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New dataset on income support in Poland's rural areas

Abstract
In this article, we introduce a new dataset to complement the existing evidence on economic inequalities in Poland's rural areas. This important dataset uses annual information on the beneficiaries of income support, which is paid to farmers within the European Common Agricultural Policy and covers the period 2014–2021. The data can be used to analyse the changing distribution of this support at municipality level using conventional inequality measures. Since part of the support is granted per eligible hectare, our data can also serve as a good approximation of land use distribution, and thus allow researchers to scrutinise the changes in the distribution of an important component of the wealth of many people living in rural areas. The paper presents selected findings on the distribution of income support granted to land users in the studied period and suggests potential research areas, for which the presented dataset can provide useful insights.

Keywords
Economic inequalities • land distribution • Poland • CAP

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Introduction

Rising economic inequalities have attracted much attention in political circles. Indeed, tackling inequalities has been presented as a political imperative for the European Commission (EC 2015); as integral to achieving the Sustainable Development Goals by the United Nations (UN n.d.); and as an important basis for sustained long-run growth by the OECD (Cingano 2014). At the same time, as a much-debated book by Thomas Piketty (2014) clearly illustrates, the topic has sparked intense discussions among academics (see, for example, Acemoglu & Robinson 2015; CESifo 2015; Kopczuk 2015).

As a result of this increased interest, a lot of new research has focused on economic inequalities. While our knowledge about the distributional landscape has been constantly improving, our understanding of the determinants and consequences of the unequal distribution of economic resources is still limited. This is largely due to the lack of reliable data. In fact, inequalities have many aspects but some of them are poorly measured, if at all. Furthermore, the existing datasets (that use, for example, surveys or tax data), while being very useful, have various problems related to potential sampling bias or tax evasion (see, for example, Kopczuk & Zwick 2020).

Not surprisingly, therefore, researchers persist in their efforts to provide new ways, either direct or indirect, to improve our knowledge about economic inequality, its extent and trends, as well as its causes and potential consequences for the future. Interestingly, in terms of geographical distribution, these efforts have been highly uneven. Indeed, while for some countries we have a much more precise picture of the level of wealth/income concentration and how it evolved over time, for others, we have a much poorer understanding of what has happened and why. One country for which we still have a very incomplete insight into the issue of inequality is Poland (Obserwator Finansowy 2020). Thanks to some recent contributions to the literature (Brzeziński et al. 2020; Brzeziński & Sałach 2021; Bukowski & Novokmet 2021), this has been slowly changing. Nevertheless, for many distributional aspects, we still need to achieve a much better understanding.

One issue, on which we have only limited evidence, concerns the level of inequality in Poland's rural areas. While this could probably be explained in a variety of ways, two factors certainly appear to play a role. First, a predominant share of GDP in Poland, as elsewhere, is generated in urban centres (MRR 2010; OECD 2019). In consequence, if the aim is to capture the distribution of income, it may seem an obvious to focus on urban areas. Second, and relatedly, rural areas, especially those located further away from large metropolitan areas, continue to be dominated by agricultural activity, despite the ongoing process of deagrarianisation (Halamska & Stanny 2021). This is important in the context of investigating inequalities because farmers in Poland do not pay personal income tax.[1] As a result, any analysis based on tax data will likely omit this social group.

While such an omission might be justified in some cases, in general, directing our focus on the non-farming population has a number of important shortcomings. One obvious consequence is that we lose sight of a significant number of households. It is worth noting that this is not a marginal issue. Indeed, according to data from the agricultural census conducted in 2020, the number of farms has been estimated at approximately 1.3 million. In addition, there is a risk that the wealth/income of this group may be severely underestimated if calculated solely on the basis of (part-time) off-farm employment, assuming that the latter can be elicited from the tax data. A second consequence of omitting farmers is that an

[1]For more information, see: Informacja o podatkach (2018).

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

important factor that affects the level of wealth – namely land – is excluded from the analysis. Given the fact that agricultural land accounts for just under 50% of the country's area (Wilkin 2019), to not include it in the analysis can be seen as a significant drawback. Therefore, taking a more detailed look at farmers might be a way to draw wider implications for our understanding of economic inequalities in Poland and especially in rural areas.

In response to these concerns, we present a new dataset on the distribution of income support in rural Poland in this paper. This was constructed on the basis of records of all individuals who receive funding from the European Union's Common Agricultural Policy (CAP). The dataset covers the period 2014–2021 and, thus, it offers the possibility of documenting the changes in the distribution of total income support granted to land users over time. The dataset provides information aggregated at the municipality level (i.e. LAU level, according to Eurostat). Hence, it is suitable for all sorts of regional analyses.

Advantages of the new dataset

The new dataset offers several advantages. First, as already mentioned, it specifically concentrates on farmers – a group that often escapes the attention of researchers. As such, it allows users to either focus on the group itself or merge the data on farming population with other datasets (covering different sub-populations), thus making it possible to take a broader view on distributional issues.

Second, the presented dataset can be used to analyse both income and wealth distribution. Indeed, the most common way to look at CAP support is to treat it as a form of income support (EC n.d.). In effect, the presented dataset, especially combined with FADN data, which allows the share of total income support in farmers' incomes to be calculated, may be used to take a closer look at the distribution of the latter.[2] That said, and importantly, our dataset might also provide useful insights into wealth inequality, which has become a central concern in a large part of the literature (Piketty 2014). Capturing this information is possible because, for part of the support (often referred to as direct payments), the Single Area Payment Scheme (SAPS) is used in Poland. In SAPS, the support paid is based solely on the number of eligible hectares declared by farmers and the level of support is the same for all hectares in the country. In effect, the distribution of single area payments in Poland may serve as a good approximation of land use distribution[3] and, thus, given the fact that land could be seen as an important asset in many rural areas, be informative on wealth inequality. This feature of our data corresponds very well with the recent contributions to the literature claiming that a (large) part of wealth may arise precisely from land (Artola Blanco et al. 2021; Bonnet et al. 2021). In this context, it might be worth mentioning that from 2010 to 2020, which roughly corresponds to the period covered by our data, nominal agricultural land prices in Poland have almost tripled.[4] This, in turn, suggests that having access to land might have been an important factor behind wealth accumulation in Poland.

