structure, data from the cadastre are used. The problem is that the data shown in the cadastre do not take into account the actual state of land use, which is influenced by leases. Leases are not listed in the cadastre. Therefore, the state shown in the usage structure is not consistent with the actual state of the area, including leases. In order to demonstrate the discrepancies between the state shown in the cadastre and the actual state, data from the cadastre are compared with data from the list of beneficiaries of the Common Agricultural Policy of the Ministry of Agriculture and Rural Development, illustrating the actual state of usage (including leases). The paper presents research results for selected poviats of the Masovian Voivodeship in Poland. Complete data on the actual state of affairs would enable field studies showing the actual pattern of plots and would allow for the calculation of land layouts resulting from the actual state of usage. This would facilitate the process of designing a new state during land consolidation.

Keywords: land consolidation, cadastre, farms, area structure of farms

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Introduction with analysis of the state of the problems

In Poland, the legal regulation that defines the principles of shaping the agricultural system state is (Act, 2003). In accordance with the Act (2003), the principles of shaping the agricultural system state are meant to be implemented by, among others, improving the area structure of farms.

One of the surveying works aimed at improving the area structure of farms is land consolidation. According to Król&Leń (2016), the process of land consolidation and exchange is one of the main technical procedures enabling the improvement of the spatial structure of farms. As a part of these works, both the internal and external patchwork of fields should be removed.

In accordance with art. 1.1 (Act, 1982), the purpose of land consolidation is to create more favorable management conditions in agriculture and forestry by improving the area structure of farms, forests and forest lands, appropriate shaping of land layouts, adapting property boundaries to the system of water drainage devices, roads and landform.

Therefore, the key task in the land consolidation process is to inventory the actual area structure of farms.

The definition of a farm for the purposes of land consolidation is provided in [Act \(1982\)](#). And so, in accordance with art. 1.2 point a) (Act, 1982), whenever the Act mentions a farm – it means a farm within the meaning of Art. 55³ of the Act of 23 April 1964 – Civil Code (Journal of Laws of 2022, items 1360, 2337 and 2339 and of 2023, item 326), in which the area of agricultural or forest land is not less than 1 ha.

Therefore, the definition of a farm can be found in Act (1964), however, as stated above regulation: the area of agricultural or forest land of a farm is not less than 1 ha. In pursuance of the definition contained in art. 55³ (Act, 1964), an agricultural farm is considered to be agricultural land together with forest land, buildings or their parts, equipment and livestock, if they are or can be an organized separate farm, and rights related to running an agricultural farm.

According to Sobolewska-Mikulska&Pułeczka (2007), before starting to assumptions development of the land consolidation project, an inventory of the existing state condition should be carried out in terms of the degree of area development and usage. One of the field studies is the area structure of farms, which presents the land area in particular area ranges of farms, e.g. scope 1 (up to 1 ha), scope 2 (1 – 5 ha), scope 3 (5 – 10 ha), scope 4 (10 – 15 ha), range 5 (15 – 50 ha), range 6 (above 50 ha).

The assessment of the quality of land consolidation, taking into account the structure of land useage, was presented by Taszakowski et al. (2023). An example of the effect of land consolidation is a farm which, before consolidation, had 77 land parcels, which ones were located in 19 registered units. After land consolidation, the number of land parcels decreased to 11 and all land parcels were included in one registration unit. As confirmed by the results of the research by Bielska (2015), the basis of studies in the field of land usage structure are cadastral data. The problem is that the data shown in the real estate

cadastre do not take into account the actual state of land usage, i.e. land that is the subject of lease.

The authors Tazakowski&Korta (2018) list the cadastral benefits of land consolidation, among others: organizing the legal status of real estate subject to consolidation proceedings (ensuring compliance of the the land usage with the real estate cadaster and land register).

