

## ORGANIC FARMS ORIENTED TOWARDS ANIMAL PRODUCTION IN THE MAŁOPOLSKIE VOIVODESHIP\*

Kamila Musiał, Jacek Walczak

National Research Institute of Animal Production, Department of Production Systems and Environment, 32-083 Balice n. Kraków, Poland

*Rolnictwo ekologiczne w ostatnich latach nabiera coraz większego znaczenia gospodarczego, a obszarem szczególnie predestynowanym do tego typu produkcji jest województwo małopolskie. Sprzyjają temu m.in. zróżnicowane warunki środowiskowe oraz rodzinny charakter gospodarstw, połączony ze stosunkowo niewielkimi ich powierzchniami, co utrudnia rozwój rolnictwa intensywnego. Celem pracy była analiza i ocena w ujęciu subregionalnym gospodarstw ekologicznych, nastawionych na produkcję zwierzęcą, w tym: ich liczby, struktury użytków rolnych oraz obsady zwierząt, zwłaszcza bydła. Do przygotowania opracowania wykorzystano arkusze danych surowych opisujących każdorazowo pojedyncze gospodarstwa, pochodzące z bazy danych Głównego Inspektoratu Jakości Handlowej Artykułów Rolno-Spożywczych (2015), jak również zbiór informacji udostępnionych przez Główny Urząd Statystyczny (2016). Według GJIHARS (2015), na terenie województwa małopolskiego było 1032 takich producentów. Gospodarstwa ekologiczne zajmowały przy tym łącznie 12976,7 ha, tj. 2,23% w stosunku do ogólnej powierzchni gospodarstw ekologicznych w Polsce. Wszystkie badane gospodarstwa zwierzęce utrzymywały krowy mleczne, natomiast bydło opasowe było utrzymywane w 68,7% gospodarstw. Największy udział gospodarstw ekologicznych utrzymujących bydło opasowe odnotowano w subregionie górskim (83,5%).*

*Słowa kluczowe: gospodarstwa ekologiczne, produkcja zwierzęca, woj. małopolskie*

According to the Eurobarometer survey (Europeans, Agriculture and the CAP, 2015), 56% of surveyed Poles say that ensuring good health quality and safety of food should be the main objective of the Common Agricultural Policy. 44% of respondents supported the objectives pursued with regard to environmental protection and climate change. So far, no other type of production has met these expectations as well as ecological farming. The conventional animal husbandry system involves the operation of highly specialised farms, where profit

\* The study was supported from project No. 01-17-01-11.

maximisation is achieved by reducing unit costs resulting from the considerable scale and concentration of production. This affects not only on the product quality and animal welfare, but can also pose a risk to the environment through the deposition of biogenic substances and gas emissions. This is why an important aspect of the development is the promotion of environmentally-friendly production methods based on the principle of sustainable development, which underlies ecological farming (Kostecka & Mroczek, 2007; Krawczyk & Walczak, 2010; Płachciak, 2011).

Ecological farming stems from the holistic trend. It is a food production system based on such farm management that combines the most environmentally friendly practices with a high level of biodiversity, the protection of natural resources and a high level of animal welfare. The methods used in it meet the requirements of consumers, who generally prefer products produced using natural substances and processes. Despite its tradition, which often dates back centuries, these methods are a completely new quality based on fully conscious and knowledge-based technologies. Ecological system requires strict control and certification of the used production methods. In addition to the prohibition against the use of artificially synthesized mineral fertilisers, plant protection products, GMOs and antibiotics, feed must come from one's own farm. Feed may be purchased after obtaining approval from competent authorities. It is also essential that animals have an access to natural elements of their environment, i.e. grazing. Polish ecological farms cover 5.2% of all ecological agricultural land in the EU-28. On the other hand, the market value of the domestic ecological farming is estimated at PLN 1 billion, with a constant upward trend of 20% per annum (Regulation of the EU Council No. 834, 2007; Kuś & Jończyk, 2009; Runowski, 2009; Nowogródzka, 2012; Paszkiewicz-Jasińska & Żyszkowska, 2011; Wójcik et al., 2013; USDA Foreign Agricultural Service, 2017).

