DIFFERENCES IN AGRICULTURAL DEVELOPMENT IN POLAND ACCORDING TO SELECTED INDICATORS IN DIFFERENT PROVINCES FOR THE YEARS 2002 AND 2004

DOMAGALSKA-GRĘDYS, Marta, ŻMIJA, Janusz

Abstract

Using selected indicators to assess agriculture in Poland for the years 2002 and 2004 makes it possible to define differences at province level. At the same time, an analysis of how EU assistance as part of PROW was used shows different ways of utilising such aid. This analysis confirms that there are differences at statistical level (as shown by the indicators) and in an economic sense (relating to utilisation of funds) among the provinces. The need has arisen to iron out the differences in development between individual provinces with a significant level of agricultural production.

Key words: regional agricultural development in Poland, indicators for assessing agriculture, assessment of assistance from EU funds for agricultural development, Balanced Development of Rural Areas at province level in Poland.

Introduction

Differences in Polish agriculture at province level form the starting point for a strategy to even out the level of development of rural areas. The competitiveness of the agricultural and forestry sectors, the environment and rural areas and other factors contributing towards quality of life in the countryside must all be improved, taking regional differences into account. Studies by Krasowicz S., Igras J. [2003] *inter alia*, show that a lot of the potential of Polish agriculture is exploited in an uneven way due to differences in environmental, economic and organisational conditions. More precisely, according to Gorzelak E. [1999], Harasin A. [2006], Heller J.[2000], Mierosławska A. [2000], Mroczek R. [1999], and Runowski H. [1990], the most significant reasons for regional agricultural differences in Poland are: environmental conditions, population density, level of industrialisation and urbanisation, development of infrastructure, agrarian changes, degree to which agricultural equipment is used in production, national land development policy, traditions and level of farming culture.

Material and methods

The article shows differences in the level of agricultural development in Poland, taking the different provinces as a basis for comparison. The study is based on data from GUS, the Polish Central Statistical Office, relating to agriculture in Poland in 2002 and 2004.

Basic indicators were chosen which are typical of agricultural production. These include the following:

- x1- persons employed in agriculture, fishing and forestry [in total]
x2- amount of agricultural land per province in relation to total land surface of the whole country [%]
x3- crops - staple cereals [dt/ha]
x4- crops - potatoes [dt/ha]
x5- cattle – in total [per 100 ha of agricultural land, in animal units]
x6- swine [per 100 ha of agricultural land, in animal units]
x7- cows’ milk – production [per 1 ha of agricultural land, in litres]
x8- cows’ milk – sale [per 1 ha of agricultural land, in litres].

The principle aim of the study was to identify and compare the provinces with the greatest and least agricultural potential two years before Poland’s accession to the EU (i.e. in 2002) and at the time of accession (in 2004). In addition, reports from the ARiMR (Agency for Restructuring and Modernisation of Agriculture in Poland) were used as the basis for a scale of commitment of the different provinces to applying for funding from the SAPARD and PROW 2004-2006 Priority B aid programmes. Measuring this should help strengthen the statistical conclusions.

**Results and discussion**

The results of the study, as presented in tables 1-3, show the positions of the different provinces in natural units (table 1), the positions of the provinces over the period as individual variables x1-x8 (table 2) and an overall ranking of the provinces based on the average positions of each from all the variables studied (table 3).

In 2002 the highest numbers of people employed in agriculture, fishing and forestry were in the provinces of Warmia-Masuria (5.35), Kujawsko-Pomorskie (3.38) and Zachodnio-Pomorskie (West Pomerania) (3.69). In 2002 the lowest numbers employed in agriculture, fishing and forestry were in Silesia (0.79), Masovia (1.16) and Lesser Poland - 1.25 (table 1).

In 2004 the highest numbers employed in agriculture, fishing and forestry were in Warmia-Masuria (4.1), Zachodnio-Pomorskie (3.38) and Lubuskie (3.03), and the lowest in Silesia (0.71), Lesser Poland (0.99) and Masovia (1.08).