Lease is regulated in Section II (Act, 1964). According to art. 693 § 1 of the (Act, 1964), by means of a lease agreement, the lessor undertakes to provide the lessee with an item for use and benefit for a specified or indefinite period, and the lessee undertakes to pay the agreed rent to the lessor. As provided in art. 708 of the Act (1964), the provisions of this section shall apply in the case where a person taking agricultural property for use and receiving benefits is not obliged to pay rent, but only to bear taxes and other burdens related to ownership or owning land. As Mickiewicz & Mickiewicz (2017) write, for many farmers focused on developing commercial production, the starting point for enlarging their farm, despite of a severe lack of capital, was leasing, as the most convenient method of area expansion.

The authors Karwat-Woźniak&Buks (2022) point out that in recent years, the situation on the agricultural land market (especially the low supply of land for sale and its high prices, as well as legal regulations) has resulted in a continuous strengthening of the leased trade in agricultural land. As a result, leases had an increasing impact on the possibilities of increasing the equipment of farms with agricultural land.

In accordance with applicable legal regulations, leases are not recorded in the real estate cadastre. Therefore, the condition shown in the structure of use is not consistent with the actual condition in the area covering the land subjected to the lease.

Confirmation of the above discrepancies can be obtained, among others, comparing these data with data on direct payments.

While examining the literature sources, the authors did not find any other studies regarding discrepancies between the state of the structure of use shown in the cadastre and the actual state including leases.

Poland, as one of the European Union member states, implements national strategic plans for the Common Agricultural Policy, including: direct payments to farmers, as well as supports land consolidation itself. Currently, the Strategic Plan for the Common Agricultural Policy 2023–2027 is in force, which includes, among others: interventions I.10.8 Land consolidation and post-consolidation development. As part of the above-mentioned intervention, work on the development and implementation of the consolidation project together with post-consolidation development will be supported. The mentioned plan also includes direct payments to farmers after meeting the requirements set out in the plan.

Material and methods

This paper presents research results regarding the area structure of farms in the Masovian Voivodeship in Poland. We examined the area of agricultural land of farms

according to area groups of agricultural land, the average size of an individual farm above 1 ha of agricultural land, and the number of farms in particular area ranges. Additionally, data on direct payments from the Grodzisk Mazowiecki municipality located in the Grodzisk powiat in the Masovian Voivodeship were analyzed. Data regarding land registration units included in the real estate cadastre were compared with the actual state of land usage, comparing them with data on direct payments and the results of interviews conducted with individual farmers.

Above the research was conducted on the basis of:

- data from the 2010 National Agricultural Census,
- data from the 2020 National Agricultural Census,
- data provided by the Central Statistical Office (GUS) from 2019,
- data sets from databases of real estate cadastre from powiat summary reports from 2021,
- data provided by the Agency for Restructuring and Modernization of Agriculture and the Ministry of Agriculture and Rural Development – regarding direct payments from 2020,
- real estate cadastre obtained from individual powiat offices in 2021,
- survey research, including interviews conducted with individual farmers in 2021.

The research was carried out, among others, as part of the implementation of selected products under task No. 1 – "Development of a diagnosis of the economic, social and environmental condition" of subtask No. 1.1. – "Research on the current status in the context of introducing new functions in rural areas of the Masovian Voivodeship" based on a contract for research services, entitled "Implementation of the Smart Villages concept in the Masovian Voivodeship" financed from the budget of the Masovian Voivodeship.

The identified discrepancies between the status shown in the real estate cadastre and the actual status of land usage resulting from the list of beneficiaries of the Common Agricultural Policy of the Ministry of Agriculture and Rural Development constitute important data that should be taken into account in future land consolidation proceedings.

Results and discussion

From Central Statistical Office data from 2022 (GUS, 2023), Masovian Voivodeship has a territorial area of 35,559 km² and is divided into 37 counties, 5 cities with county rights and 314 communes. Among the communes, 35 are urban communes, 53 are urban-rural communes and 226 are rural communes. The dominant type of commune are rural communes. Figure 1 shows administrative division of Poland into voivodeships and counties on January 1, 2024.

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Fig. 1. Administrative division of Poland into voivodeships and counties on January 1, 2024
Source: GUS, 2024

According to Figures 1, the Masovian Voivodeship is located in east-central Poland. Table 1 shows households with a farm according to the sources covered in the Masovian Voivodeship in 2020.

