

# AGRICULTURAL LAND USE AND ECOLOGICAL FARMING IN THE KREKENAVA REGIONAL PARK

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## Abstract

The analysis of the declared agricultural land and ecological farming situated in the Krekenava regional park (RP), which is situated in the Middle Lithuania, is presented in the article. The Naujamiestis subdistrict was chosen for the comparison of the use of agricultural lands and ecological farming in the regional park. In 2011, the total agricultural land and crop area declared in the Krekenava Regional Park was 8184.19 ha, i.e. by 317.89 ha or 3.74 percent less than in 2009. 371 family farms were declared, i.e. by 53 farms less in comparison with 2009. In 2009, the declared area of agricultural lands in Naujamiestis subdistrict covered 9877.66 ha and it made up 63.32 percent of the total subdistrict's area. 359 farmers introduced declarations. The average area of the declared farms was 27.51 ha. In 2011, the declared area of the agricultural lands was 9851.33 ha i.e. smaller than 26.33 ha or 0.27 percent less than in 2009. The number of declared farmers in 2011 was 329, i.e. by 30 farms or 9.12 percent less than in 2009. Ecological farming is relevant to protected areas. The article analyzes the Krekenava RP and Naujamiestis subdistrict's farms applying ecological farming tools. The analysis of the 2009-2011 period showed that the declared areas in Krekenava RP have decreased, and the area of farms applying organic measures has increased by 81.69 hectares (nearly 2.5 times). The number of farmers applying organic farming measures in Naujamiestis subdistrict has increased twice and 12 farms i.e., 3.63 per cent of the declared ones had organic farms in 2011, the analyzed area was increased by 581.55 hectares or 3 times.

Key words: regional park, land use, agricultural lands, ecological farming measures, declared areas.

## Introduction

Lithuania is historically an agricultural country. The agricultural sector plays a very important economic, social, environmental, ethnic and cultural function and is considered a priority for the country's agricultural industry (Čiegis, Zeleniūtė, 2008).

Farming in protected areas is difficult because it is faced with environmental and economic problems. Protected areas are divided into zones subject to different restrictions of economic activity, therefore economic activity differs as well.

The aim of protected areas is to preserve natural habitats and species (common on agricultural land) of the European Community interest. Such rate of the conservation and use of treatment of the territory is determined that non-intensive farming forming natural values should not be interrupted and should be continued in environmentally-friendly manner. If extensive farming disappears in natural grasslands, pastures and wetlands, these areas will overgrow with shrubs, trees and biodiversity will face a serious threat. As a result, only those activities are limited which could suddenly and irreversibly destroy natural values, for example, grassland ploughing, drainage works, liming, fertilizing and so on.

Sustainable development in agriculture is an organic farming helping solve important problems in rural areas (Brazauskienė, 2002). Organic farming is recognized as sustainable agriculture and it is an important expression of its potential options to address the competitiveness of agricultural products, rural employment and additional income issues and work together as a preventive environmental measure (Offermann, Nieberg, 2000).

The number of organic farms across Europe has been increasing since 1990. The growing demand for organic products has accelerated the growth of organic farming in Europe, and the development of organic farms is determined by the financial support from the EU funds.

The area of certified organic farms in Lithuania is increasing annually: in 2004 the area of organic farms covered 42955 ha, then there was an increase by 26475 ha accounting for 69430 ha in 2005. In 2006 the area increased by 32690 ha more and made up 102120 ha. In 2012 the certified organic farms covered the area of 162655 hectares and, compared to 2004, the amount has increased by 119700 ha. The number of certified organic farms has increased twice, i.e., from 1178 units (2004) to 2511 units (2012) (Viešosios įstaigos EKOagros..., 2012).

One of the reasons determining an increasing number of organic farms is the EU's state support. Benefits for the certified area used for organic farming and food production have the greatest impact from support measures (direct and compensatory payments) allocated to organic farms. (Kazakevičius, 2010).

Protected areas have to comply with the principles of sustainable farming, expansion of the area under organic farming and organic farming for measures to preserve the landscape, the importance of biodiversity, natural and cultural heritage values (Ivavičiūtė, Gurskienė, 2010).

