

EXTERNAL FEATURES OF AGRICULTURE ECONOMY AND THEIR IMPACT ON SPATIAL DIVERSIFICATION IN POLAND

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Abstract

The paper presents the impact assessment of the external features of agriculture in Poland in the context of spatial diversification. It undertakes three research problems: (1) selection of diagnostic features and delimitation of the spatial structure of agriculture; (2) definition of determinants – external features of agriculture; and (3) comparative analysis of the elements mentioned above – assessment of the impact these external conditions exert on agriculture. The research was based on the National Agricultural Census data and followed the administrative division of Poland. The analysis of man-made determinants was carried out for three factors: (1) historical (HIS), (2) urban (URB), where poviats fell into two categories: well-urbanised, i.e. with townships, and lessurbanised, i.e. with rural districts only; and (3) the Common Agricultural Policy (AB/EU), where poviats were differentiated by the absorption level of the European funds, i.e. below and above the national average. The analysis demonstrated that the Polish agriculture shows a historically-driven, polarised spatial structure – with Western Poland on one end and Eastern Poland on the other – and, thus, it revealed the necessity for the continuation of the processes aiming at territorial cohesion in the EU.

Keywords: agricultural economy, spatial structure, external conditions, standardised average, Poland

JEL Code: Q10, N53, N54

Introduction

Delimitation problems of the spatial structure of agriculture and the separation and assessment of the impact of factors shaping this structure are essential subjects of geographic and agricultural research and studies in Poland and worldwide. Such research projects were conducted by J. Kostrowicki (1968) – long-term Head of the former

department of Rural Geography and President of the Commission on Agricultural Typology of the International Geographical Union, and his co-workers, e.g.: Stola, Szczęsny (1976), Kulikowski (1982), Falkowski, Kostrowicki (2001), Bański (2007), as well as other academic researchers: Rudnicki (2009, 2013), Jezierska-Thole, Janzen, Rudnicki (2014). Traditional methodology proposes the agricultural analysis in the form of a package of internal features categorised into several groups (e.g. the division of 27 diagnostic features of agriculture into the following groups: social; organisational and technical; production-related; and structural (Głębocki, Rogacki, 2002; Szczęsny, 1988; Rogalska, 2017). Spatial patterns of these features were analysed with regard to external factors – both natural and man-made – such as: agricultural production area quality; historical and economic determinants; urbanisation and industrialisation; food industry; access to communication; commercial outlets; and agriculture-related state policy (according to Rudnicki, 2016a, Jezierska-Thole, Janzen, 2016). The research from that period showed that differences in the spatial structure of agriculture were primarily the result of the impact of historical and economic conditions. This was mainly a consequence of the diversity of Polish lands in the nineteenth century - during the transition of the economy from the feudal to the capitalistic system, which took place in the economic conditions of three countries: Austria, Prussia and Russia, each of them different in terms of the level and pace of economic development.

Taking into account the results of the research on the contemporary spatial structure of agriculture in Poland (Rudnicki 2016b), the application formulated nearly 40 years ago was reviewed, including development processes in agriculture, especially those resulting from Poland's membership in the EU and those covering agricultural holdings with a number of instruments of the Common Agricultural Policy.

1 Methodology

The paper aims to present a comprehensive analysis of the spatial structure of Polish agriculture, including the impact assessment of external factors, particularly the Common Agricultural Policy (CAP) instruments. It undertakes three research problems: (1) selection of diagnostic features and delimitation of the spatial structure of agriculture; (2) definition of determinants – external features of agriculture; and (3) comparative analysis of the elements mentioned above – assessment of the impact these external conditions exert on agriculture.

The research was based on the National Agricultural Census 2010 data and followed the administrative division of Poland into sixteen voivodeships and 314 *poviats*, which were discussed by the means of fifteen diagnostic features, including six groups of the internal features of agriculture, i.e.: land quality and land use (LQ&LU); agrarian structure (AS); socio-demographic features of agriculture (SD); technical infrastructure in agricultural holdings (TCH); agricultural production structure (APS); as well as agricultural productivity and profitability (APP). The analysis of man-made determinants was carried out for three factors: (1) historical (HIS), (2) urban (URB), and (3) the Common Agricultural Policy (AB/EU). Upon analysis of the data compiled in the NAC 2010, fifteen diagnostic features were distinguished for the comprehensive examination of the spatial structure of agriculture.