Table 1. Households with a farm by source of income in the Masovian Voivodeship in 2020

Households with a farm user who received income from:				
agricultural activities	activities non-agricultural	hired work	retirement and pension	unearned sources of income beyond retirement and pension
207000	28000	91000	50000	32000

Source: study based on: GUS, 2021

According to Table 1 in the Masovian Voivodeship in 2020 most households with a farm usage (207 000) derived income from agricultural activities, followed by (91 000) from hired work.

Table 2 shows the area of agricultural land according to the area groups of agricultural land in the Masovian Voivodeship according to data from the 2020 National Agricultural Census, while chart 1 shows the percentage share of the above-mentioned surface.

Table 2. Areas of agricultural land [ha] on agricultural holdings according to area groups of agricultural land in the Masovian Voivodeship

Area groups of agricultural land [ha]											
0-1	1-2	2-3	3-5	5-10	10-15	15-20	20-30	30-50	50-100	100 ha and more	sum
2195	38 409	64 087	153 607	404 237	313 853	204 325	232 536	216 223	165 540	189 909	1984921

Source: own study based on: GUS, 2022

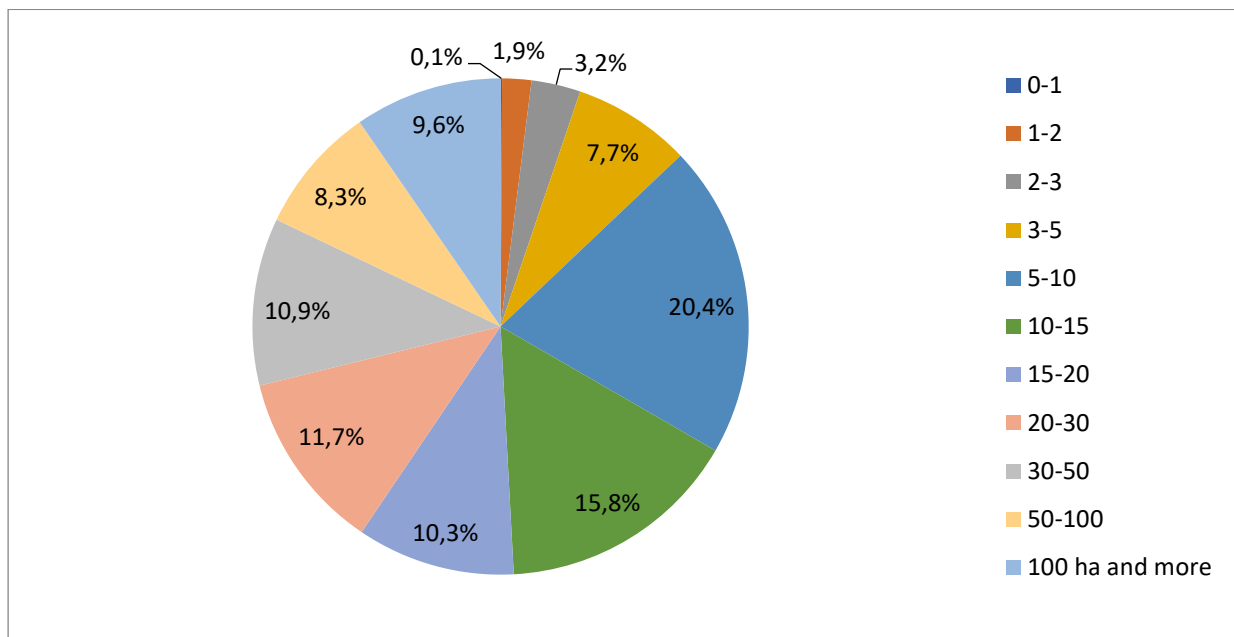


Chart 1. Share of agricultural land on agricultural holdings [%] according to agricultural land area groups in the Masovian Voivodeship

Source: own study based on: GUS, 2022

Table 2 shows that the largest area group of agricultural land has an area of 5 to 10 ha – 404,237, which is 20.4% (Chart 1), while the second largest area group is the area group of 10 to 15 ha – 313,853, representing 15.8% (Chart 1). The smallest area group of agricultural land has an area of up to 1 ha – 2195, which is 0.1% (Chart 1).

