

AN APPLICATION OF CLUSTER ANALYSIS TO COMPARE SELECTED AGRICULTURAL HOLDINGS IN THE KAŁOLEWNICA COMMUNE

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Abstract. The paper presents a comparison of nine agricultural holdings which are dairy farms located in the Kałolewnica Commune. The analysis was based on results of a survey carried out in the years 2008–2010, and used to prepare a description of the holdings in terms of their area, cultivation structure, cattle stocking rate, economic size and profitability coefficients. The multidimensional cluster analysis was applied to make simultaneous comparisons of the holdings taking into accounts all the characteristics studied. It was found that the holdings could be divided into two groups. One group consisted of the farms with the greatest area, which were also similar to each other in terms of the variables studied. The second group was made up of holdings covering an average or small area, which were more or less different. In this group, holding 9 differed most from the remaining farms. The holding had a much greater area, a higher stocking rate of cattle and greater crop plant harvest volumes. However, these values were not great enough for the holding to be incorporated into the cluster of the holdings covering the greatest area.

Key words: cluster analysis, agricultural holding, profitability index, economic size of a farm

INTRODUCTION

An agricultural holding is characterised by a specific structure which consists of the production sector, production branch and production activity. The two sectors which can be found most frequently on agricultural holdings are: crop plant production and live-stock production.

The production type of every farm, which is expressed in the final output of the farm, should follow an efficient utilisation of natural and economic conditions of the holding. The development of a farm is conditioned largely by its production potential which is

determined by resources – predominantly by their quantity and quality. What also matters is relationships between the resources which affect the effectiveness of agricultural production [Poczta and Kołodziejczak 2004, Majchrzak 2008]. Selection of an adequate production type, based on natural conditions, influences the economic results of agricultural holdings. The results are described by economic indices, for example the profitability index. After the accession to the European Union, measures describing the economic size of agricultural holdings have been introduced, mainly to meet the requirements of reporting. The measures are as follows: Standard Gross Margin (SGM) and European Size Unit (ESU). The measures are calculated based on European Commission legislation and take into account, among others, agricultural holding location (statistical region), type and output [Skarżyńska et al 2002].

Changes that have been taking place in the Polish economy for well over 10 years have also influenced the new situation for all the market participants, including agricultural producers. Polish agriculture is characterized by a heterogeneous level of economic development due to a different economic potential of farms, and historical and natural influences [Jóźwiak 2007]. The aforementioned factors markedly affect effectiveness which, from the perspective of the market, is defined as a benefit from maximised production, in particular sale resulting from optimal allocation of resources having taken into account the existing demand and supply limitations [Jarka 2009].

In economic and agricultural studies based on empirical data, it is frequently necessary to group holdings into as homogenous clusters as possible due to diverse production factors on holdings [Borkowski 1996]. Statistical multidimensional methods make it possible to form groups enabling simultaneous comparisons of units studied in terms of many characteristics. Such methods include cluster analysis which employs data segmentation performed in such a way that it is possible to establish groups of similar units [Stanisz 2007]. Cluster analysis, based on variables describing studied units, finds groups (clusters) of units which are more “similar” to units belonging to the same cluster than to units from other clusters [Jain et al 1999, Holland 2006, Stanisz 2007]. The analysis yields dendrograms depicting clusters of similar units.

The purpose of the present work was to compare agricultural holdings specialised in the same agricultural activity, taking into account production conditions, profitability indices and the economic size unit ESU.

MATERIALS AND METHODS

Analyses were performed basing on the results of surveys carried out in the years 2008–2010 in nine agricultural holdings specialised in milk production in the Kąkolewnica Commune.

The Kąkolewnica Commune is located in the northern part of the Radzyń Podlaski District, Lublin Province, 90 km of Lublin. It is a typically rural commune whose 70% of total area is agricultural land. The land’s structure and the level of agricultural structure are favourable. The commune’s economy is based on agriculture because soils are of average quality and easy to cultivate mechanically. The holdings’ area mainly consists of arable land.