2. External determinants in agriculture

2.1. Natural determinants in agriculture

As part of the environmental analysis, the following conditions were distinguished:

- natural determinants – based on the agricultural production area quality index was adopted, which was processed by the Institute of Soil Science and Plant Cultivation in Puławy (Waloryzacja...2000). The assumption of this method was the assessment of the agricultural production area based on four primary components of the natural environment: soil (15-100 points), agroclimate (0-15 points), relief (0-15 points) and water conditions (0-15 points). The total sum of scores gives the value of the agricultural production area quality index.
- ecological determinants – based on the diversified presence of areas protected by law as it is the key to the assessment the natural environment about the proposal calling for the greening of agriculture (Jeziarska-Thöle, Rudnicki, Kluba, 2016).

2.2. Man-made determinants of agriculture

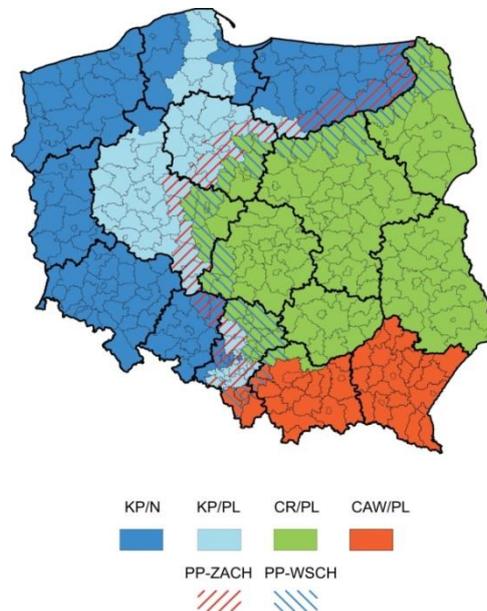
The analysis of man-made determinants of agriculture covered three aspects:

- the historical aspect:
 1. Area of the Kingdom of Prussia (further referred to as ‘Western Poland’, ‘WP’ for short), including the area which belonged to Germany and Poland in the interwar period

(1919–1939), i.e. the following voivodeships: Dolnośląskie, Lubuskie, Opolskie, Pomorskie, Warmińsko-Mazurskie and some of the poviats of Kujawsko-Pomorskie, Śląskie, and Wielkopolskie; the analysis also accounted for the bipartite division of this area, including the territories of two historical units:

2. Area of the Austrian and Russian Partitions (further referred to as ‘Eastern Poland’, ‘EP’ for short), including the area which belonged to Poland in the interwar period, i.e. the following voivodeships: Lubelskie, Łódzkie, Mazowieckie, Podkarpackie, Podlaskie, Świętokrzyskie and some of the poviats of Kujawsko-Pomorskie, Śląskie, and Wielkopolskie (Jezierska-Thöle, 2016, Fig. 1).

Fig.1: Political division of present-day Poland in the 19th and 20th centuries.



Source: own study

Key to the map:

PL-ZACH - Prussian Partition, including:

KP/N – Kingdom of Prussia and Germany in the interwar period;

KP/PL – Kingdom of Prussia and Poland in the interwar period;

PL-WSCH – Austrian and Russian Partitions, including:

CR/PL – Russian Empire and Poland in the interwar period;

CAW/PL – Austro-Hungarian Empire and Poland in the interwar period;

- the urban aspect:

The division into two groups: with urban poviats (cities with poviat rights - 53 area units, grouping 66 poviats - this difference is the result of ARiMR poviat offices - gathering more than one poviat) and only with poviat counties - other 261 poviats.

