ROMAN RUDNICKI
University of Nicolas Copernicus in Toruń

CHANGES IN LAND USE STRUCTURE OF AGRICULTURAL HOLDINGS IN POLAND IN LIGHT OF COMPARATIVE ANALYSIS OF *NATIONAL AGRICULTURAL CENSUSES OF 2002 AND 2010*

Abstract. The study presents the results of the spatial analysis of the total area of agricultural holdings as of 2010 and the changes in these figures as recorded in 2002 and 2010, whereby the agricultural acreage (including: arable lands, permanent crops and permanent grassland) and lands excluded from agricultural activities (including: forests, forestlands and other lands) are treated separately. It has been demonstrated that with a decrease in the total area of agricultural holdings, the agricultural acreage became significantly smaller (by 1,366 thousand ha) and the area of unutilised agricultural lands – in particular forests – enlarged (by 92.3 thousand ha in the case of forests). The changes varied substantially across the regions as a result of both natural, urban and historical conditions, on the one part, and the Common Agricultural Policy mechanisms, on the other part.

Key words: Agricultural holdings, land use, Poland.

Introduction

The matters related to land use comprise an important field of geographical and agricultural studies. Initiated by Powell in the USA at the end of the 19th century, it was developed by Stamp in the UK [Falkowski, Kostrowicki 2001, pp. 17-18]. In Poland it fell within the scope of scientific research carried out predominantly by Uhorczak [1963], Kostrowicki [1960], and Kulikowski [1969]. At present it is further explored by such Polish researchers as: Bański [1997, 1998] and Głębocki [2007, in co-operation with Świderski]. Their studies they include not only the presentation of regional differences in relation to a particular land use form, but also the impact assessment of natural, historical, urban (and any other relevant) conditions.

To a large extent, the contemporary changes in agriculture, including those in the land use structure of the agricultural holdings, are related to the mechanisms of the Common Agricultural Policy (CAP), which applies also to a notable improvement in the financial condition of the agricultural holdings and to the implementation of several aid programmes. As indicated by Rudnicki [2013, pp. 71-92], the agricultural holdings received approximately PLN 93 mld in the period of 2002–2010. These funds had a considerable influence on the land use due to both the area payment schemes (including the Single Area Payment Scheme and the Complementary National Direct Payments for lands in good agricultural condition) and a series of measures within the Rural Development Programme (RDP), in particular those related to afforestation. In order to assess the changes in the land use structure which happened in such conditions, a comparative analysis of the two most recent National Agricultural Censuses (2002 and 2010) was employed.

At that point it should be noted that due to the requirement imposed on the Polish agricultural statistics to comply with the Eurostat standards, the results of the National Agricultural Census of 2010 – the first to be concluded after the Polish accession to the EU – are presented according to another methodology. Unlike in the National Agricultural Census of 2002, that of 2010 treats the agricultural acreage in good agricultural condition as a separate category of land use [*cf. Charakterystyka…2012* and *Użytkowanie…* 2002].

For the purposes of this analysis the census data aggregated by holding headquarters only were used. Particular lands were ascribed to that administrative unit which encompassed the location of farm facilities and the land area or, if there were no building structures, they were attributed to the *gmina* (commune) whose boundaries enclosed the largest part of the land area.

On account of a different availability of and access to the statistical data, the author of the study concentrated on the assessment of transformations in the land use structure of agricultural holdings taking into consideration the division into agricultural acreage and unutilised agricultural lands, which are further divided into two categories: forests and forestlands; and other lands. The regional diversities were analysed on the level of voivodships (regions) and *poviats,* whereby both natural and man-made conditions were investigated.

As far the former conditions are concerned, by means of the agricultural production area quality index [Polish: *WjRpp – cf. Waloryzacja…* 2000] and on the basis of the RDP application criteria for the aid for farmers in Less Favoured Areas (LFA), the following division was developed: U – unfavourable conditions (below 52 points by *WjRpp*, lowland areas); M – moderate conditions (52-72 points by *WjRpp,* lowland areas); and F – favourable conditions (over 72 points by *WjRpp,* areas excluded from the aid allocated for the LFA). When it comes to the man-made conditions, the following two factors were differentiated:

– urban, *i.e.* division of *poviats* into: PZ – *poviat ziemski* (poorly urbanized) and PG – *poviat grodzki* (well urbanized);
– historical, *i.e.* division of *poviats* according to their location: AP – territories of the Polish–Lithuanian Commonwealth acquired by the Austrian Empire during the partitions of Poland and which remained within the Polish borders in the interwar period; PP – territories of the Polish–Lithuanian Commonwealth acquired by the Kingdom of Prussia during the partitions of Poland and which remained within the Polish borders in the interwar period; RP – territories of the Polish–Lithuanian Commonwealth acquired by the Russian Empire during the partitions of Poland and which remained within the Polish borders in the interwar period; and PN – territories of the Polish–Lithuanian Commonwealth acquired by the Kingdom of Prussia during the partitions of Poland and which remained within the German borders in the interwar period (signatures as in Table 1).

The other elements of the analysis, which comprise a detailed characterization of the land use structure of agricultural lands, forests and forestlands, were presented at the regional level only.

1. Land use structure in general

The land use structure was determined on the basis of the total area of lands used by agricultural holdings, which fell into two categories: agricultural acreage and unutilised agricultural land.

The comparative analysis of the National Agricultural Censuses of 2002 and 2010 evinced that within the period under analysis the total area of agricultural holdings in Poland decreased dramatically: by 1,255 thousand ha (from the level of 19,325 thousand ha in 2002 to 18,070 thousand ha in 2010). On average, the indicator of change in the agricultural holding areas for the period of 2002–2010 equalled 94 points (benchmark: 2002 = 100 points) and varied across the regions: with 86-87 points in three voivodships in southern Poland, where mountains constitute a large area (*i.e.* Małopolskie Voivodeship, Podparpackie Voivodship and Śląskie Voivodeship), and with 104 points in the Kujawsko-Pomorskie Voivodeship (*cf.* Table 1).

Taking *poviats* into consideration, an increase in the total agricultural holding area was noted in the group of *poviat grodzki* (130 points on average) and usually in the *poviats* situated in western Poland, which may be related to the take-over of lands previously belonging to the state farms (it may be an outcome of the SAPS implementation).

What is noteworthy at that point is that only the data by *GUS* relating to the holding headquarters were analysed. The comparative study for the period at issue showed particularly pronounced differences between selected entities at the *poviat* level, which applied both to a very high growth in the total area of agricultural holdings (with the highest growth recorded in the *poviat* of Ząbkowice in the Dolnośląskie

Voivodeship (58 thousand ha); the *poviat* of Świecie in the Kujawsko-Pomorskie Voivodeship (47 thousand ha); and the *poviat grodzki* of Gdynia in the Pomorskie Voivodeship (37 thousand ha)) and to a considerable shrinkage of the area (most in the *poviat* of Słupsk in the Pomorskie Voivodeship (60 thousand ha); the *poviat grodzki* of Wrocław in the Wrocław region – which is the Dolnośląskie Voivodeship in the administrative division of Poland – (57 thousand ha); and the *poviat* of Lublin in the Lubelskie Voivodeship (35 thousand ha)). Such big differences prove that the organizational changes related to the designation of a particular agricultural holding to a given *gmina* (or *poviat,* or region) has an increasing impact on the formation of the land use structure. Detailed information on such agricultural holdings is not published by *GUS* in compliance with the obligation on the part of *GUS* to keep statistical confidentiality.

Table 1

Selected assessment elements related to changes in the area and land use structure of agricultural holdings in Poland in period 2002–2010

Specification	Total area of agricultural holdings (TA)			Including				Ratio of change indicators for agricultural acreage and for area of unutilised agricultural land in period 2002-2010
				agricultural acreage		unutilised agricultural land		
	as of 2010		changes in period 2002-2010 (2002=100 points)	(%) of TA as of 2010	changes in period 2002-2010 (2002=100 points)	(%) of TA as of 2010	Changes in period 2002-2010 (2002=100 points)	
	thousand (ha)	(%)						
Poland	18,070	57.8	94	85.8	92	14.2	106	0.87
by voivodships								
Dolnośląskie	1,138	57.0	100	86.1	93	13.9	180	0.52
Kujawsko-Pomorskie	1,257	69.9	104	85.6	98	14.4	155	0.63
Lubelskie	1,668	66.4	92	85.5	90	14.5	102	0.88
Lubuskie	526	37.6	95	88.3	93	11.7	114	0.82
Łódzkie	1,164	63.9	90	86.5	88	13.5	108	0.82
Małopolskie	848	55.8	86	77.8	84	22.2	97	0.86
Mazowieckie	2,285	64.3	92	85.1	90	14.9	103	0.87
Opolskie	549	58.3	93	94.6	93	5.4	87	1.06
Podkarpackie	851	47.7	87	82.3	86	17.7	93	0.92
Podlaskie	1,280	63.4	93	83.3	92	16.7	101	0.92
Pomorskie	962	52.6	94	84.2	94	15.8	96	0.98
Śląskie	526	42.7	86	82.7	83	17.3	104	0.80
Świętokrzyskie	663	56.6	91	84.6	88	15.4	113	0.78

Specification		Total area of agricultural holdings (TA)			Including				Ratio of change indicators for agricultural acreage and for area of unutilised agricultural land in period 2002-2010
					agricultural acreage		unutilised agricultural land		
		as of 2010		changes in period 2002-2010 (2002=100 points)	(%) of TA as of 2010	changes in period 2002-2010 (2002=100 points)	(%) of TA as of 2010	Changes in period 2002-2010 (2002=100 points)	
		thousand (ha)	(%)						
Warmińsko-Mazurskie		1,286	53.2	93	86.5	94	13.5	85	1.11
Wielkopolskie		1,950	65.4	98	90.2	98	9.8	105	0.93
Zachodniopomorskie		1,116	48.7	96	88.1	95	11.9	103	0.92
by natural conditions *									
WjRpp	U	1,489	56.0	95	79.5	92	20.5	110	0.83
	M	11,939	55.3	94	85.4	92	14.6	104	0.89
	F	4,642	66.2	92	89.0	91	11.0	110	0.82
by man-made conditions*									
urban	PZ	17,595	57.6	93	86.1	92	13.9	105	0.87
	PG	474	66.9	103	76.3	98	23.7	118	0.83
historical	AP	1,683	50.0	87	78.6	84	21.4	98	0.85
	PP	2,996	61.4	99	87.0	97	13.0	117	0.82
	RP	8,174	64.0	92	85.3	90	14.7	106	0.85
	PN	5,216	50.9	95	88.3	94	11.7	105	0.90

*Conditions:
- natural: U – unfavourable conditions (below 52 points by *WjRpp*); M – moderate conditions (52-72 points by *WjRpp*); F – favourable conditions (over 72 points by *WjRpp*);
- urban: PZ – *poviat ziemski* (poorly urbanized); PG – *poviat grodzki* (well urbanized);
- historical: AP – territories of the Polish–Lithuanian Commonwealth acquired by the Austrian Empire during the partitions of Poland and which remained within the Polish borders in the interwar period; PP – territories of the Polish–Lithuanian Commonwealth acquired by the Kingdom of Prussia during the partitions of Poland and which remained within the Polish borders in the interwar period; RP – territories of the Polish–Lithuanian Commonwealth acquired by the Russian Empire during the partitions of Poland and which remained within the Polish borders in the interwar period; and PN – territories of the Polish–Lithuanian Commonwealth acquired by the Kingdom of Prussia during the partitions of Poland and which remained within the German borders in the interwar period;

Source: Own work on the basis of data by *GUS* [Central Statistical Office] (*PSR* 2002 [2002 NAC] and *PSR* 2010 [2010 NAC] by holding headquarters).