The agricultural holdings were subjected to comparative analysis according to the following criteria: holdin's size, area of land under crops, livestock stocking rate, level of production costs, profitability index and economic size unit (ESU).

The profitability index is a ratio of output to total costs incurred. Economic size of a farm is the sum of Standard Gross Margins of all the enterprises on the farm expressed in euro. The value of one ESU is determined by the European Commission and has been equal to 1200 EUR since 1984. A given holding can be assigned to one of ten size classes (Table 1) based on economic units expressed in ESU [Goraj and Mańko 2009].

Table 1. Economic size classes of agricultural holdings used in EU typology
Tabela 1. Klasy wielkości ekonomicznej gospodarstw rolnych używane w typologii UE

Economic size class	Value in ESU	Nomenclature for farm size classes since 1983/84
I	less than 2	Very small
II	2- < 4	
III	4- < 6	Small
IV	6- < 8	
V	8- < 12	Medium-small
VI	12- < 16	
VII	16- < 40	Medium-large
VIII	40- < 100	Large
IX	100- < 250	Very large
X	250 and more	

Source: L. Goraj, S. Mańko: Accountancy and economic analysis on a farm, published by Difin, Warszawa 2009, p. 39

Źródło: L. Goraj, S. Mańko: Rachunkowość i analiza ekonomiczna w indywidualnym gospodarstwie rolnym, Wyd. Difin, Warszawa 2009, s. 39

The descriptive and statistical methods were used in the study. Cluster analysis was applied to compare individual farms in terms of the production characteristics and economic indices. The Euclidean distance was used as a distance measure and the single linkage as a clustering method. The farms were compared in terms of the following 14 characteristics: agricultural land area, arable land area, area of land under crops, harvest volume of crop plants (triticale, cereal mixes, corn for green mass) livestock stocking rate in livestock units, profitability index and economic size of a farm (ESU). In order to determine numbers of clusters grouping farms, the dendrograms were divided using the agglomeration sequence and Mojena's rule. According to this rule the "cutting" point is the distance of a linkage for which the following inequality is fulfilled:

$$d_{i+1} > \bar{d} + ks_d$$

where:

d_0, d_1, \dots, d_{n-1} – linkage distances for stage $n, n-1, \dots, 1$,

\bar{d} – average value of linkage distance,

s_d – standard deviation of linkage distance,

k – constant 1.25.

The variables describing the farms were expressed in different units so they were standardised.

The calculations were performed by means of Statistica 9.0 PL.

DESCRIPTION OF FARMS

The surveyed holdings are dairy farms only. They are commodity holdings which derive their income from milk production. Cereals cultivated on these farms are used to produce animal fodders.

The average agricultural land area was 39.4 ha, of which 24.21 ha was arable land and 15.2 ha was under meadows and pastures. The numbers indicate that comparisons were made of large farms only. There were no orchards on the farms. Holdings 4 and 5 covered the largest area and holdings 2 and 8 were the smallest (Table 2)

Table 2. Types of land and their area on the surveyed farms in ha
Tabela 2. Stan gruntów w badanych gospodarstwach w ha

Holding nr	Agricultural land (ha)				Forests (ha)	Land occupied by buildings (ha)	The remaining land (ha)	Total (ha)
	Arable land	Orchards	Meadows and pastures	Total				
1	18.0	–	14.0	32.0	0.5	0.7	–	33.2
2	12.3	–	3.5	15.8	0.1	0.4	–	16.1
3	25.0	–	15.0	40.0	1.5	0.8	0.5	42.8
4	50.0	–	30.0	80.0	0.5	1.0	–	81.5
5	45.0	–	25.0	70.0	3.0	2.0	–	75.0
6	15.0	–	15.0	30.0	0.5	0.5	–	31.0
7	6.7	–	14.0	20.7	–	0.6	–	21.3
8	13.5	–	4.0	17.5	0.5	0.2	–	18.2
9	32.4	–	16.3	48.7	–	0.9	–	49.6
Mean	24.21	–	15.2	39.41	0.94	0.78	0.05	40.96