- CAP funds:

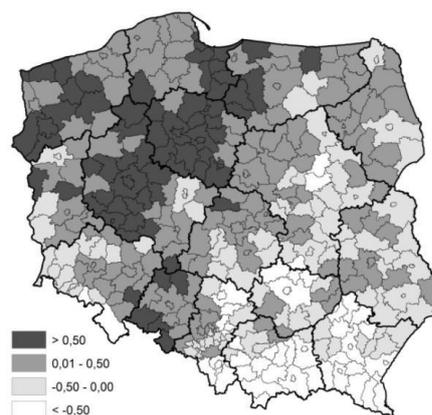
The bipartite division of poviats into units with a lower and higher level of absorption of EU funds than the national average was used. This level was defined on the basis of the total amount of the CAP funds supplying agricultural holdings in Poland in 2002-2010 (together with the SAPARD pre-accession program - PLN 90.5 billion, which, taking the average exchange rate of PLN 4 / EUR 1, amounted to EUR 22.6 billion - cf. Rudnicki 2013).

3. Study results

3.1. Level of agricultural development

In accordance with the adopted research procedure, the indicator of the general level of agriculture was determined as the average of the sum of normalised values for the separated six groups of internal agricultural features, i.e.: quality and land use (UZ); agrarian structure (AG), socio-demographic characteristics of agriculture (SD), technical equipment of farms (TCH), structure of agricultural production (STR), production and income features of agriculture (PD). The analysis showed a robust spatial differentiation of Polish agriculture - both regional (from -0,708 in Podkarpackie to 0.628 in Kujawsko-Pomorskie), and above all in the poviats (from -1.32 in Żywiec District in Śląskie Voivodeship and up to 1.21 in the area of ŚrodaŚląska in Wielkopolskie Voivodeship (Fig. 2)

Fig. 2. Composite index of agricultural development in 2010



Source: own study based on data by the Central Statistical Office

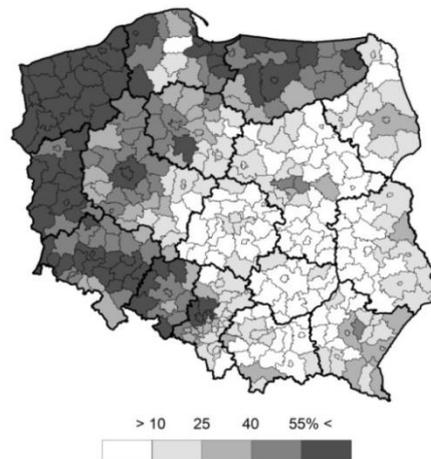
In addition to determining the level of agriculture, the adopted research procedure required the separation of a number of external agricultural conditions - natural, ecological,

historical, urban and those defined by the level of absorption of the EU funds and their inclusion in relation to 314 poviats, including a simplified (divisible) division into units with lower or higher ratios depending on their average level in the country (applies to natural, ecological and CAP payments) and less (poviat only) or more urbanised (poviats along with urban poviats), as well as located within the former Prussian partition (Western Poland) or Russian and Austrian (Eastern Poland).

3.2. Impact of the selected conditions on the agrarian structure features

As part of the assessment of the effects of the agrarian structure features on the spatial structure of agriculture, three diagnostic features were identified. Taken together, they showed that historical conditions exerted the most substantial impact (GTC 1.51), including diagnostic features "Agricultural holdings over 50 ha of UAA in% of the total area of farms "(OWW 1.75, Tab. 2, Fig. 3).

Fig. 3. Share of agricultural holdings with over 50 ha of agricultural land in the total area of agricultural holdings in Poland in 2010



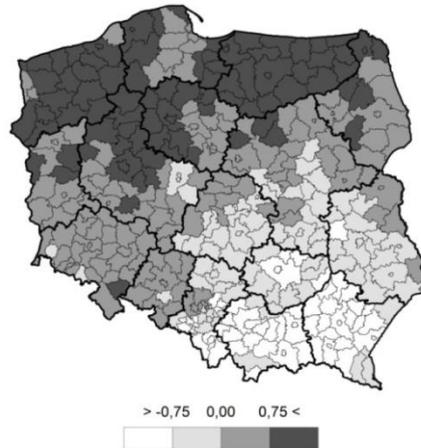
Source: own study based on data by the Central Statistical Office