Małopolskie voivodeship is distinguished by the richness of its natural and landscape resources, however in recent years, there have been changes in the landscape structure resulting from the regression of multi-directional agricultural production, especially within small farms. The discontinuation of the agricultural land use has a negative impact on the biodiversity of e.g. clusters of meadows and pastures. In the absence of grazing, the trophic nature of habitats is being reduced and thus impoverished and degraded, and such clusters lose their unique characteristics. Therefore, abandoning farming in such ecosystems may result in the elimination of vegetation typical of the *Molinio-Arrhenatheretea* class over time. This can be seen especially in the southern part of the province, where grasslands were the dominant part of the agroecosystems. The traditional use through grazing has also lost its importance due to the lower profitability of small-herd ruminant farming. For several years now, it has been possible to observe the phenomenon of withdrawal of agriculture especially from the areas with sharper relief or located in uplands with considerable slopes that hinder agronomic treatments. On the other hand, the Rio de Janeiro Convention of 1992 obliges our country to preserve biodiversity also in agricultural areas and maintain

native breeds of farm animals (Kryszak, 2001; Trąba et al., 2004; Pawlak, 2007; Dembek, 2012; Musiał et al., 2015; Musiał et al., 2017).

The aim of the study was to perform an assessment of the ecological farms focused on animal production Małopolskie voivodeship. The research hypothesis is that the largest number and share of ecological animal farms are located in montane areas predestined for this type of production due to their climatic conditions.

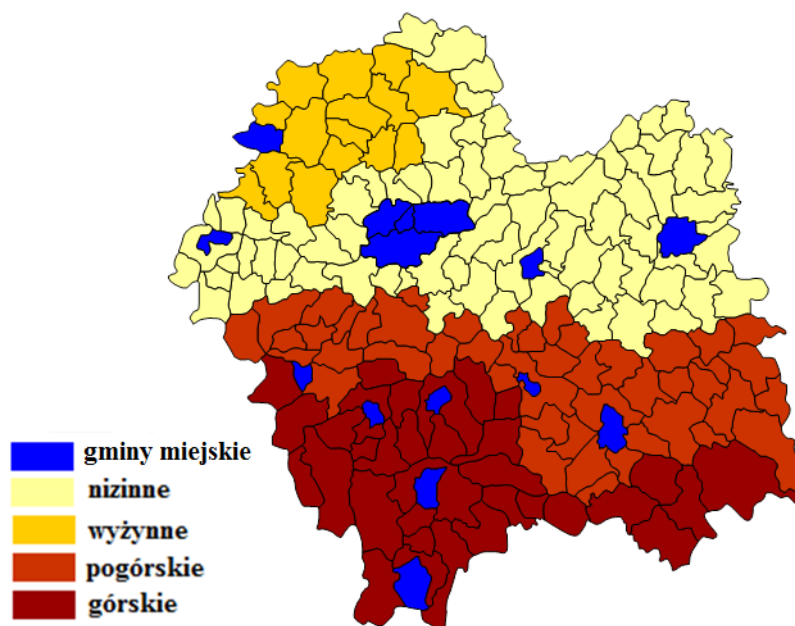
### **Material and methods**

The paper presents an analysis and assessment of ecological farms conducting livestock production Małopolskie voivodeship. The basis for obtaining initial information for the assessment of the farms was the raw data sheets describing individual farms. It was a set of 220 variables compiled for 1,032 farms (described jointly) which met the institutional requirements of ecological farms and farms in the process of conversion from conventional to ecological farms. The analysed data come from the database of the Main Inspectorate of the Quality of Agricultural and Food Products (GIJHARS) (2015). The study also used a collection of information from the Central Statistical Office (2016) and the “Report – the state and barriers of sheep production in the Małopolskie voivodeship Region” (Raport – stan i bariery produkcji owczarskiej w Regionie Małopolski – 2013), which was prepared for the Voivodeship Office in Kraków.

The data describing ecological farms were analysed in accordance with the division of Małopolskie voivodeship into four topographical and physiographical areas: lowland, upland, submontane and montane subregions (Fig. 1). The lowland subregion consists of municipalities whose agricultural areas are mostly located at an altitude of 300 m or less and physiographically belong to the unit called Northern Subcarpathia (Kondracki, 2009; Raport – stan i bariery..., 2013). The upland and submontane subregions include the municipalities with more than 50% of the area located at an altitude of more than 300 m. The first one includes parts of the Silesian-Kraków Upland and Małopolska Upland, while the submontane subregion consists of municipalities located within the range of Carpathian foothills and a part of the Western Outer Carpathians, which include the Beskid Mountains. The montane subregion includes the municipalities located at the altitude of more than 500 m within the ranges of the Beskid Mountains and the Tatra Mountains. There are urban municipalities located within all the four subregions.

