

REGIONAL DIVERSIFICATION OF AGRICULTURE IN POLAND⁶⁹

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Summary

Polish accession to the EU changed conditions of the farms. Farmers started to use the system of subsidies which mobilized a large number of them to take a more active farming. There have been significant changes in the structure of land use and production on farms. However, it should be noted that agriculture in Poland is characterized by considerable regional variation. Recent years have seen quite a profound change in the scale of land use. With the economic environment are eliminated, particularly the smallest farms. It strengthens a group of medium-sized farms area. There is continuous growth in livestock production per 1 ha. Increasing the number of bovine animals reared mainly in the direction of the meat was reflected in the production of meat per hectare of arable land. It can be observed a systematic, very dynamic, decrease the number of livestock both in the general as well as a reduction in the number of sows. The results of analysis by region indicate a more competitive position farms located in northern and western Poland. The lowest growth potential are characterized by a farm from southern and eastern Poland.

Keywords: Poland, agriculture diversification, structural changes, farms, animal production

JEL Code: Q15, R14, R52

Introduction

Polish agriculture in recent decades undergone a very dynamic process of political and economic transformation. Initially the beginning of the 90s it was the transition from a regulated (socialist) to the purely market economy. Another important moment influencing the changes in agriculture was the Polish accession to the EU, which radically changed the conditions for functioning farms. Farmers started to use the system of subsidies which has mobilized a large group of them to take more economic activity. The effect of changes in the conditions of functioning farms became significant changes in the structure of land use on farms which confirms the common statement that structural transformations in agriculture, rely on two processes, namely: absolute decline in the number of farms and the polarization structure. It affected the structure of production.

The characteristics of development processes is their susceptibility to the global phenomenon, which could already be seen many centuries ago when the local events influence on the processes of change in distant areas. The current processes of globalization also have significant impact on the transformation of the agrarian structure of Polish agriculture. It should also be noted that changes in agriculture tend to have a long-term and are closely related to the pace of economic development of the country and the world.

In this paper, the analysis of structural changes in Polish agriculture since Polish accession to the EU has been done, whereas the new conditions for the functioning of farms significantly influenced the processes of structural change

⁶⁹ Results of the paper are based on the research tasks of the Jean Monnet Networks project No. 564651-EPP-1-2015-1-SK-EPPJMO-NETWORK “Sustainable Land Management Network“

Material and Methods

The aim of the paper is the presentation of the process of agricultural changes in Poland in the decade of the integration (2004-2014). The paper tries to find the main ways of the changes in Polish agriculture. The paper is based on statistical data Mainly, professional literature, reports of research institutes, statistical Yearbooks as well as on other sources available on the Internet. It should be noted that from 2010 the Central Statistical Office (GUS)applied the new definition of a farm according to which, farms do not include holders of agricultural land is not conducting agricultural activities and holders of up to 1 ha of agricultural land engaged in agricultural activities on a small scale. This results in significant changes in some values for these same years. The analysis was executed on a regional basis, it also should be observed for that in different regions of the dynamics of the Polish transformation is different which is largely the result of the development disparities which could seen for many decades.

Structural changes in agriculture

In the recent years quite profound changes in the scale of land use have been seen (table 1). First of all, it should be noted that in ten years agricultural area of farms decreased by nearly 3.3% (an average of about 0.33% per year). The reasons for this should be seen primarily in the massive pressure on other areas of the economy that taking over agricultural land for other purposes. Similar changes occur in the whole Europe and for example in the UK in the last ten years the average annual loss of agricultural land was about 0.2%.

Table 1 Use of agricultural land

Years	Farmland and grassland	Meadows and grassland	Arable land	Perennial crops	Gardens	Fallow
2004	16 327 411	3 365 157	12 684 614	282 439	39 102	1 761 708
2005	15 905 965	3 387 502	12 084 719	350 760	75 440	1 062 010
2006	15 957 290	3 215 648	12 357 372	338 505	37 579	1 025 407
2007	16 177 081	3 271 236	11 748 025	375 017	74 932	440 939
2008	16 154 250	3 184 383	11 972 709	374 101	70 164	491 525
2009	16 119 584	3 179 687	11 997 844	372 987	67 783	528 248
Change year 2004=100	98,7	94,5	94,6	132,1	173,3	30,0
2010	14 859 652	3 229 508	10 797 513	389 682	31 074	431 628
2011	15 133 932	3 290 975	11 044 398	390 388	54 471	468 403
2012	14 969 200	3 206 463	10 871 437	397 990	53 529	439 867
2013	14 609 161	3 206 312	10 759 573	412 150	31 835	446 537
2014	14 558 389	3 119 756	10 895 121	376 048	33 316	475 208
Change year 2010=100	98,0	96,6	100,9	96,5	107,2	110,1