Third, the dataset provides information at municipality (gmina) level. This appears to be an important advantage over other datasets, which report various inequality measures at country level. Thanks to this, researchers can take a much more detailed view on the potential heterogeneity in the level of, and changes in, income/land inequalities. Obviously, if needed, our data can be used for analyses at more aggregated (county – powiat, subregion or voivodeship – województwo) levels. This presents a big difference between our dataset and FADN data. The latter, in principle, also includes information on farm payments at individual level. However, it is based on a surveyed sample and cannot be used at the municipality or county level (due to an insufficient number of observations).[5]

Fourth, the dataset allows various inequality measures to be examined and is not limited to the Gini index, which has often been used in other research focusing on land inequality (Deininger & Squire 1998). While being useful, the Gini index has its shortcomings (for example, the same Gini index may be observed for two regions even though their asset distribution is different). It is important, therefore, to complement this with other inequality measures. In particular, with our data, one can easily measure higher-order moments (e.g. skewness, kurtosis), analyse income support shares – namely the share of support granted to a given population group such as the top 1%; top 10% or bottom 10% (see, for example, Piketty 2014; Kopczuk & Zwick 2020 – for analyses of various types of income data; or Bauluz et al. 2020 – for the work on land distribution) or other commonly used measures, such as the Theil index, Atkinson index or the coefficient of variation (Davies et al. 2017).

Fifth, the dataset covers the whole population of farmers receiving income support, which is roughly 1.3 million records per year. Therefore, in contrast to many other datasets focusing on inequalities, our data is free of potential concerns related to relying only on one or another segment of the population of interest. Furthermore, and relatedly, the data includes farmers at both ends of the distribution: those who receive the least and those who receive the most. What follows is that the data should accurately capture the very bottom and the very top of the distribution (see, however, some caveats listed in the next section).

Sixth, the dataset does not rely on farmers' declarations but is based on official records documenting all payments that were made. Accordingly, we do not have to worry that some payments were not reported (misreported) or that the reports on payments for some categories of farmers (richest, poorest, with or without political connections, etc.) are biased (for example, rich people are often reluctant to reply to surveys measuring incomes/wealth). Thanks to this, typical concerns related to surveys measuring the level of economic inequalities do not apply.

Seventh, the fact that the municipality-level aggregates are based on individual data implies that we do not have to make

[2]According to the existing estimates, the share of EU subsidies in famers' incomes reached, on average, 50% in 2018 (eds Wilkin & Nurzyńska 2018). This, however, varies across farm types and/or farm size classes (for more details, see, for example, Pawłowska-Tyszko et al. 2022).

[3]In this context, it may be noted that our dataset complements the data from agricultural censuses very well. Two things are of particular importance. First, agricultural censuses are only carried out once every few years (for example, the last two agricultural censuses in Poland were conducted in 2010 and 2020). In contrast, our data is available annually and, therefore, if somebody is interested in changes in land distribution in any particular year, or over a relatively short time, our dataset might be useful. Second, land distribution data published on the basis of agricultural censuses provides researchers with information about the number of farmers in given farm size classes only (for example, we know how many farmers in a given municipality had farms larger than two but smaller than five hectares). Our inequality measures, in turn, are calculated based on the data at an individual level and, therefore, can be more precise.

[4]According to the data published by Statistics Poland (GUS), the average price of one hectare of agricultural land in Poland in the first quarter of 2010 was PLN 17,748, whereas in the fourth quarter of 2020, it was PLN 48,805 (ARiMR 2021a). It might be added that, according to FADN data, land accounts for the largest share (at around 60% on average) of farmers' fixed assets (Pawłowska-Tyszko et al. 2022).

[5]It should be also mentioned that FADN data focuses only on farms deemed to be commercial. Consequently, small, non-commercial farms are not included. Our dataset, however, includes all households that receive farm payments, regardless of whether their production is sold on the market, and no matter how much land they own or how much they produce. In addition, aggregated FADN data, which is publicly available, does not focus on inequality and does not include measures that would allow one to investigate the distribution of farm payments.

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

any imputations and the resulted measures are not estimates (which can vary in accuracy). Likewise, we do not have to make any a priori assumptions about the underlying population/asset ownership/income.

Eighth, the fact that some of the support is paid per hectare provides an opportunity to complement the picture that emerges from other datasets that measure land distribution – either by extending the period of analysis or by taking a closer look at differences/similarities in changes in land distribution depending on the data used. A natural point of reference here is the data collected during agricultural censuses in 1996, 2002, 2010 and 2020.

Ninth, in addition to information on individual farmers, our dataset also contains information on financial transfers to institutional beneficiaries[6] (legal persons, unincorporated entities, civil partnerships). This allows any changes in the importance of the latter in income support/land use distribution at the local level to be traced. That said, as mentioned in Section 2.1 below, this data should be treated with caution as it displays huge variability between years. The dataset is constructed in such a way that a particular type of beneficiary can be included or excluded, depending on the research interest.

Finally, although the dataset is most suitable for capturing inequalities in rural municipalities with a relatively large dependence on agriculture, it includes data for all beneficiaries, including those residing in urban or urban–rural municipalities. In consequence, the data might be useful not only for researchers with a primary focus on rural areas/agricultural economics but also for those interested in the processes of urban sprawl, rural–urban migrations or the role of agricultural holdings in determining the wealth of urban dwellers.

Data issues that should be kept in mind during the analysis

While the presented dataset has several advantages, it is not without its problems. The following data issues should certainly be taken into account while using the dataset. First, some municipalities have a fairly small number of income support beneficiaries. Indeed, in some cases this number is lower than 100. The researcher should, therefore, judge whether these municipalities should be included in their analysis. It is important to note that, for each municipality, the dataset provides the number of beneficiaries included in the inequality measures; researchers can therefore easily adopt any cut-off point according to their own needs.

Second, some municipalities are not included in the data. This is due to the fact that, in the original dataset, published by the Ministry of Agriculture and Rural Development, only information on the name of the municipality and the postal code was made available. In several cases, however, the names of rural and urban municipalities were the same, and the postal code information was not enough to distinguish one from the other. For a detailed description of this issue, see the discussion in the next section.

Third, while our data offers a good opportunity to analyse various issues related to land distribution, it is important to note that land, although being an important asset, may constitute just one element of the wealth of people living in rural areas. This needs to be taken into account if the dataset is to be used for analysing the distribution of wealth.

