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CHANGES AND SPATIAL DIFFERENTIATION IN POLISH AGRICULTURE

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Introduction

Agriculture is an important branch of Poland's economy and provides about 16% of the total country's employment. Equally, agriculture is in itself a major factor influencing the state of the environment and shaping the rural landscape.

Among the natural factors, the ones influencing the development of agriculture the most are climate, soil and relief. Some of the plants grown in Poland are subject to frequent ground-frosts in the late spring and early ones in the autumn. Another problem is the dearth of precipitation and its negative distribution through the year.

The soils in Poland were in a large measure developed on post-glacial sediments (sands, gravels and rarely clays). The best and very good soils cover only 3.3% of the country; poor and very poor soils take up 34.6%.

The plain is the most dominant type of relief which does not in general hinder cultivation.

Poland has a large potential where agricultural land is concerned. As more than half of the country is accounted for by agricultural lands, constituting for more than 10% of EU total farmland (*Bański,* 2007). A low level of pollution of the natural environment over most of the country, represents a major attribute of Polish agriculture especially from the point of view of food exportation.

The political transformation of the 1990s brought macroeconomic deterioration where agriculture was concerned. The first years saw an end to the state sector in Polish agriculture, as well as a limitation of eastern markets for its output. The period 1996–2000 brought a marked worsening of the relationships between the prices charged for articles farmers needed to buy and those paid their output was purchased (*Zegar*, 2001). Such changes meant a decline in farmers' incomes to about 40% on the average of what those employed outside agriculture could expect (*Orłowski,* 2001).

After Poland became an EU member state in May 2004, the macroeconomic background for agriculture started improving considerably. Exports of agricultural products from Poland to Western Europe had increased in a very short time by around 30% and the trend was maintained in the next months. Some 1.5 million Polish farmers have received direct payments under the Guarantee section of the Community's EAGGF. At present agricultural economists estimate about 40% of average income of Polands' farmers constitute the total EU fund supports.

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Agrarian structure

At the beginning of the 1990s, the changes of Polish agrarian structure had been significant – especially in terms of land ownership. In 1989 private farming owned 76.2% of total agricultural land in Poland, state farms possessed 18.8%, 3.8% was under collective ownership, and some 0.3% was kept by the agricultural circles (*Głębocki,* 2005). In the years 1992–1995, state farms and agricultural circles were liquidated and their land, together with land belonging to the State Land Fund was taken over by the State Treasury Agricultural Property Agency. Under the administration of the Agency some 4 million hectares were distributed, out of which 2.9 million were leased and barely 380 thousand sold. As the result of transformations the share of land used by private agriculture amounted to 95% of the total agricultural area and the average size of a private individual farm had increased from 7 ha of agricultural land in 1990 to 8.9 in 2007. Simultaneously the number of individual holdings decreased from 2138 to 1881 in parallel with the process of polarisation involving the increase of the share of the smallest holdings (1–2 ha) and of farms above 15 ha. The smallest acreage of holdings is observed in the southern provinces of the country, while the provinces featuring the largest acreage were in the north, where farms of more than 15 ha constitute about 70% of the total agricultural area (*Figure 1*).

Employment in agriculture

As of 2007, agriculture was giving work to 2,092,300 people, or 13.7% of the total employment in the country. The average number of persons employed in agriculture per 100 hectares of agricultural land dropped in Poland from 24 persons in 1989 to 14.7. This number, likewise, varies considerably across space, ranging from 5 persons in Lubuskie voivodship and West Pomerania, 9 persons in Warmia and Mazury to 30 persons in the regions situated at the foot of Carpathians.

The 2002 Agricultural Census revealed that around half of all people running farms had no professional agricultural qualification whatsoever. Also as of 2002, the average figure for agricultural population with over primary education was 53%. In turn, tertiary education of relevance to agriculture was possessed by just 1.2% (*Figure 2*).

The changes in labour resources in the 1990s encompassed also their increase in South-East and Central Poland, where considerable surplus was noted, and the decrease in northern and western parts of the country. In South-Eastern Poland, as well as some central parts, the greatest proportions of farms being run by the over–65s are to be found.