Source: authors' own compilation based on the survey
Źródło: opracowanie własne na podstawie ankiety badawczej

The soil of the surveyed farms belonged mainly to quality classes V, IVa and IVb. None of the farms had soils classified as class I. Only one farm had mostly good soils of classes II and IIIa (over 13 ha). Holding 4, which was the largest, had the same areas (10 ha) of class IIIb, IVa, IVb, V and VI. The second largest holding had mostly soils of class V which represented 75% of the arable land. The smallest farms (2 and 8) had predominantly class IIIb soils (Table 3). As shown in table 3, most soils were poor, the poorest being noted on holding 5. Three out of nine holdings had average quality soils. Holding 8 was the only farm which had good soils.

Figure 1 displays cattle stocking rate in livestock units (LSU). An increasing tendency was found on almost all farms (from 2 to 7). The number of livestock units in successive years remained on a similar lever for holding 8. Holding 9 had the same LSU numbers in the first two study years whereas in 2010 the number slightly increased. The opposite trend was observed for holding 1 where LSU number in 2010 dropped compared with the previous years.

Table 3. Area, structure and grading index of the surveyed farms in 2010

Tabela 3. Powierzchnia, struktura i wskaźnik bonitacji gleb w badanych gospodarstwach w 2010 roku

Holding nr	Area	Soil quality class								Grading index	
		I	II	III a	III b	IV a	IV b	V	VI		Total
1	ha			3.0	3.0	4.0	3.0	5.0		18.0	0.92
	%			16.7	16.7	22.2	16.7	27.8		100.0	
2	ha				2.0	3.5	2.5	1.81	2.45	12.3	0.74
	%				16.3	28.5	20.3	15.0	19.9	100.0	
3	ha			3.0	4.0		10.0	5.0	3.0	25.0	0.78
	%			12.0	16.0		40.0	20.0	12.0	100.0	
4	ha				10.0	10.0	10.0	10.0	10.0	50.0	0.72
	%				20.0	20.0	20.0	20.0	20.0	100.0	
5	ha			2.0	4.0	5.0	34.0			45.0	0.68
	%			4.4	8.9	11.1	75.6			100.0	
6	ha				4.0	6.0			5.0	15.0	0.78
	%				26.7	40.0			33.3	100.0	
7	ha				3.7		3.0			6.7	1.03
	%				55.2		44.8			100.0	
8	ha				7.0	6.5				13.5	1.13
	%				51.9	48.1				100.0	
9	ha		1.8	5.5	2.8	11.2	10.1	1.0		32.4	1.04
	%		5.6	17.0	8.6	34.6	31.2	3.1		100.0	
Total (ha)		–	1.8	11.5	38.5	45.2	43.6	56.81	20.45	217.9	

Source: authors' own compilation based on the survey

Źródło: opracowanie własne na podstawie ankiety badawczej

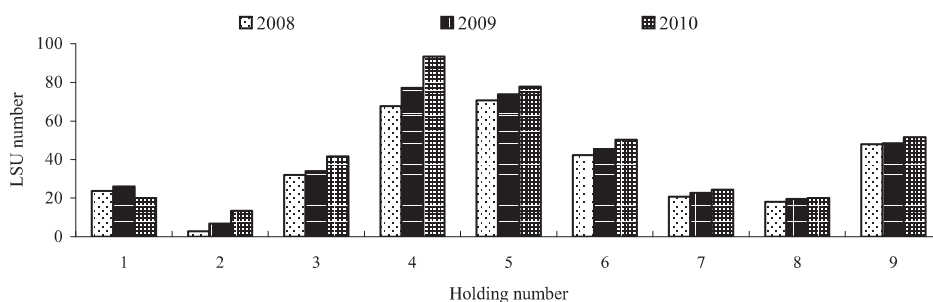


Fig. 1. Cattle stocking rate in LSU on the holdings in 2008–2010

Rys. 1. Obsada zwierząt wyrażona w SD w gospodarstwach w latach 2008–2010

Source: authors' own compilation based on the survey

Źródło: opracowanie własne na podstawie ankiety badawczej

Crop plant production of holdings specialised in livestock production is generally limited, and triticale, cereal mixes and maize for green mass are cultivated. The area under these crops was similar on most holdings with the exception of the largest farms (4 and 5) where more maize for green mass was cultivated, compared with the remaining crops. Per 1 ha crop yields were different in successive years and ranged from 3.0 to 5.0 t for mixes and from 22 to 62 t for maize (Table 4) depending on the growing season and holding.