Such criteria for the division of municipalities and consequently ecological farms located within a given subregion made it possible to compare and assess selected aspects of the organisation of farms in different subregions, including their surface area and plant and animal production (by farmed animal species). The share of agricultural land in good agricultural condition was determined on the basis of data available in agricultural statistics of the Central Statistical Office

(GUS). Particular attention was paid to ecological farms keeping cattle, i.e. dairy cows and fattening cattle, which fulfil very important production and ecological functions, together with small ruminants kept on small family farms. Assuming that the submontane and montane sub-regions are more suitable for the production of ruminants due to their specific natural conditions, the authors looked for the reflection of this condition in ecological farms.



Source: authors' own study based on Raport – stan i bariery..., 2013; and Kondracki, 2009

Fig. 1. Topographic and physiographic distribution of subregions in Małopolskie voivodeship

## Results

### Agriculture in Małopolskie voivodeship

Małopolska is a region with the largest natural, economic and cultural diversity in Poland. The areas defined as lowlands occupy 42.7% of the total agricultural land area of the province and cover 271,000 hectares (Tab. 1). The area is characterised by diverse natural conditions, including soil conditions as there are both fertile loess soils, especially in Miechów and Proszowice districts, and less fertile podzols and highly skeletal soils. Despite the clear deproductivisation of agriculture in its western part, which can be observed especially in the Chrzanów district, the agricultural land in this region that is in good agricultural condition constitutes 92.9%. This is the highest share compared to other subregions. It is an area predominantly predestined for ecological

production but one should exclude the areas surrounding motorways and the areas around chemical and heavy-industry plants, such as Tarnów, Kraków and Alwernia.

Table 1. Characteristics of subregions of the Małopolskie voivodeship in terms of production

Subregion	Acreage of UAA	Share of UAA (%)	Share of UAA in g.a.c.	Acreage of permanent grasslands		Permanent grassland not used for production purposes	
	ha	%	%	ha	%	ha	%
Lowlands	271,0	42,7	92,9	66,2	22,4	9,1	13,7
Uplands	69,0	10,9	90,7	9,0	13,0	1,8	20,0
Submontane	149,6	23,5	90,6	76,8	51,3	8,4	10,9
Mountain	145,6	22,9	86,1	114,9	78,9	8,3	10,5
Małopolskie voivodeship*	659,3	100,0	90,5	278,3	42,2	29,6	10,6

UAA – permanent utilized agricultural area in thousands of hectares, permanent grasslands – grasslands in thousands of hectares, g.a.c. – good agricultural conditions, \* – with urban areas.

Source: authors' own study based on Raport – stan i bariery... (2013).

The submontane and montane subregions have a similar area of agricultural land, as well as a similar share in the subregional structure of the voivodeship, which are equal to 23.5% and 22.9%, respectively. The structure of agricultural land is dominated by permanent grassland, which accounts for 78.9% and 51.3% in the montane and submontane subregions, respectively. The share of agricultural land in good agricultural condition is 90.6% in the submontane subregion and 86.1% in the montane subregion. This confirms the known trends and relationships for the increased abandonment of land use by farmers in the areas with less favourable natural conditions for agricultural production (Wojewodzic, 2017). This also applies to areas with an increased agrarian fragmentation, with distant and dispersed small agricultural plots whose cultivation or grazing use becomes technologically inconvenient and unprofitable (Musiał & Wojewodzic, 2014). At the same time, these subregions are definitely predestined for the production of products of higher quality, including ecological production. Products produced in ecological farms can find buyers more easily here due to well-developed tourism or spa services.

The smallest of the analysed subregions, called the upland subregion, covers an acreage of 69,000 ha of agricultural land. The share of this land in good agricultural condition is similar to montane areas (90.7%). The agricultural production area consists mainly of arable land since grassland accounts only for 13%. Even such a relatively small area of land is not fully developed, as 20% of

this area is excluded from agricultural production. This testifies to the exacerbation of the phenomenon of abandonment of animal production by small-scale farms, including cattle and sheep farming, for which grassland forms an important feed base. In some municipalities, especially those bordering the Silesian voivodeship, the abandonment of agricultural land use by such farms is now common. This is clearly visible in the landscape of the Kraków-Częstochowa Upland, located within the Silesian-Kraków Upland, which is subject to a multi-faceted disagrarisation process. However, they constitute a potential base for restitution of ruminants, including within the ecological production system (Wojewodziec, 2017).