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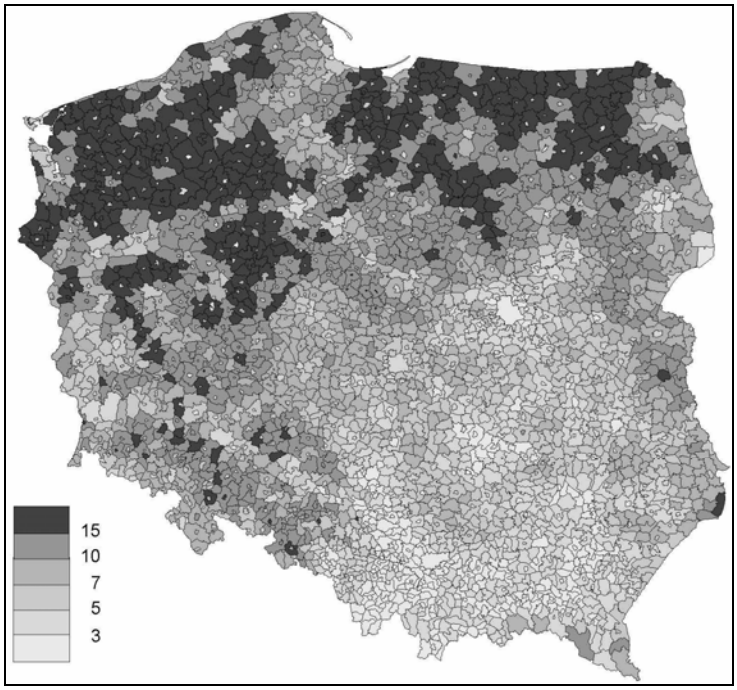
The mechanisation of agriculture and the use of mineral fertilisers

The over-dominant source of traction available in Polish agriculture is mechanical (98%). In the years 1989–2007 the number of tractors increased from 1.1 million to 1.5 million, while the areas of agricultural land per 1 tractor decreased from 16 to 10 ha. The serious problem in the circumstances of the still highly fragmented farms present in Poland is not so much that the number of tractors per unit of agricultural land is low, as that there is a shortage on the land of the kind of low-horsepower machines best suited to work on the small plots actually being cultivated. Furthermore, over half of these tractors have usually been produced before 1980 and represent dated technology. In the early 90s, there was an inevitable decline in the level of use of fertilisers – from 164 kg NPK per ha of agricultural land in 1989/1990 to 66 kg in 1992/1993. Usage rose slightly thereafter to reach 117 kg per ha of farmland in 2006/2007. As of 2000–2007, the supply of pesticides expressed in terms of kg of active substance rose from 0.4 to 0.9 kg per ha of agricultural land on the average. However, not all farms use pesticides.

Figure 1

Average size of Individually-owned farms in Poland, 2002



Source: Author's elaboration according to Geografia rolnictwa Polski 2007.

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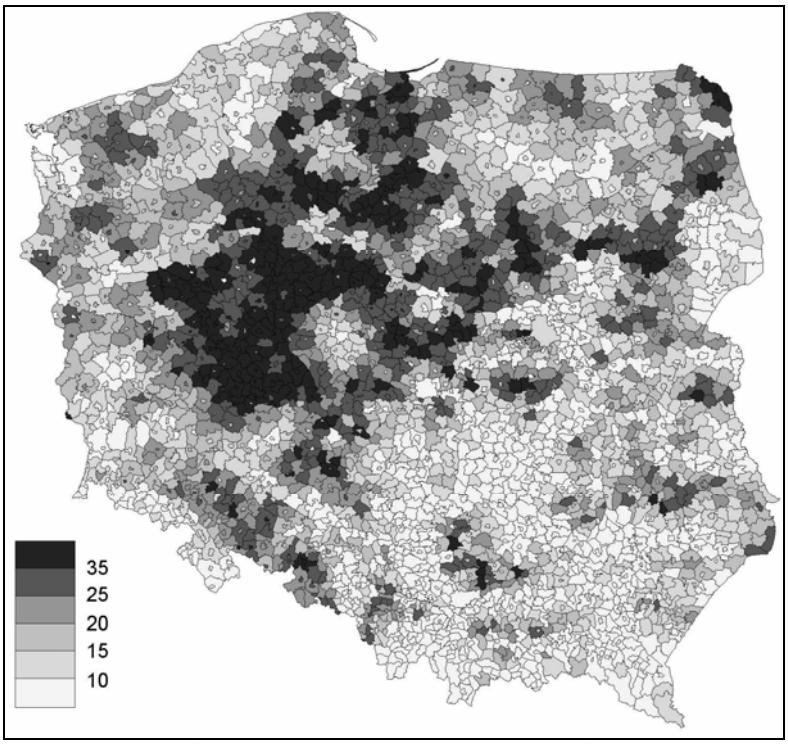
Figure 2

Percentage share of farm leaders with above primary education in the total number of farm leaders. Individually-owned farms in Poland, 2002



Source: Author's elaboration according to Geografia rolnictwa Polski 2007.