Despite the figures confirming the downward trend of the total area of agricultural holdings, these areas still comprise the most important segment of the land development in Poland; agricultural holdings constituted 57.8% of the total area of Poland (2010): with 37.6% in the Lubuskie Voivodeship (with a big share of forestlands); 42.7% in the Śląskie Voivodeship (with a big share of urbanized lands); and with a clear dominance of agricultural lands (65-70%) in the Kujawsko-Pomorskie

Voivodeship, the Lubelskie Voivodeship and the Wielkopolskie Voivodeship (*cf.* Table 1). Even bigger differences were recorded at the level of *poviats*: below 40% in 67 units, mostly in highly urbanized areas and in areas less-favoured by nature (including the *poviat grodzki* of Ruda Śląska in the Śląskie Voivodeship and the *poviat grodzki* of Świnoujście in the Zachodniopomorskie Voivodeship – approximately 5%) and above 70% in 91 units (including 22 *poviats* which totalled 85%), which were most numerous in the Kujawsko-Pomorskie Voivodeship (11 *poviats*), the Lubelskie Voivodeship (10), the Mazowieckie Voivodeship (13) and the Wielkopolskie Voivodeship (16). The only voivodeships where such high indicators were not found were the Śląskie and the Zachodniopomorskie (*cf.* Fig. 1).

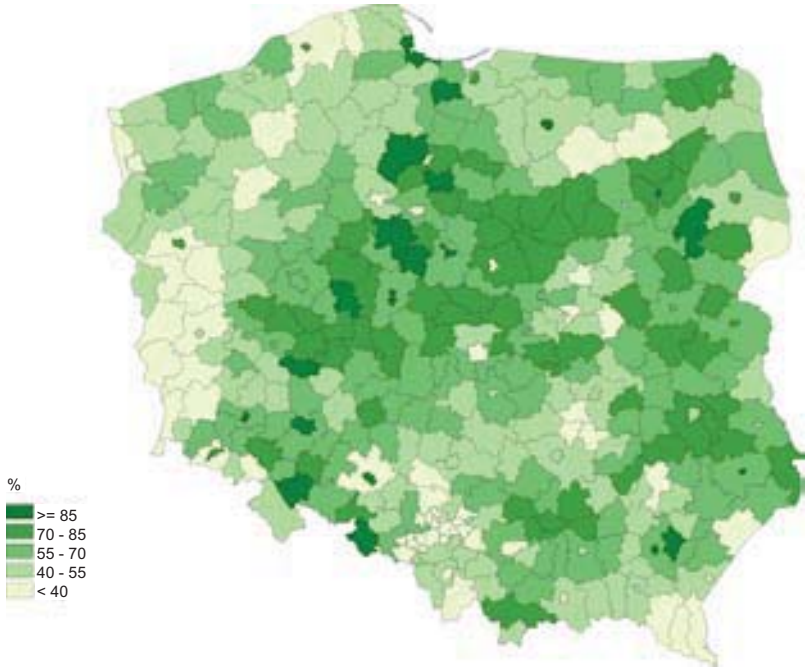

Figure 1. Total area of agricultural holdings by holding headquarters in proportion to the total area of *poviats* (as of 2010)

Source: Own work on the basis of *BDL GUS* [Local Data Bank by Central Statistical Office.

The analysis of conditions as in the above-mentioned territorial breakdown demonstrated that a large share of agricultural holdings in the total area (66.2% on average) usually characterises the *poviats* with favourable natural conditions and those in the centre and in the east of Poland, i.e. in the territories of the Polish–Lithuanian Commonwealth acquired by the Russian Empire during the partitions of Poland (61.4%; *cf.* Table 1).

The share of agricultural holding areas in the total area of a particular *poviat grodzki* remained constant or – not infrequently – rose, which was reflected in the indicator of change calculated for all of the units: 103 points (while the relevant total calculation for the group of *poviat ziemski* was 93 points). Moreover, the study of the man-made conditions evinced a deep decline in the area of agricultural holdings located in the historical region of Galicia (87 points – which is explained by a high fragmentation of agriculture in the mountains), in particular when compared to the figures for territories of the Polish–Lithuanian Commonwealth acquired by the Kingdom of Prussia during the partitions of Poland and which remained within the Polish borders in the interwar period (99 points – which applies to the intensive agriculture on lands in very good agricultural condition).

Apart from the changes in the total area of agricultural holdings, the period of 2002–2010 saw changes in the land use. These applied mostly to the relation between agricultural acreage and unutilised agricultural lands.

Agricultural acreage

According to the National Agricultural Censuses of 2002 and 2010, the agricultural acreage decreased by 1,366 thousand ha (from 16,899 thousand ha in 2002 to 15,503 thousand ha in 2010). Such a big decline, which can be considered an unfavourable phenomenon, especially when continuing, may endanger the national food self-sufficiency.

The period under analysis saw the indicator of change in agricultural acreage at the level of 92 points (benchmark: 2002 = 100 points) and a regional diversity in that respect: with 83 points in the Śląskie Voivodeship and 98 points in the Kujawsko-Pomorskie Voivodeship and the Wielkopolskie Voivodeship. As far as the analysis of *poviats* is concerned, the scale of differences stretched from below 80 points in 54 *poviats* (including 28 *poviats* in three voivodships in southern Poland: Małopolskie Voivodeship, Podkarpackie Voivodeship and Śląskie Voivodeship) to over 100 points in 96 *poviats* (including 38 in the category of *poviat grodzki*, *cf.* Fig. 2).

Taking into account the natural conditions (*WjRpp*), the analysis of changes in agricultural acreage demonstrated an alarming downward trend for the acreage in the *poviats* characterised by favourable natural conditions – 92 points (with the figure for the *poviats* with less-favourable natural conditions being 95 points; *cf.* Table 1).

As a result of the above-described changes in 2010, the share of agricultural acreage in the total area of agricultural holdings amounted to 85.8% and was different for particular voivodships: starting with 77.8% in the Małopolskie Voivodeship and reaching 94.6% in the Opolskie Voivodeship. As regards the *poviats,* the variations were within the limits of 6-8% in the *poviat grodzki* of Gdynia and the *poviat grodzki* of Włocławek, up to 96-97% in the following *poviats*: Dzierżoniów, Strzelin (Dolnośląskie Voivodeship), Prudnik, Głubczyce (Opolskie Voivodeship), Pyrzyce, and Sławno (Zachodniopomorskie Voivodeship).

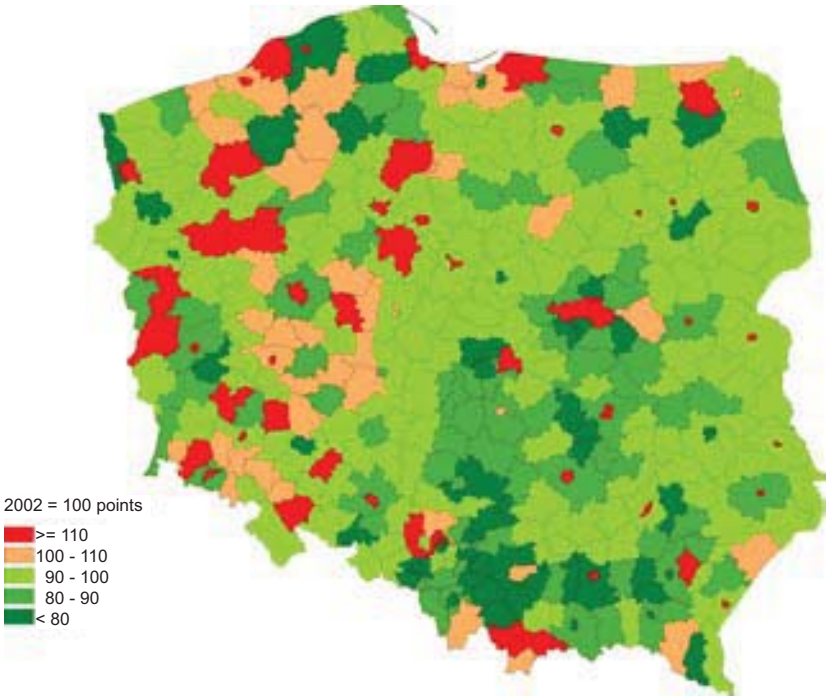

Figure 2. Changes in agricultural acreage of agricultural holdings in period 2002–2010 (benchmark: 2002 = 100 points)

Source: Own work on the basis of data by *GUS* [Central Statistical Office] *PSR* 2002 [2002 NAC] and *PSR* 2010 [2010 NAC].

A low share of agricultural acreage (below 75%) in the total area of a *poviat* was noted in 26 *poviats,* which were usually located in the areas less-favoured by natural conditions, *i.e.* in the mountains in the Małopolskie Voivodeship (6 *poviats*). On the other hand, the agricultural acreage predominated in the land use structure of agricultural holdings (above 90%) in 134 *poviats* which, as a rule, were situated in the areas with favourable natural conditions: Dolnośląskie Voivodeship (17 *poviats*), Kujawsko-Pomorskie Voivodeship (13 *poviats*), Opolskie Voivodeship (12 *poviats*), Pomorskie Voivodeship (13 *poviats*), Wielkopolskie Voivodeship (23 *poviats*) and Zachodniopomorskie (13 *poviats*; *cf.* Fig. 3).