In 2002 the highest percentage of agricultural land was in Masovia (12.99%), Greater Poland (Wielkopolskie) (10.27%) and Lubelskie (9.3%), and the least was in Lubuskie (2.99%), Opolskie (3.17%) and Silesia (3.35%).

In 2004, the figures for percentages of agricultural land per province were very similar to those of 2002 (table 1).

The level and structure of crop production reflect climatic and soil conditions as well as economic and organisational factors [Krasowicz. Kuś 2006].

**Table 1 Agricultural variables expressed in natural units for the years 2002 and 2004**

<table>
<thead>
<tr>
<th>List of variables</th>
<th>x1</th>
<th>x2</th>
<th>x3</th>
<th>x4</th>
<th>x5</th>
<th>x6</th>
<th>x7</th>
<th>x8</th>
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</thead>
<tbody>
<tr>
<td>Province</td>
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<td></td>
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</tr>
<tr>
<td>Lower Silesia</td>
<td>.25</td>
<td>.77</td>
<td>1%</td>
<td>7%</td>
<td>9.5</td>
<td>4.7</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>Kujawsko-Pomorskie</td>
<td>.88</td>
<td>.89</td>
<td>2%</td>
<td>6%</td>
<td>5.7</td>
<td>8.6</td>
<td>04</td>
<td>23</td>
</tr>
<tr>
<td>Lubelskie</td>
<td>.77</td>
<td>.51</td>
<td>0%</td>
<td>4%</td>
<td>1.4</td>
<td>89</td>
<td>93</td>
<td>7.9</td>
</tr>
</tbody>
</table>

1 Literature overview include in the text.
In 2002 the largest staple cereal crop yield was in **Opolskie** (43.7 dt/ha), Lower Silesia (39.5 dt/ha) and **Kujawsko-Pomorskie** (35.7 dt/ha), and the lowest in Podlaskie (24.2 dt/ha), Masovia (25.7 dt/ha) and Łódzkie (26.6 dt/ha).

In 2004 the largest staple cereal crop yield was in **Opolskie** (50.4 dt/ha), Lower Silesia (44.7 dt/ha) and West Pomerania (Zachodnio-Pomorskie (40.7 dt/ha) and the lowest was in Podlaskie (27.2 dt/ha), Świętokrzyskie (28.1 dt/ha) and Mazowieckie (28.2 dt/ha).

The province of Opolskie, which had the highest level of crop production per hectare, also enjoys the best environmental conditions for this (high levels of indicators referring to agricultural production area according to IUNG), and also the highest consumption of mineral fertilisers and a large proportion of intensive crop types (wheat, barley, sugarbeet, rape). On the other hand, the provinces of Kujawsko-Pomorskie and Greater Poland used intensive crop production as a basis for animal production.

In 2002 the potato crop was largest in Pomerania with 246 (dt/ha), **Opolskie** (225 dt/ha) and **Zachodnio-Pomorskie** (219 dt/ha), and smallest in Świętokrzyskie (168 dt/ha), Łódzkie (176 dt/ha) and Masovia (183 dt/ha).

In 2004 the potato crop was largest in Zachodnio-Pomorskie (230 dt/ha), Kujawsko-Pomorskie (223 dt/ha) and Lower Silesia (221 dt/ha), and the lowest in Lesser Poland (170 dt/ha), Świętokrzyskie (175 dt/ha) and Podkarpackie (181 dt/ha).

In 2002 the highest total numbers of cattle were in Podlaskie (59.9 units/100ha), Masovia (40.6 units/100ha) and **Greater Poland** (39.6 units/100ha) and the lowest numbers were in Zachodnio-Pomorskie (12.1 units/100ha), Lower Silesia (13.9 units/100ha) and Lubuskie (15.3 units/100ha).

In 2004 the highest total numbers of cattle were in **Podlaskie** (61.4 units/100ha), Masovia (44.5 units/ha) and Wielkopolskie (40 units/ha), and the lowest numbers were in **Podlaskie** (50 units/ha), Masovia (36.5 units/ha) and **Lesser Poland** (37.2 units/ha).