Agricultural land use and crop production

More than half (51%) of Poland is in agricultural use. Over ¾ of farmland is arable land. Nearly 30% of the total country is forested.

The last 17 years have brought major changes in the land-use structure pertaining to agriculture (*Kulikowski,* 2005). First, there has been a marked decline in the overall area of agricultural land, along with a large decrease in the area of arable land (*Table 1*).

After arable land, it is meadows that represent the second most important category of agricultural land use. The area they occupy has not changed greatly over the last seventeen years. The area under orchards has increased since 1990 by 15.3% and the most important fruit-growing region is the one to the south of War-

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saw. This accounts for little more than 1% of the country's farmland, yet supplies more than 1/3 of its fruit.

A distinct observable phenomenon post-1990 in relation to arable land was the marked fall in the area sown with crops (*Table 2*), not so much in area but in a large increase of the share being taken by cereals, as well as the absolute and relative decline for potato and fodder crop cultivation.

Table 1

Structure of agricultural land use 1990–2007

Agriculture land	1990		2000		2007	
	thousand ha	%	thousand ha	%	thousand ha	%
Total	18 539	100,0	17 812	100,0	16 177	100,0
Arable land	14 311	77,2	13 683	76,8	11 869	73,5
Orchards	269	1,4	257	1,4	337	2,0
Meadows	2 427	13,1	2 503	14,0	2 497	15,4
Pastures	1 532	8,3	1 369	7,7	1 474	9,1

Source: Author's elaboration according to Geografia rolnictwa Polski 2007.

Table 2

Structure of cropland 1990–2007

Cropland	1990		2000		2007	
	thousand ha	%	thousand ha	%	thousand ha	%
Total	14,242	100.0	12,408	100.0	11,456	100.0
Grains	8,531	59.9	8,814	71.0	8,353	72.9
Wheat	2,281	16.0	2,635	21.3	2,112	18.4
Rye	2,314	16.2	2,130	17.2	1,316	11.5
Triticale	562	3.9	695	5.6	1,260	11.0
Barley	1,174	8.2	1,096	8.8	1,232	10.8
Oats	747	5.2	566	4.6	583	5.1
Grain mixtures	1,169	8.2	1,478	11.9	1,505	13.1
Potatoes	1,835	12.9	1,251	10.1	570	5.0
Sugar beets	440	3.1	333	2.7	247	2.1
Rape seed	500	3.5	437	3.5	797	7.9
Fodder crops	2,342	16.4	913	7.4	866	7.6
Field vegetables	255	1.8	248	2.0	217	1.9
Other crops	339	2.4	546	4.4	406	3.6

Source: Author's elaboration according to Geografia rolnictwa Polski 2007.

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As of late, the area growing potatoes is only one quarter of the area in 1960. The spatial differentiation of potato cultivation has also changed. The areas formerly showing a marked importance of potato growing in the east-central part of Poland and in East Wielkopolska have now disappeared, and their place has been taken by the south-east.

A favourable change in the area sown is the increase of crops of greater value in feeding livestock (like triticale and mixed cereal) at the expense of rye and oats.

Among the industrial crops, sugar beet and rape play very important roles in Poland. The last 17 years have seen a gradual fall of the area under sugar beet. As of 2007 rape is grown on some 800 ha and its cultivation since 2000 has grown almost twice. Tobacco (some 10 thousand ha) was being grown mainly in the upland of Lublin and to the north-east of Cracow.

The field cultivation of vegetables was taking place on some 1.9% of all cropland and was concentrated in the zones around big agglomerations, especially Warsaw and Cracow as well as in the valley of the Vistula river.

The data from the 2002 Agricultural Census show that just 6300 ha of Poland were devoted to the cultivation of vegetables under cover. Nevertheless, the crops in question are of importance, since they supply consumers with much needed vitamins and microelements in the winter period.

Average cereal harvests in the years 1986–1990 had accounted for 26.1 million t and declined to 23.2 million t in the years 1991–1994 (the beginning of the transformation period). In the last several years the cereal production increased to about 27 million t.

In potato production one can observe a marked fall from 36.1 million t in the years 1989–1990 to 14.6 million t in 2001–2005 and 11.8 million t afterwards.

The harvest of vegetables (5.5–6.0 million tons) do not show bigger in the last few years, while the production of fruits from trees have risen from 1.8 million t in the years 1990–1995 to 2.8 million tons in 2001–2006.