Based on the nomenclature of size classes (ESU), the surveyed holdings represented classes I to VIII. In general the holdings tended to increase in size in the years 2008–2010. In 2008 the farms were mainly medium-large (ESU 16–40) and medium-small (ESU 8–16). Holdings 3, 4, 5, 6 and 9 were classified as medium-large, and holdings 3, 7 and 8 were medium-small. In 2009, two medium-large farms (4 and 5) increased in area and became large holdings with the ESU values ranging from 40 to 100. In 2010, the dominant role was played by medium-small farms (holding 1, 2, 7 and 8). The number of medium-large and large farms did not change compared with 2009 (Table 5).

Table 4. Area under crops, yields and harvest volume of basic crop plants cultivated on the surveyed farms in 2009–2010

Tabela 4. Powierzchnia zasiewów oraz plon i zbiór podstawowych roślin uprawianych w badanych gospodarstwach w latach 2009–2010

Characteristic	Holding number	Triticale			Mixes			Maize for green mass		
		2008	2009	2010	2008	2009	2010	2008	2009	2010
Area under crops [ha]	1	5.00	5.00	5.00	8.00	8.00	8.00	5.00	5.00	5.00
	2	1.50	1.50	6.26	2.00	2.00	2.50	1.45	1.45	3.50
	3	5.00	5.00	5.00	10.00	10.00	10.00	10.00	10.00	10.00
	4	13.00	13.00	13.00	8.00	8.00	8.00	9.00	29.00	29.00
	5	9.00	11.00	13.00	10.00	13.00	15.00	15.00	16.00	17.00
	6	4.00	4.00	4.00	5.00	5.00	5.00	6.00	6.00	6.00
	7	1.00	1.00	1.00	1.00	3.00	2.70	2.70	2.70	3.00
	8	5.00	6.00	4.00	4.00	4.00	4.00	4.50	3.50	5.50
	9	4.00	3.20	2.00	17.40	16.00	16.40	11.00	13.20	14.00
Yield [t·ha ⁻¹]	1	5.00	5.50	3.50	4.50	5.00	3.00	30.00	31.00	25.00
	2	4.00	4.00	4.00	4.00	3.80	3.50	35.00	38.00	40.00
	3	3.80	4.40	3.70	4.40	5.00	3.20	29.00	30.00	27.00
	4	3.30	3.40	3.80	3.50	3.80	3.50	50.00	48.00	45.00
	5	3.80	4.50	4.50	4.00	4.00	3.40	35.00	35.00	40.00
	6	5.00	5.00	5.00	4.00	4.00	4.00	25.00	22.00	27.00
	7	4.00	4.00	3.00	3.00	3.00	3.50	27.00	28.00	29.00
	8	4.00	4.10	4.10	4.00	3.90	4.00	40.00	40.00	40.00
	9	3.30	3.50	3.40	3.75	3.80	3.86	62.00	60.00	60.00
Harvest [t]	1	25.00	27.50	17.50	36.00	40.00	24.00	150.00	155.00	125.00
	2	6.00	6.00	25.04	8.00	7.60	8.75	50.75	55.10	140.00
	3	19.00	22.00	18.50	44.00	50.00	32.00	290.00	300.00	270.00
	4	42.90	44.20	49.40	28.00	30.40	28.00	450.00	1392.00	1305.00
	5	34.20	49.50	58.50	40.00	52.00	51.00	525.00	560.00	680.00
	6	20.00	20.00	20.00	20.00	20.00	20.00	150.00	132.00	162.00
	7	4.00	4.00	3.00	3.00	9.00	9.45	72.90	75.60	87.00
	8	20.00	24.60	16.40	16.00	15.60	16.00	180.00	140.00	220.00
	9	13.20	11.20	6.80	65.25	60.80	63.30	682.00	792.00	840.00