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### Table 1. Production and consumption of mineral fertilisers per hectare in 2002 and 2004

<table>
<thead>
<tr>
<th>Province</th>
<th>2002</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opolskie</strong></td>
<td>50.4</td>
<td>50.4</td>
</tr>
<tr>
<td><strong>Lower Silesia</strong></td>
<td>44.7</td>
<td>44.7</td>
</tr>
<tr>
<td><strong>Zachodnio-Pomorskie</strong></td>
<td>35.7</td>
<td>35.7</td>
</tr>
<tr>
<td><strong>Kujawsko-Pomorskie</strong></td>
<td>39.5</td>
<td>39.5</td>
</tr>
<tr>
<td><strong>Masovia</strong></td>
<td>25.7</td>
<td>25.7</td>
</tr>
<tr>
<td><strong>Łódzkie</strong></td>
<td>26.6</td>
<td>26.6</td>
</tr>
</tbody>
</table>

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* Source: own calculations based on data from GUS.
* explanation of variables x1-x 8 can be found in the Method.
Zachodnio-Pomorskie (9.6 units/100ha), Lower Silesia (12.1 units/100ha) and Lubuskie (12.7 units/100ha).

Among the provinces with the highest levels of animal production, Podlaskie has the highest number of cattle and specialises in dairy farming.

In 2002 the largest numbers of swine were in Greater Poland (Wielkopolskie) (264.1 units/100ha), Kujawsko-Pomorskie (201.2 units/100ha) and Opolskie (131.2 units/100ha) and the smallest numbers were in Podkarpackie (48.1 units/100ha), Lower Silesia (53.5 units/100ha) and Lubuskie (59.9/100ha).

In 2004 the largest numbers of swine were in Greater Poland (222.3/ha), Kujawsko-Pomorskie (197/100ha) and Łódzkie (134.6/100ha) and the smallest numbers were in Podkarpackie (44.1/100ha), Lower Silesia (42.9/100ha) and Lubuskie (49.5/100ha).

In 2002, the highest levels of cows’ milk production were in Podlaskie (1165 l/ha), Łódzkie (961 l/ha) and Masovia (912 l/ha), and the lowest levels were in Zachodnio-Pomorskie (214 l/ha), Lower Silesia (234 l/ha) and Lubuskie (285 l/ha).

In 2004 the highest levels of cows’ milk production were in Podlaskie (1454 l/ha), Masovia (957 l/ha) and Łódzkie (916 l/ha), and the lowest in Zachodnio-Pomorskie (209 l/ha), Lower Silesia (225 l/ha) and Lubuskie (256 l/ha).

In 2002 the highest levels of purchase of cows’ milk were in Podlaskie (1116 l/ha), Masovia (614 l/ha) and Łódzkie (555 l/ha) and the lowest in Zachodnio-Pomorskie (156 l/ha), Lower Silesia (185 l/ha) and Podkarpackie (165 l/ha).

In 2004 the highest levels of purchase of cows’ milk were in Podlaskie (1354 l/ha), Masovia (709 l/ha) and Łódzkie (632l/ha) and the lowest were in Zachodnie-Pomorskie (132 l/ha), Lower Silesia (160 l/ha) and Podkarpackie (167 l/ha).

In western and northern Poland agriculture is plant-based, specialising largely in cereal crops and rape, with a significantly lower level of stock production (cattle).

Decisive in determining an individual province’s contribution to national production is not only the area of land planted but differences in yield. Cereal crop yield varies more widely than potato yield. Much of the difference in yield is related to the fact that these are the crops which are predominantly sown and to species differences connected with climatic and soil conditions.