When describing farms in Małopolskie voivodeship holistically, one can see a great potential of the land, which includes the area of 635,200 ha after the exclusion of the areas belonging to the urban municipalities, with 81% being occupied by agricultural land (Statistical Office in Kraków, 2016). Their surface area and share are constantly decreasing, both due to the development of transport infrastructure and housing construction and the emerging trend in afforestation and spontaneous shrub growth of the most agriculturally poor and peripheral areas. According to the data of the Statistical Office for 2015, over the last 10 years, i.e. from 2005 to 2014, the share of the total area occupied by farms in Małopolskie voivodeship decreased by 8.4%, and the number of farms decreased from 354,000 to 137,000. Currently, the agricultural production in Małopolska is conducted in 134,200 farms, which are dominated by small entities with the area of up to 5 ha, constituting 82% of all farms, while relatively large farms, i.e. over 15 ha of agricultural land, account for only 2%. The small share and number of the latter may be a significant problem for the maintenance of agricultural production in the coming years, in particular commercial farming and ensuring the sustainability of agriculture, including opportunities for the development and modernisation of production technologies. In 2015, there were 120,600 productively and economically active farms that met the requirements of applications for area subsidies, and their number in the last 12 years decreased by almost 14,000, or by 10.7% compared to the baseline.

On farms in Małopolska, meadows and pastures accounted for 31.9%. As in most regions of the country, the population of livestock was relatively small, showing a downward trend. In 2015, the total number of cattle was about 170,000 head (2.9% of the population of livestock in Poland), including 83,100 cows. The population of pigs was similar in terms of numbers with the total of 171,700 head and showed a downward trend of 9.9%, compared to 2014. In 2015, the cattle stock density expressed in physical heads per 100 ha of permanent grassland was 31.6 head, including 15.5 cows. Taking into account the natural conditions of the region for the production of ruminants, this value can be considered very low, as the national average is 39.6 cattle and 15.8 cows, respectively. The population of sheep in 2015 was 62,900 head and showed a significant upward trend in comparison to the previous year (increase by 9.1%). Sheep were kept mainly in small flocks located in individual farms (99.6%). This relatively small population

of sheep, especially in comparison to the period prior to the marketisation, accounts for as much as 31.8% of all sheep in Poland, which places Małopolska in the first place in this respect. However, given the feed capacity, the sheep population shortage is very large and amounts to approximately 130,000 head, i.e. 206% of the current population (Raport – stan i bariery..., 2013).

### Ecological farms in Małopolskie voivodeship

Ecological production plays a rather insignificant role in Poland, including Małopolska, and it seems that it will become a development system in the coming years. The most ecological farms are located in the Małopolskie, Podkarpackie and Lubelskie voivodeships, where they account for a little less than 50% of the total number of such entities in Poland (GUS, 2016). Ecological production is favoured by specific diverse environmental conditions, the technological conservatism of farmers and agrarian fragmentation of Małopolska, resulting in difficulties in the organisation of high-capacity and commercial production. In 2015, ecological farms occupied a total area of 12,976.7 ha – 2.23% of the total agricultural land area in Poland (Tab. 2). The number of ecological farmers in 2015 represented 4.5% of the total number of farmers in our country (GIJHARS, 2015).

Table 2. Organic agricultural land and producers in Poland and the Małopolskie voivodeship in 2015

Item	Małopolskie voivodeship		Poland	
	ha	%	ha	Total agricultural area and producers
Total acreage of organic agricultural land	12976,7	2,23	580730,0	100,0
including:				
after conversion	11689,4	2,36	501924,9	100,0
during conversion	1287,3	1,62	78805,1	100,0
Total number of organic producers	1032	4,5	23015	100,0
including:				
farmers	981	5,06	22277	100,0
processors of organic products	51	9,07	562	100,0

Source: authors' own study based on GIJHARS (2015).

When analyzing the state and organisation of ecological farms shown in the GIJHARS statistics (2015), it is important to pay attention to their subregional distribution in Lesser Małopolskie voivodeship. There were 74 such farms in the lowland area, and this system was much more popular in the montane and submontane subregions, where the number of ecological farms was 491 and 448,

respectively (Tab. 3). Ecological production in the upland subregion was carried out by only 16 agricultural entities, and there were 3 such farms in urban areas located within different subregions. The analysed farms were larger than the province average of 4.01 ha (Rocznik Statystyczny Województwa Małopolskiego, 2015), as their average area was 8.34 ha, or twice the size. The differences in this respect between the subregions, especially the montane and submontane subregions, were significant as the average for ecological farms located in the mountains was 9.62 ha and the average for the submontane subregion was 6.35 ha, which accounted for 66% of the acreage of farms located in the mountains. A separate analysis subgroup comprised three ecological farms located within urban municipalities and urban areas, for which the average agricultural land area was 137.67 ha. Almost all of this area was covered by permanent grassland (98.1%), which often fitted well into urbanised areas. However, it was a group of farms that were atypical for Małopolska, therefore it was not relevant objects of analysis due to their small number (3 farms).