Fourth, and relatedly, it needs to be kept in mind that our dataset includes only land that is used by the people who receive direct payments. While it is reasonable to assume that all people who are eligible for these payments apply for them, according to the current regulations, the users of the smallest holdings – those below one hectare – cannot be paid.[7] In consequence, extremely small farms are not included in the dataset. In order to assess how important that omission is, the two following pieces of information might be helpful. On the one hand, according to the most recent Agricultural Census conducted in 2020, the total number of farmers in Poland is 1.3 million, and approximately 25,000 farmers have less than one hectare.[8] From this angle, therefore, our dataset includes approximately 98% of farmers. On the other hand, the total agricultural area in Poland is 14.9 million hectares (GUS 2022). According to the Agency for Restructuring and Modernisation of Agriculture – designated to perform the role of an accredited paying agency – the direct payments area amounts to approximately 14.3 million hectares (ARiMR 2021b). Taken from this view, our dataset accounts for 96% of the agricultural area in the country. Overall, then, our dataset appears to cover almost all agricultural land and almost all farmers in Poland.

Fifth, and still relatedly, our data captures land use distribution rather than land ownership distribution. From the distributional point of view, the latter might appear to be more important. That being said, our data can still be informative. To see this, one should refer to research conducted by the Institute of Agricultural and Food Economics (IERiGŻ 2018). According to the estimates presented there, in 2017, the share of farms using leased land (farmer-to-farmer rentals) was around 20%, and leased land (through private rentals) accounted for, on average, around 15% of the cultivated area. Apart from that, around one million hectares of public agricultural land was rented, which roughly accounts for an additional 7% of the cultivated area.[9] This clearly shows that tenancy, although being used, is much less prevalent than land ownership. That said, the incidence of tenancy is likely to vary across regions/municipalities. Hence, drawing conclusions about land ownership on the basis of our data may not be easy.

Sixth, and relatedly, as the largest landowners artificially transfer the land to family members, our data may underestimate the level of land use concentration. Put differently, while calculating inequality measures at municipality level, we treat every individual beneficiary equally. Consequently, we do not take into account the possibility that one person may also effectively operate land that is registered under different names (e.g. family members).

Seventh, when using our data to make comparisons between years, one should rely on relative measures rather than comparing changes in absolute values. This is because payment rates varied over time. In addition, the EU support for farms has evolved over the years. For example, new forms of support have been introduced and the amounts paid under the old measures have decreased.

Eighth, and relatedly, since 2016, Poland has applied the Small Farmers Scheme (SFS), granting a one-off payment to farmers whose income support payments do not exceed EUR 1,250.[10] This replaced all other forms of income support payment for this group. In consequence, for these farmers, we can no longer differentiate between single area payments and other payments. This makes it impossible to accurately

[6]We consider as 'institutional beneficiaries' all beneficiaries for whom there is no first name/surname information, and who are not registered in the Small Farmers Scheme (SFS).

[7]This condition, however, does not apply to animal farms, provided that the payments exceed EUR 200 (ARiMR 2023).

[8]This number, however, also includes animal farms that might still be eligible for the support (see footnote 7).

[9]For exact figures see Table 16 in IERiGŻ (2018, p.57). The information in the report also shows that nearly 58,000 farmers have concluded public rentals. These estimates are in line with those based on FADN data. According to the latter, the share of leased agricultural land was on average about 30% of the total area (Pawłowska-Tyszko et al. 2022).

[10]More on this scheme can be found in EC (2018).

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

determine the acreage cultivated by farm households in this group. Nevertheless, we believe that our data can also serve as a good approximation for land use for these farmers. This is because the data suggests that, among farmers who joined the SFS, the one-off payment (paid from 2016 onwards) seems to largely correspond to the single area payment that they received in 2014 and 2015. We base this belief on the following observation. Among farmers who joined SFS, the share of the one-off payment in total support oscillated between 75–85% between 2016 and 2021. This is very close to the 81–82% share that the single area payments accounted for in total subsidies for this group of farmers in 2014 and 2015.[11] In consequence, it does not appear that we are making a big mistake in assuming that SFS payments represent the equivalent of single area payments.

Ninth, data on institutional beneficiaries shows a suspiciously high degree of variability between years. This relates to the number of such beneficiaries, the amounts they received, and the share in total payments. For example, we observe a huge decrease in the latter between 2016 and 2017, despite the fact that the data suggests an increase in the number of institutional beneficiaries in this period. The year 2019 also seems to stand out in this respect (see Tables A1 and A2 in the online Appendix).[12] Overall, this problem appears to be more acute in cases of data on total payments than on single area payments. That said, when using this data, regardless of the type of payments, one needs to be cautious.

With these advantages and shortcomings in mind, we now present detailed information on how the dataset was constructed.

Description of the dataset

The dataset, available at https://beneficjenciwpr.wne.uw.edu.pl, contains annual data on income support for farmers at the municipality level for the period 2014–2021. The source data was scraped from a website operated by the Polish Ministry of Agriculture and Rural Development (https://beneficjenciwpr.minrol.gov.pl/). The website presents information on all beneficiaries of the European Union's Common Agricultural Policy in Poland.[13] Our focus is on the distribution of two types of payments. On the one hand, we are interested in the distribution of single area payments – referred to as measure I.2 in the description of the support schemes set out in Annex I to Regulation (EC) 73/2009 of the Council.[14] As argued earlier, this can be informative with regard to the distribution of land use, as the payment for eligible agricultural land is based on a flat rate (the same rate is applied countrywide). On the other hand, we focus on the distribution of total payments – the sum of all payments listed in the above-mentioned Annex – received by CAP beneficiaries. While single area payments are the most important form of subsidising farmers in Poland, CAP payments include other support measures. A look at total payments, therefore, allows for a broader picture; if the analysis is not limited to land use distribution, this might be more useful.

We collected the data and filtered it in the source website by name of municipality; when needed, we used additional filtering based on the payment amount.[15] In this way, we calculated a total number of 10,989,718 beneficiaries for the 2014–2021 period, including both individuals and institutions. We removed 41 observations that had missing postal codes, missing names and missing data on received payments (11 in 2015; 6 in 2016; 24 in 2018). Another 28,229 beneficiaries received zero payments (27,379 in 2016; 20 in 2017; 830 in 2018) and were also removed from the source data. Given the fact that some beneficiaries received only very small amounts, we decided to apply an additional filter when calculating inequality measures by excluding observations whose total payments were less than PLN 750 (~ EUR 190). The reason we adopted this threshold was that lower payments were extremely rare (irrespective of the year in question). This can be clearly seen in Figure A1, presented in the online Appendix. This filter resulted in excluding 22,328 beneficiaries from the calculations (from 1,511 in 2015 to 4,266 in 2017). In the end, we considered 10,939,120 beneficiaries – approximately 1.3–1.4 million for each year.

