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REGIONAL DIFFERENCES IN THE PRO-ECOLOGICAL MEASURES OF THE 2007-2013 RDP IN POLAND

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ABSTRACT: The article deals with regional differences in the use of the EU funds allocated to pro-ecological measures in Poland. The research covers support for land management in mountain areas and other less-favoured areas (LFAs), agri-environmental programme, afforestation of agricultural and non-agricultural land implemented under the 2007-2013 Rural Development Programme. The analysis was made by voivodeships on the basis of data from the Agency for the Restructuring and Modernisation of Agriculture and Statistics Poland. Ward's method was used for the division of voivodeships into groups with similar intensity of absorption of funds from pro-ecological measures. Three groups of voivodeships, most similar internally and with the largest differences between them were selected. It has been stated that the highest level of use of RDP funds concerned the voivodeships of northern and western Poland, while their lowest use was in the voivodeships of the south-eastern part of the country and in Łódź.

KEY WORDS: less-favoured areas, agri-environmental programme, land afforestation, Ward's method

Introduction

The common agricultural policy (CAP) of the European Union combines the aspects of the protection of environmental resources and assets with the economic and social goals of agricultural and rural development (Liro, 2003; Zegar, 2010; Kutkowska, 2010; Bujanowicz-Harnaś, 2011; Mickiewicz et al., 2013; Pawlewicz, Bórawski, 2013). Measures for preserving the precious richness of the natural environment, supporting areas with unfavourable natural conditions as well as those allowing the economic and ecological activation of local communities take an important position among EU instruments for the development of rural areas. It has been indicated by, e.g. Bołtromiuk (2012, p. 126), who wrote that "The multidimensional interdependence of the agricultural economy and the natural environment is increasingly noticed and considered in the objectives and instruments of CAP to a large extent." The measures implemented as part of the 2007-2013 Rural Development Programme (RDP 2007-2013), which is the continuation of the 2004-2006 RDP, serve to promote the environmentally friendly agriculture, preserve the landscape assets of the countryside, protect valuable natural areas, consolidate sustainable farming and form the landscape structure. Three measures of the RDP are of particular pro-ecological importance: support for farming in mountain areas and other less favoured areas (LFAs), the agri-environmental programme and the afforestation of agricultural and non-agricultural land. Financial support is a kind of remuneration for generating environmental public goods (Bołtromiuk, Kłodziński, 2011; Brodzińska, 2013). The implementation of pro-ecological measures contributes to the improvement in the management and protection of the environment, and is also conducive to the restructuring and modernisation of agriculture and rural areas (Polna, 2012).

Material and research methodology

The article aims to present regional differences in the use of the EU funds allocated to measures for pro-ecological land management. The spatial scope of the analysis covers the area of the entire country, with the voivodeship adopted as the basic research unit. The research was conducted on the basis of the data shared by the Agency for the Restructuring and Modernisation of Agriculture (ARMA) on the implementation of pro-ecological measures as part of the 2007-2013 RDP and the data of Statistics Poland (in Polish GUS) on the number and area of agricultural holdings above 1 ha of AL. Moreover, the documents of the Ministry of Agriculture and Rural Development were the complementary source of information.

In order to distinguish regions characterised by the similar absorption of EU funds use was made of Ward's method (1963) which belongs to hierarchic agglomeration methods of cluster analysis. What is applied in this method to assess the distance between clusters is variance analysis. It aims at minimising the sum of squared deviations inside clusters (Parysek, 1982; Stanisz, 2007).

While indicating groups of voivodeships with similar absorption of resources allocated to the pro-ecological measures of the RDP (2007-2013), the following indicators were used:

- the number of applications granted under the measure per 1,000 farms with the area above 1ha of AL,
- the payment received under the measure in PLN per 1 application for a farm larger than 1ha of AL,
- the payment received under the measure in PLN per 1ha of AL.

Results of the research

The measure "Support for farming in mountain areas and other less favoured areas (LFAs)" is an instrument of financial support for farms situated in areas where agricultural production is difficult because of unfavourable natural conditions. Payments were to compensate for existing problems in relation to agricultural holdings located outside the LFAs. The budget of the measure amounted to almost 2.6 m euros, including about 2.1 m euros which came from the European Agricultural Fund for Rural Development (EAFRD).