Table 3. Number of organic farms and selected characteristics of land use

Subregion	Number of farms	Share of organic farms (%)	Acreage of UAA (ha)	Acreage of UAA per farm (ha)	Acreage of PG (ha)	Acreage of PG per farm (ha)
Lowlands	74	7,2	509,20	6,88	127,13	1,72
Upland	16	1,6	118,56	7,41	4,93	0,31
Submontane	448	43,4	2843,56	6,35	1206,83	2,69
Mountain	491	47,5	4721,17	9,62	3457,43	7,04
Urban areas	3	0,3	414,98	138,32	413	137,67
Total	1032	100,0	8607,47	8,34	5209,32	5,05

UAA – utilized agricultural area in thousands of hectares, PG – permanent grasslands.  
Source: authors' own study based on GIJHARS (2015).

Permanent grassland dominated the structure of agricultural land in the Małopolska's ecological farms, as its share on average amounted to 60.4%, while the average share of arable land amounted to 35.4% (Tab. 4). However, differences in the land use pattern were significant between the subregions. The shares of permanent grassland in the montane and submontane subregions were 73.2% and 42.4% respectively, while in uplands – only 4.1%. Orchards occupied on average 4% of the used land, but they occupied as much as 9.3% in the submontane subregion and just 0.1% in urban areas. The land use structure indicates that the majority of the analysed farms were predestined for livestock production, in particular ruminant farming. The collected data confirm that this production played an important role, especially in relation to six livestock species (Tab. 5).



Table 4. Structure of utilized agricultural area in farms in particular subregions (%)

Subregion	UAA	PG	Orchards	Other crops	Total UAA
Lowland	70,9	25,0	3,9	0,2	100,0
Upland	94,4	4,1	1,2	0,3	100,0
Submontane	48,1	42,4	9,3	0,2	100,0
Mountain	25,5	73,2	1,2	0,1	100,0
Urban areas	1,7	98,1	0,1	0,1	100,0
Average	35,4	60,4	4,0	0,2	100,0

UAA – utilized agricultural area, PG – permanent grasslands.

Source: authors' own study based on GIJHARS (2015).

Cattle were the most frequently kept livestock species, with fattening cattle kept in 68.7% of the analysed farms and dairy cows kept in all of them. On a sub-regional level, the largest share of ecological farms with fattening cattle was found in montane areas (83.5%). However, ecological farms in submontane and upland areas also preferred the production of fattening cattle, which were kept in 69.9% and 68.8% of agricultural entities, respectively. Pigs were farmed in the Małopolska region in 14% of farms. This type of farming was located mainly on farms in the lowland subregion, where 32.4% of the analysed entities carried out this type of production. In the montane subregion, on the other hand, these accounted for only 5.3% of farms. Certainly, different animal production patterns related to sheep farming, which was carried out in only 6% of the analysed ecological farms. It was not recorded at all on farms located in the upland subregion, and it applied by far the most to the agricultural entities located in the montane subregion (16.1%), in contrast to the submontane subregion (3.6%). Goat farming was carried out on average in one in 50 ecological farms (2.1% of the total number of farms), i.e. approx. 3 times less frequently than sheep farming, with the highest share of goat farms recorded in the lowland subregion (3.9%). One in six farms kept horses (17%), with 24.3% and 12.5% of such entities being found in the lowland and upland regions, respectively. The shares of farms that kept horses in the montane and submontane subregions were less diverse and pertained to 16.3% and 15% of the entities. The vast majority of the analysed farms kept poultry (78.6%) and all the analysed farms in the upland subregion kept chickens or turkeys, ducks and geese. The smallest share of poultry farms was recorded in the montane subregion, which may be related to the lower share of cereals in the crop structure.

Table 5. Share of organic farms with different livestock species (%)

Subregion*	Share of organic farms with livestock (%)						
	dairy cows	fattened cattle	pigs	sheep	goats	horses	poultry**
Lowland	100,0	52,7	32,4	4,1	3,9	24,3	87,8
Upland	100,0	68,8	6,3	0,0	0,0	12,5	100,0
Submontane	100,0	69,9	17,3	3,6	3,1	15,0	70,3
Mountain	100,0	83,5	5,3	16,1	1,4	16,3	56,2
Total	100,0	68,7	14,0	6,0	2,1	17,0	78,6

\* In addition, 3 dairy farms located in the urban areas maintained dairy cows and fattened cattle.