The vast majority of these beneficiaries are individual farmers, with institutional beneficiaries accounting for 0.7–1.2% of these. However, the share of the latter in the amounts of direct payments received is much higher. On average, this was 17.4% – the figure decreased from 24–25% at the beginning of the period to 12–13% in recent years.

As mentioned above, since 2016, the Ministry of Agriculture and Rural Development has applied the small farmers scheme (SFS), granting a one-off payment to farmers whose income support payments do not exceed EUR 1,250.[16] At the beginning of the period, this type of beneficiary accounted for approximately 54% of individual farms receiving the payments. Over time, however, this share has decreased and, in 2021, it amounted to 42%. The exact number of observations assigned to each category of beneficiaries is presented in Table A1 in the online Appendix.

The total value of all payments received by beneficiaries in the analysed period amounted to PLN 183 bln, ranging from 19 to 27 bln in particular years. At least half of these payments (49–64%, depending on a year) were single area payments, amounting to PLN 98 bln in total – a range of 12–13 bln every year. The average total payment received by small farms participating in the SFS amounted to approximately PLN 3,000 each year (with a median of about PLN 2,400). The respective amount for the remaining individual farmers (not participating in the SFS) was, on average, about PLN 22–27,000 (with a median of PLN 12–13,500). A huge majority of this type of beneficiary (92–98%) received single area payments, which accounted for 52–67% of their total payments on average. The average payment for institutional beneficiaries, in turn, exceeded PLN 300,000[17] and only 40–63% of them received single area payments. In most years, the average single area payment for this type of beneficiary accounted for 40–45% of the average total payment. Table A2 in the online Appendix

[11]The names of recipients of SFS payments are not published (the name is replaced by a unique number). In consequence, these beneficiaries cannot be directly identified in the 2014 and 2015 data. We can, however, calculate the share of single area payments in total subsidies for all farmers who appear in the database in the 2014 and 2015 data but no longer appear in the 2016–2021 data. While some farmers in this group are those who exited farming after 2015, it seems plausible to assume that the vast majority of these will be farmers who joined the SFS.

[12]As suggested by one of the Reviewers, this could be driven, at least partly, by the fact that, in some years, institutional beneficiaries might have received a larger share of their subsidies in the form of advanced payments. Unfortunately, we were not able to verify this due to the lack of data on advanced payments broken down by type of beneficiary.

[13]The information on the website is only displayed for the last two years. Therefore, our dataset had to be collected continuously for several years.

[14]The respective description can be found in MRiRW (2018).

[15]On the website, a list of beneficiaries can be viewed (with a limit of, at most, 1,500 observations), selected according to defined criteria (financial year, beneficiary first name, beneficiary surname, name of municipality and, possibly, additional payment filters such as the range of total payments) and then downloaded in the form of a csv file.

[16]In Annex I to Regulation (EU) No 1307/2013 of the European Parliament and of the Council, these payments are referred to as measure II.9. For these farmers, detailed personal information (first name, surname, etc.) is not disclosed in the source data. Instead, identities are coded using unique identifiers.

[17]The data for 2017 suggests an average of half that amount. For that year, we observed a relatively large number of institutional beneficiaries that did not receive single area payments but obtained relatively small payments in other categories. As mentioned earlier, however, this is likely to be driven by data issues and, therefore, this data should be treated with caution.

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

presents the relevant statistics for different types of beneficiaries, focusing on those residing in rural municipalities and receiving at least PLN 750.

One issue that had to be resolved when compiling the dataset was that, in Poland, 470 municipalities do not have a unique name. Consequently, individual beneficiaries could not always be unambiguously assigned to a given administrative unit. In the vast majority of cases, a municipality was repeated twice (428 municipalities, 214 names), eleven municipality names were repeated three times (Czarna, Baranów, Bolesławiec, Brodnica, Brzeziny, Kolno, Lipno, Oleśnica, Poświętne, Sławno, Świdnica) and two four times (Dobra, including Dobra (Szczecińska) and Osiek). Among the municipalities with non-unique names, 156 pairs consisted of an urban municipality and the surrounding rural municipality of the same name (see Table A3 in the online Appendix for the list of these pairs of municipalities). Whenever it was possible, beneficiaries were assigned to the appropriate municipality on the basis of the postal code provided in the source data.[18] However, in some cases (when the two municipalities had the same postal code or when the postal code information in the source data was missing), this was not possible. In these cases, we considered the pair of urban and surrounding rural municipalities of the same name together (i.e. as one territorial unit). For the sake of data consistency, this solution was used for all such pairs of municipalities, even if they had different postal codes assigned to them. In the online application, where the dataset is available, these municipalities are assigned the type 'urban and rural merged' and can be easily filtered out from the analysis if needed.

Finally, it should be noted that there are several municipalities for which there is not even a single beneficiary. These are Jastarnia (TERYT code 2211023) in 2014, Słupia Konecka (TERYT code 2605062) in 2014 and 2017, Józefów (TERYT codes 0602073 and 14170011) – both in 2017, Dobra (Szczecińska) (TERYT code 3211012) in 2017, 2019, 2020 and 2021 and Stargard (TERYT codes 3214011 and 3214102) in 2016–2019. This is probably due to minor changes in the names of these municipalities. Until the end of 2015, the Stargard municipality was called Stargard Szczeciński. The Słupia Konecka municipality was called Słupia until 1999, and then until the end of 2017, the name was Słupia (Konecka). Usually, the source website of the Ministry uses the exact name of the municipality but in the case of Dobra (Szczecińska), for example, it shows beneficiaries from this municipality only among beneficiaries from the other three municipalities bearing the name Dobra. In the analysed period, the name of the Nowiny rural municipality (TERYT code 2604172) also changed – until the end of 2020, it was called Sitkówka-Nowiny. For these municipalities, it was impossible to assign individual beneficiaries and, therefore, these are missing from our dataset.