Source: authors' own compilation based on the survey

Źródło: opracowanie własne na podstawie ankiety badawczej

Table 5. Economic sizes of the surveyed holdings in ESU in 2008–2010
 Tabela 5. Wielkości ekonomiczne badanych gospodarstw w ESU w latach 2008–2010

Years	Holding number								
	1	2	3	4	5	6	7	8	9
2008	13.408	1.663	18.803	39.934	39.450	24.944	12.742	10.764	26.788
2009	14.718	3.993	19.981	44.257	41.127	26.621	13.763	11.602	25.922
2010	11.403	8.118	23.702	53.425	43.289	29.136	14.471	11.785	30.850

Source: authors' own compilation based on the survey
 Źródło: opracowanie własne na podstawie ankiety badawczej

The output of almost all the holdings increased year by year. The exception to this rule was holding 1 where there was a 17% drop in the output value in the year 2010 compared with 2009, and holding 2, covering the greatest area, whose output value in 2009 was at almost the same level as in 2008 (Table 6).

Total production costs in the successive years increased for all the surveyed farms. The majority of total costs was largely determined by increasing fuel oil and mineral fertiliser prices. The data of this study revealed that in 2010 the increase in total costs was much greater than in 2009 (Table 6).

The analysis of profitability indices demonstrated that the value of final gross output of almost all the holdings covered the total costs incurred on production. The exception was holding 2 whose profitability index in 2008 was by 100% lower. Over the next years the farm increased livestock unit stocking rate, which yielded an increase in profitability indices to 119.6% in 2009 and 188.2% in 2010. Values of profitability indices on most farms decreased in successive years as indicated by the dynamics of their change. The profitability index increased year by year for holding 2 only and its value rose systematically by 21.8 and 57.3%, respectively.

COMPARISON OF SURVEYED FARMS BY MEANS OF CLUSTER ANALYSIS

Dendrograms show that the holdings formed similar clusters in all the study years. As indicated by agglomeration schedule results and Mojena's rule, cutting of dendrograms took place after step 7. As a result, the surveyed holdings were divided into two clusters (groups) every year. A clearly separate cluster was formed by holdings 4 and 5 (the largest ones); the second group was created by the remaining farms.

The agglomeration schedule (linking of units) for 2008 indicated that holdings 1 and 6 were the most similar; they were the least diverse because their cluster was formed at step 1. The holdings had a similar agricultural land area (32 and 30 ha, respectively), similar harvest volume of triticale and maize for silage and a similar profitability index (190 and 201%, respectively). However, they had a different economic size (13.4 and 24.94 ESU, respectively). At step 2, holding 3, which had a greater area but a lower profitability coefficient (178%), joined the cluster formed by holdings 1 and 6. Although holdings 7, 2 and 9 formed a cluster with the aforementioned farms, they entered the cluster at the penultimate step of agglomeration. It means that holdings 2 and 7 were similar to each other in terms of the examined characteristics but they were rather different from holdings 1, 3 and 6. Holding 8 was most different from the remaining farms (Figure 2, Table 7).

Table 6. Output levels, total production costs and profitability indices for the surveyed holdings in 2008–2010
 Tabela 6. Kształtowanie się wielkości produkcji, kosztów całkowitych produkcji i wskaźnika opłacalności w badanych gospodarstwach w latach 2008–2010