As part of the RDP measure, 5,861.3 thousand applications were granted – from 55.7 thousand in Opole to 1,121.9 thousand in Mazovia (table 1). The activity of beneficiaries measured with the number of applications per 1,000 farms varied between 1,957 in Opole and 6,612 in Podlasie, with the average of 3,751 applications for the country. As part of the LFA payments 10,891.2m PLN were spent – from 97.2m PLN in Opole to 2,025.3m PLN in Mazovia. Such high payments resulted from the large area qualified for LFAs (9.2m ha, i.e. 56% of agricultural land in the country), relatively high amount per 1 ha (from 179 PLN – lowland zone I to 320 PLN – mountain areas) and an easy access of farmers to these resources – farmers submitted an LFA application together with an application for uniform area payments (UAP). The amount paid to the end of 2015 per 1 ha of AL was 621.3 PLN and was regionally diversified – from 180.1 PLN in Opole to 1,153.4 PLN in Podlasie. On average, one granted application was subsidised with 1.9 thousand PLN. These payments were the lowest in Małopolska (980.4 PLN) and the highest in West Pomerania (3.4 thousand PLN).

The spatial differences in the measure are a consequence of the delimitation of areas with unfavourable conditions of farming, hence the relation with the quality of the farming production space. In voivodeships with low values of the index the absorption level was observed to be the highest, while in those with higher values the activity of the beneficiaries and the payments were lower. This regularity is corroborated by correlation analysis (r = -0.754 and r = -0.891 respectively).

Table 1. Level of use of funds from the measure "Support for farming in mountain areas and other less-favoured areas (LFAs)"

Voivodeship	Applications granted			Payments received			
	number [in thousands]	% of the total	per 1,000 farms	total [in millions of PLN]	% of the total	per 1 ha of AL [in PLN]	per 1 application [in thousands of PLN]
Lower Silesia	165.2	2.8	2,603	401.1	3.7	389.1	2.4
Kujavia-Pomerania	245.6	4.2	3,617	558.2	5.1	444.3	2.3
Lublin	529.3	9.0	2,787	727.4	6.7	451.8	1.4
Lubuska Land	133.1	2.3	5,661	348.2	3.2	697.0	2.6
Łódź	604.0	10.3	4,492	823.0	7.6	723.8	1.4
Małopolska	418.3	7.1	2,578	410.1	3.8	530.7	1.0
Mazovia	1,121.9	19.1	4,721	2,025.3	18.6	868.9	1.8
Opole	55.7	1.0	1,957	97.2	0.9	180.1	1.7
Podlasie	568.7	9.7	6,612	1,465.1	13.5	1,153.4	2.6
Pomerania	193.4	3.3	4,515	540.7	5.0	568.6	2.8
Silesia	154.5	2.6	1,990	187.7	1.7	376.2	1.2
Subcarpathia	349.9	6.0	2,410	355.4	3.3	464.9	1.0
Świętokrzyska Land	297.5	5.1	2,885	309.3	2.8	498.1	1.0
Warmia-Mazuria	252.5	4.3	5,688	784.8	7.2	649.9	3.1
Wielkopolska	621.5	10.6	5,017	1,352.4	12.4	689.3	2.2
West Pomerania	149.9	2.6	4,700	505.2	4.6	469.5	3.4
Poland	5,861.3	100.0	3,751	10,891.2	100.0	621.3	1.9

Source: author's own work based on the ARMA data and Local Data Bank, Statistics Poland.

The agri-environmental programme was a stimulus for farmers to take action for environmental protection. It comprised 9 packages with 41 variants available. One farm could implement up to three agri-environmental

projects. The means allocated to Polish agricultural holdings under the agri-environmental payments were 2.3 bln euros (including over 1.8m euros from EAFRD). The programme benefited 138.4 thousand farmers who were paid 6,936.9 m PLN – from 81.7 m in Silesia to 860.4 m PLN in West Pomerania (table 2). Beneficiaries submitted 566.5 thousand applications (with a maximum of 12.5% in Lublin). The number of applications granted per 1,000 farms (with the national average of 363 applications) varied between 97 in Silesia and 969 in Warmia-Mazuria. On average one application in the country was subsidised with the amount of 12.2 thousand PLN – from 5.1 thousand PLN in Świętokrzyska Land to 27.8 thousand PLN in West Pomerania. On the other hand, the payment received per 1 ha of AL was 395.7 PLN, and it varied between 131.3 PLN in Łódź and 880.2 PLN in Lubuska Land.

This measure was especially popular in regions with extensive areas attractive in natural terms. The dependence between the absorption level and the proportion of such areas is indicated by, e.g. Rudnicki (2010), Biczkowski, Jezierska-Thöle (2012), Pawlewicz, Bórawski (2013), Czudec et al. (2017) as well as Kutkowska, Barczyk (2017).