\*\* Total hens, turkeys, ducks and geese.

Sources: authors' own study based on GIJHARS (2015).

In view of the number and importance of cattle farming on ecological farms, an in-depth analysis of this production direction seemed to be relevant (Tab. 6). On average, cattle farms kept on average approx. 5 cows and/or approx. 4 fattening cattle. Thus, these were generally small herds that would not be economically viable in conventional farming. The differences in this respect between farms located in different subregions were small, ranging from 2 cows in the lowland subregion to just over 6 cows in the montane subregion. In total, the ecological farms showed a relatively high population and stocking density for cattle, which was equal to 77.5 LSU/100 ha of permanent grassland on average. However, the highest cattle stocking density was recorded on farms in the upland subregion with 86.4 LSU/100 ha. Thus, the vast majority of ecological farms kept animals which were able to use fodder produced on permanent grassland. Maintaining livestock production on these farms in the context of increased simplification of production and the abandonment of animal farming, including on small farms, is an important asset. These farms also perform positive roles regarding the preservation of biodiversity, especially on grassland and rational development of areas of increased ecological value, including protected areas. For this form of ecological services, they also receive support for the use of agri-environmental programmes (Musiał & Musiał, 2016); Radkowska & Musiał, 2017).

Table 6. Selected characteristics of organic cattle farms

Subregion	Total number of cows	Number of cows/farm	Number of fattened cattle	Number of fattened cattle /farm*	Livestock units of cattle/100 ha UAA
Lowlands	151	2,0	91	2,3	43,6
Upland	87	5,4	26	2,4	86,4
Submontane	1615	3,3	1002	2,9	70,9
Mountain	3089	6,3	1702	4,1	83,2
Urban areas	16	5,3	33	11,0	7,2
Total	4942	4,8	2821	3,5	77,5

Source: authors' own study based on GIJHARS (2015).

Due to their specific characteristics resulting from formal constraints and the selection of livestock breeds and animal feeding method for ecological farms, these farms achieve much lower yields than those producing in a conventional manner. This was also observed in the analysed sample, where the share of farms selling milk, i.e. commercial farms, was 68.5%, and the highest number of such agricultural entities was found in the upland subregion (87.5%) (Tab. 7). On average, commercial production of milk from 1 cow was 2,140 litres in the whole sample. These are definitely low results, which testify to the difficult grazing conditions and low productivity of permanent grassland. There is no data available for direct sales from herds with such low productivity. However, it seems that this type of sales must be predominant, given the low herd population. Due to their small acreage, these farms produced an average of 1,014 litres of milk per 1 ha of agricultural area, with the highest rates in this respect being achieved by the entities in the upland subregion, which amounted on average to 1,892.4 litres. The lowest milk production rates, excluding urban areas, were those of the lowland subregion and were equal to 558.2 l/ha of UAA, whereas the values for submontane and montane subregions were equal to 1,255.8 and 1,265.7 l/ha of UAA. Milk production averaged 10,459 litres per farm. However, significant variations in the production level were found here due to stocking density and productivity of animals. In the lowland subregion, commercial milk production per farm was the smallest and amounted to only 3,839 litres while it was the highest on farms in the upland subregion and amounted to almost 14,000 litres. However, the scale of global, and thus commercial, production per farm in all the analysed subregions was relatively small. The estimated revenues from milk sales, assuming direct sales and milk price of 2 PLN/l. amounted on average to approx. 20,500 PLN per farm (from approx. 7,600 to 26,600 PLN). It is difficult to regard this level of income as a satisfactory income that provides good prospects for the development of these farms. It is, therefore, important that they combine different revenues from their sales, mainly direct sales, with the income from European Union funds intended for ecological farms.

Table 7. Commercial production of cow milk, the milk yield of cows from organic farms and the share of commercial dairy farms

Subregion	Milk production (l/year)			Share of commercial dairy farms (%)
	per cow	per farm	per ha of UAA	
Lowlands	1882	3839	558,2	62,2
Upland	2567	13956	1892,4	87,5
Submontane	2211	7969	1255,8	58,0
Mountain	2103	13232	1265,7	66,2
Urban areas	2500	13300	99,5	-
Average	2252	10459	1014	68,5

Source: authors' own study based on GIJHARS (2015).