Source: Own elaboration based on Central Statistical Office data

The biggest changes in the structure of land use have occurred in the first years of operation in the EU. There has been a regular decrease in the area of agricultural land and grassland at the expense of the growth area of perennial crops. The area of the latter increased to 2013 to violently break in 2014 when there was an increase in agricultural land. This means that this year liquidated a large area of crops and plowed nearly 3% of the area of meadows and pastures. It also should be noted that in the early years of agriculture within the EU has

significantly increased area of gardens, reflecting the growing interest in growing their own vegetables. Especially significant changes occurred in the management of fallow land. In the first few years of operation under the EU's area of fallow land has decreased four times. The increase in activity in the use of fallow land was mainly due to the emergence of direct payments, which mobilized many farmers to acquire the use of a number of areas excluded in the previous years of production.

Table 2 Farmland in% of farms according to the new definition

Territorial unit	2010	2011	2012	2013	2014	change 2010=100
Poland	87,5	86,8	87,5	88,6	89,3	102,1
Central Region	86,3	87,8	86,8	86,9	87,2	101,0
Southern Region	82,8	79,1	83,0	84,0	85,2	102,9
Eastern Region	85,2	84,6	85,0	86,1	86,2	101,2
North Western Region	90,4	91,0	91,7	91,6	93,0	102,9
South Western Region	93,4	89,8	90,4	93,4	94,5	101,2
Northern Region	87,4	85,8	87,4	89,9	90,4	103,4

Source: Own elaboration based on Central Statistical Office data

The increase in the range of care management is also seen in the increase in the share of agricultural land in the area of farms (table 2). In just four years (2010-2014) agricultural area in the country has increased by more than 2.1%. Particularly strong growth was recorded in the regions of north, southern and north-western (about 3%).

Table 3 Total number of farms

Territorial unit	2000	2010	change 2000=100	2010	2011	2012	2013	change 2010=100
Poland	2859196	2277613	79,7	1509148	1656701	1477852	1429006	94,7
Central Region	550244	445625	81,0	359386	*	364743	340468	94,7
Southern Region	594419	446803	75,2	218516	*	216979	201855	92,4
Eastern Region	905176	764625	84,5	509539	*	485077	480282	94,3
North Western Region	333069	253700	76,2	178364	*	174322	173106	97,1
South Western Region	201608	152171	75,5	90271	*	87931	86297	95,6
Northern Region	274680	214688	78,2	153072	*	148800	146999	96,0

Source: Own elaboration based on Central Statistical Office data

Very significant changes occur in the number of farms (table 3). In the years 2000-2013 the number of farms decreased by more than 25%. With the economic environment are particularly eliminated the smallest farms which is particularly visible in the southern region where the process of division of family lead have lasted from centuries to the significant structural fragmentation.

At the same time the group of medium-sized farms strengthened and pass to the upper level area. As a result, the number of farms with an area exceeding 50 hectares increased in the period more than doubled. It is curious that in the structure of farms continues to represent a significant share of household relatively small. While in 2000 the unit with an area of 1-5 hectares accounted for 37.2% of all households in 2012, their share rose to more than 50% despite previously indicated a significant decrease in the total number of farms.

Table 4 The average size of an individual farm with an area exceeding 1 ha of agricultural land

	2003	2004	2005	2006	2007	2008	2009	2010	2010	2011	2012	2013
Poland	7,4	7,5	7,6	7,7	7,8	7,8	8	8,6	8,9	8,4	9,3	9,5
Central Region	6,9	7,1	7,3	7,2	7,4	7,3	7,4	7,8	8	*	8,1	8,5
Suothern Region	3,5	3,5	3,5	3,6	3,7	3,7	3,8	4,1	4,4	*	4,3	4,6
Eastern Region	5,9	6,1	6,1	6,1	6,2	6,2	6,5	6,7	6,9	*	7,3	7,3
North Western Region	11,4	11,8	12,4	12,2	12,4	12,5	12,6	13,7	14	*	15,1	14,8
South Western Region	9,8	10,1	9,9	9,8	10,3	10	10,5	12,2	12,5	*	13,1	13,7
Northern Region	13,8	13,4	13,8	14,1	14,4	14,6	14,6	15,8	16,1	*	16,7	17,1