The spatial differences in the "Agri-environmental programme" are also connected with the historically formed areal structure of farms. The most extensive areas benefiting from agri-environmental payments are in voivodeships where large and economically effective farms predominate (Głębocki, 2014). This regularity is corroborated by an analysis of the correlation between the features examined and the mean area of farms (0.871 for the number of applications per 1,000 of farms; 0.656 for the payment received per application and 0.592 for the payment received per 1 ha AL).

The afforestation of agricultural and non-agricultural land was aimed at improving the conditions of the natural environment. The purpose of this measure was to enlarge forest areas, maintain and strengthen their ecological stability by reducing the fragmentation of forest complexes and creating ecological corridors and also to raise the economic value of low-quality soils. It concerned the afforestation of low quality agricultural land and land listed in the records as agricultural land or farmland overgrown with trees and shrubs, not used for agricultural production.

The budget of the measure "Afforestation of agricultural and non-agricultural land" was 245.8m euros, including 196.6m euros from EAFRD. The analysis shows that 16.8 thousand decisions granting afforestation payments were issued. By voivodeship, the number of granted applications varied between 193 (1.2%) in Opole to almost 3.4 thousand (20.2%) in Mazovia. The beneficiaries of the programme afforested 36.8 thousand of private land in total, including 33.7 ha (91.5%) of agricultural land and 3.1 thousand of non-agricultural land. The largest proportion of forest areas appeared in

Table 2. Level of use of funds from the measure "Agri-environmental programme"

Voivodeship	Applications granted			Payments received			
	number [in thousands]	% of the total	per 1,000 farms	total [in millions of PLN]	% of the total	per 1 ha of AL [in PLN]	per 1 application [in thousands of PLN]
Lower Silesia	21.0	3.7	331.6	378.8	5.5	367.5	18.0
Kujavia-Pomerania	48.0	8.5	706.6	551.4	7.9	438.8	11.5
Lublin	70.9	12.5	373.3	606.2	8.7	376.5	8.6
Lubuska Land	16.9	3.0	720.5	439.7	6.3	880.2	26.0
Łódź	22.6	4.0	168.2	149.3	2.2	131.3	6.6
Małopolska	28.6	5.0	176.0	189.2	2.7	244.9	6.6
Mazovia	54.8	9.7	230.5	536.5	7.7	230.2	9.8
Opole	11.7	2.1	409.3	164.2	2.4	304.2	14.1
Podlasie	48.4	8.5	562.5	522.7	7.5	411.5	10.8
Pomerania	34.1	6.0	796.1	529.3	7.6	556.6	15.5
Silesia	7.6	1.3	97.5	81.7	1.2	163.8	10.8
Subcarpathia	41.7	7.4	286.9	353.2	5.1	462.0	8.5
Świętokrzyska Land	37.2	6.6	360.3	188.7	2.7	303.9	5.1
Warmia-Mazuria	40.5	7.1	911.9	744.1	10.7	616.2	18.4
Wielkopolska	51.8	9.1	418.0	641.3	9.2	326.9	12.4
West Pomerania	30.9	5.5	969.5	860.4	12.4	799.6	27.8
Poland	566.5	100.0	362.6	6,936.9	100.0	395.7	12.2

Source: author's own work based on the ARMA data and Local Data Bank, Statistics Poland.

Mazovia – 8.0 thousand ha, i.e. 21.7% of the general area afforested in the study period. On the other hand, the smallest area of agricultural and non-agricultural land was designated for afforestation in Opole – 0.47 thousand ha (1.3%) (Polna, 2018). As part of the afforestation payments 567m PLN were spent – from 7.4 m PLN in Opole to 120.5m PLN in Mazovia (table 3).

The analysed indicators of the absorption of the RDP means were as follows:

- the number of applications granted per 1,000 farms (the country average 10.7 applications) – from 2.5 in Małopolska to 25.8 in Warmia-Mazuria,
- the payment received in PLN per 1 application for a farm (the country average 33.8 thousand PLN) – from 16.6 thousand PLN in Subcarpathia to 91.2 thousand PLN in Pomerania,

- the payment received in PLN per 1 ha of AL (the country average 32.3 PLN) – from 10.9 PLN in Małopolska to 71.0 PLN in Warmia-Mazuria.