### Discussion of results

Małopolskie voivodeship is characterised by the largest diversity of natural conditions and agrarian fragmentation, which creates favourable conditions for the development of ecological animal farming. It is conducted on the acreage of approx. 13,000 ha in a little more than a thousand farms in all four topographical and physiographical subregions, i.e. montane, submontane, upland and lowland areas. 90.9% of all ecological farms were located in the montane and submontane areas, which was due to the specific natural conditions prevailing there. Thus, the assumed research hypothesis was reflected in the condition of the existing farms. They were characterised by a high share of permanent grassland and the average area of ecological farms was 8.34 ha, which made it more than double the average farm area in Małopolska. Due to the high share of permanent grassland, the farms focused on livestock production, with individual entities keeping, on average, one or more species of large and medium-sized livestock. Cattle (mostly dairy cows) were kept in all the ecological farms included in the observation. Although Małopolskie voivodeship ranks first in Poland in terms of the size of the sheep population, their production was not widespread in ecological farms, as they were present in only approx. 6% of the analysed farms.

Due to scarce land resources and traditional stall maintenance, animal farming in this type of entities was of a small-product nature (Musiał & Musiał, 2016). As far as cattle farming is concerned, the stocking density of these animals in the statistical ecological farm was 7.3 LSU and the lowest average stocking density of 3 LSU was found in the lowland subregion. The total LSU number for cattle per 100 ha of permanent grassland was relatively high, as the average stocking density was 77.5 LSU/100 ha, with the highest in the upland subregion (86.4) and the lowest – excluding urban areas – in the lowland subregion (43.6).

On average, milk production was recorded for 68.5% of farms. This indicator was the highest in the upland subregion (87.5%) and the lowest in the submontane subregion (58%).

From the environmental and social point of view and also in terms of market needs, it is necessary to create good conditions and promote the conversion of traditional farms into ecological farms with a lower production intensity, which will, nevertheless, keep livestock production. This is particularly justified under the conditions prevailing in Małopolskie voivodeship, where it is common for farmers to abandon the small-herd farming of ruminants. As a result, the countryside is gradually becoming deagrarianised and the large part of the grassland is synanthropised. This is unfavourable because of their role in producing valuable feed for ruminants, which is characterised by a high feed and dietary value, as well as in maintaining the biodiversity that exists there. The animal production which ensures sustainable development of rural areas based on existing farms should be favoured in areas of high natural value that are located away from urban and industrial centres and burdening transport infrastructure. These conditions can be met by entities that conduct integrated or ecological production.

#### References

- Dembek W. (2012). Problemy ochrony polskiej przyrody w kontekście Wspólnej Polityki Rolnej. Woda Środowisko Obszary Wiejskie, t. 12, z. 4 (40): 109 - 121.
- Europeans, Agriculture and the CAP. (2015). Special Eurobarometer 440. Survey requested by the European Commission.
- Główny Inspektorat Jakości Handlowej Artykułów Rolno-Spożywczych. (2015).
- Kondracki J. (2009). Geografia regionalna Polski. Warszawa PWN, wyd. III uzupeł: 15–75.
- Kostecka J., Mroczek J. (2007). Świadomość ekologiczna rolników a zrównoważony rozwój obszarów wiejskich Podkarpacia. *Ekonomia i Środowisko*, 2 (32): 164–177.
- Krawczyk W., Walczak J. (2010). Potencjał biogeny obornika jako źródło emisji amoniaku i zagrożenia środowiska. *Roczniki Naukowe Zootechniki*, 2 (37): 187–193.
- Kryszak A. (2001). Różnorodność florystyczna zespołów łąk i pastwisk klasy *Molinio – Arrhenatheretea* w Wielkopolsce w aspekcie ich wartości gospodarczej. *Rozpr. Naukowe Roczniki AR w Poznaniu*, z. 314: 181.
- Kuś J., Jończyk K. (2009). Rozwój rolnictwa ekologicznego w Polsce. *Journal of Research and Applications in Agricultural Engineering*, 3 (54): 178–182.
- Musiał K., Szewczyk W., Grygierzec B. (2015). Wpływ zaprzestania użytkowania na skład gatunkowy łąk i pastwisk wybranych mezoregionów Karpat Zachodnich. *Fragmenta Agronomica*, 32(4): 53–62.
- Musiał K., Szewczyk W., Walczak J., Grygierzec B. (2017). The role of re-introducing sheep grazing on protected calcareous xerothermic grasslands. Grassland resources for extensive farming systems in marginal lands: major drivers and future scenarios. *Grassland Science in Europe*, 22: 372–374.
- Musiał W., Musiał K. (2016). Wybrane problemy przebudowy strukturalnej rolnictwa