Source: Own elaboration based on Central Statistical Office data

Changes in the structure of farms in the form of loss of the smallest and the strengthening of the largest holdings are reflected in an increase in the average area of farms (table 4). In the years 2003-2013 the average farm size has increased by over 28% and in some areas (region of south-western) growth reached nearly 40%. Noting at the same time very large regional differences were in the average farm area. In the southern region, the average farm is almost four times smaller than a farm in the northern region. It is still the effect which was mentioned earlier the centuries process of shaping agricultural structures.

Table 5 The number of organic farms

	2006	2007	2008	2009	2010	2011	2012	2013	2014	change 2006=100
Poland	3504	6618	8685	10153	12901	15234	18187	19872	21020	599,9
Central Region	489	860	1177	1301	1466	1707	1995	2342	2447	500,4
Southern Region	685	1167	1428	1547	1882	2081	2103	1901	1514	221,0
Eastern Region	1465	2750	3590	4045	4972	5619	6307	6600	6654	454,2
North Western Region	293	718	1045	1541	2185	2701	3617	4354	5117	1 746,4
South Western Region	202	390	491	583	827	969	1107	1083	1023	506,4
Northern Region	370	733	954	1136	1569	2157	3058	3592	4265	1 152,7

Source: Own elaboration based on Central Statistical Office data

Interesting changes occurred in the group of organic farms (table 5). The interest in this form of agricultural activity resulted in a fourfold increase in their numbers over the years 2006-2014. Nationally, there was a significant variation in the growth of the number of organic farms. Most organic farms appeared in the regions of north-western and northern regions and the least in the south and east. In the case of the latter region, a relatively small increase in the number of farms could be due to the fact that already in 2006, functioned here a lot of organic farms.

It should be noted that the average size of organic farms (table 6) was almost three times bigger than the average farm area in Poland. It denies a common belief that organic farms are smaller units, using larger expenditures of manual labor, conducted in an extensive way.

Table 6 The average area of agricultural land on organic farms

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Poland	21,4	20,8	20,6	21,9	23,9	24,7	25,1	24,8	26,4
Central Region	14,0	14,0	16,5	17,2	19,6	21,0	22,5	22,7	24,2
Southern Region	11,1	9,0	12,0	9,1	11,3	11,0	11,6	11,0	14,1
Eastern Region	15,3	14,7	15,4	14,2	15,4	16,4	16,7	17,4	17,4
North Western Region	59,0	55,9	42,1	48,0	46,5	44,1	41,7	38,2	38,6
South Western Region	44,7	31,8	34,1	28,9	33,5	32,6	32,7	31,0	35,3
Northern Region	32,4	30,5	27,3	32,7	33,4	34,5	31,3	29,0	29,4

Source: Own elaboration based on Central Statistical Office data

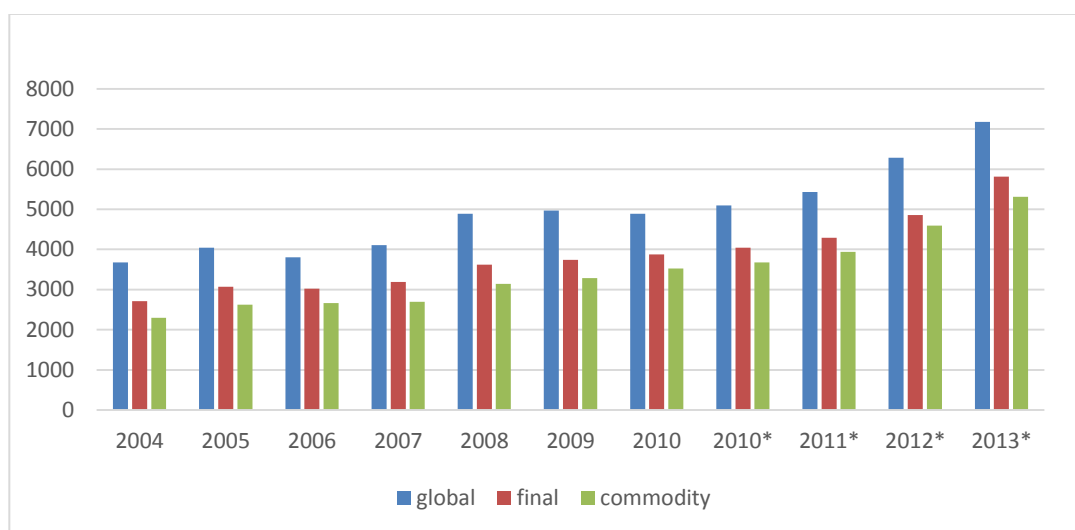


Figure 1 Agricultural production (in constant prices of the previous year) per 1 ha of agricultural land in zł