The impact of natural conditions on the territorial differences in the said indicator was confirmed by a large share of agricultural acreage in the areas with favourable natural conditions (89%), especially when set beside the areas with unfavourable natural conditions (79.5%). However, the latter figure points to the fact that too much land in the areas with unfavourable natural conditions in Poland was dedicated to agricultural acreage.

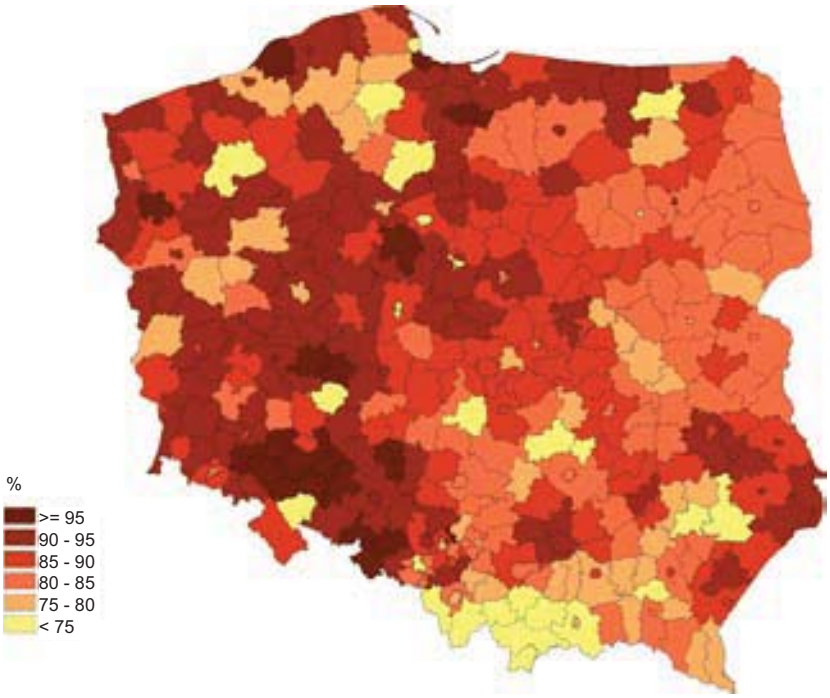

Figure 3. Agricultural acreage in proportion to the total area of agricultural holdings (as of 2010)
Source: Own work on the basis of data by *GUS* [Central Statistical Office] *PSR* 2010 [2010 NAC].

With reference to man-made conditions, it has been concluded that the share of agricultural acreage was smaller in the subgroup of *poviat ziemski:* 76.3% (against 86.1% in the subgroup of *poviat grodzki*) and in territories of the Polish–Lithuanian Commonwealth acquired by the Austrian Empire during the partitions of Poland (78.6%, which can be attributed to a large share of agricultural areas in the mountains; *cf.* Table 1).

The analysis also involved the issues of the agricultural land use. None the less, due to the introduction of lands in good agricultural condition (which comply with the required minimum of environmental protection standards) into the agricultural statistics (*Rozporządzenie*... 2004), particular types of agricultural acreage are incomparable with the results of the National Agricultural Census of 2002 (*PSR* 2002 [2002 NAC]). Therefore, the analysis of that matter encompassed the data on regional differences presented in 2010 NAC (*cf.* Table 2). The inability to compare the area of arable lands, orchards, meadows and pastures as given in the National Agricultural Census of 2002 (which presents the area by the above-mentioned land use forms) with the figures as of 2010 (which apply exclusively to the lands in good agricultural condition) can be deemed a significant barrier to the analysis of spatial structure of agriculture.

Another fact to be highlighted at that point is that the EU funds can be granted only to those agricultural holdings which are run in compliance with the principles of the Good Agricultural Practice, which means that their management standards abide by the principles governing: the rational management of waste, protection of water and soil, preservation of valuable habitats and species living in agricultural areas, and preservation of the natural beauty of the landscape [*Kodeks*... 2004].

In general, the agricultural acreage in good agricultural condition (14,603 thousand ha) comprised 94.2% of the total agricultural acreage in Poland in 2010. The proportion varied across the voivodship: 86.3% in the Podkarpackie Voivodeship, 85.3% in the Śląskie Voivodeship, and approximately 98% in the Kujawsko-Pomorskie Voivodeship, the Opolskie Voivodeship and the Wielkopolskie Voivodeship (*cf.* Table 2).

On the basis of 2010 NAC, the agricultural acreage in good agricultural condition lies at the foundation of the differentiation and the analysis of particular forms of agricultural land use. The most significant position in the structure was taken by the arable lands (on average 74.8% in Poland: from 55.5% in the Małopolskie Voivodeship to 90.7% in the Opolskie Voivodeship). These were predominantly sown areas involving the entirety of the crops which were both sown and planted in the agricultural holding – they constituted 95.5% of all arable lands in Poland (from 55.5% in the Małopolskie Voivodeship, to 90.7% in the Opolskie Voivodeship). Within the arable lands two other land use forms were differentiated, as specified below.

1. Kitchen gardens – areas usually located around holding headquarters with crops first and foremost dedicated to the self-supply of the household run by the person using the agricultural holding, which are accounted in the NAC under 'other crops' and in 2010 NAC are treated separately as a result of the adjustment of *GUS* agricultural statistics to the EU classification (Eurostat); their area equalled 44.2 thousand ha in 2010, which was made up by: potatoes (28.1%), vegetables (43.5%), strawberries (8.0%), and other crops (20.4%).
2. Fallow lands – arable lands not used for the purposes of production (including green manure), but maintained in good agricultural condition and in compliance with the environment protection rules; their area approximated 450 thousand ha in 2010, *i.e.*: 4.1% of arable lands; the share varied across the voivodship with the following extremes: 1-2% in the Kujawsko-Pomorskie Voivodeship, the Opolskie Voivodeship and the Wielkopolskie Voivodeship, and 14.5% in the Podkarpackie Voivodeship (*cf.* Table 2).
   What is to be emphasised here is that, according to the data in 2002 NAC, the area of unutilised agricultural lands was by far larger (2.2 mln ha) and its subsequent decrease was related to the Polish accession to the EU and to the implementation of the direct payment scheme [Bański 2007, pp 150-152].

Table 2

Agricultural land use structure (by agricultural acreage in good agricultural condition)

Specification	Agricultural acreage in good agricultural condition [thousand ha]		Including [%]								
			arable lands				permanent crops		permanent grassland		
			total	including			total	including orchards	total	including	
	(thousand ha)	(%) of total area of agricultural acreage (AA)		sown areas	kitchen gardens	fallow lands*				me-adows	pastures
Poland – total	14,603.2	94.2	74.8	95.5	0.4	4.1	2.7	94.0	22.5	80.1	19.9
by voivodships											
Dolnośląskie	918.1	93.8	83.3	95.6	0.3	4,0	1.0	92.7	15.8	81.7	18.3
Kujawsko-Pomorskie	1,059.6	98.5	85.6	98.5	0.2	1.4	1.1	90.0	13.3	82.0	18.0
Lubelskie	1.373.7	96.3	77.6	95.9	0.9	3.2	5.4	95.5	17.0	89.0	11.0
Lubuskie	421.0	90.7	74.6	92.3	0.3	7.3	2.0	87.3	23.4	85.1	14.9
Łódzkie	962.9	95.6	79.3	96.9	0.3	2.9	4.0	96.6	16.7	87.5	12.5
Małopolskie	595.4	90.3	55.5	90.0	1.3	8.7	2.7	95.4	41.8	89.4	10.6
Mazowieckie	1.843.4	94.8	66.8	95.5	0.3	4.2	5.7	97.8	27.5	81.4	18.6
Opolskie	512.1	98.5	90.7	98.0	0.2	1.8	0.4	82.8	8.9	88.0	12.0
Podkarpackie	604.3	86.3	61.4	83.8	1.8	14.5	2.7	82.7	35.8	84.7	15.3
Podlaskie	1.035.1	97.1	60.2	96.7	0.3	2.9	0.6	89.2	39.2	72.8	27.2
Pomorskie	734.2	90.7	80.9	96.3	0.1	3.5	0.9	72.9	18.2	71.6	28.4
Śląskie	371.3	85.3	76.0	93.8	0.5	5.7	1.0	85.9	23.0	89.0	11.0
Świętokrzyskie	510.9	91.1	70.2	92.0	0.6	7.4	6.9	98.4	22.9	92.1	7.9
Warmińsko-Mazurskie	1,031.9	92.7	64.9	93.1	0.2	6.7	1.0	89.5	34.1	55.9	44.1
Wielkopolskie	1.729.2	98.3	85.0	98.1	0.2	1.7	1.4	92.0	13.7	89.4	10.6
Zachodniopomorskie	900.2	91.6	79.1	95.0	0.2	4.8	3.4	88.7	17.5	77.4	22.6

Source: Own work on the basis of data by *GUS* [Central Statistical Office] (*PSR* 2010 [2010 NAC])

According to the data presented in 2010 NAC, the agricultural holdings in good agricultural condition were further divided into permanent crops (almost 398 thousand ha), in other words: the total area of planted fruit trees, fruit shrubs, fruit arboreta, ornamental tree and shrub cultivations, forest nurseries for commercial purposes, and other permanent cultivations (*e.g.* wicker). That form of land use was dominated by orchards, which made up 94% (mean average) of all permanent crops in Poland (from 72.9% in the Pomorskie Voivodeship to 98.4% in the Świętokrzyskie Voivodeship; *cf*. Table 2). The area occupied by orchards in Poland in 2010 amounted to 374.2 thousand ha, including: fruit tree plantations (71.3%), mostly apple trees (44.2% of all orchards), cherry trees (8.5% of all orchards) and walnut trees (7.6% of all orchards); fruit shrubs and berry shrubs (24.3%), mostly currants (11.2% of all orchards) and raspberries (7.6% of all orchards); and fruit arboreta (4.4%).