**The object** of the research is declared agricultural lands in the Krekenava Regional Park and Naujamiestis subdistrict.

**The aim** of the research is to carry out the comparative analysis of the years 2009 and 2011 of the agricultural lands situated in the Krekenava Regional Park and the Naujamiestis subdistrict, to perform the analysis of farms applying organic farming measures as well as the analysis of the change of their areas.

The following **objectives** have been set:

1. To characterize the Krekenava Regional Park and the Naujamiestis subdistrict.
2. To carry out the analysis of the declared agricultural lands in the Krekenava Regional Park and the Naujamiestis subdistrict.
3. To perform the analysis of farms applying organic farming measures as well as the analysis of the change of their areas.

### **Methodology of research and materials**

Comparative, analytical as well as statistical and logical research methods were used for the investigation of the years 2009 and 2011. The analysis of the agricultural lands in the Krekenava regional park and the Naujamiestis subdistrict was carried out following the data of the Agriculture Information and Rural Business Center on the declared agricultural land and crop areas.

The survey was conducted to determine whether agricultural land use and environmental measures for the Krekenava regional park and the Naujamiestis subdistrict differ because of the restrictions and recommendations (on the regional parks) to protect and enhance biodiversity, promote environmentally friendly farming methods and organic farming measures.

The study was carried out to determine how many farms included in the territory of the regional parks applied organic farming measures. The change of above farms' area for 2009-2011 was analyzed as well. Naujamiestis subdistricts, not incorporated into the territory of regional parks, were chosen for the performance of comparative analysis.

### **Discussion and results**

**Description of the Krekenava Regional Park.** The Krekenava Regional Park was founded in 1992 to preserve and maintain the landscape of the Nevėžis river valley, its natural ecosystem and cultural heritage treasures.

The Nevėžis old valley is the biggest treasure of Middle Lithuanian Lowland landscape. A lot of traces of the old riverbeds appeared when the river changed its course. During tides the river Nevėžis bursts from its banks and leaves a lot of silt in the flooded bank meadows forming many irregularly-shaped pools and ponds. The landscape of the Nevėžis old valley is little touched by people and it is a heritage of the post ice-age times. The Nevėžis Middle River Reserve was founded to preserve the treasures of nature and landscape. Natural treasures are abundant in the forests of the park as well.

Almost the entire park's territory is situated in Panevėžys district municipality of Panevėžys County, only the south-western edge intervenes into the Kėdainiai district municipality of Kaunas County.

The analysis of the location of Lithuanian regional parks shows that Middle Lithuania has only one regional park, i.e. the Krekenava regional park therefore the significance of this park is especially important.

Having prepared the plan of the Krekenava regional park and its zones in 2009 and having evaluated the character and distribution of cultural heritage, the following zones were singled out: conservation, ecological protection, recreational, economic and residential priority zones. The change of areas was predicted as well (Krekenavos, 2009). The analysis of the change of the regional park's areas reveals that the area of the park has decreased from 111749.0 ha to 11589.7 (Krekenavos, 2014) (Table 1) ha, i.e. by 159.4 ha or by 1.4 percent, respectively. The conservation priority zone was reduced most of all (by 2.5 percent). The ecological protection priority zone was increased by 1.9 percent and covering 4.6 percent (538.6 ha) of the whole park's territory. The agricultural zone has increased by 36.8 ha or by 0.7 percent, respectively.