Source: own construction based on the source of the Central Statistical Office data

Period in the EU is a time of continual growth of agricultural production per 1 ha (figure 1). In less than ten years (2004-2013) global production has increased by 265%. A lower growth rate took place in the production of final goods and respectively 214.6% and 231.3%. Nevertheless, the scale of the increase should be considered impressive.

Table 7 Commodity economy structure of agricultural production in%

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Plant production	43,0	36,6	35,3	36,9	41,5	42,1	37,7	42,5	42,9	44,0
Central Region	46,1	37,1	39,5	40,5	51,2	45,9	42,1	48,0	41,9	42,8
Southern Region	45,4	42,2	37,0	39,7	45,2	41,1	35,1	43,7	43,1	45,9
Eastern Region	38,9	33,4	32,8	32,9	41,0	38,6	36,2	42,2	40,7	43,9
North Western Region	36,4	36,8	28,9	32,8	33,4	39,1	31,2	32,3	37,3	38,1
South Western Region	61,7	59,1	53,8	61,2	63,6	66,2	57,6	64,3	69,9	68,0
Northern Region	40,8	36,8	35,3	37,7	38,7	41,2	34,1	36,4	40,3	42,0
Animal production	57,0	63,4	64,7	63,1	58,5	57,9	62,3	57,5	57,1	56,0
Central Region	53,9	62,9	60,5	59,5	48,8	54,1	57,9	52,0	58,1	57,2
Southern Region	54,6	57,8	63,0	60,3	54,8	58,9	64,9	56,3	56,9	54,1
Eastern Region	61,1	66,6	67,2	67,1	59,0	61,4	63,8	57,8	59,3	56,1
North Western Region	63,6	63,2	71,1	67,2	66,6	60,9	68,8	67,7	62,7	61,9
South Western Region	38,3	40,9	46,2	38,8	36,4	33,8	42,4	35,7	30,1	32,0
Northern Region	59,2	63,2	64,7	62,3	61,3	58,8	65,9	63,6	59,7	58,0

Source: Own elaboration based on Central Statistical Office data

Economic integration with the EU has also changed the structure of commodity production (table 7). The share of commodity crop production increased at the expense of the production of animal. This indicates a significant number of farmers follow to extensive production at the expense of cost intensive animal production. They revealed a regional specializations. In the Northwest region nearly 62% of the production of goods constituted, for livestock production, and the region of south-western specialized in commercial crop production (68%). This is reflected in the structure of production but also the level of obtained yields. In the region of south-western grain yields throughout the entire period 2004-2014) came the significantly from the average for Poland to the average in different regions.

Table 8 Yields of cereals in dt

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Poland	35,4	32,3	26,0	32,5	32,2	34,8	35,6	34,3	37,0	38,0	42,7
Poland	29,6	27,0	21,9	27,5	27,7	29,2	29,5	28,9	30,0	30,4	35,1
Central Region	35,4	34,0	26,1	33,7	35,5	33,3	31,5	36,5	37,7	35,9	41,7
Southern Region	29,8	28,5	21,9	28,2	31,3	29,4	30,1	29,6	31,5	31,6	36,8
Eastern Region	39,4	35,0	27,4	34,3	29,4	39,9	39,3	34,1	40,3	43,2	47,2
North Western Region	48,1	45,7	34,0	43,5	45,6	44,6	48,2	49,7	51,0	48,8	56,2
South Western Region	36,2	31,1	29,1	34,9	32,8	36,6	38,4	36,3	38,8	41,8	44,7

Source: Own elaboration based on Central Statistical Office data

In the analyzed decade, substantial changes in the structure and intensity crop production were observed (table 8 and 9). Although significantly reduced the area of cereal crops (about 11%) was offset by a higher share of their crops in the structure of crops. In addition, there was a significant increase in yields per hectare (over 20%), which resulted in a nearly 8% increase in the harvest.