The category of 'agricultural acreage in good agricultural condition' used in 2010 NAC also entailed permanent grasslands, *i.e.* the lands permanently (for at least five years) overgrown with grasses, including the subcategories of lands dedicated for mowing (pastures) and lands not dedicated for mowing (meadows). The green lands constituted 22.5% of all arable lands in Poland. The proportion varied across the voivodship: from 8.9% in the Opolskie Voivodeship to approx. 40% in the Małopolskie Voivodeship (41.8%) and the Podlaskie Voivodeship (39.2%). The green land structure was characterised by a high regional diversification: with the domination of meadows in the Świętokrzyskie Voivodeship (92.1%) and with a large share of pastures (44.1%) in the Warmińsko-Mazurskie Voivodeship (*cf.* Table 1).

2. Forms of non-agricultural land use

With the above-described decline in the area of agricultural acreage, the period 2002–2010 saw a pronounced increase (by 141.3 thousand ha) in the area of non-agricultural lands in agricultural holdings, *i.e.* forests, bodies of water, *etc*; there were 2,425.5 thousand ha in 2002 and 2,566.8 thousand ha in 2010. With reference to this category of land use, the average value of the indicator of change for Poland was 106 points, with the highest figure calculated for the Dolnośląskie Voivodeship (180 points). However, no growth in the non-agricultural lands of agricultural holdings was noted only in the Małopolskie Voivodeship (97 points), the Opolskie Voivodeship (87 points), and the Podkarpackie Voivodeship (93 points) – in the south of Poland – and in the Pomorskie Voivodeship (96 points) and the Warmińsko-Mazurskie voivodship (85 points) – in the north of Poland (*cf.* Table 1).

As far as the *poviats* are concerned, on the one end of the scale there were the figures of below 50 points (19 *poviats*) and, on the other end, there were values exceeding 200 points (29 *poviats; cf.* Fig. 4). Generally, the differences were not related to the natural conditions (*cf.* Table 1) as the indicator of change amounted to 110 points both for the *poviats* with favourable natural conditions and for those

with unfavourable natural conditions. What concerns the man-made conditions, an increase in the non-agricultural land area was more distinct in the group of *poviat grodzki:* 118 points. It was due to a greater number of non-agricultural activities (for comparison: 105 points in the category of *poviat ziemski*). When it comes to the historical units, this phenomenon was not observed only within the territories of the Polish–Lithuanian Commonwealth acquired by the Austrian Empire during the partitions of Poland (which is attributed to a high employment rate in agriculture and a big agrarian fragmentation – the factors restricting the non-agricultural development of lands belonging to agricultural holdings).

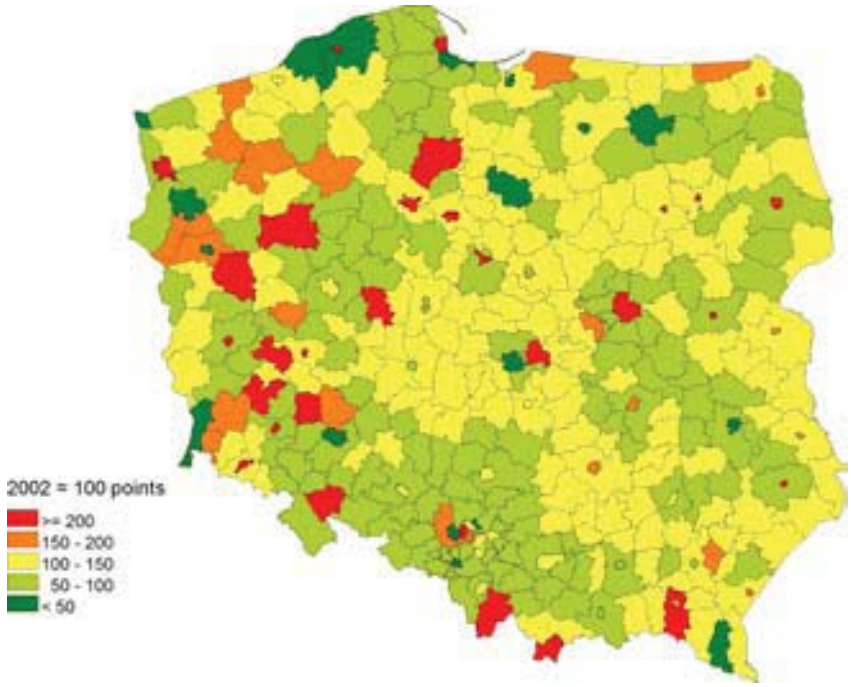

Figure 4. Changes in non-agricultural acreage of agricultural holdings in period 2002–2010 (benchmark: 2002 = 100 points).

Source: As in Fig. 2

In 2010 the non-agricultural acreage comprised (on average) 14.2% of the total area of agricultural holdings in Poland. The percentages differed across the regions (with 5.4% in the Opolskie Voivodeship, up to 22.2% in the Małopolskie Voivodeship; *cf.* Table 3) and across the *poviats* (below 5% in 22 *poviats*, with the lowest result for the *poviat grodzki* of Piekary Śląskie in the Śląskie Voivodeship; over 25% in 26 *poviats*, with the highest values for the *poviat grodzki* of Gdynia, *i.e.* 94.4%, and the *poviat grodzki* of Włocławek, *i.e.* 91.8%; *cf.* Fig. 5). The analysis of the geographical layout evinced that the natural conditions played an important role here: the share

of non-agricultural acreage amounted to 11% of the area of *poviats* with favourable natural conditions and to 20.5% of the area of *poviats* with unfavourable natural conditions. Yet, the influence of man-made conditions was not negligible: the urban factor was responsible for the result of 23.7% in the group of *poviat grodzki* (13.9% in the group of *poviat ziemski*); and the historical factor analysis showed a particularly large share of non-agricultural acreage (affected by natural conditions as well) in the total area of agricultural holdings in the *poviats* lying within the boundaries of the territories of the Polish–Lithuanian Commonwealth acquired by the Austrian Empire during the partitions of Poland (21.4%; *cf.* Table 1).

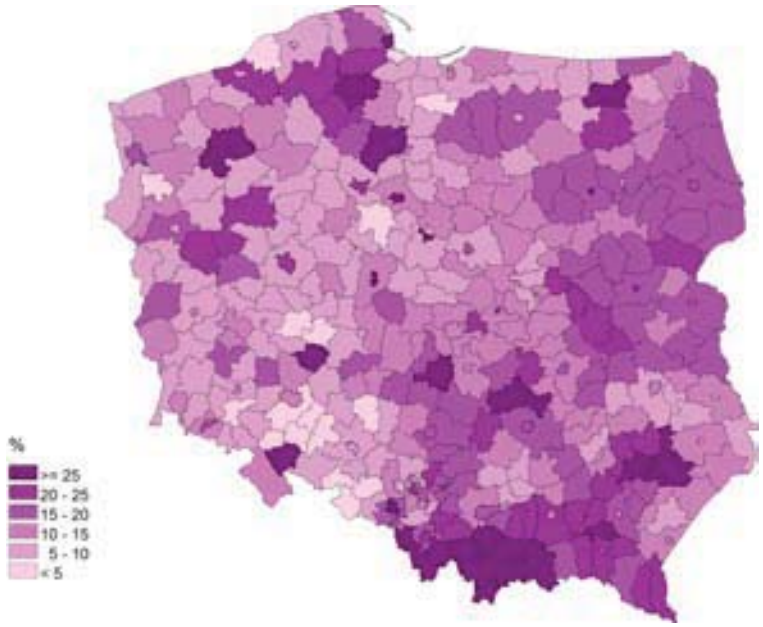

Figure 5. Proportion of non-agricultural acreage in the total area of agricultural holdings (as of 2010).
Source: As in Fig. 3.

Relation of change indicators for agricultural and non-agricultural acreage

Another important fact which emerged in the study was that the Polish agriculture was marked by a downward trend for agricultural acreage, on the one hand, and by a rise in the non-agricultural acreage, on the other hand. In order to assess these changes, a marker showing the relation between the change indicators for agricultural and non-agricultural acreage (the latter being composed of forests and other lands, altogether) was employed in the analysis. Its average for Poland was 0.87. The values differed across the voivodships: from 0.52 in the Dolnośląskie Voivodeship (the change indicator for agricultural acreage (AA) was much lower (93 points) than the change indicator for non-agricultural acreage (180 points)) up to 1.11 in the Warmińsko-

Mazurskie Voivodeship (the change indicator for AA (94 points) was higher than the change indicator for non-agricultural acreage (85 points); similar relation was noted in the Opolskie Voivodeship: 1.06; *cf.* Table 1). The territorial analysis showed that the *poviats* with high values of the marker (over 1.00) were more concentrated in the north and west of Poland. For example: out of 52 *poviats* with the marker of over 1.20, seven *poviats* were in the Wielkopolskie Voivodeship and other seven *poviats* were in the Zachodniopomorskie Voivodeship, whereas such values were not found in the Lubelskie Voivodeship, the Podlaskie Voivodeship and the Świętokrzyskie Voivodeship (*cf.* Fig. 6). An increase in the agricultural acreage being relatively high when compared to the non-agricultural acreage in particular voivodships is explained by large non-agricultural acreage in 2002 (fallow lands and set-asides – mostly within the boundaries of the former state agricultural farms) and by the implementation of a series of Common Agricultural Policy mechanisms, especially the area payments, after 2004.

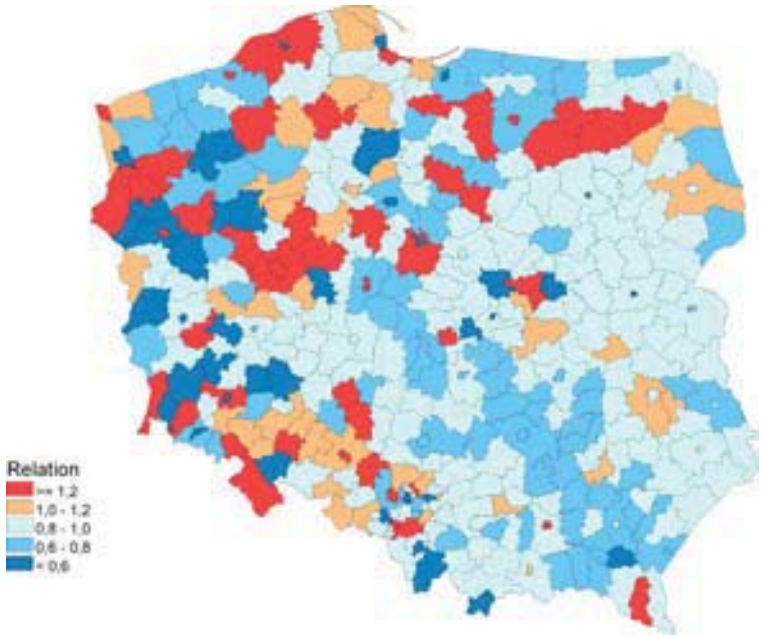

Figure 6. Relation of change indicators for agricultural and non-agricultural acreage of agricultural holdings in period 2002–2010.
Source: As in Fig. 2.