Specification	Years	Holding number									
		1	2	3	4	5	6	7	8	9	
Output value in PLN	2008	111 000	22 200	154 290	388 500	342 990	188 700	124 023	111 400	185 400	
	2009	116 280	29 070	161 880	444 600	359 100	199 500	140 524	125 900	193 600	
	2010	102 000	54 000	183 600	502 800	380 400	222 200	151 197	144 500	219 000	
	Dynamics 2009/2010	104.8	130.9	104.9	114.4	104.7	105.7	113.3	113.0	104.4	
	Dynamics 2010/2009	87.7	185.8	113.4	113.1	105.9	111.4	107.6	114.8	113.1	
		2008	58 200	22 600	86 700	183 600	181 000	93 600	90 300	64 550	151 800
Total costs in PLN	2009	60 500	24 300	91 900	238 900	189 200	96 000	11 6690	83 210	169 550	
	2010	75 900	28 700	100 400	405 900	254 900	120 600	12 8600	83 510	193 600	
	Dynamics 2009/2010	104.0	107.5	106.0	130.1	104.5	102.6	129.2	128.9	111.7	
	Dynamics 2010/2009	125.5	118.1	109.2	169.9	134.7	125.6	110.2	100.4	114.2	
		2008	190.7	98.2	178.0	211.6	189.5	201.6	137.3	172.6	122.1
	2009	192.2	119.6	176.1	186.1	189.8	207.8	120.4	151.3	114.2	
Index of production profitability (%)	2010	134.4	188.2	182.9	123.9	149.2	184.2	117.6	173.0	113.1	
	Dynamics 2009/2010	100.8	121.8	99.0	87.9	100.2	103.1	87.7	87.7	93.5	
	Dynamics 2010/2009	69.9	157.3	103.8	66.6	78.6	88.7	97.6	114.4	99.1	

Source: authors' own compilation based on the survey

Źródło: opracowanie własne na podstawie ankiety badawczej

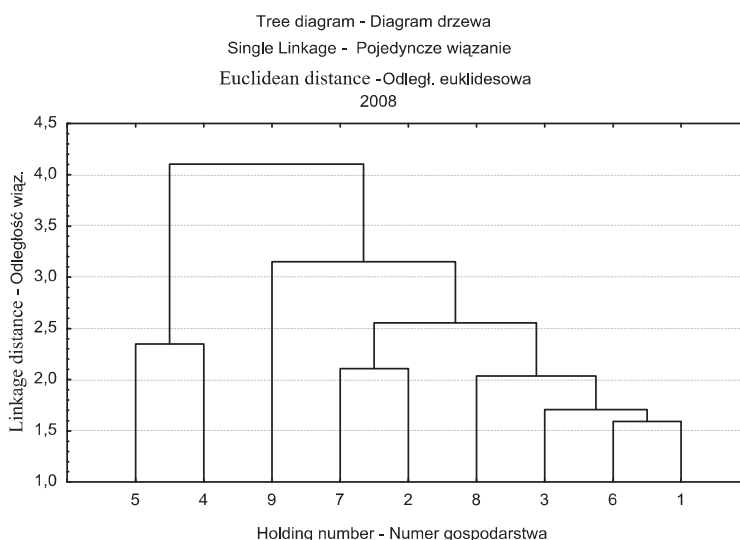


Fig. 2. Clusters formed by the holdings in 2008

Rys. 2. Skupienia utworzone przez gospodarstwa w 2008 roku

Source: authors' own calculations

Źródło: obliczenia własne

The dendrogram for 2009 is very similar to the dendrogram for 2008 but the agglomeration schedule was different (Figure 3). In 2009 the shortest distance was found between holdings 1 and 3. Holdings 2 and 7 formed a cluster at step 2 so they were more similar to each other than in 2008. The crop plant harvest volumes of the farms were the lowest, they had the lowest cattle stocking rate and the lowest profitability indices. Holding 8 was most similar to holdings 2 and 7 in 2009. Holding 9 did not form a cluster with the remaining farms in 2008 and 2009 until step 7.

In 2010, the smallest holdings, that is 2 and 8, were most similar to each other because they formed a cluster at the first step so the distance reflecting differences between the objects was the smallest. These holdings, covering the smallest areas, differed slightly as to the livestock stocking rate (13.34 and 20.0 LSU, respectively), economic size (8.11 and 11.78 ESU, respectively) and crop plant harvest volume. As the dendrograms and agglomeration schedule demonstrated, holdings 6 and 3 were similar, too; They formed a cluster at step 2. They has similar values of cattle stocking rate (50.2 and 41.68 LSU, respectively), triticale harvest volume (20.0 and 18.50 t, respectively) and profitability coefficient (184.2 and 188.2%, respectively). Holdings 7, 1 and 9 joined the cluster at further steps, which is also showed in the dendrograms. The finding indicates that the farms were dissimilar to each other and to the remaining farms (Figure 4, Table 7).