Significant changes occur in the case of other major crops. The greatest extent there has been an increase in the cultivation area of rape (table 10). Nationally, the area of rapeseed increased by about 77% and the largest increase in acreage of rape were recorded in southern and eastern regions. At the same time changes in agricultural techniques which allowed for more than 13% increase in yields.

Table 9 Cereal production in the years 2004-2014

years	ha area	in the share of cereals in the area. GO%	yield ha dt	set in dt altogether
2004	8 377 273	66,0	35,4	296 351 479
2005	8 328 904	68,9	32,3	269 278 459
2006	8 381 129	67,8	26,0	217 759 315
2007	8 352 859	71,1	32,5	271 428 092
2008	8 598 812	71,8	32,2	276 643 060
2009	8 582 783	71,5	34,8	298 266 201
2010	7 637 653	70,2	35,6	272 280 999
2011	7 802 971	70,7	34,3	267 673 521
2012	7 704 322	70,9	37,0	285 438 436
2013	7 479 493	69,5	38,0	284 551 096
2014	7 484 955	68,7	42,7	319 454 333
change 2004=100	89,3	104,0	120,6	107,8

Source: Own elaboration based on Central Statistical Office data

Table 10 The cultivation of rape and turnip rape

	growing area		change 2004=100	yields dt / ha		change 2004=100
	2004	2014		2004	2014	
Poland	538 222	951 108	176,7	30,3	34,4	113,5
Central Region	42 167	61 027	144,7	17,6	32,3	183,5
Southern Region	1 4112	29 718	210,6	32,0	33,2	103,8
Eastern Region	39 664	110 818	279,4	29,8	29,7	99,7
North Western Region	172 238	266 625	154,8	31,9	36,6	114,7
South Western Region	108 894	208 540	191,5	35,2	35,4	100,6
Northern Region	161 147	274 379	170,3	28,6	34,2	119,6

Source: Own elaboration based on Central Statistical Office data

Potatoes as one of the main directions of former production plant in Poland lost in importance recently (table 11). This is mainly due to leave in fattening pigs from this feed for cereals and a decrease in the importance of the consumption of potatoes in households. Total area under potatoes decreased by over 60% and the largest decrease in crop area was recorded in the eastern region which used to be the main growing area. A positive fact is the significant increase in potato yields by nearly 42%.

Table 11 The cultivation of potatoes

	growing area		change 2004=100	yields dt / ha		change 2004=100
	2004	2014		2004	2014	
Poland	713 250	276 927	38,8	196,0	278,0	141,8
Central Region	170 271	69 373	40,7	190,0	269,0	141,6
Southern Region	82774	32 288	39,0	178,0	262,0	147,2
Eastern Region	209 080	73 228	35,0	184,0	276,0	150,0
North Western Region	111 988	43 018	38,4	217,0	285,0	131,3
South Western Region	51 046	21 663	42,4	218,0	318,0	145,9
Northern Region	88 091	37 361	42,4	215,0	280,0	130,2

Source: Own elaboration based on Central Statistical Office data

Changes in the structure of crops were accompanied by significant changes in the structure of livestock production (table 12). In the case of swine was observable a systematic, very dynamic, drop in livestock both in the general as well as a decrease in the number of sows. Regional analysis shows a considerable variation changes. The largest decreases were recorded in the regions of eastern and south-western. Wonder can be a fact that the level of pig production in the Northwest region and the increase in the central region. The explanation of that fact it should be the creation on these areas large feed farms operating on the basis of breeding material from Western Europe.

Table 12 The number of animals in the years 2004-2014

	pig population			cattle population		
	total	total sows	on 100 ha	total	dairy cows	on 100 ha
2004	17 395 568	1 648 460	106,5	5 200 173	2 730 448	31,8
2005	18 711 294	1 808 079	117,6	5 384 981	2 754 810	33,9
2006	18 812 975	1 786 398	117,9	5 280 967	2 636 956	33,1
2007	17 621 213	1 587 368	108,9	5 405 545	2 677 275	33,4
2008	14 242 273	1 278 828	88,2	5 563 564	2 696 920	34,4
2009	14 252 509	1 360 812	88,4	5 590 219	2 584 749	34,7
2010	14 775 694	1 328 237	99,4	5 561 747	2 529 428	37,4
2011	13 056 411	1 124 946	86,3	5 500 936	2 446 136	36,3
2012	11 132 184	1 012 107	74,4	5 520 345	2 346 097	36,9
2013	10 994 403	955 135	75,3	5 589 543	2 299 083	38,3
2014	11 265 649	956 288	77,4	5 660 271	2 247 800	38,9
zmiana 2004=100	64,8	58,0	72,7	108,8	82,3	122,3