The highest values of the analysed indicators were recorded in voivodeships with a favourable area structure of agricultural holdings, whereas the lowest – in voivodeships most fragmented in terms of agriculture because they had problems with meeting the requirements and making decisions concerning the limitation of agricultural activity (Polna, 2018). A barrier was often a negative attitude of farmers towards formalities involved in completing the necessary documentation and the requirement for the land owner to cover the cost of afforestation. Small holdings producing mostly for their own needs only rarely had a surplus of financial means necessary for making investments.

Table 3. Level of use of funds from the measure "Afforestation of agricultural and non-agricultural land"

Voivodeship	Applications granted			Payments received			
	number	% of the total	per 1,000 farms	total [in millions of PLN]	% of the total	per 1 ha of AL [in PLN]	per 1 application [in thousands of PLN]
Lower Silesia	493	2.9	7.8	26.5	4.7	25.7	53.8
Kujavia-Pomerania	780	4.7	11.5	26.5	4.7	21.1	34.0
Lublin	2,044	12.2	10.8	44.1	7.8	27.4	21.6
Lubuska Land	258	1.5	11.0	15.3	2.7	30.6	59.3
Łódź	1,485	8.9	11.0	29.4	5.2	25.9	19.8
Małopolska	410	2.4	2.5	8.4	1.5	10.9	20.6
Mazovia	3,385	20.2	14.2	120.5	21.2	51.7	35.6
Opole	193	1.2	6.8	7.4	1.3	13.7	38.2
Podlasie	1,071	6.4	12.5	32.4	5.7	25.5	30.3
Pomerania	428	2.6	10.0	39.1	6.9	41.1	91.2
Silesia	271	1.6	3.5	10.1	1.8	20.3	37.3
Subcarpathia	2,379	14.2	16.4	39.4	7.0	51.5	16.6
Świętokrzyska Land	1,449	8.6	14.1	30.4	5.4	48.9	21.0
Warmia-Mazuria	1,147	6.8	25.8	85.7	15.1	71.0	74.7
Wielkopolska	694	4.1	5.6	29.2	5.2	14.9	42.1
West Pomerania	268	1.6	8.4	22.5	4.0	20.9	83.8
Poland	16,755	100.0	10.7	567.0	100.0	32.3	33.8

Source: author's own work based on the ARMA data and Local Data Bank, Statistics Poland.

Taking into account the absorption level of funds from pro-ecological measures, the hierarchic grouping of voivodeships by Ward's method was carried out. The procedure allowed dividing Poland into three groups of voivodeships, most internally similar and with the largest differences between them (figure 1). These groups embraced the following voivodeships:

I – Lublin, Łódź, Małopolska, Świętokrzyska Land, Subcarpathia
II – Kujavia-Pomerania, Mazovia, Opole, Silesia, Wielkopolska, Podlasie
III – Lower Silesia, Lubuska Land, Pomerania, Warmia-Mazuria, West Pomerania

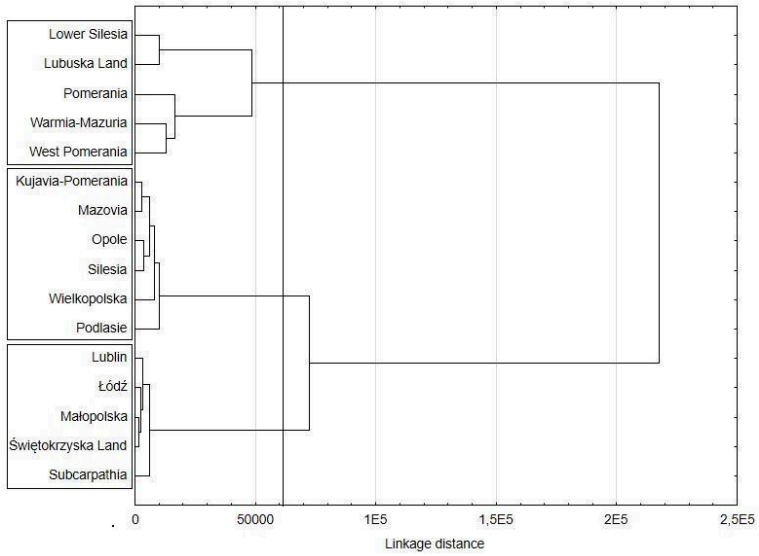

Figure 1. Dendrogram of Polish regions with similar use of funds for the pro-ecological measures of the RDP (2007-2013)

Source: author's own work.