It is important to note that we have used the names, types, and boundaries of municipalities as of 01/01/2022. While the boundaries of municipalities generally did not change in the analysed period, small adjustments take place every year. In addition, a few municipalities changed type when their capitals obtained municipal rights. Moreover, in 2015, one municipality was created and, in both 2015 and 2019, one municipality was abolished. Regarding these issues, the reader is advised to consult the detailed reports prepared by Statistics Poland, which document changes to the TERYT system over the years.[19]

Based on the above-mentioned procedure, the individual data on CAP payments were aggregated to four territorial levels – municipalities (LAU 2), powiats (LAU 1), subregions (NUTS 3) and voivodeships (NUTS 2). This reflects the three-tier administrative division of Poland (consisting of municipalities, powiats and voivodeships) and one non-administrative category of subregions, which is part of the NUTS classification in Poland. Three types of municipalities (based solely on the administrative criteria) are distinguished: urban, urban–rural and rural. The former refers to municipalities whose boundaries coincide with the boundaries of the city or town. Urban–rural municipalities include both the city or town within its administrative boundaries and areas outside these boundaries. Finally, rural municipalities do not have a city or town within their area.[20]

The dataset has the following variables. TERYT provides a unique identifier for each administrative unit, whereas Year refers to a particular year to which the data refers. Variable names with the suffix '_obsz' refer to statistics calculated based on area payments only. Those without the suffix, in turn, use total payments for calculations. The dataset provides all variables calculated using data for individual beneficiaries only (without institutional beneficiaries=1) or using data for all beneficiaries (institutional and individual; without institutional beneficiaries=0). n reports the number of beneficiaries and count_inst represents the number of institutional beneficiaries. Share_inst reports on the share of payments accounted for institutional beneficiaries, whereas sum_inst stands for the total sum of payments going to institutional beneficiaries. For each municipality, the dataset includes minimum, maximum, mean, median and total sum of payments.[21] In addition, standard deviation, skewness and kurtosis are reported. Among inequality measures, we include various quantile ratios, Theil index, Gini index, Atkinson index, coefficient of variation, standard deviation of logarithms and aggregate relative deprivation. For each municipality, we also report the share of the top/bottom groups in payments. The dataset includes the share of the top/bottom centile, 5th centile, decile and quartile.

Basic descriptive statistics on the distribution of farmer subsidies in Poland in 2014– 2021 are presented in Table A4 in the online Appendix. On the one hand, they provide some insight into the level and changes in payment inequality. On the other hand, they give an idea of what type of information can be extracted from our dataset. Several things seem worth noting. First, our data suggests that, over time, the distribution of farm payments has become more unequal and this conclusion does not seem to depend on the measure examined. Indeed, almost all measures in 2021 are higher than those observed for 2014 (with the exception of the share of payments going to the top 1% of beneficiaries). Moreover, for all of them, the average for the 2018–2021 period is higher than the average for 2014–2017. Second, while the inequality seems to have increased over time, the levels observed for the beginning of the period were already quite high (e.g. Gini coefficient was 0.61). Third, it appears that the increase in inequality was, to a considerable extent, driven

[18]Polish postal codes are written in five-digit form: the first digit defines the postal district, including one or two voivodeships; the second digit represents a code zone – a part of a district that is a defined area located along communication lines, or a voivodeship city; and the third digit roughly relates to the county (powiat). In the postal codes given in the beneficiaries' data, there were many where it was easy to identify and correct the errors, such as switching the first two digits or one of them written incorrectly. Therefore, the assignment of beneficiaries to the correct municipality was not a problem in the case of the location of municipalities with the same name in different voivodeships or at least counties because, in those cases, the postal codes differ from each other in a way that allows easy separation of beneficiaries from different areas.

[19]The reports are available here: https://bdl.stat.gov.pl/bdl/metadane/teryt/zmiany (last access: 1 March 2024). Changes in the TERYT system can be also tracked using the tool developed by the Instytut Badań Strukturalnych, which can be found here: https://ibs.org.pl/resources/przejsciowka-dla-gmin-i-powiatow-kody- teryt-1999-2024/ (last access 1 March 2024).

[20]More information on this issue can be found here: https://stat.gov.pl/en/regional-statistics/classification-of- territorial-units/administrative-division-of-poland/types-of-gminas-and-urban-and-rural-areas/ (last access: 1 March 2024).

[21]The dataset also includes mean and skewness calculated for trimmed data. Depending on the option, we exclude 1%, 5% or 10% of the data (symmetrically from the top and the bottom). This should allow the potential impact of outliers to be better understood.

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

by the growing difference between those who received the highest payments and the rest. In fact, the ratio between q50 and q10 increased a little (by 5%) between 2014 and 2016 but remained fairly stable afterwards. In turn, the ratio between q90 and q50 increased over the whole period and the value for 2021 was one and a half times higher than that observed for 2014. Consequently, while, at the beginning of the period under study, the household at the 90th percentile of the distribution received four and a half times more payments than the household at median subsidy, by the end of the period, the former received seven times more than the latter.

These country-level statistics obviously mask important heterogeneity at regional level. This is illustrated in Table A5 in the online Appendix, in which we present the data for voivodeships (NUTS 2 level according to Eurostat classification). Our focus is on the Gini index, as it is the most commonly used in papers interested in land inequality.

As reported, while the general upward trend can be observed for most of the regions, the index varies from 0.47 to 0.72 in 2014 and from 0.56 and 0.72 in 2021. This obviously calls for a better understanding of the factors behind this variation. As these statistics show, the concentration of farm payments is highest in the western part of Poland (that is in the Dolnośląskie, Lubuskie, Zachodniopomorskie regions), largely reflecting developments after the Second World War (redrawn borders, huge migrations and the establishment of State Agricultural Farms as part of the forced collectivisation imposed by the communist dictatorship). That said, while historical factors can definitely be used to explain the differences between regions in levels of payment concentration, they seem to be less convincing in explaining different patterns of how the distribution of farm payments evolved more recently. What could also be noted is that the level of concentration of subsidies in the two regions with a highly fragmented farm-size structure (that is in Małopolskie and Podkarpackie regions) is by no means the lowest – at least when looking at this issue using the Gini coefficient.

A huge variation in the levels of, and changes in, the concentration of subsidies can also be seen very clearly when looking at the data for municipalities. Within the same region, we have administrative units in which we observe huge increases in the Gini coefficient but also units in which it decreased considerably over time. This is illustrated in the data presented in Table A6 in the online Appendix, where we report the municipalities with the highest increase/decrease in the Gini index between 2014 and 2021. This variation in the data is definitely something that should be better explored. We hope that our dataset can prove helpful for researchers interested in investigating this. Below we highlight potential research areas that can be analysed using our dataset. Obviously, the presented list is not exhaustive.