**Table 1**

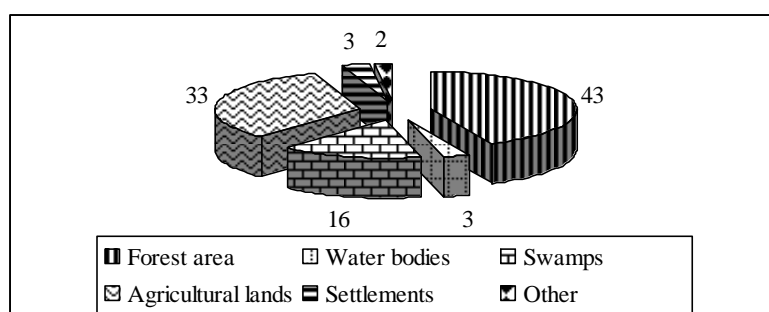
The areas of the functional priority zones of Krekenava regional park

Number	The name of the functional priority zone	Area, ha	Percent from the RP area
1	Conservation priority zone - reserve	4089.9	35.3
2	Ecological protection priority zone	538.6	4.6
4	Recreational priority zone	266.7	2.3
5	Economic priority zone	6582.2	56.8
6	The living zone	112.3	1.0
<b>Total:</b>		<b>11589.7</b>	<b>100</b>

The average productivity of soils of agricultural lands in the Panevėžys district municipality is 47.5 scores.

Panevėžys district is situated in the zone of Central Lithuania and belongs to the zone of soils with average fertility of II B-1 district group, for use in the main commercial agricultural crops, i.e. winter wheat, barley, rape, flax, sugar beet (Mažvila et. al. 2010).

Agricultural lands make up 33.0 percent of the Krekenava regional park's territory (Raudonytė, 2009) (Fig. 1). The average productivity of the agricultural lands situated in the park is higher than 45 scores.

**Fig 1.** Distribution of agricultural lands in the Krekenava regional park, in percent.

The largest part of agricultural lands is covered by forests (43.0 percent). Moist, mainly mixed forests, in some places oak-woods and ash-woods predominate in the Krekenava regional park (Krekenavos, 2014).

**The analysis of the declared areas of agricultural land use in the Krekenava regional park and Naujamiestis subdistrict.** In 2009, Lithuanian farmers and legal entities used and declared 2,420 thousand ha of agricultural lands, private agricultural land users and small landowners – 220 thousand ha, the members of the community gardeners – 16 thousand hectares (Mažvila et. al. 2010).

Following the data of the Agriculture Information and Rural Business Center (Žemės ūkio informacijos..., 2011) the declared area of agricultural lands and crops occupied 8502.08 ha in 2009, accounting for 73.36 percent of the total regional park's area. The number of the farmers, who had declared their farming lands, was 424. The average area of the declared farms was 20.05 ha.

In 2011 the total agricultural land and crop area declared in the regional park was 8184.19 ha (Fig. 2), i.e. smaller by 317.89 ha than in 2009. 371 family farms were declared, i.e. by 53 farms less in comparison with 2009.

The Naujamiestis subdistrict was chosen for the comparison of the use of agricultural lands in the Naujamiestis subdistrict and the regional park. The territory covered the area of approximately 15.6 thousand ha. There were 66 villages, 4 agricultural companies and agricultural cooperatives in the subdistrict (Naujamiesčio seniūnija..., 2014).

In 2009 the declared area of agricultural lands in Naujamiestis subdistrict covered 9877.66 ha and it accounted for 63.32 percent of the total subdistrict's area. 359 farmers introduced declarations. The average area of the declared farms was 27.51 ha.

In 2011 the declared area of the agricultural lands was 9851.33 ha i.e. smaller by 26.33 ha or by 0.27 percent less than in 2009. The number of declared farmers in 2011 was 329, i.e. by 30 farms or 9.12 percent less than in 2009.

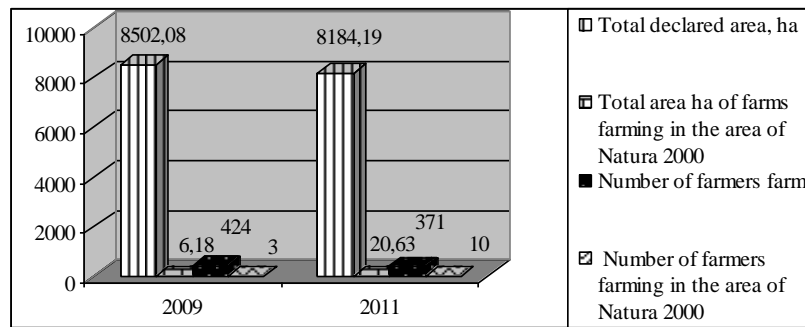
The above analysis suggests that, comparing 2011 and 2009, the number of declared farms decreased (in the Krekenava regional park – by 12.5 percent, in the Naujamiestis subdistrict – by 9.12 percent),

and the declared areas decreased by 3.74 percent in the Krekenava regional park, by 0.27 percent in the Naujamiestis subdistrict, respectively.