According to data (GUS, 2021), in the Masovian Voivodeship the average area of agricultural land of a farm in 2020 is equal to 9.4 ha (in Poland – 11.4 ha).

Table 3 shows the number of farms by area groups of agricultural land in the Masovian Voivodeship according to data from the 2020 National Agricultural Census, while Chart 2 shows the percentage share of the above-mentioned number of agricultural holdings.

Table 3. Number of agricultural holdings by area groups of agricultural land in the Masovian Voivodeship

Area groups of agricultural land [ha]											
0-1	1-2	2-3	3-5	5-10	10-15	15-20	20-30	30-50	50-100	100 ha and more	sum
3134	25 998	26 330	39 305	56 697	25 934	11 919	9 697	5 745	2 502	840	208101

Source: own study based on: GUS, 2022

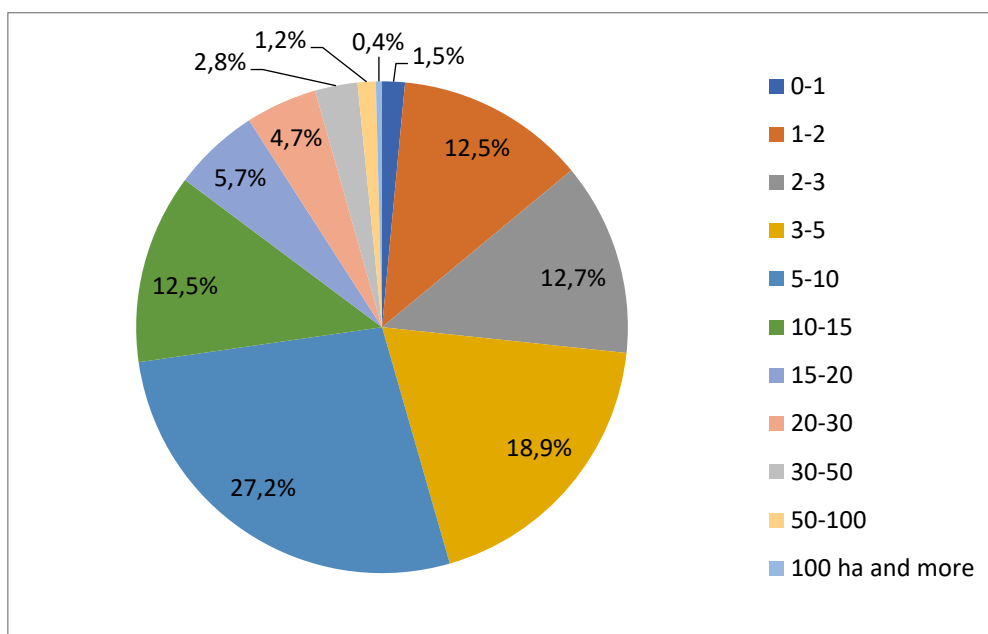


Chart 2. Share of the number of agricultural holdings [%] by area groups of agricultural land in the Masovian Voivodeship

Source: own study based on: GUS, 2022

According to Table 3, the largest number of farms, i.e. 56 697, have agricultural land in the range of 5–10 ha, and the fewest farms, i.e. 840, have agricultural land in the range of 100 ha and more. In the Masovian Voivodeship the total number of farms is 208 101.

An analysis of the value of the average size of an individual farm over 1 ha of agricultural land in the communes of the Masovian Voivodeship was also carried out. For the communes of Łąck and Drobin (Płockpoviat), the data needed for the assessment were unavailable, including: due to statistical secrecy or the impossibility of providing them due to the high random sample error (such information was included in the tables obtained from the Local Data Bank of the Central Statistical Office (2021a)).

The analyzes carried out on the average size of an individual farm above 1 ha of agricultural land in the communes of the Masovian Voivodeship showed that the designated value ranges included:

- 16 communes (5.8%) [1–4.99ha],
- 150 communes (54.2%) [5–9.99ha],
- 77 communes (27.8%) [10–14.99ha],
- 34 communes (12.3%) [≥ 15 ha].