The first group was selected the earliest, which proves the greatest internal similarity of the analysed features within. It is worth noticing that the most similar in the selected cluster are Małopolska and Świętokrzyska Land with Łódź, Lublin and Subcarpathia subsequently "overlapping" them (figure 1). The voivodeships in this group are characterised by the lowest level of the use of EU funds related to the improvement in the natural environment. It has also the lowest mean values of the indicators adopted for the analysis (table 4). An average amount of financial support per 1 ha of AL was 869.2 PLN and the value of one application – 1,771 PLN. At the same time the activity of beneficiaries was at the level of 3.3 applications per 1 farm.

Table 4. Mean values of amounts of funds used as part of the pro-ecological measures of the RDP (by groups of voivodeships)

Group	Number of applications per 1,000 of farms in total above 1 ha of AL	Payments received per 1 ha of AL [PLN]	Payments received per 1 application [PLN]
I	3,276.2	869.2	1,770.9
II	4,820.9	1,070.2	2,806.5
III	5,047.2	1,200.8	5,499.5

Source: author's own work.

The highest level of the use of the RDP means for measures supporting environmental functions of rural areas and agriculture was demonstrated in the third group of voivodeships, situated in the northern and western part of the country (figure 2). In the subsequent stages of the analysis they were not combined with other groups selected earlier, which indicates significant differences between this group and other groups in terms of the investigated indicators. This group recorded the highest mean values of the indicators of the absorption of EU funds as part of pro-ecological measures (table 4). However, one can notice certain differences in Lower Silesia and Lubuska Land, which create a separate subgroup in this cluster in relation to other voivodeships in the group (figure 1).

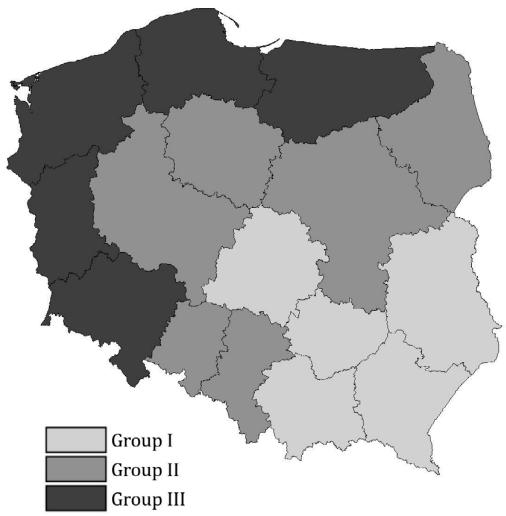

Figure 2. Groups of voivodeships distinguished based on the similarities in the absorption of funds from the pro-ecological measures of the 2007-2013 RDP

Source: author's own work.

Conclusions

The implemented pro-ecological measures under the 2007-2013 RDP, due to a large number of applications and a significant financial influence, were an important instrument for the multifunctional and sustainable development of rural areas. The research revealed that the implementation of pro-ecological measures was diversified regionally. Despite the observed differences in the regional use of the funds under individual measures, the division of voivodeships into several groups is outlined. The conducted grouping of voivodeships by Ward's method allowed selecting three groups of voivodeships. This helped to indicate both the general similarity in the level of absorption in the voivodeships representing particular parts of Poland and differences among its various regions. The financial support from the RDP was the greatest in the northern and western parts of Poland, characterised by, e.g., large-area farms and the richness of environmental assets (Podstawka, Konieczny, 2002; Potocki, 2003; Rudnicki, 2010; Biczkowski, Jezierska-Thöle, 2012). The influence of pro-ecological measures in these areas was the strongest. It helped to initiate conscious actions conducive to preserving and protecting the natural and landscape values of rural areas, increasing their biodiversity, improving the landscape structure, moving away from very intensive agricultural production or limiting the tendency to retreat from the extensive forms of production (Kołodziejczak, Rudnicki, 2012). On the other hand, the lowest use of financial resources supporting pro-ecological land management was reported in the south-eastern voivodeships of Poland (Lublin, Małopolska, Świętokrzyska Land, Subcarpathia) and in Łódź. Those regions are characterised by an unfavourable size structure of farms and strong land fragmentation, which made it difficult for them to meet the conditions for taking advantage of the RDP measures and did not encourage the decision to limit the agricultural activity. The EU payments intended to make up for the lost income on small farms are not a motivation for involvement in activities aiming to make agriculture permanent and sustainable. It is therefore necessary to raise further farmers' ecological awareness and improve their knowledge concerning the mechanisms of support for farming.

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