Forms of non-agricultural land use in agricultural holdings

When the sustainable agriculture is developing and when the production is no longer a dominating function in agriculture, the variety of non-agricultural land use forms is gaining in significance. Therefore, the analysis involved two forms of land use: forests and forestlands (treated as one group); and other lands (*cf.* Table 3).

Table 3

Selected elements for the assessment of changes in non-agricultural acreage of agricultural holdings and in its structure in Poland in period 2002–2010 (by holding headquarters)

Specification	Forests and forestlands in agricultural holdings (thousand ha) as of 2010	Including			Other lands in agricultural holdings (thousand ha) as of 2010	Including		
		(%) of total area of agricultural holdings (2010)	(%) of unutilised agricultural lands (2010)	changes in acreage in period 2002-2010 (2002=100 points)		(%) of total area of agricultural holdings (2010)	(%) of unutilised agricultural lands (2010)	changes in period 2002-2010 (2002=100 points)
POLAND	1,293.5	7.2	50.4	108	1,273.3	7.0	49.6	104
by voivodships								
Dolnośląskie	32.3	2.8	20.4	122	126.1	11.1	79.6	205
Kujawsko-Pomorskie	65.2	5.2	36.0	197	115.8	9.2	64.0	139
Lubelskie	146.0	8.8	60.3	102	96.3	5.8	39.7	102
Lubuskie	30.8	5.9	49.9	274	31.0	5.9	50.1	72
Łódzkie	89.3	7.7	56.9	105	67.8	5.8	43.1	111
Małopolskie	123.8	14.6	65.8	93	64.5	7.6	34.2	103
Mazowieckie	224.5	9.8	66.1	102	115.0	5.0	33.9	104
Opolskie	10.6	1.9	36.0	99	18.8	3.4	64.0	82
Podkarpackie	78.7	9.2	52.1	84	72.2	8.5	47.9	107
Podlaskie	153.0	11.9	71.5	103	60.9	4.8	28.5	96
Pomorskie	61.9	6.4	40.6	92	90.6	9.4	59.4	98
Śląskie	51.7	9.8	56.7	119	39.5	7.5	43.3	90
Świętokrzyskie	60.5	9.1	59.1	121	41.9	6.3	40.9	102
Warmińsko-Mazurskie	53.9	4.2	31.1	134	119.2	9.3	68.9	73
Wielkopolskie	85.6	4.4	44.6	116	106.5	5.5	55.4	99
Zachodniopomorskie	25.7	2.3	19.3	114	107.3	9.6	80.7	101

by natural conditions									
WjRpp	U	214.6	14.4	70.2	112	91.1	6.1	29.8	105
	M	897.3	7.5	51.3	107	851.2	7.1	48.7	101
	F	181.7	3.9	35.4	108	331.0	7.1	64.6	112
by man-made conditions									
Urban	PZ	1,270.6	7.2	51.8	108	1,183.6	6.7	48.2	103
	PG	23.0	4.8	20.4	103	89.7	18.9	79.6	123
Historical	AP	221.5	13.2	61.4	94	139.1	8.3	38.6	105
	PP	167.4	5.6	42.8	125	223.5	7.5	57.2	112
	RP	731.7	9.0	60.7	104	473.5	5.8	39.3	108
	PN	173.0	3.3	28.4	133	437.2	8.4	71.6	96

Sources and legend as in Table 1.

Forests and forestlands

The category of 'Forests and forestlands' involves the areas covered with forest plants (afforested) or partly devoid of them (not afforested), as well as the lands related to the forestry. It encompasses the forest nurseries established in forestlands and used for the self-supply of an agricultural holding (*i.e.* not for commercial purposes) and the cultivations of fast-growing trees and shrubs within agricultural acreage.

The comparative analysis of the National Agricultural Censuses of 2002 and 2010 evinced that the period at issue was characterised by a nationwide tendency for the areas of forests within agricultural holdings to grow; there were 92.3 thousand ha more forests (with 1,201.2 thousand ha in 2002 and with 1,293.5 thousand ha in 2010). The phenomenon was observed in the majority of regions, *i.e.* in 12 voivodships. The biggest rise was noted in the Kujawsko–Pomorskie Voivodeship (32.1 thousand ha), the Lubuskie Voivodeship (19.6 thousand ha), the Świętokrzyskie Voivodeship (10.6 thousand ha), and the Warmińsko-Mazurskie Voivodeship (13.8 thousand ha). There were also four voivodships where the area of forests and forestlands dwindled, *i.e.*: the Opolskie Voivodeship, the Pomorskie Voivodeship, and – first and foremost – the Małopolskie Voivodeship (by 8.7 thousand ha) and the Podkarpackie Voivodeship (by 15.3 thousand ha).

The indicator of change in the forest area of agricultural holdings for the period of 2002–2010 was at the average level of 108 points for Poland (benchmark: 2002 = 100 points). There were a lot of regional differences: with 84 points in the Podkarpackie voivodship and with over twice as many points (274) in the Lubuskie Voivodeship (*cf.* Table 3).

The forest area of agricultural holdings shrank in 126 *poviats* scattered all over Poland (mostly in the Małopolskie Voivodeship with 16 *poviats*, the Mazowieckie Voivodeship with 16 *poviats*, and the Śląskie Voivodeship with 18 *poviats*). Other *poviats* were characterised by a growth in that area (50 *poviats* crossed the threshold of 200 points), with the exception of the *poviats* in the Małopolskie Voivodeship. The Śląskie Voivodeship, marked by high urbanization, had the biggest number of these *poviat*s*, i.e.* 8 altogether (*cf.* Fig. 7).

The impact of urban factors was also corroborated by the differences between the calculations for all units in the groups of *poviat grodzki* (108 points) and *poviat ziemski* (103 points). What has also transpired from the analysis is that the forest area of agricultural holdings situated in the *poviats* with unfavourable natural conditions grew more intensively (the average of 112 points) than in the *poviats* with moderate or unfavourable natural conditions (107-108 points; *cf.* Table 3).

The changes in the area of forests within agricultural holdings were also related to the historical factors. It was reflected, on the one hand, in a decrease in the forest area within the territories of the Polish–Lithuanian Commonwealth acquired by the Austrian Empire during the partitions of Poland (98 points) and, on the other hand, in the increase in the said area within the territories of the Polish–Lithuanian Com-

monwealth acquired by the Kingdom of Prussia during the partitions of Poland, which applies both to the territories remaining within the Polish borders in the interwar period (125 points) and to those remaining within the German borders (133 points). As regards the territories of the Polish–Lithuanian Commonwealth acquired by the Russian Empire during the partitions of Poland, the result was at the level of 104 points (*cf.* Table 1, Fig. 7).

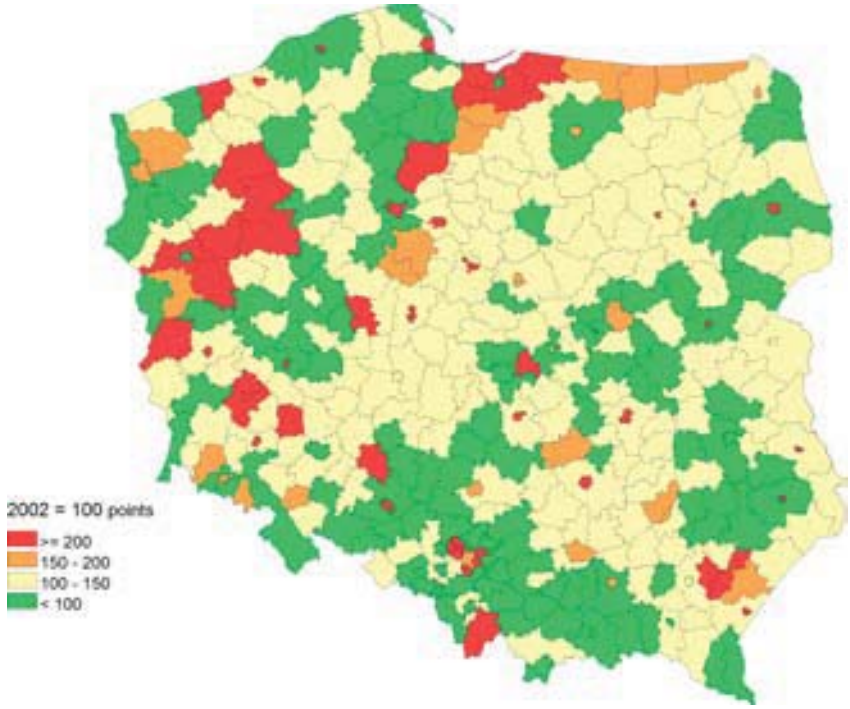

Figure 7. Changes in forest area and forestland area of agricultural holdings in period 2002–2010 (benchmark: 2002 = 100 points).

Source: As in Fig. 2.

In 2010 the area of forests and forestlands made the average of 7.2% of the total area of agricultural holdings. The share varied largely across the voivodships (from 1.9% in the Opolskie to 14.6% in the Małopolskie; *cf.* Table 1). The variations were even more pronounced at the level of *poviats* (from 0.1% in the *poviat grodzki* of Piekary Śląskie to 40.3% in the *poviat ziemski* of Żywiec, both of them being in the Śląskie Voivodeship). The territorial differences in the proportion of forests to the total area of agricultural holdings is highly historically-determined: traditionally, there were more forests in the agricultural holdings situated in the centre and east of Poland (the territories of the Polish–Lithuanian Commonwealth acquired by the Russian Empire during the partitions of Poland: 9%; and the territories of the Pol-

ish–Lithuanian Commonwealth acquired by the Austrian Empire during the partitions of Poland: 13.2%) than in the north and west of Poland (the territories of the Polish–Lithuanian Commonwealth acquired by the Kingdom of Prussia during the partitions of Poland, which applies both to the territories remaining within the Polish borders in the interwar period: 5.6% and to those remaining within the German borders: 3.3%). A high figure of the marker (*i.e.* low *WjRpp*) was calculated for the Lake District of Kaszuby (belonging to the territories of the Polish–Lithuanian Commonwealth acquired by the Kingdom of Prussia during the partitions of Poland), which points that the above-mentioned territorial characteristics were affected by the natural conditions as well. Such a relation was also supported by different proportions of forest areas to the area of the agricultural holdings in the *poviats* with unfavourable (14.4%), moderate (7.5%) and favourable natural conditions (3.9%). Moreover, it has been concluded that the urban factor played an important role, too, because the markers at issue were higher in the group of *poviat ziemski* (7.2%) than in the category of *poviat grodzki* (4.8%; *cf.* Table 1, Fig. 8).