In 2009 three farmers carried out farming activities in Krekenava Regional Park in the area of 6.18 ha of the Natura 2000 territory. In 2011 ten farmers carried out farming activities in the regional park in the area of 20.63 ha of the Natura 2000 territory (Fig. 2).

In 2009 two farmer's existing 4.3 hectare property in the Naujamiestis subdistrict was included into the Natura 2000 site. Two family farms occupying 4.04 hectares were declared in 2011.

Thus, the number of farmers in the Krekenava RP has increased by 7 farms in Natura 2000 area and the area has increased by 14.45 ha. The number of farms in Naujamiestis subdistrict remained stable, but the area decreased slightly (0.26 ha).



**Fig. 2.** Analysis of the change of declared areas and farmers' farms in Krekenava RP, in ha.

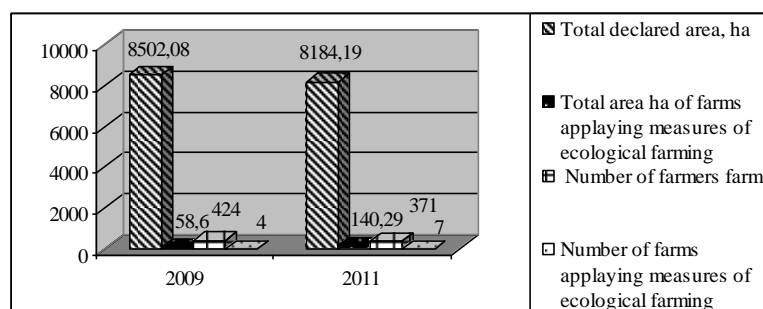
In 2009 in the Naujamiestis subdistrict, the total area of low disadvantage occupied 210.52 ha (1.35 percent from the total area claimed), the number of farmers was 20. As regards 2011, 17 households declared 276.12 ha of low disadvantage areas.

Comparing the declared data of Naujamiestis subdistrict of the years 2009 and 2011 one can see that the number of declared farmers farming in areas of low disadvantage for farming has decreased, and the area increased by 65.6 ha. Meanwhile, the areas of low disadvantage in the Krekenava Regional Park were reported neither in 2009 nor in 2011.

**Ecological farming in Krekenava RP and the Naujamiestis subdistrict.** The above analysis of declared areas reveal that the number of farmers' farms, which submitted declarations, as well as the area declared in Krekenava RP, decreased in 2009-2011.

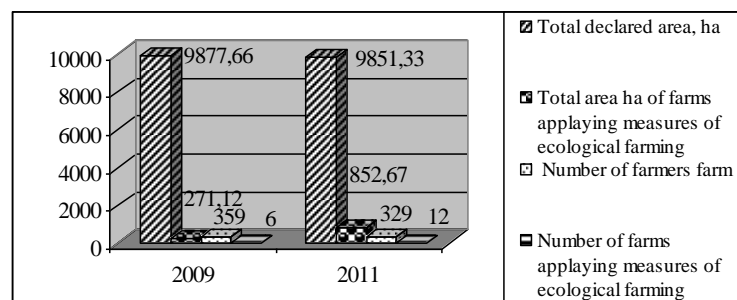
Only 4 farmers (0.94 percent of all who had declared) applied organic farming measures in the area of 58.6 ha in Krekenava Regional Park in 2009. It made up just 0.69 percent of the total area declared. In 2011 such measures were applied by 7 farmers in the area of 140.29 ha (1.71 per cent) (Fig.3).

The analysis of the period of 2009 and 2011 showed that the declared areas in Krekenava RP have decreased, but the area of farms applying organic measures has increased by 81.69 hectares (nearly 2.5 times).