Livestock raising

According to the 2002 Agricultural Census, not quite half of all agricultural land was devoted to activity connected with livestock production. In 2007, the division of livestock raising accounted for 44.7% of global output, and for 56.7 of the output of commercial agricultural production. Animal breeding is dominated by the two branches of cattle- and pig-rearing. Poultry breeding for meat and eggs also plays a major role.

The last quarter-century has brought a deep fall in the number of heads of livestock in Poland, mainly cattle and sheep. There was also a decline in the number of large livestock units (where 1 unit = 500 kg) per 100 ha of farmland.

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As of 2007, there were 45% as many cattle as there had been in 1980. Such a large fall in the national cattle herd reflected a marked reduction of cattle breeding on small farms, as well as the liquidation of state farms post-1990. A next underlying factor was the declining profitability of the small herds capable of being maintained on small holdings. Nevertheless, cattle still remained present on 48% of holdings covering more than 1 ha, and individually-owned farms supported 96% of the total national herd of cattle. A region of the particularly intensive raising of cattle in Poland, which has only taken shape in the last 20 or so years, is the western part of Podlasie voivodship.

The second very important branch of livestock production in Poland involves pigs. As of 2007, pork accounted for 11.8% of gross output and 15.9 % of commercial agricultural production, This represents a dominant 55% share in the country's overall production of meat that year. The size of the national herd of pigs has fluctuated markedly, but its reduction was much more smaller. Furthermore, the differences in numbers of pigs from region to region were great as of 2002 The numbers of pigs per 100 ha of agricultural land varied from 1–2 in the vicinity of Warsaw specialising in market gardening, through 15–20 in the foothill areas of the Carpathians, up to 230 in Wielkopolska and the Kujawy region. Record stock levels of between 800 and 1000 were in turn present on some of the gminas of Wielkopolska.

After cattle- and pig-raising, a very important branch of livestock production in Poland is that connected with poultry. The share this branch takes in overall commercial output of livestock increased from 13.3% in 1990 to 15.1% in 2007. The major role where the poultry breeding is concerned is assigned to hens, which represent 80% of all birds kept.

Sheep breeding was virtually completely discontinued (decrease from 4.2 million heads in 1990 to 362 thousand in 2007).

Commercialisation, land and labour productivity

The degree of commercialisation, i.e. the share of commercial production in total gross output declined from 62.5% in 1990 to 50.1% in 1995, albeit with subsequent rise back to 70.5% by 2007. This marked decline in commercial production of agriculture reflected the crisis accompanying the onset of economic restructuring at the beginning of 90s, as well as the closure of the state farms, whose indices were much higher than on individually-owned holdings. The great growth of the degree of commercialization was noted after Poland become a member of EU and was connected to the big increase of export of Polish food product do West European countries.

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According to the 2002 Agricultural Census, around 2/3 of individually-owned farms in Poland were supplying the market with their putput, but a mere 6% of farms could be classed as highly commercial. The main concentrations of such commercially viable farms were in Wielkopolska, Kujawy, Żuławy and certain gminas in Podlasie. At the same time 10.6% of all farms, located mainly in the south-east were producing solely for their own need, with no surplus being sold on the market (*Figure 3*).

The value of commercial and gross agricultural production per unit of agricultural land, are presents in important indices of socio-economic efficiency of land use (*Kulikowski*, 2002). As of 2006, their national average value of commercial production measured in zlotys per 1 ha of agicultural land (level of commercialisation) reached 2876 zł. (about 1200 USD at that time). The spatial differentiation of this index across the country ranged from 1686 zł in the Podkarpackie Voivodship where its level was the lowest, to 4963 zł in Wielkopolska, where its value was the highest (*Figure 4*).

Figure 3

Percentage share of individual farms with the high value (over 50 000 zlotys) of commercial agricultural production in the total number of individual farms, 2002