Potential research areas

We hope that, after merging our data with other existing datasets, researchers will find the new information useful for improving our understanding of the following aspects. First, the dataset allows for better contributions to the general debate about inequalities in Poland and provides new insights into whether the level of economic inequalities in Poland is likely to be higher than typically assumed and documented by the existing datasets (see Brzeziński et al. 2020; Bukowski & Novokmet 2021).

Another research area that could be exploited using our data is various regional analyses. Indeed, the fact that the data can be aggregated at different administrative units provides a rare opportunity to explore potential regional heterogeneities in the levels and changes in economic inequalities, as well as factors that contribute to bridging or increasing disparities between regions.

Third, our dataset can be used to examine whether economic inequalities (or their changes over time) should be considered as relevant independent variables for explaining various economic or political phenomena. One potential option is to investigate the importance of economic inequalities in entrepreneurship. Another is to examine the role of economic inequalities in shaping support for redistributive policies.

Fourth, and relatedly, the dataset allows for a detail exploration of the importance of political rents (agricultural subsidies in this case) in the functioning of the local economy (e.g. its structure) and the local political scene. Concerning the latter, exploring the relationship between the distribution of farmer subsidies and the level of electoral support for one political party or another seems a natural research avenue. Looking at how (un)equal farm payment distribution affects the local budget (both revenue and expenditure) is another interesting research area. Given that our data can be used to approximate land use distribution, it could also be useful for those interested in the question of whether land distribution affects the pattern of rural–urban migrations.

While these are potential research lines that could be pursued using the new dataset, we hope that it can also be used in other ways.

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Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

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Appendix

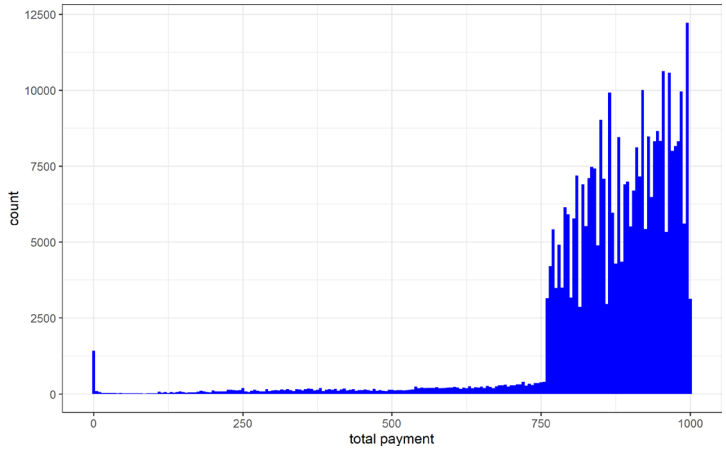

Figure A1. Histogram of total payments below PLN 1,000 for the period 2014–2021

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

Table A1. Number of beneficiaries of CAP payments by year and type (for total payments of not less than PLN 750)

Year	Individual farmers	Small farmers	Institutional farmers	All beneficiaries	% Institutional	% Institutional in the value of total payments
2014	1,411,568	–	15,223	1,426,791	1.1%	23.8%
2015	1,416,227	–	17,863	1,434,090	1.2%	25.3%
2016	642,091	745,924	10,039	1,398,054	0.7%	20.5%
2017	678,342	698,073	12,082	1,388,497	0.9%	10.6%
2018	679,864	655,660	8,887	1,344,411	0.7%	13.9%
2019	705,701	619,315	10,150	1,335,166	0.8%	17.2%
2020	727,453	573,771	9,324	1,310,548	0.7%	13.4%
2021	750,524	541,825	9,214	1,301,563	0.7%	11.7%

Source: Own elaboration based on data published by the Ministry of Agriculture and Rural Development on https://beneficjenciwpr.minrol.gov.pl/ Note: Beneficiaries who had total payments below PLN 750 or for whom postal code information was missing are not included here. 'Individual farmers' are those farmers who were listed by name in the database. 'Small farmers' denotes farmers who joined the Small Farmers Scheme (in place since 2016). 'Institutional farmers' denotes all beneficiaries for whom the database does not report first name and surname and who are not listed as beneficiaries of SFS payments. The last column presents the percentage of payments that go to institutional beneficiaries. The share is calculated in total payments – namely all types of payments that are reported by the Ministry of Agriculture and Rural Development.

Table A2. Average and median total payments and single area payments by year and type of beneficiary (for total payments of not less than PLN 750; rural municipalities only)

Type	Year	Average total payment (PLN)	Median total payment (PLN)	% Receiving single area payments	Average single area payment (PLN)	Median single area payment (PLN)
Individual farmers	2014	12,564.37	5,876.29	94%	8,068.39	4,408.89
	2015	14,438.64	6,275.89	94%	8,924.12	4,800.28
	2016	23,111.17	13,703.34	92%	14,307.21	9,582.33
	2017	20,953.64	12,881.24	94%	13,895.78	9,275.02
	2018	22,772.81	12,876.52	97%	13,579.06	8,951.87
	2019	22,434.67	12,292.40	98%	13,365.31	8,705.32
	2020	24,521.88	12,524.77	98%	13,526.19	8,680.80
	2021	26,834.20	13,106.54	97%	13,420.43	8,574.87
Small farmers	2016	3,176.42	2,576.78	100%	2,495.97	2,206.84
	2017	3,000.12	2,599.94	100%	2,528.20	2,231.51
	2018	3,156.97	2,558.08	100%	2,491.52	2,190.55
	2019	3,073.93	2,510.09	100%	2,451.04	2,148.63
	2020	3,336.57	2,601.71	100%	2,493.17	2,183.26
	2021	3,503.80	2,610.95	100%	2,505.27	2,192.02
Institutional farmers	2014	358,385.50	50,661.73	45%	156,280.51	13,279.74
	2015	376,394.86	71,793.19	42%	156,111.07	12,614.01
	2016	419,455.13	148,748.05	53%	176,139.70	56,568.09
	2017	144,829.82	18,519.16	40%	171,014.03	51,770.90
	2018	333,602.93	108,638.00	63%	164,682.63	44,243.18
	2019	381,143.53	124,063.96	54%	161,612.76	41,823.51
	2020	349,188.61	116,636.81	60%	160,903.89	39,930.64
	2021	297,782.05	100,000.00	63%	156,739.69	37,465.25