- przykład Małopolski. Roczniki Naukowe SERiA, t. XVIII, z. 6: 131–138.
- Musiał W., Wojewodziec T. (2014). Innowacyjność w zakresie gospodarowania ziemią rolniczą w regionach rozdrobnionych agrarnie. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 361: 162–168.
- Nowogródźka T. (2012). Stan i perspektywy rozwoju rolnictwa ekologicznego w Polsce. *Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie. Problemy Rolnictwa Światowego*, 12 (27): 54–65.
- Paszkiewicz-Jasińska A., Żyszkowska M. (2011). Charakterystyka i ocena stopnia synantropizacji zbiorowisk łąkowych Gór Sowich (Sudety Środkowe). *Acta Bot. Sil.* 7: 37–47.
- Pawlak A. (2007). Stan środowiska kulturowego w obszarach chronionych Małopolski – na przykładzie Popradzkiego Parku Krajobrazowego. *Wydawnictwo Politechniki Krakowskiej*, z. 7 - A: 231–237.
- Płachciak A. (2011). Geneza idei rozwoju zrównoważonego. *Economia Economics*, 5 (17): 231–248.
- Radkowska I., Musiał K. (2017). Wykorzystanie pastwiskowe różnych typów zbiorowisk trawiastych, jako sposób zachowania ich funkcji gospodarczych, przyrodniczych i kulturowych. *Innowacyjne rozwiązania w hodowli i produkcji zwierząt gospodarskich. Konf. Polsko – Niemiecka*: 217–227.
- Raport – stan i bariery produkcji owczarskiej w Regionie Małopolski (2013). Opracowany przez: Musiał W., Mikołajczyk J., Sroka W. *Uniwersytet Rolniczy w Krakowie. Maszynopis powielany*: 1–39.
- Rocznik Statystyczny Rolnictwa (2016). Główny Urząd Statystyczny, Warszawa.
- Rocznik Statystyczny Województwa Małopolskiego (2015).
- Rolnictwo w województwie małopolskim w 2015 r. (2016). *Urząd Statystyczny w Krakowie, Kraków*.
- Rozporządzenie Rady (WE) nr 834. (2007). *Dziennik Urzędowy Unii Europejskiej*.
- Runowski H. (2009). Rolnictwo ekologiczne – rozwój czy regres? *Roczniki Nauk Rolniczych*, seria G, t. 96, z. 4: 182–193.
- Trąba Cz., Wolański P., Oklejewicz K. (2004). Zbiorowiska roślinne nieużytkowanych łąk i pól w dolinie Sanu. *Łąkarstwo w Polsce*, 7: 207–238.
- USDA Foreign Agricultural Service. (2017). *Global Agricultural Information Network*.
- Wojewodziec T. (2017). Procesy dywestyacji i dezagraryzacja w rolnictwie o rozdrobnionej strukturze agrarnej. *Zeszyty Naukowe Uniwersytetu Rolniczego w Krakowie*, zeszyt 412, nr 535: 105–128.
- Wójcik P., Majewska A., Walczak J., Czubska A. (2013). Kształtowanie się cech produkcyjnych rodzimej rasy bydła polskiego czarno-białego oraz polskiego holsztyno-fryza w warunkach chowu ekologicznego. *Roczniki Naukowe Zootechniki*, 1 (40): 15–23.

KAMILA MUSIAŁ, JACEK WALCZAK

**Organic farms oriented towards animal production  
in the Małopolskie voivodeship**

## SUMMARY

Organic farming has recently gained economic importance and the Małopolskie voivodeship seems to be particularly predisposed to this type of production. This is favoured, among others, by varied environmental conditions of that region and the family nature of farms, along with their relatively small size, which impedes the development of intensive farming. The aim of the study was to analyse organic farms oriented towards animal production from a subregional perspective, including their numbers, structure of utilized agricultural area (UAA) and stocking rate, especially concerning cattle. The present paper was prepared based on the raw data sheets describing individual farms, originating from the Main Inspectorate of Commercial Quality of Agri-Food Products (GIJHARS, 2015), as well as a collection of information from the Central Statistical Office of Poland (Rocznik Statystyczny Rolnictwa, 2016). According to GIJHARS, in 2015 there were 1032 such producers in the Małopolskie Voivodeship. Organic farms occupied an area of 12,976.7 ha, which is 2.23% of the total acreage of such farms in Poland. All the animal farms maintained dairy cows, while fattening cattle was kept in 68.7% of the farms. The largest share of organic farms with fattening cattle was recorded in the submontane region (83.5%).

Key words: organic farms, animal production, Małopolskie voivodeship