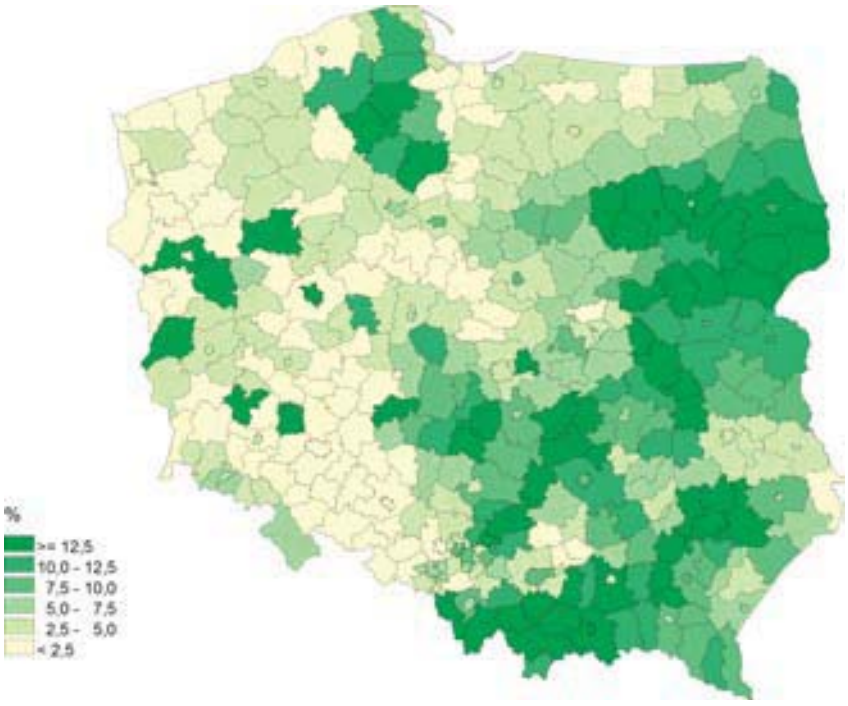

Figure 8. The proportion of forest area and forestland area in the total area of agricultural holdings (as of 2010).

Source: As in Fig. 3.

The analysis of data published in 2010 NAC demonstrated that forests and forestlands were important features of the agricultural holdings in Poland, by reason of both their natural impacts (improvement of biodiversity in ecosystems) and their economic significance (income of agricultural holdings derived from silviculture and afforestation within the Common Agricultural Policy – CAP). As far as the natural importance of forestlands for agricultural holdings is concerned, it suffices to look at their share in the total area of forests. The Polish average was 13.9%. The breakdown into voivodships saw the lowest results (below 5%) in: the Lubuskie Voivodeship (4.4%), the Opolskie Voivodeship (4.1%) and the Zachodniopomorskie Voivodeship (3.1%); while the highest results, which approximated 30%, were noted in: the Małopolskie Voivodeship (28.2%) and the Mazowieckie Voivodeship (27.4%).

While the economic significance of forests and forestlands becomes clear upon the study of the number of the agricultural holdings where these lands were in use (898.5 thousand holdings, with the largest sum of 150.2 thousand in the Mazowieckie Voivodeship). What emerged due to 2010 NAC was that as many as 39.5% of all Polish agricultural holdings used forests and forestlands. The proportions differed across the voivodships: with about 15% in the Dolnośląskie Voivodeship (14.7%) and the Lubuskie Voivodeship (14.9%; *cf* Table 4).

To a large extent, the increase in the forest area of agricultural holdings was an effect of the CAP instrument operating within the Rural Development Programme (RDP) which was dedicated for supporting the afforestation of agricultural holdings. In that light, the afforestation comes as an important factor in the processes of improving the natural conditions of agricultural acreage (*i.e.* increasing the forest area through the afforestation of lands used within agricultural holdings) within the RDP for 2004–2006 (which applies mostly to the low-soil-quality lands) and of other lands within the RDP for 2007–2013 (*i.e.* afforestation of abandoned agricultural lands or other types of set-asides). The measure is particularly significant for the Polish agriculture which is characterised by an excessive use of lands with low agricultural usefulness and lands exposed to such risks as erosion or water contamination. When undertaken in these conditions, the afforestation has positive influence on the sustainable growth of agriculture and rural areas. It applies both to the natural environment (larger forest cover leads to the creation of conditions favourable for ecosystems and biological diversity) and to the socio-economic growth of the rural areas (through the provision of additional workplaces and sources of income; [Polna 2006, Rudnicki 2010].

The afforestation within the RDP was in compliance with the *Krajowy Program Zwiększenia Lesistości* (*KPZL*) [National Afforestation Programme] and was undertaken on the lands which did not belong to the Treasury but which were farmers' private property, whereby the minimum afforestation area amounted to 0.3 ha (RDP, 2004–2006) and 0.5 ha (RDP, 2007–2013) and the minimum width of wood cover was to equal 20 m (with exception of the plots adjacent to the forest). Only the indigenous species of trees and shrubs (following the subcategorization of the major

species, minor species and biocoenotic species) may be used for afforestation; what is more, the saplings must be traceable to a licensed seed bank. In the process of choosing the species for planting the following was taken into consideration: classification of agricultural lands and the physiography, according to the Regulation of the Council of Ministers on detailed conditions of and procedures for granting financial aid for the afforestation of agricultural lands within the Rural Development Programme [The Journal of Laws of 2004, No. 187, item 1929].

Table 4

Forests and forestlands in agricultural holdings and afforestation within the RDP – selected elements

Specification	Forests and forestlands in agricultural holdings (2010)				Afforestation within RDP (2004-2010)			
	area		number of holdings		afforestation area		number of applications	
	(thousand ha)	(%) of total area of forests	(thousand ha)	(%) of total agricultural holdings	(thousand ha)	(%) of forests within agricultural holdings	(thousand ha)	(%) of agricultural holdings with forests
Poland - total	1,293.5	13.9	898.5	39.5	55.5	4.3	64.0	7.1
by voivodships								
Dolnośląskie	32.3	5.3	15.6	14.7	3.1	9.7	2.5	16.2
Kujawsko-Pomorskie	65.2	15.2	19.1	21.5	2.9	4.5	3.5	18.1
Lubelskie	146.0	24.9	137.9	53.0	4.0	2.7	5.6	4.1
Lubuskie	30.8	4.4	6.4	14.9	2.0	6.6	1.5	23.8
Łódzkie	89.3	22.8	77.0	45.4	3.0	3.3	4.5	5.9
Małopolskie	123.8	28.2	124.0	43.3	0.6	0.5	1.7	1.4
Mazowieckie	224.5	27.4	150.2	55.1	9.1	4.1	9.8	6.5
Opolskie	10.6	4.1	8.3	18.5	0.6	5.6	0.8	10.1
Podkarpackie	78.7	11.6	96.3	36.6	4.1	5.2	8.8	9.2
Podlaskie	153.0	24.4	69.1	65.6	3.1	2.0	4.4	6.3
Pomorskie	61.9	9.1	17.6	29.4	3.7	5.9	2.7	15.2
Śląskie	51.7	12.9	46.5	30.2	1.3	2.6	1.2	2.6
Świętokrzyskie	60.5	18.1	61.3	42.1	2.4	3.9	5.0	8.1
Warmińsko-Mazurskie	53,9	7.1	21.4	31.9	9.9	18.3	6.7	31.3
Wielkopolskie	85.6	10.9	38.7	23.8	3.1	3.6	3.7	9.7
Zachodniopomorskie	25.7	3.1	9.1	18.9	2.6	10.1	1.5	16.6

Source: Own work on the basis of *BDL GUS* [Local Data Bank by Central Statistical Office] and data published by *ARiMR* [Agency for Restructuring and Modernisation of Agriculture].

1. The financial aid for farmers undertaking the afforestation of their lands within the RDP stemmed from the EU funds in 80% (from the state funds in 20%) and involved three stages: The support for afforestation, whereby the amount of support depended on the structure of tree stands (*i.e.* the share of deciduous and coniferous species), the use of fencing to protect the cultivation against animals, the landform (the slopes of a gradient higher than 12° raise the afforestation costs by 40% in relation to the afforestation costs incurred through activities on lands with a favourable landform configuration). The payments were in the form of lump sums and covered 80% of costs related to afforestation and protection against animals (beneficiary's own contribution was 20%). The one-off payments were calculated for each hectare of lands under afforestation and were available for farmers upon the start of cultivation. At present (PDR, 2007–2013) the financial aid for afforestation of agricultural acreage starts with EUR 1,065.6 per hectare (cultivation of deciduous trees in the areas with a favourable landform configuration where the miccorhized seedlings with a covered root system are used) and reaches EUR 1,603.6 per hectare (cultivation of coniferous trees on slopes with a gradient higher than 12° where the miccorhized seedlings with a covered root system are used);
2. The annual allowance to cover maintenance costs paid in the first five years of cultivation. It is to compensate for the costs of maintenance involving, apart from fighting the pathogens and weeds hampering the growth of seedlings, first and foremost the so-called preliminary thinning, *i.e.* practices of removing some of the seedlings from the silviculture with a view to forming a desirable species structure and to facilitating their growth. The amounts of the allowance do not depend on the tree stand species; what matters is the use of tree protection measures against animals, such as: repellents (RDP, 2007–2013: EUR 48.7 per hectare), pickets (RDP, 2007–2013: EUR 179.3 per hectare) and sheep wool (RDP, 2007–2013: EUR 71.7 per hectare) as well as whether the afforestation is undertaken on lands with a favourable or unfavourable landform configuration, whereby the cultivations on lands with unfavourable conditions (reclaimed lands) and grown in the system of natural rotation are treated separately (the differences in payments for the afforestation of agricultural lands amounted to: at least EUR 248.5 per hectare of land with unfavourable configuration or up to EUR 348.4 per hectare of land on the slopes with the gradient higher than 12°);
3. The annual premium per hectare to cover loss of income resulting from afforestation (RDP, 2007–2013) paid for the period of fifteen years counting from the first year of cultivation (RDP, 2004–2006: paid for the period of twenty years). The amount of the premium, under the RDP for 2004–2006, depended on the proportion of income from agricultural activities in the total income of a particular agricultural holding: when below 20%, the premium amounted to PLN 360 per hectare in 2004; and when above 20%, the premium reached PLN

1,400 per hectare in 2004. Whereas under the RDP for 2007–2013 the premium was granted to the farmers whose income from agricultural activities did not surpass 25% of their income in total: PLN 1,580 (EUR 404.7) per hectare annually [*cf.* Kołodziejczak, Rudnicki 2012].