Source: Own elaboration based on Central Statistical Office data

Less dynamic changes taking place in the number of cattle population. Generally, the state population increased in the period by nearly 9%, but it should be noted about 18% decline in population of dairy cows. This means that the reconstruction of the production structure in the direction of beef cattle followed. This took place mainly in the regions of northern and north-western which recorded the highest increase of cattle per 100 ha of arable land (table 13). In turn, the decline in population of dairy cows resulted from the operation of the milk quotas, which limited growth opportunities and on the other hand, farmers put up to increase the efficiency of the unit which was reflected in the liquidation of the least efficient units. The largest decrease in number of cows was recorded in the southern region and the south west.

Table 13 The number of animals in the regions of 100 hectares of farmland

	pig population			cattle population		
	2004	2014	change 2004=100	2004	2014	change 2004=100
Poland	106,5	77,4	72,7	31,8	38,9	122,3
Central Region	98,7	112,9	114,4	41,3	28,2	68,3
Southern Region	74,0	48,6	65,7	31,5	31,2	99,0
Eastern Region	70,1	37,5	53,5	36,1	43,3	119,9
North Western Region	154,7	145,4	94,0	25,9	34,4	132,8
South Western Region	74,9	42,8	57,1	15,1	14,9	98,7
Northern Region	140,7	89,7	63,8	31,6	39,0	123,4

Source: Own elaboration based on Central Statistical Office data

Increasing the number of bovine animals reared in the direction of the meat as well as the increase in milk yield of cows reflected in the production of meat and milk from one hectare of agricultural land (table 14).

Table 14 Production of meat and milk per 1 ha of agricultural land

	meat production in kg per 1 ha of agricultural land								
	2004	2010	change 2004= 100	2010	2011	2012	2013	2014	change 2010= 100
Poland	212,0	252,1	118,9	263,1	262,0	264,3	267,4	300,7	114,3
Central Region	230,6	282,6	122,5	292,9	290,7	320,1	330,4	403,9	137,9
Southern Region	185,6	234,4	126,3	263,5	263,0	272,8	235,3	261,0	99,1
Eastern Region	147,8	170,0	115,0	177,8	179,6	174,1	174,6	181,9	102,3
North Western Region	301,9	354,6	117,5	363,1	355,0	340,3	368,6	395,1	108,8
South Western Region	139,8	148,7	106,4	154,3	155,4	131,2	135,3	137,2	88,9
Northern Region	225,6	272,6	120,8	284,3	289,2	301,9	290,4	338,1	118,9
	milk production in kg per 1 ha of agricultural land								
Poland	703	769	109,4	802,0	796,0	822,0	845,0	866,0	108,0
Central Region	943	1237	131,2	1282,0	1193,0	1202,0	1251,0	1331,0	103,8
Southern Region	736	520	70,7	585,0	538,0	655,0	631,0	661,0	113,0
Eastern Region	862	898	104,2	939,0	978,0	991,0	1012,0	1018,0	108,4
North Western Region	493	536	108,7	549,0	566,0	611,0	675,0	628,0	114,4
South Western Region	328	311	94,8	323,0	301,0	309,0	302,0	335,0	103,7
Northern Region	648	704	108,6	734,0	746,0	759,0	753,0	800,0	109,0

Source: Own elaboration based on Central Statistical Office data

Conclusion

In conclusion it should be noted that the environment in agriculture are eliminated holding smallest farms. Strengthening is important at the same time a group of medium-area farms, which increase the status of their ownership.

In the structure of the production takes place limiting the production of root crops to cereals and oilseed rape. Meanwhile, developments in the agriculture help to increase the production, and the overall unit.

Increasing the number of bovine animals reared mainly in the direction of the meat it was reflected in the production of meat per hectare of arable land. In the case of swine it was observable a systematic, very dynamic, drop in livestock both in the general as well as a decrease in the number of sows.

The results of this analysis by regions indicate a more competitive farms located in northern and western Poland. The lowest growth potential are characterized by a Polish farm from southern and eastern Europe.

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