The obtained results are presented in Figure 2.

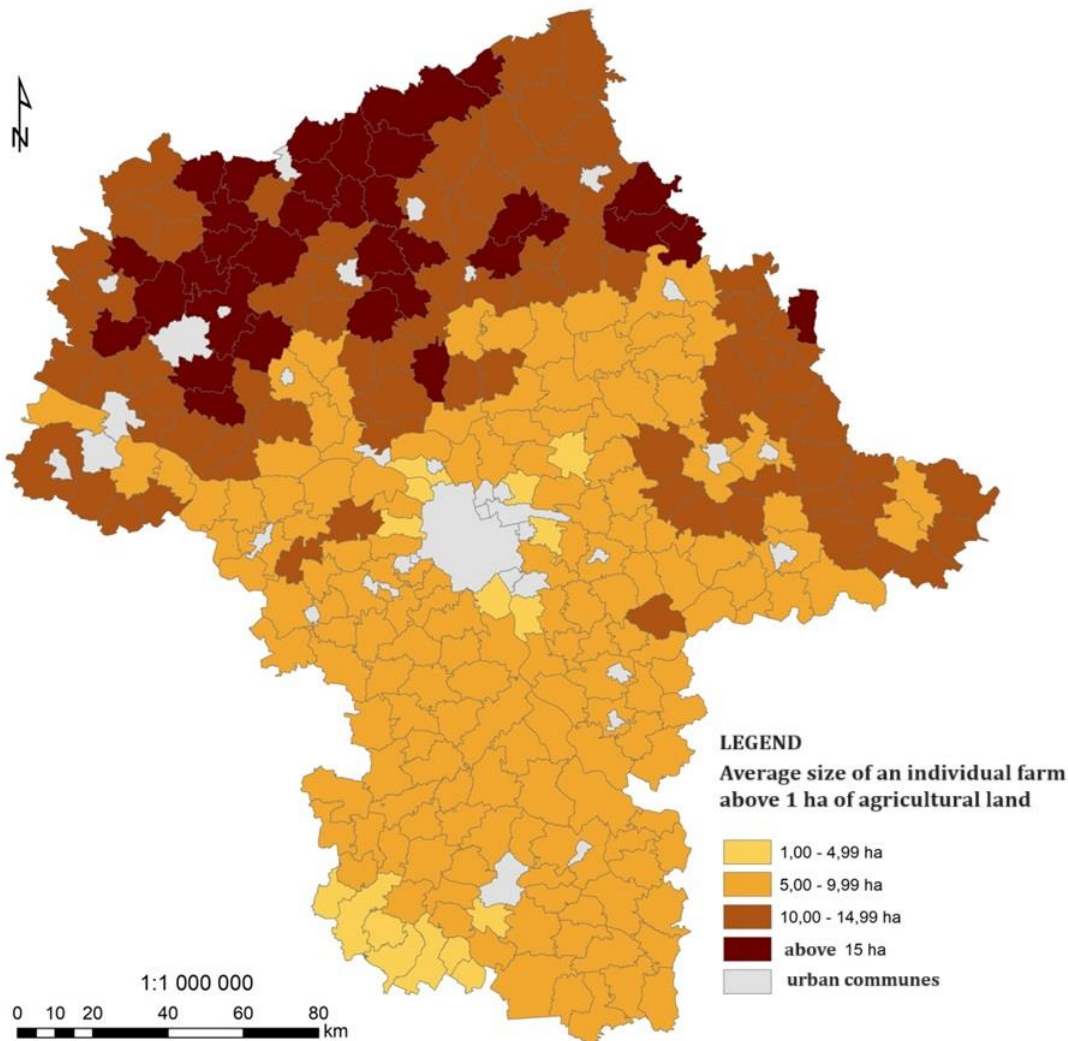


Fig. 2. Average size of an individual farm above 1 ha of agricultural land in communes of the Masovian Voivodeship – results
Source: own study based on: GUS, 2010

Taking into account the results obtained (Fig.2), in the largest number of communes, i.e. 150 communes, constituting 54.2% of the total, the average size of an individual farm above 1 ha of agricultural land is in the small farm range (in the range [5–9.99 ha]). It can be observed that they occur, among others: in all communes located in the

following powiat: białobrzeski, garwoliński, grodziski, grójecki, kozienicki, lipski, pruszkowski, wyszkowski, zwoleński, żyrardowski. In the smallest number of communes, i.e. 16, constituting 5.8% of the total, the average farm size examined is in the range of very small farms (in the range [1–4.99 ha]).