Table 7. Agglomeration schedule (linking) of holdings into clusters
 Tabela 7. Przebieg aglomeracji (łączenia) gospodarstw w skupienia

Linking process	Distance	Number of farms entering the cluster								
		2008								
Step 1	1.59	1	6							
Step 2	1.71	1	6	3						
Step 3	2.03	1	6	3	8					
Step 4	2.10	2	7							
Step 5	2.34	4	5							
Step 6	2.55	1	6	3	8	2	7			
Step 7	3.15	1	6	3	8	2	7	9		
Step 8	4.10	1	6	3	8	2	7	9	4	5
cutting point – 3.48										
2009										
Step 1	1.32	1	3							
Step 2	1.70	2	7							
Step 3	1.60	1	3	6						
Step 4	2.09	2	7	8						
Step 5	2.37	1	3	6	2	7	8			
Step 6	2.76	1	3	6	2	7	8	9		
Step 7	3.00	4	5							
Step 8	4.20	1	3	6	2	7	8	9	4	5
cutting point – 3.54										
2010										
Step 1	1.10	2	8							
Step 2	1.59	3	6							
Step 3	2.09	2	8	3	6					
Step 4	2.09	1	2	8	3	6				
Step 5	2.10	1	2	8	3	6	7			
Step 6	3.10	4	5							
Step 7	3.63	1	2	8	3	6	7	9		
Step 8	4.68	1	2	8	3	6	7	9	4	5
cutting point – 4.01										

Source: authors' own calculations
 Źródło: obliczenia własne

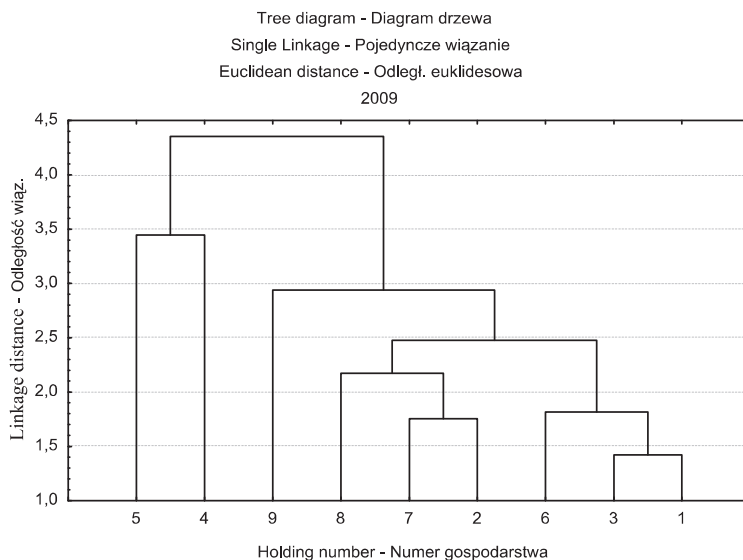


Fig. 3. Clusters formed by the holdings in 2009
Rys. 3. Skupienia utworzone przez gospodarstwa w 2009 roku
Source: authors' own calculations
Źródło: obliczenia własne