3.3. Impact of the selected conditions on the socio-demographic features of agriculture

As part of the assessment of the impact of the group of socio-demographic features on the spatial structure of agriculture, three diagnostic features were identified, which, taken into account together, showed the most substantial impact of historical conditions (OWW 0.69) and above all the level of the CAP subsidies (OW 0.83). In the system of diagnostic features, the unusually high level of the indicator is characterised by the conditions as

mentioned above in the case of the assessment of the impact of labour inputs in the division agriculture (OW 1.00 and 1.04 respectively, Fig. 4).

Fig. 4. Index of labour input in agriculture in 2010

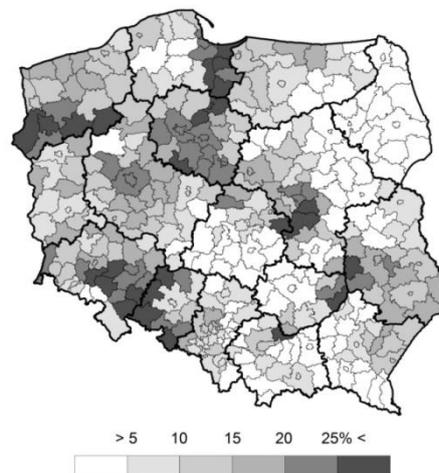


Source: own study based on data by the Central Statistical Office

3.4. Impact of the selected conditions on the features of agricultural production structure

As part of the assessment of the impact of production structure features on the spatial structure of agriculture, two diagnostic features were identified, which, taken together, showed the most substantial impact of natural conditions (OWW 0.97, see Tab. 7), including the highest level in the case of the participation of intensive forms of plant production in agricultural areas (OWW 1.17, Fig. 5).

Fig. 5. Share of land under intensive plant production in the total of agricultural land



. Source: own study based on data by the Central Statistical Office

Conclusion

The research has shown that, as in Kostrowicki's (1978) conclusion nearly 40 years ago, the spatial structure of Polish agriculture is shaped to the most significant extent by historical conditions. The fact that the old, over 100-year border between the Partitions, despite nearly 70 years of functioning of the Polish State within the borders established after World War II - is the most crucial determinant of the diversification of the contemporary spatial structure of agriculture in Poland is confirmed by the highest - in comparison to other conditions - average level of the impact indicator. The research also showed that the impact of historical conditions on agriculture in Poland is not homogeneous. It is mainly noted in the spatial layout of agrarian structure (first position) as well as socio-demographic and production-income features (second position). The stability of the historically shaped agrarian structure is indicated by the large difference between the average size of agricultural holdings over 1 ha between Eastern Poland - 8.0 ha and Western Poland - 21.3 ha.

It was also found that, concerning the scale of impact on the spatial structure of agriculture in Poland, the second position is taken by the CAP payments. This determinant, due to the high amount of payments received (2002-2010: 90.5 billion PLN, i.e. 22.6 billion euros) and a large number of beneficiaries (1.4 million according to the ARiMR list of agricultural producers) is now the main factor for modernisation and the development of Polish agriculture. Regarding the division into separate groups of internal features, the weak impact of CAP payments was found only in the case of quality and land use (fourth position). The remaining groups of features are characterised by the first (socio-demographic, technical and production-income features) or the second positions (characteristics of the agrarian structure and production-income assessment of agricultural holdings). The research also showed a positive statistical dependence between the indicators of the general level of agriculture and the overall level of the CAP payments (correlation coefficient 0.580), from which it appears that, despite the strong spatial differentiation of the general level of agriculture in Poland, mainly historically conditioned, EU aid is mostly directed to the areas with a high level of agricultural development. Maintaining this direction of the allocation of CAP funds contributes to the deepening of regional differences in Polish agriculture.

The research indicated that Polish agriculture shows strong territorial differentiation, generally creating a historically shaped polarised system - between Western

and Eastern Poland. The need to limit this disproportion is an essential task from the socio-economic development point of view.

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