In general, the analysed measure covering the period of 2004-2010 allocated PLN 734 mln for afforestation, which was tantamount to 64 thousand applications being processed (with 0.8 thousand in the Opolskie Voivodeship and with 9.8 thousand in the Mazowieckie Voivodeship) and to 55.5 thousand ha being afforested (from 0.6 thousand ha in the Małopolskie Voivodeship and the Opolskie Voivodeship to 9.1 thousand ha in the Warmińsko-Mazurskie Voivodeship; *cf.* Table 4).

The importance of the financial aid from the EU funds is demonstrated by the fact that the afforestation undertaken within the RDP made as many as 60% of the increment of forests and forestland areas in agricultural holdings in the period of 2002–2010. Although this CAP instrument has been effective for a relatively short time, as early as in 2010 the area under afforestation within the RDP comprised 4.3% of the total area of forests and forestlands in agricultural holdings in Poland. The share varied in the following manner: from 0.5% in the Małopolskie Voivodeship, through 10.1% in the Zachodniopomorskie Voivodeship and up to 18.3% in the Warmińsko-Mazurskie Voivodeship. Therefore, it can be acknowledged that the RDP measure under analysis was highly popular with farmers, particularly in those Voivodeship where the number of processed afforestation-related applications exceeded 20% of all agricultural holdings utilizing forests and forestlands, i.e. in the Lubuskie voivodship (23.8%) and the Warmińsko-Mazurskie Voivodeship (31.3%; whereby the national average was 7.1%; *cf.* Table 4).

A great popularity of the measure was also demonstrated in the data by *Agencja Restrukturyzacji i Modernizacji Rolnictwa* (Agency for Restructuring and Modernisation of Agriculture). There were only four *poviats* where the measure was not found so attractive, namely: Dzierżoniów (Dolnośląskie), Zakopane (Małopolskie), Bielsko-Biała and Racibórz (both in the Śląskie). In contrast, the measure enjoyed the highest levels of attractiveness in the *poviat* of Warszawa Zachodnia (2,806 ha; data by beneficiary's headquarters).

Forests constitute a significant form of non-agricultural land use in agricultural holdings. On average, their share in the total non-agricultural acreage in Poland amounted to 50.4% (2010). The proportions varied across the voivodeships: with 19.3% in the Zachodniopomorskie and 20.4% in the Dolnośląskie voivodeship to 66.1% in the Mazowieckie voivodship and 71.5% in the Podlaskie. The differences were noted at the level of *poviats* as well: from 1.2% in Ząbkowice (Dolnośląskie) to 86.7% in Nowy Targ (Małopolskie) and 87.6% in Żywiec (Śląskie). Upon the analysis of these figures in relation to geographical layout, it has become evident that the historical factors were very strong. On the one hand, forests and forestlands had a non-negligible share in the total non-agricultural acreage of agricultural holdings situated

in the voivodeships in eastern Poland: mostly the territories of the Polish–Lithuanian Commonwealth acquired by the Austrian Empire and the Russian Empire during the partitions of Poland (*i.e.* Małopolskie, Mazowieckie, Lubelskie, Łódzkie, Podlaskie, Świętokrzyskie, Podkarpackie voivodeships. The phenomenon was exemplified by the fact that out of 113 *poviats* with the result below the threshold of 30%, merely 12 of them were located in the above-mentioned areas). On the other hand, there were very few *poviats* with high values of the indicator in the rest of Poland (*e.g.* out of 48 *poviats* with the result of over 70%, only 13 of them were situated in the north and west of Poland).

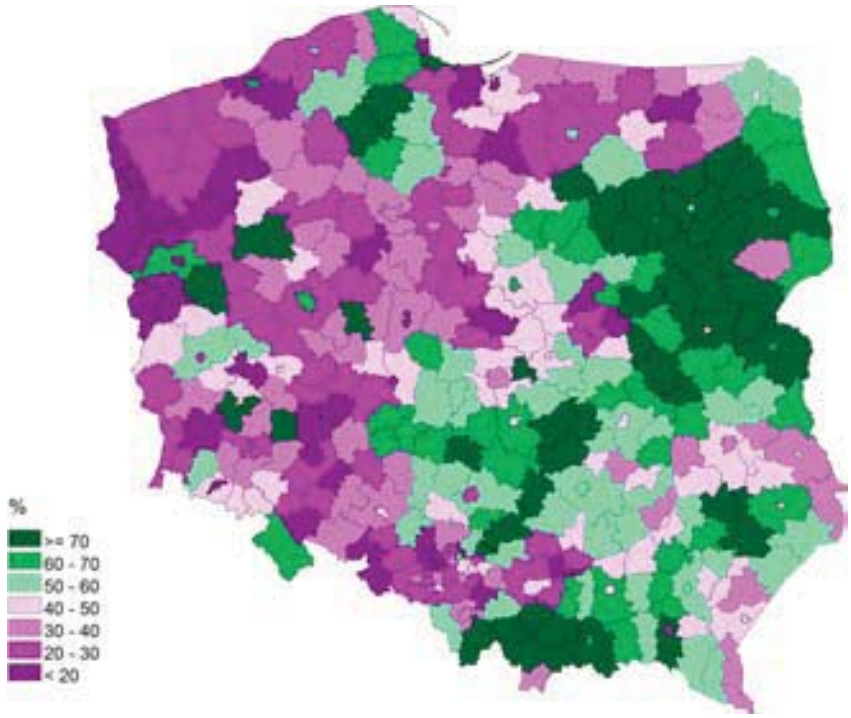

Figure 9. Proportion of forests and forestlands in the non-agricultural acreage of agricultural holdings (as of 2010).

Source: As in Fig. 3.

To a large extent, the territorial differences, as described above, resulted from the agrarian reform executed by virtue of the Decree of *Polski Komitet Wyzwolenia Narodowego* [Polish Committee of National Liberation] dated 6 September 1944. The aim of the reform was to assign some lands to individual agricultural holdings; however, in the north and west of Poland (the so-called Regained Territories) these lands comprised first and foremost non-agricultural acreage; whereas the forests and forestlands were usually taken over by the State to enrich the resources of the just-created

body of State Forests. The lands which were not in the focus of the said reform maintained a high, historically-determined share of forests in the total area of agricultural holdings.

Other lands

The analysis of changes in the land use structure of agricultural holdings in Poland also involved the category of 'other lands'. It includes the lands occupied by building structures, yards, decorative squares and gardens, parks, areas of landlocked bodies of water, field drains, areas overgrown with natural wicker, swamps, other uncategorized areas (*e.g.* peat-bogs, gravel pits), wastelands and areas dedicated for sports and recreation (*e.g.* golf courses). Moreover, this category encompasses the area of unutilised agricultural lands if these are not to become part of agricultural acreage again (*e.g.* agricultural lands dedicated for road or supermarket construction).

In general, the period of 2002–2004 saw an increase in the share of the abovementioned lands in the agricultural holdings in Poland by nearly 49 thousand ha (from 1,224.3 thousand ha in 2002 to 1,273.3 thousand ha in 2010). However, the regional analysis of changes in the area of the 'other lands' evinced that, apart from the units characterised by the said rise (mostly in the Dolnośląskie Voivodeship with 64.5 thousand ha and the Kujawsko-Pomorskie with 32.5 thousand ha), there were also some voivodships marked by a significant decrease in that area (the Lubuskie Voivodeship with 12.2 thousand ha and the Warmińsko-Mazurskie with 44 thousand ha).

The spatial analysis of the phenomenon was conducted on the basis of the indicator of change in the area of the 'other lands' calculated for the period of 2002–2010 (benchmark: 2002 = 100 points). Its national average was 104 points. In seven voivodships the results were below 100 points (a decrease was most striking in the Lubuskie Voivodeship and the Warmińsko-Mazurskie (72-73 points)). Yet, more than a twofold increase in the area of the 'other lands' was recorded in the Dolnośląskie (205 points; *cf* Table 3). Much bigger differences in the indicator at issue were found in the study of *poviats*: below 75 points in 63 units (most in the Pomorskie with 9 *poviats,* the Śląskie with 12 *poviats,* the Warmińsko-Mazurskie with 8 *poviats* and the Zachodniopomorskie with 10 *poviats*) and over 125 points in 51 units (most in the Mazowieckie with 8 *poviats*, the Podkarpackie with 7 *poviats*, the Wielkopolskie with 8 *poviats* and the Zachodniopomorskie with 9 *poviats*) (*cf.* Fig. 10).

As far as the contributing factors are concerned, the highest rate of growth in the area of the 'other lands' was in the *poviats* characterised by favourable natural conditions, which is a negative phenomenon, because such areas are naturally predestined to be used for agricultural production. At that point it is to be emphasised that the 'other lands' in these *poviats* made as many as 64.6% of the total area of non-agricultural lands (*cf.* Table 3). Moreover, a particularly sharp increase in the analysed area was found in the group of *poviat grodzki* (123 points).