**Table 2 Position of provinces according to agricultural variables for 2002 and 2004***

<table>
<thead>
<tr>
<th>List of variables</th>
<th>x1</th>
<th>x2</th>
<th>x3</th>
<th>x4</th>
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<tbody>
<tr>
<td><strong>Year</strong></td>
<td>2002</td>
<td>004</td>
<td>2002</td>
<td>004</td>
<td>2002</td>
<td>004</td>
<td>2002</td>
<td>004</td>
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<tr>
<td><strong>Province</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Lower Silesia</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Kujawsko-Pomorskie</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Lubelskie</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Lubuskie</td>
<td>6</td>
<td>3</td>
<td>16</td>
<td>16</td>
<td>2</td>
<td>7</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Łódzkie</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Małopolskie</td>
<td>4</td>
<td>5</td>
<td>12</td>
<td>12</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Masovia</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Opolskie</td>
<td>4</td>
<td>6</td>
<td>15</td>
<td>15</td>
<td>1</td>
<td>1</td>
<td>2</td>
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</tr>
</tbody>
</table>
This sample ranking of provinces for the years 2002 and 2004 puts Kujawsko-Pomorskie in first place, followed by Zachodnio-Pomorskie and Warmia-Masuria (table 3). In last place is the province of Swietokrzyskie, which is preceded in 15th and 14th positions by Silesia and Podlaskie.

On the basis of this simplified ranking of the provinces, general conclusions can be drawn regarding agricultural development in Poland. The variables chosen for the study related to main areas of agriculture (cereal and root vegetable crop yield, numbers of major breeding stock). This is why for the variables chosen the position in the ranking seems somewhat unfair on certain provinces, for instance Masovia and Greater Poland.

The aim of the study was however to find a method of ranking regional differences in Poland according to sample agricultural variables. Naturally, had other variables been chosen (e.g. of a more economic nature), the positions of the various provinces would have been different.

**Table 3** Ranking* of provinces according to level of agricultural development in the years 2002 and 2004

| Item number | Average position* in 2002 | Province           | Average position in 2004 | Province
|-------------|--------------------------|--------------------|--------------------------|--------
| 1.          | 5.38                     | Kujawsko-Pomorskie | 5.13                     | Kujawsko-Pomorskie |
| 2.          | 5.88                     | Zachodnio-Pomorskie| 5.25                     | Zachodnio-Pomorskie |
| 3.          | 6.50                     | Warmia-Masuria     | 5.75                     | Warmia-Masuria |
| 4.          | 7.00                     | Opolskie           | 6.38                     | Greater Poland |
| 5.          | 7.00                     | Wielkopolskie      | 8.25                     | Lubuskie |
| 6.          | 8.13                     | Pomorskie          | 8.25                     | Łódzkie |
| 7.          | 8.63                     | Lower Silesia      | 8.38                     | Opolskie |
| 8.          | 8.63                     | Łódzkie            | 8.50                     | Lower Silesia |
| 9.          | 8.75                     | Podkarpackie       | 8.50                     | Pomorskie |
| 10.         | 9.00                     | Lubuskie           | 8.63                     | Masovia  |
| 11.         | 9.00                     | Lesser Poland      | 9.38                     | Lubelskie |
| 12.         | 9.00                     | Masovia            | 9.38                     | Podkarpackie |
| 13.         | 9.13                     | Lubelskie          | 9.63                     | Lesser Poland |
Absorption of EU funds for agriculture at province level

Possibilities for eliminating differences in the level of development between individual provinces in Poland are available in the form of EU agricultural support funds. To what extent these funds were used can be seen in the study from, among other things, the number of applications for funding from PROW 2004-2006 Priority B Balanced Development of Rural Areas at province level, including:

**B1- Support for farming in areas with unfavourable agricultural conditions**

The highest number of applications came from the provinces of Masovia (131653), Greater Poland (75946) and Lódzkie (73221) and the lowest number from Opolskie (6405) and Lubuskie (15824).

Of all the land classified as having unfavourable agricultural conditions in Poland, 52.4% was used as farmland and occupied by 18% of the farming population. It should be pointed out that the provinces with the highest percentage of farmland with unfavourable agricultural conditions in 2004 and 2005 were Masovia, Greater Poland (Wielkopolskie) and Podlaskie, and among those with the lowest percentage were Opolskie, Silesia and Świętokrzyskie [Pomianek I and B. 2006].