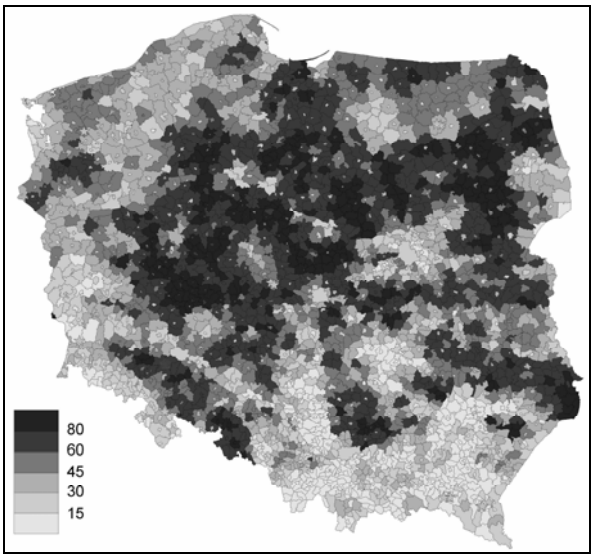

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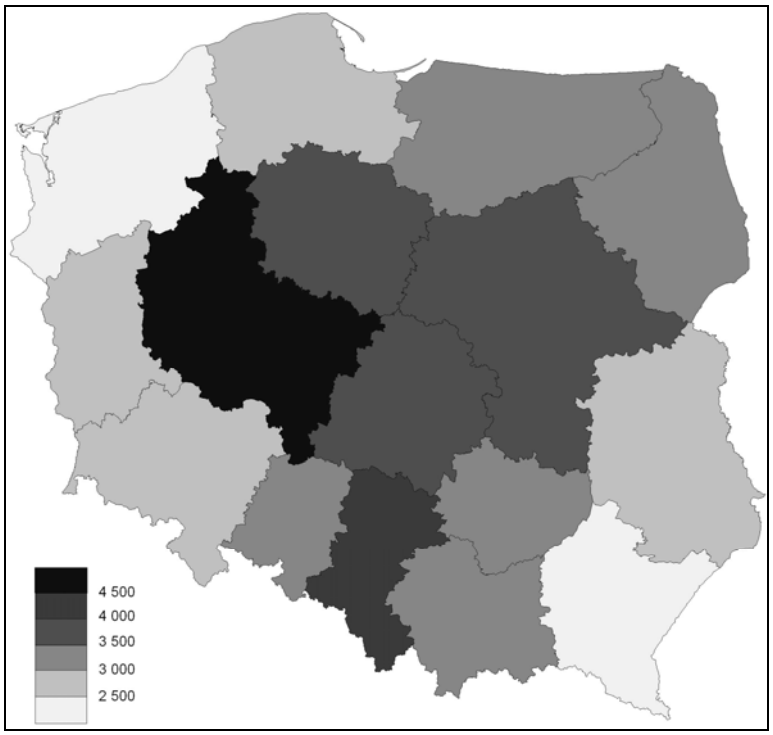
Figure 4

Value of commercial agricultural production in PLN per hectare of agricultural land, 2006



Source: Author's elaboration according to Geografia rolnictwa Polski 2007.

The national value of agricultural gross output measured in zł per 1 ha of agricultural attained the value of 4,079 zł (nearly 1800 USD) in 2006. There are historically conditioned regional differences in the levels of agricultural development and in the values of land productivity in Poland. High levels of land productivity characterised Greater Poland (Wielkopolska), Kujawy and Lower Silesia, as well as agricultural suburban zones of big agglomerations with specialization in horticulture. The lowest level of the index mentioned was noted in central and eastern provinces where small-scale individual holdings dominate and part of them are subsistence farms.

Another important measure of agricultural efficiency is the value of agricultural production per person actively employed in agriculture. In the study here reported labour productivity is shown through the value of gross agricultural production in zł per person fully employed in agriculture. In 1999 the index attained 14,355 PLN.

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The spatial differentiation of this index is closely connected with the size of farms, the level of education of farmers, the level of mechanisation, as well as the degree of specialisation in agricultural production.

Conclusions

Polish agriculture is diversified across space due to natural conditions and historical past. Stagnation or even regression of agricultural production had been brought about by the technological backwardness of this sector of the economy and the worsening profitability of agricultural production at the beginning of 90s. Further processes of transformation of Polish agriculture are, however, unavoidable, although they will be significantly distributed over time, and connected with Polish EU-membership after 2004. Inclusion into EU agricultural policy and the liberalisation of agricultural trade with this group of countries may in the future be a factor of development of agricultural production (*Poczta*, 2008). Nevertheless, according to *Woś* (2001) besides certain benefits, which are promised by integration, at the same time it demands certain real concessions, such as the loss of national independence, broadening the range of risks and social fears of the unknown future.

The hope for the resolution of these problems resides not so much in agriculture itself as in the remaining links of the food economy, which, following the model of the Western European countries, ought to form in time a food system chain united by the common interest, rather than a set of isolated links. The present Polish food economy is characterised by too high employment in agriculture and too high percentage of agricultural production in the total value of production of this sector.

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