Subsequent research on the spatial structure was carried out on the basis of a database containing information on 806,676 land registration units identified with agricultural farms, from the powiat summaries of land and building records from 2021 in the Masovian Voivodeship, divided into the following ranges of the number of farms depending on the farm area:

- 1) farms with an area of up to 1 ha;
- 2) farms with an area ranging from 1.00 ha to 4.99 ha;
- 3) farms with an area ranging from 5.00 ha to 9.99 ha;
- 4) farms with an area ranging from 10.00 ha to 14.99 ha;
- 5) farms with an area ranging from 15.00 ha to 49.99 ha;
- 6) farms with an area exceeding 50 ha.

Pursuant to § 13. 1⁷⁾ (Regulations, 2021), registration plots located within one registration powiat and being subject to identical rights and corresponding shares referred to in § 11 point 7 and § 12 points 1 and 3 constitute a registration unit land.

The number of farms in individual areas in the Masovian Voivodeship is presented in Table 4.

Table 4. List of the number of farms in individual areas in the Masovian Voivodeship

area range [ha]	to 1	1,00 – 4,99	5,00 – 9,99	10,00 – 14,99	15,00 – 49,99	above 50	Sum
number of farms	379731	281001	85795	32695	25417	2038	806676
[%] farms	47,1%	34,8%	10,6%	4,1%	3,2%	0,3%	100,0%

Source: own study based on powiat summary reports: EGiB, 2021

Table 4 shows that:

- 47.1% of the number of farms in the Masovian Voivodeship have an area of less than 1 ha;
- 34.8% of the number of farms in the Masovian Voivodeship have an area ranging from 1.00 ha to 4.99 ha;
- 10.6% of the number of farms in the Masovian Voivodeship have an area ranging from 5.00 ha to 9.99 ha;
- 4.1% of the number of farms in the Masovian Voivodeship have an area ranging from 10.00 ha to 14.99 ha;
- 3.2% of the number of farms in the Masovian Voivodeship have an area ranging from 15.00 ha to 49.99 ha;
- 0.3% of the number of farms in the Masovian Voivodeship have an area above 50 ha.

The following section presents research results regarding direct payments from the Grodzisk Mazowiecki commune located in the Grodzisk powiat in the Masovian Voivodeship. In the Grodzisk Mazowiecki commune in the Grodzisk powiat, 528 beneficiaries received direct payments in 2020. The total amount of payments was PLN 6,285,189, which means on average: PLN 11,904 per beneficiary. Table 5 presents the number of beneficiaries in individual payment ranges.

Table 5. Summary of the number of beneficiaries of direct payments in the payment ranges in the Grodzisk Mazowiecki commune, Grodzisk powiat, Masovian voivodeship

paymentrange [PLN]	to 1000	1001 – 5000	5001 – 10000	10001 – 15000	15000 – 50000	50000 – 100000	above 100000	Sum
Number of beneficiaries	16	285	111	32	54	18	12	528
[%]beneficiaries	3.0	54.0	21.0	6.1	10.2	3.4	2.3	100
total payments in range [PLN]	13811	706754	770103	381030	1329676	1262324	1821491	6285189
[%]payment-scope	0.2	11.2	12.2	6.0	21.2	20.1	29.1	100

Source: own study based on data: MRiRW, 2020

Table 5 shows that 2.3% of beneficiaries (12 beneficiaries) received a total of PLN 1 821 491 in 2020, which is 29.1% of the payment amount of the entire Grodzisk Mazowiecki commune, while 5.7% of beneficiaries (30 beneficiaries) received a total of PLN 3 083 815 in 2020, which is 49.2% of the payment amount of the entire Grodzisk Mazowiecki commune.