**B2- Support for agro-environmental ventures and the improvement of stock welfare**

The largest number of applications came from Lubelskie (3847), Świętokrzyskie (2383) and Greater Poland (2206) and the smallest from Silesia (416), Lubuskie (624) and Lesser Poland (Małopolskie) (784).

**B3- Afforestation of agricultural land**

The largest number of applications came from Podkarpackie (730), Mazowieckie (612) and Warmia-Masuria (456) and the lowest number from Opolskie (58) and Silesia (88).

**B4- Alignment of agriculture with EU standards**

Most applications came from Greater Poland (15064), Mazowieckie (14237) and Kujawsko-Pomorskie (13281) and least from Lubuskie (559) and Opolskie (656).

The ARiMR's reports on utilisation of SAPARD fund assistance in 2002-2003 (content of contracts) give information on four areas of activity (1-Improvement of manufacture and marketing of farming and fishing equipment, 2- Investment in agricultural land. 3- Development and improvement in infrastructure of rural areas. 4- Differences in agricultural activity in rural areas).

In area 1, **Improvement of manufacture and marketing of farming and fishing equipment**, most contracts were in Greater Poland (226) and Mazowieckie (147) and least in Opolskie (32), Lubuskie and Świętokrzyskie (40+).

In area 2, **Investment in agricultural land**, most contracts were in Mazowieckie (3423) and Lubelskie (1512), and least in Lubuskie (141) and Zachodnio-Pomorskie (181).

In area 3, **Development and improvement in infrastructure of rural areas**, most contracts were for Greater Poland (504) and Mazowieckie (453) and least were for Opolskie (100) and Zachodnio-Pomorskie (134).

In area 4, **Differences in agricultural activity in rural areas**, most contracts were for Greater Poland (540) and Podkarpackie (560) and least for Lubuskie (117) and Opolskie (124).
Conclusion

Taking into account the overall average figures for all the variables studied, the **best results** in Polish agriculture for the years 2002 and 2004 were achieved in the provinces of Kujawsko-Pomorskie, Zachodnio-Pomorskie and Warmia-Masuria. The **lowest position** was taken by the province of Świętokrzyskie, and the second and third lowest (15 and 14) by Silesia and Podlaskie.

The high position of Kujawsko-Pomorskiego (in both 2002 and 2004) is due to a high average value of indicators (high numbers employed in agriculture, fishing and forestry, highest percentage of agricultural land, high cereal and potato yield and large swine stock).

Zachodnio-Pomorskie’s high position in 2004 was due to an improvement in the following indicators: number of persons employed in agriculture, fishing and forestry; cereal and potato yield. A study by Poczta and Mrówczyńska [2002] also confirmed the high agricultural potential of Kujawsko-Pomorskie.

The indicators selected in this studied do not provide an exhaustive picture of the issue of agricultural differences in Poland but rather give a general overview. Differences between the provinces include differences in environmental conditions. Balanced development in Polish agriculture must take account not only of the results of production (in terms of crops and stock) but also of natural and organisational limitations.

From the point of view of the number of applications for funding form SAPARD/PROW, the highest level of activity was in Masovia and Greater Poland and the lowest in Opolskie, Lubuskie and Silesia. Taking into account the small number of applications made by Silesia (both for SAPARD and PROW 2004-2006 Priority B), it can be predicted that there is little likelihood of a move towards a greater balance in agricultural development.

Changes in rural areas with the support of EU funds are hampered by the fact that funds are too thinly spread, with the result that progress is slowed down and there are too many “important aims” arising.

References


Synopsis
Regional differences determine the possibilities for balanced agricultural development in Poland. The aim of this study was to show selected indicators relating to agricultural production in the years 2002 and 2004, by province. A ranking based on the variables used made it possible to determine which provinces enjoyed strong and which weak conditions. At the same time, a study of the number of applications for funding from the SAPARD and PROW programmes gave a broader overview of agricultural development in recent years, revealing that Masovia and Greater Poland were the provinces which absorbed the greatest amount of funds and Opolske, Lubuskie and Silesia were those that absorbed the least.

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