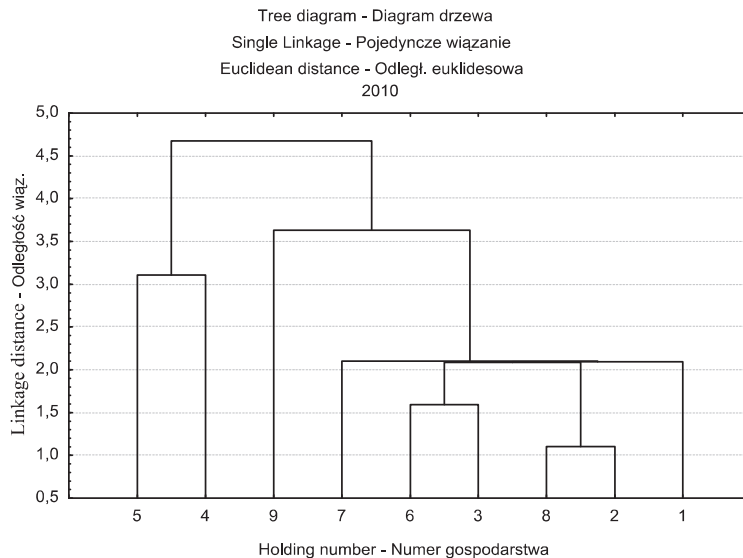


Fig. 4. Clusters formed by the holdings in 2010
Rys. 4. Skupienia utworzone przez gospodarstwa w 2010 roku
Source: authors' own calculations
Źródło: obliczenia własne

SUMMARY

The first step in economic studies of agricultural holdings is to look at farm resources, production conditions, production activities, and economic results. Having completed a detailed description, one can attempt an analysis of activities of the holdings. The surveyed farms specialised in commodity milk production. The average area of a farm was almost 40 ha, which indicates that they were large holdings whose activities, however, were carried out on poor-quality soils. Crop plant production of the farms was limited to three basic crop plants, that is triticale, cereal mixes and maize for silage. The area under these crops increased following an increase in cattle stocking rate. Also, the holdings differed as to the economic size (ESU).

The cluster analysis sorted the holdings into two clusters each year. One cluster consisted of farms with the largest area and greatest economic size. The other cluster was created by the remaining farms. Within the latter cluster the linkage distance (which is indicative of probability) between individual farms changed following changing production conditions, which can be seen in dendrograms and is indicated by agglomeration sequence results for the years 2008–2010. In this cluster, the greatest linkage was found for holding 9 which was merged with the remaining farms of the cluster at the penultimate step. Values of the characteristics describing this holding were quite different from the values describing the remaining six farms of the cluster. The differences were not large enough, however, for holding 9 to form a separate cluster.

The main characteristics influencing the similarity or dissimilarity of the surveyed holdings included: agricultural land area, arable land area, stocking rate in livestock units, economic size of a farm and profitability coefficient.

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WYKORZYSTANIE ANALIZY SKUPIEŃ DO PORÓWNIANIA GOSPODARSTW ROLNYCH W GMINIE KĄKOLEWNICA

Streszczenie. W pracy przedstawiono porównanie dziewięciu gospodarstw rolnych specjalizujących się w produkcji mleka w gminie Kąkolewnica. Podstawą analizy były wyniki ankiety badawczej przeprowadzonej w latach 2008–2010. Na jej podstawie gospodarstwa scharakteryzowano pod względem: powierzchni, struktury uprawy, obsady bydła, wielkości ekonomicznej gospodarstwa oraz współczynników opłacalności. Do porównania gospodarstw pod względem wszystkich badanych cech jednocześnie użyto wielowymiarowej analizy skupień. Na jej podstawie stwierdzono, że badane gospodarstwa można podzielić na dwie grupy. Jedną grupę stanowiły gospodarstwa obszarowo największe, które są jednocześnie podobne do siebie pod względem badanych cech. Drugą grupę tworzyły gospodarstwa o średnim i małym areale, które w większym bądź mniejszym stopniu różniły się między sobą. W tej grupie gospodarstwem najbardziej różniącym się od pozostałych było gospodarstwo 9, które charakteryzowało się znacznie większym arealem, większą obsadą bydła i większymi zbiorami uprawianych roślin. Wielkości te nie były jednak na tyle duże, aby gospodarstwo to zostało przyłączone do skupienia utworzonego przez największe obszarowo gospodarstwa.

Słowa kluczowe: analiza skupień, gospodarstwo rolne, wskaźnik opłacalności, ekonomiczna wielkość gospodarstwa

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