Table 6 shows the number of farms in 6 area ranges in the cadastral area of IzdebnoKościelne, in the Grodzisk Mazowiecki commune, in the Grodzisk powiat, based on data from the powiat summary report from 2021.

Table 6. Number of agricultural farms in area ranges in the cadastral area of IzdebnoKościelne, in the Grodzisk Mazowiecki commune, in the Grodzisk powiat, in the Masovian voivodeship

surface range [ha]	to 1	1.00 – 4.99	5.00 – 9.99	10.00 – 14.99	15.00 – 49.00	above 50	sum	surface [ha]
number of farms	31	101	31	13	2	0	178	704
[%] farms	17.4	56.8	17.4	7.3	1.1	0.0	100.0%	

Source: own study based on powiat summary reports: EGiB, 2021

Data on farms shown in the real estate cadastre (Table 6) do not correspond to the actual state of usage, which is confirmed by data on direct payments (Table 5) and the

results of interviews conducted with individual farmers. In the area of IzdebnoKościelne, despite the number of 178 farms shown in the table, in practice, including leases, only a few dozen farmers cultivate the land. Most of them on a small area – up to 10 ha, of which about half of the farm area is owned and half is leased.

In addition, several farmers have an area of approximately 50 ha, and the largest producers in terms of the size of farms are two farmers who, including leases, conduct plant production on an area of over 200 ha and over 300 ha, respectively. According to interviews conducted with these farmers, running agricultural activities in an area of less than 10 ha is not profitable. The profitability of plant production, taking into account the possibility of participating in Agency for Restructuring and Modernization of Agriculture programs and subsidies, is high only when the area exceeds 200 ha, which is not included in the cadastre records at all.

The cadastre records database lists two farmers with areas ranging from 15 to 49 ha - these are the two agricultural producers whose, in practice, areas of farm exceeds 200 ha. In each area group, farm owners had significantly higher areas of actually used farms. There is an answer to the question why the ownership structure does not constitute a barrier to the development of agriculture. This is because the actual state of usage does not coincide with the state shown in the real estate cadastre.

Conclusions

The size and structure of farms, the distance of land parcel from the habitat and the efficiency of the transport system have a huge impact on the amount of income obtained from agricultural production. On small farms, usage structure, spatial and ownership does not constitute a significant barrier to the development of the farm, because arable fields are often located close to the habitat. On the one hand, the larger the farm area, the greater the possibilities of obtaining funds for modernization, but on the other hand, the larger the farm, the greater the distance from the land parcel to the habitat and the greater the difficulties with access, which must be via public roads.

Important conclusions resulting from the conducted research concern discrepancies in the ownership and spatial structure that occur between the areas of agricultural farms, resulting from the ownership status, and the areas actually used, including leases. The discrepancies were identified based on surveys, interviews and data on direct payments. There was no spatial data for analysis containing information about agricultural producers in connection with land parcels that belong to farms in their actual state. Such data would enable field studies to be performed showing the actual pattern of land parcels and would allow for the calculation of land layouts resulting from the actual state of usage. This is a very important conclusion that should be taken into account in subsequent research related to the identification of barriers to the development of agriculture, as well as when planning consolidation works.

A solution that would allow for the registration of the actual location and area of farms used by farmers may be the expansion of the Agency for Restructuring and

Modernization of Agriculture (ARiMR) geoportal to implement the following functionalities in practice:

- access to spatial data registers kept and made available by the Agency for Restructuring and Modernization of Agriculture.

- viewing and downloading thematic layers of LPIS (Agricultural Parcel Identification System) and GSA (agricultural declarations from area applications).

Data from the LPIS public register include: geometry and identifiers of reference plots, maximum eligible area, boundaries of various types of land use, as well as areas and naturally valuable permanent grasslands. Thematic layers of the GSA contain information on crops (on agricultural plots), permanent grassland, as well as information on aggregated agricultural declarations.

The main functionality of the website should be the ability to share vector and area data contained in the agricultural plot identification system and in the integrated control system. The authors, despite the support of ARiMR employees, in practice failed to use the system to locate registration plots belonging to separate agricultural farms.

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