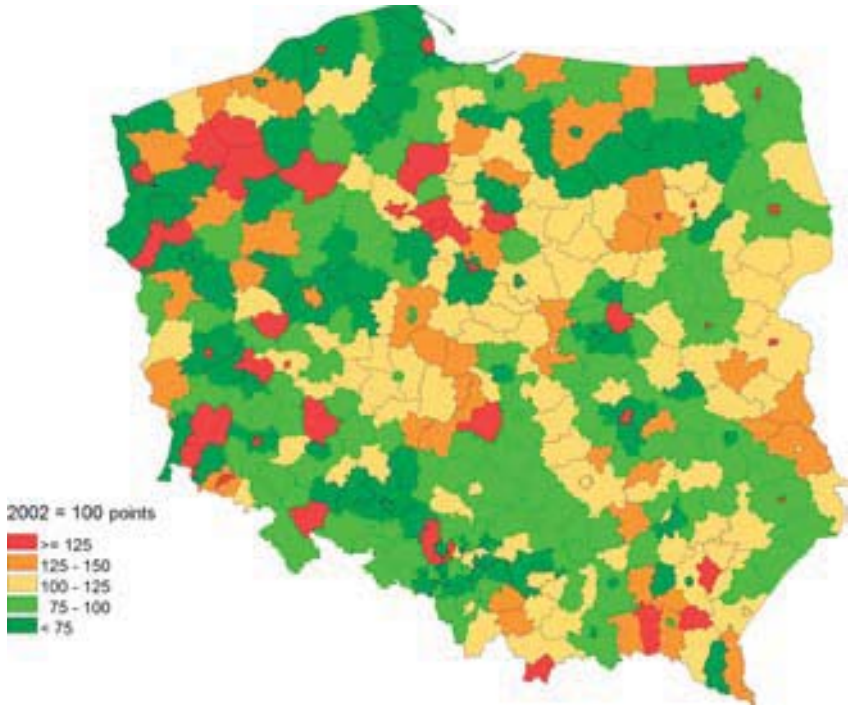

Figure 10. Changes in the area of the 'other lands' in agricultural holdings in period 2002–2010 (benchmark: 2002 = 100 points).

Source: As in Fig. 2.

When it comes to the historical determinants, a decline in the area of the 'other lands' was noted only in the territories which were added to Poland after World War II. Being part of the mechanisms operating in the previous political and economic system, they were dominated by the state agriculture. During the transformation period these lands were only partially used for agricultural purposes (there were large areas of fallow lands and set-asides). That negative trend was reversed upon the Polish accession to the EU and the implementation of direct subsidies.

According to the data published in 2010 NAC, the 'other lands' comprised 7% of the total area of agricultural holdings in Poland. The values differed in particular voivodships: starting with 3.4% in the Opolskie Voivodeship and 4.8% in the Podlaskie; through 9.2% in the Kujawsko-Pomorskie, 9.4% in the Pomorskie, 9.3% in the Warmińsko-Mazurskie, 9.6% in the Zachodniopomorskie; reaching the record of 11.1% in the Dolnośląskie (*cf.* Table 3).

In terms of *poviats,* low results (*i.e.* below 4%) were calculated for 57 units, which gravitated around two centres: the first being the region of Dolny Śląsk [Lower Silesia] and the region of Opole (22 *poviats*); the other lying on the borderline between the Mazowieckie and the Podlaskie Voivodeship (10 *poviats*). On the other hand, high

results (*i.e.* over 10%) were noted in 55 *poviats*, which were densely grouped in southern Poland: in the Małopolskie, Śląskie and Podkarpackie Voivodeship (25 *poviats* altogether). As far as the other parts of Poland are concerned, such poviats could usually be found in the stretch of the lake districts in the north of Poland (*cf.* Fig. 11).

The analysis of the above-mentioned indicator demonstrated a significant role of both the urban factors (a high proportion of the 'other lands' in the group of *poviat grodzki* (18.9%)) and the historical ones (high results in the territories of the Polish–Lithuanian Commonwealth acquired by the Austrian Empire during the partitions of Poland, *i.e.* 8.3%, which is also a feature of agricultural holdings situated in the mountains; and in the so-called Regained Territories, *i.e.* 8.4%, which is characteristic of agricultural holdings located in lake districts).

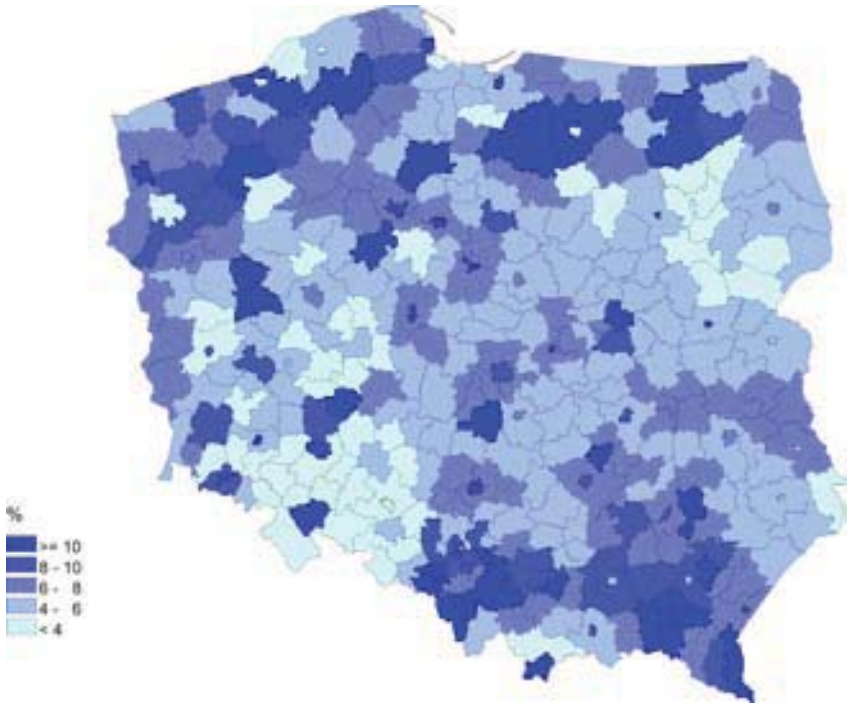

Figure 11. Proportion of area occupied by bodies of water and 'other lands' in the total area of agricultural holdings (as of 2010).

Source: As in Fig. 3.

Summary

The analysis demonstrated that the period of 2004-2010, mostly related to the first years of the Polish membership in the EU and to the inclusion of the Polish agri-

cultural holdings into the Common Agricultural Policy, saw substantial changes in the land use structure, which applied to both their rates and their directions. The period was characterised by a considerable decrease in the area of agricultural acreage (by 1,366 thousand ha). Since the scale of this phenomenon was rather large, its implications are deemed highly unfavourable at present and even dangerous to the national food self-sufficiency in the future. It has also transpired that the area of unutilised agricultural lands was on the rise, which applied particularly to forests and forestlands (an increase by 92.3 thousand ha). That phenomenon, on the other hand, can be considered positive, as it contributes to the biological diversity of rural areas.

The changes in the land use structure of the agricultural holdings varied immensely across the regions, which was related to the impacts of natural, urban and historical factors as well as to the mechanisms of the Common Agricultural Policy. These conditions, as is clearly exemplified by a serious shrinkage of the agricultural acreage, do not always find their reflection in the *Koncepcja Przestrzennego Zagospodarowania Kraju 2030* [*National Spatial Development Concept 2030*], particularly with reference to objective 4, namely: the development of 'spatial structures supporting the achievement and preservation of Poland's high-quality natural environment and landscape' [*Koncepcja...* 2011].

References

Bański J., 1997, *Przemiany rolniczego użytkowania ziemi w Polsce w latach 1975-1988.* „Prace Geograficzne", 168, IGiPZ PAN, Warsaw.

Bański J., 1998, *Gospodarka ziemią w Polsce w okresie restrukturyzacji.* IGiPZ PAN, 117, Warsaw.

Bański J., 2007, *Geografia rolnictwa Polski*. PWE, Warsaw.

Charakterystyka gospodarstw rolnych, 2012, Powszechny Spis Rolny 2010, GUS, Warsaw.

Falkowski J., Kostrowicki J., 2001, *Geografia rolnictwa świata*. PWN, Warsaw.

Głębocki B., 2007, *Rolnictwo*, [in:] *Geografia społeczno-gospodarcza Polski*. H. Rogacki (Ed.), PWN, Warsaw.

Głębocki B., Świderski A., 2007, *Zasoby użytków rolnych w Polsce i ich wykorzystanie.* Studia Obszarów Wiejskich, 12, 41-59.

Kodeks Dobrej Praktyki Rolniczej. 2004, MRiRW-MŚ, Warsaw.

Kołodziejczak A., Rudnicki R., 2012, *Instrumenty Wspólnej Polityki Rolnej ukierunkowane na poprawę środowiska przyrodniczego a planowanie przestrzenne rolnictwa.* Acta ScientiarumPolonorum, AdministratioLocorum, 11 (2) 2012, pp. 117-133.

Koncepcja przestrzennego zagospodarowania kraju 2030, 2011, Uchwała Nr 239/2011 Rady Ministrów, Warsaw.

Kostrowicki J., 1960, *Problematyka geograficzno-rolnicza szczegółowego zdjęcia użytkowania ziemi Polski.* Przegląd Geograficzny, 32.

Kulikowski R., 1969, *Zmiany w kierunkach użytkowania gruntów ornych w Polsce w latach 1958-1965.* Przegląd Geograficzny, 41, 2.

Polna M., 2006, *Zalesiania gruntów rolnych i nieużytków w Polsce – dynamika i znaczenie środowiskowe*, [in:] *Rozwój regionalny i wielofunkcyjny obszarów wiejskich.* Acta agraria et silvestria, Vol. XLVI/1, Wyd. Oddziału Polskiej Akademii Nauk, Cracow, pp. 195-204.

Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi w sprawie minimalnych norm, 2004 (7 kwietnia), Dz. U. z 2004 r., nr 65, poz. 600.

Rudnicki R. 2010, *Zróżnicowanie przestrzenne wykorzystania funduszy Unii Europejskiej przez gospodarstwa rolne w Polsce*. Bogucki Wyd. Naukowe. Poznań.

Rudnicki R., 2013, *Zróżnicowanie przestrzenne absorpcji funduszy Unii Europejskiej w rolnictwie polskim jako problem badawczy i aplikacyjny*, [in:] *Koncepcje i problemy badawcze w geografii wsi*, M. Wójcik (Ed.). Acta Universitatis Lodziensis, Folia Geographica-Socio-oeconomica, 13, Wyd. Uniwersytetu Łódzkiego, Łódź; pp. 71-92

Uhorczak F., 1963, *Użytkowanie ziemi i rolnictwo*, [in:] *Geografia powszechna*, J. Barbag (Ed.), Vol. II, PWN, Warsaw.

Użytkowanie gruntów, powierzchnia zasiewów i pogłowie zwierząt gospodarskich, 2003, Powszechny Spis Rolny 2002, GUS, Warsaw.

Waloryzacja rolniczej przestrzeni produkcyjnej Polski, 2000, IUNiG, Puławy.