**Fig. 3.** Analysis of the declared areas and farmers' farms in Krekenava RP, in ha.

In Naujamiestis subdistrict both the areas declared farms and the number of farmers, who had submitted declarations in 2009 and 2011, have decreased. During the above period the number of farmers applying organic farming measures in Naujamiestis subdistrict has increased twice; 12 farms i.e., 3.63 per cent of the declared farms were organic farms in 2011 (Fig. 4).



**Fig.4.** Analysis of the declared areas and farmers' farms in Naujamiestis subdistrict, in ha.

In 2009 the area of 271.12 ha (2.74 per cent of the total area declared), in which organic farming measures were applied, was declared in the subdistrict. In 2011 the area increased to 852.67 ha (8.66 per cent of the total area declared). The analyzed area increased by 581.55 hectares or 3 times.

The analysis of Krekenava RP and Naujamiestis subdistrict (which is not incorporated into the park's territory) of 2009 and 2011 showed that organic farming has been introduced in a number of farms and the area has increased.

The area of farms applying organic farming measures in Krekenava RP was only 1.71 per cent, the measures were applied only by 1.89 per cent of all the declared. Meanwhile, the percentage in Naujamiestis subdistrict, which is not incorporated into the area of Krekenava RP, is distributed as follows: 8.66 per cent of the total area declared and 3.65 per cent from the number of farmers' farms who submitted declarations. It was thus found that the area of the farms applying organic farming measures in Krekenava Regional Park is the smallest compared to Naujamiestis subdistrict and Aukštadvaris RP, although one of the activities promoted in Krekenava RP is organic farming. Organic farming, clearly a viable option in many situations, is still not fully exploited and it is not wide spread in protected areas. Organic farming is important because conventional agriculture, which involves high-yielding plants, mechanized tillage, synthetic fertilizers and biocides, is so detrimental to the environment.

## Conclusions

1. The area of certified organic farms in Lithuania is increasing annually. In 2012 the certified organic farms covered the area of 162655 hectares and, compared to 2004, has increased by 119700 ha. The number of certified organic farms has increased twice, i.e., from 1178 units (2004) to 2511 units (2012). One of the reasons determining an increasing number of organic farms is the EU's state support.

2. The largest area of Krekenava RP is occupied by the functional priority zone – Economic priority zone covers 56.8 per cent of the whole park's territory. The ecological protection priority zone covers 4.6 per cent of the whole park's territory.

3. The number of farmers in the Krekenava RP has increased by 7 farms in Natura 2000 area and the area has increased by 14.45 ha. The number of farms in Naujamiestis subdistrict remained stable and the area decreased slightly (0.26 ha).

4. Comparing the declared data of Naujamiestis subdistrict of the years 2009 and 2011, one can see that the number of declared farmers' farming in areas of low disadvantage for farming has decreased, but the area has increased by 65.6 ha. In the Krekenava regional park the areas of low disadvantage were reported neither in 2009 nor in 2011.

5. The analysis of 2009 and 2011 showed that the declared areas in Krekenava RP have decreased, but the area of farms applying organic measures has increased by 81.69 hectares (nearly 2.5 times). The number of farmers applying organic farming measures in Naujamiestis subdistrict has increased twice; 12 farms i.e., 3.63 per cent of the declared had organic farms in 2011, the analyzed area increased by 581.55 hectares or 3 times.

6. The area of farms applying organic farming measures in Krekenava RP was only 1.71 per cent, measures were applied only by 1.89 per cent of all the declared. The percentage in Naujamiestis subdistrict, which is not incorporated into the area of Krekenava RP, is distributed as follows: 8.66 per cent of the total area declared and 3.65 per cent from the number of farmers' farms who submitted declarations.

7. It is recommended to develop animal-breeding as well as ecological farming for the improvement of the condition of environment and the landscape in Krekenava Regional Park. It is necessary to form

clear and sufficient policy of the compensation for the restrictions of farming in the protected areas, which should reduce the load of ordinary economic activity in the protected areas, and their usage should become more favorable for protected valuables.

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