Note: In 2014 and 2015, 'individual farmers' include 'small farmers', who have been a separate category since 2016. For 'small farmers', the one-off payment was assumed to correspond to the single area payment. Beneficiaries who had total payments below PLN 750, or for whom postal code information was missing, are not included here. For 'institutional beneficiaries', the data for 2016/2017 should be treated with caution as it clearly departs from the rest with no obvious reason as to the case

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

Table A3. TERYT codes of pairs of neighbouring urban/rural municipalities with the same name

Municipality	Urban	Rural
Aleksandrów Kujawski	0401011	0401042
Augustów	2001011	2001022
Bartoszyce	2801011	2801032
Bełchatów	1001011	1001022
Biała Podlaska	0661011	0601032
Białogard	3201011	3201022
Bielsk Podlaski	2003011	2003032
Biłgoraj	0602011	0602032
Bochnia	1201011	1201022
Bolesławiec	0201011	0201022
Braniewo	2802011	2802022
Brańsk	2003021	2003052
Brodnica	0402011	0402032
Brzeziny	1021011	1021022
Chełm	0662011	0603032
Chełmno	0404011	0404022
Chełmża	0415011	0415022
Chodzież	3001011	3001032
Chojnice	2202011	2202032
Chojnów	0209011	0209022
Ciechanów	1402011	1402022
Czarnków	3002011	3002022
Człuchów	2203011	2203032
Darłowo	3213011	3213032
Dębica	1803011	1803042
Dynów	1816011	1816052
Działdowo	2803011	2803022
Dzierżoniów	0202021	0202052
Elbląg	2861011	2804012
Ełk	2805011	2805022
Garwolin	1403011	1403042
Giżycko	2806011	2806042
Głogów	0203011	0203022
Głowno	1020011	1020052
Gniezno	3003011	3003032
Golub-Dobrzyń	0405011	0405032
Gorlice	1205011	1205042
Gostynin	1404011	1404022
Górowo Iławeckie	2801021	2801052
Grajewo	2004011	2004022
Grudziądz	0462011	0406012

Municipality	Urban	R
Grybów	1210011	1210042
Gubin	0802011	802052
Hajnówka	2005011	2005062
Hrubieszów	0604011	0604042
Iława	2807011	2807032
Inowrocław	0407011	0407042
Jarosław	1804011	1804042
Jasło	1805011	1805042
Jordanów	1215011	1215052
Kamienna Góra	0207011	0207022
Kętrzyn	2808011	2808032
Kłodzko	0208021	0208072
Kolno	2006011	2006032
Koło	3009011	3009072
Kołobrzeg	3208011	3208042
Kościan	3011011	3011032
Kościerzyna	2206011	2206042
Kowal	0418011	0418092
Krasnystaw	0606011	0606052
Kraśnik	0607011	0607052
Kutno	1002011	1002062
Kwidzyn	2207011	2207032
Leżajsk	1808011	1808042
Lidzbark Warmiński	2809011	2809032
Limanowa	1207011	1207072
Lipno	0408011	0408062
Lubaczów	1809011	1809042
Lubań	0210011	0210042
Lubartów	0608011	0608072
Lubawa	2807021	2807052
Lubin	0211011	0211022
Łańcut	1810011	1810042
Łaskarzew	1403021	1403062
Łęczyca	1004011	1004052
Łomża	2062011	2007022
Łowicz	1005011	1005072
Łuków	0611011	0611052
Malbork	2209011	2209042
Mielec	1811011	1811052
Międzyrzec Podlaski	0601011	0601102
Mińsk Mazowiecki	1412011	1412112

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

Table A3. TERYT codes of pairs of neighbouring urban/rural municipalities with the same name (continued)

Municipality	Urban	Rural
Mrągowo	2810011	2810032
Mszana Dolna	1207021	1207092
Nowa Ruda	0208041	0208112
Nowa Sól	0804011	0804052
Nowe Miasto Lubawskie	2812011	2812052
Nowy Targ	1211011	1211092
Obrzycko	3024011	3024042
Oleśnica	0214011	0214062
Oława	0215011	0215042
Ostróda	2815011	2815092
Ostrów Mazowiecka	1416011	1416072
Ostrów Wielkopolski	3017011	3017042
Ozorków	1020021	1020062
Pabianice	1008021	1008072
Pionki	1425011	1425082
Płońsk	1420011	1420092
Pruszcz Gdański	2204011	2204042
Przasnysz	1422011	1422072
Przemyśl	1862011	1813082
Przeworsk	1814011	1814062
Puck	2211031	2211072
Puławy	0614011	0614092
Raciąż	1420021	1420102
Radomsko	1012011	1012122
Radymno	1804021	1804082
Radziejów	0411011	0411062
Radzyń Podlaski	0615011	0615062
Rawa Mazowiecka	1013011	1013042
Słupsk/Redzikowo	2263011	2212082
Rejowiec Fabryczny	0603011	0603082
Rypin	0412011	0412042
Sanok	1817011	1817052
Sejny	2009011	2009052
Siedlce	1464011	1426082
Siemiatycze	2010011	2010092
Sieradz	1014011	1014082
Sierpc	1427011	1427052

Municipality	Urban	Rural
Skierniewice	1063011	1015082
Skórcz	2213021	2213102
Sławno	3213021	1007072
Słupca	3023011	3023062
Sochaczew	1428011	1428072
Sokołów Podlaski	1429011	1429082
Stargard	3214011	3214102
Starogard Gdański	2213031	2213122
Stoczek Łukowski	0611021	0611082
Suwałki	2063011	2012072
Szczecinek	3215011	3215062
Szczytno	2817011	2817062
Świdnica	219011	219072
Świdwin	3216011	3216062
Tarnów	1263011	1216092
Tczew	2214011	2214062
Terespol	0601021	0601162
Tomaszów Lubelski	0618011	0618112
Tomaszów Mazowiecki	1016011	1016092
Turek	3027011	3027082
Ustka	2212011	2212102
Wałcz	3217011	3217052
Wąbrzeźno/Ryńsk	0417011	0417052
Wągrowiec	3028011	3028072
Wejherowo	2215031	2215102
Włocławek	0464011	0418132
Włodawa	0619011	0619062
Wysokie Mazowieckie	2013011	2013102
Zambrów	2014011	2014052
Zamość	0664011	0620142
Zduńska Wola	1019011	1019042
Zgierz	1020031	1020092
Zgorzelec	0225021	0225072
Złotoryja	0226021	0226062
Złotów	3031011	3031082
Żagań	0810021	0810092
Żary	0811021	0811102

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

Table 4. Summary statistics of total payments (based on rural municipalities and individual beneficiaries with total payments of at least PLN 750) – country level

Statistic	2014	2015	2016	2017	2018	2019	2020	2021
no. of obs.	729,536	730,897	713,962	708,029	687,517	678,698	673,242	669,220
min (PLN)	750	750	750	750	750	751	750	751
max (PLN)	13.76 mln	7.08 mln	17.75 mln	2.75 mln	5.02 mln	3.29 mln	5.04 mln	5.00 mln
mean (PLN)	12,564	14,439	12,956	12,324	13,624	13,842	15,585	17,472
median (PLN)	5,876	6,276	5,663	5,605	5,613	5,583	5,900	6,117
Theil	0.828	0.912	0.830	0.756	0.855	0.883	0.912	0.932
Gini	0.612	0.637	0.627	0.612	0.639	0.645	0.660	0.671
Atkinson	0.502	0.532	0.527	0.507	0.543	0.551	0.572	0.592
sd of log	1.083	1.104	1.147	1.131	1.173	1.180	1.213	1.260
q90/10	16.857	16.072	20.109	19.849	22.148	22.538	24.767	28.670
q95/05	29.683	34.407	39.613	38.109	42.918	43.689	47.812	52.668
q75/25	4.784	4.628	5.444	5.401	5.635	5.710	5.918	6.556
q99/01	135.849	152.757	128.961	111.724	135.814	141.373	172.507	190.820
q90/50	4.454	4.303	5.035	5.059	5.600	5.693	6.183	7.032
q50/10	3.785	3.736	3.994	3.924	3.955	3.959	4.005	4.077
share top 1%	17.8%	18.5%	15.8%	14.0%	16.5%	17.2%	16.6%	16.1%
share top 10%	49.6%	53.3%	49.8%	47.7%	50.7%	51.4%	53.2%	53.5%
share bottom 1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
share bottom 10%	1.0%	0.9%	0.9%	0.9%	0.8%	0.8%	0.7%	0.7%

Note: Own elaboration. All the measures were calculated at country level – that is, for all beneficiaries taken together. Only rural municipalities and individual farmers with total payments of not less than PLN 750 are included. Variables denoted as 'qX/Y' refer to different percentile ratios as indicated by X and Y

Table A5. Gini of total payments by year and voivodeship (based on rural municipalities and individual beneficiaries with total payments of at least PLN 750)

Voivodeship	Year							
	2014	2015	2016	2017	2018	2019	2020	2021
Poland	0.612	0.637	0.627	0.612	0.639	0.645	0.660	0.671
Dolnośląskie	0.681	0.684	0.678	0.686	0.706	0.709	0.713	0.719
Kujawsko-pomorskie	0.583	0.611	0.586	0.580	0.605	0.610	0.617	0.628
Lubelskie	0.577	0.611	0.583	0.575	0.616	0.620	0.648	0.652
Lubuskie	0.724	0.743	0.721	0.714	0.722	0.726	0.722	0.723
Łódzkie	0.535	0.584	0.545	0.539	0.583	0.581	0.604	0.615
Małopolskie	0.565	0.608	0.568	0.544	0.606	0.602	0.633	0.658
Mazowieckie	0.565	0.581	0.570	0.536	0.559	0.582	0.595	0.618
Opolskie	0.663	0.693	0.672	0.660	0.684	0.682	0.687	0.705
Podkarpackie	0.625	0.609	0.596	0.595	0.630	0.624	0.652	0.669
Podlaskie	0.477	0.513	0.492	0.514	0.534	0.529	0.554	0.566
Pomorskie	0.618	0.662	0.630	0.611	0.629	0.640	0.644	0.648
Śląskie	0.661	0.682	0.651	0.645	0.684	0.670	0.694	0.695
Świętokrzyskie	0.577	0.598	0.628	0.536	0.605	0.589	0.633	0.637
Warmińsko-mazurskie	0.595	0.601	0.588	0.598	0.606	0.609	0.621	0.619
Wielkopolskie	0.594	0.638	0.634	0.589	0.604	0.626	0.641	0.653
Zachodniopomorskie	0.682	0.710	0.684	0.672	0.684	0.686	0.701	0.705

Note: Own elaboration. Gini coefficients were calculated at voivodeship level for all beneficiaries taken together. Only rural municipalities and individual farmers with total payments of not less than PLN 750 are included.

Vol. 28 • No. 2 • 2024 • ISSN: 2084-6118 • 54-65 • DOI: 10.2478/mgrsd-2023-0031

Table A6. The biggest changes in the Gini coefficient between 2014 and 2021 in rural municipalities, based on direct payments to non-institutional beneficiaries (total payments > PLN 750, municipalities with > 100 beneficiaries)

	TERYT	Name of municipality	Gini 2014	Gini 2021	Change
10 largest decreases	3020052	Gołuchów	0.813	0.652	-0.161
	2417062	Lipowa	0.601	0.475	-0.126
	1406032	Chynów	0.753	0.630	-0.123
	1417072	Sobienie-Jeziory	0.759	0.640	-0.119
	1215082	Zawoja	0.583	0.468	-0.116
	1403132	Wilga	0.750	0.661	-0.089
	1418052	Prażmów	0.719	0.631	-0.088
	3026012	Brodnica	0.658	0.571	-0.087
	2404072	Konopiska	0.782	0.695	-0.087
	2604172	Sitkówka-Nowiny	0.608	0.522	-0.087
10 largest increases	1425072	Kowala	0.549	0.832	0.283
	1207062	Laskowa	0.388	0.636	0.248
	1201042	Lipnica Murowana	0.486	0.726	0.240
	1005032	Chąśno	0.411	0.643	0.232
	2611022	Brody	0.452	0.681	0.230
	1209052	Raciechowice	0.451	0.662	0.211
	2417132	Świnna	0.467	0.676	0.209
	1206042	Jerzmanowice-Przeginia	0.449	0.657	0.208
	2601052	Solec-Zdrój	0.514	0.715	0.202
	1816072	Hyżne	0.447	0.641	0.194

Note: Own elaboration. Gini coefficients were calculated at municipality level. Only rural municipalities with at least 100 beneficiaries are included. In addition, only individual farmers with total payments no less than PLN 750 are considered. TERYT is a unique identifier of units of territorial division in Poland