

ANALYSIS OF FARMING LAND USAGE IN SOUTHERN LITHUANIA

Vilma Sinkevičiūtė

Aleksandras Stulginskis University

Abstract

Peculiarities of farming land usage in southern Lithuania are analyzed in the article. The analysis of archival data and cartographical material reflecting the structure of farming land in Marijampolė, Šakiai, Kazlų Rūda, Alytus, Lazdijai and Vilkaviškis municipalities was accomplished. Information was taken from yearbooks and archives of public institutions of the Republic of Lithuania and other sources as well. It was determined after analysis of collected information that usage and location of cultivated land greatly depend on the land's productivity. The largest amount of undeclared farming land is in the districts where the land less favorable for farming is dominant. The analysis of the period of last 10 years has shown that the area of farming land decreased by 753 ha in Lazdijai district and by 194 ha in Vilkaviškis district, but increased by 5.5 ha in Alytus district on average per annum.

Key words: declared land, farming land, land usage.

Introduction

The structure of farming land in Lithuania has been continually changing: the plots of occupied territories have increased, the road net has developed, the plots of forests and sprouts have enlarged, etc.

The development and variety of landscape are determined by land-tenure formed in the interaction of natural processes and human economic activity; the landscape's structure is actively influenced by general principles and methods of land management.

There is much more abandoned agricultural land in the territories with large variety of agricultural land, and likely a part of it will be intensively used again, while another share (in particular, areas of overmoistured land) will remain in natural state or will be afforested.

The aim of this research is to analyze farming land usage. The object of the research is farming land in southern Lithuania. The objectives of the research are: to analyze the composition of farming land and to determine the tendencies of its change; to find out the causes of abandoned land disuse; to estimate in how many land plots land, cultivated by farmers, is located.

During the investigation the methods of literature sources and cartographical material analysis, logical mind, statistical analysis and graphical viewing were applied.

The analysis of archival data and cartographical material regarding the structure of farming land in Marijampolė, Šakiai, Kazlų Rūda, Alytus, Lazdijai and Vilkaviškis municipalities was accomplished. The information was taken from yearbooks and archives of public institutions of the Republic of Lithuania and other sources as well. Additional information was received from specialists preparing planning projects for the land reform. The dependence of cultivated land plot from productivity score was also determined. In order to analyze land usage in more detail, 64 owners of land parcels in Šakiai district, Griškabūdis cadastre locality were directly surveyed.

With the help of GIS – the inventory database of the Central regional land fund Žinv_DB50LT the analysis of the deserted lands of the territories was carried out at scale 1:50000. In Kazlų Rūda municipality these land plots were surveyed in the vicinity.

Results

Farming has been the main means of subsistence for people for a long time. People have been changing natural landscape by cutting the first trees in order to form a farmland site; they have created a new landscape – agrarian. When earthwork technologies and means have been improving, the landscape has changed expeditiously. Not only new technologies and human possibilities but also various political circumstances, change of land ownership forms and even traditions had an influence on the development of agrarian landscape (Ribokas G., 2009). To fulfil the conversion of land usage successfully, sufficient and well-timed sponsorship is required (Ribokas G., 2008).

Statistical data show that farming land composes more than 44% of the whole land-tenure in Europe. Farming land occupies the biggest part in Denmark, Ireland, the United Kingdom and Spain etc.

According to Abalikštienė (Abalikštienė E., 2013), the changes of land usage are related to variation of the number of economic activity subjects.

After the nationalization of the land and after the establishment of collective farms (kolkhozs) the boundaries between peasants' farms and historical villages disappeared. After the move of 115 thousand steadings and after the destruction of farmsteads and field plantings as well as after the draining of 80 % of the country's territory, 20-50 km² of reclaimed uncultivated plains with the islands of thin forests and other plantings of trees and shrubs started to predominate in the territory of Lithuania (Povilaitis, 2001). An intensive landscape anthropogenization influenced the changes of separate territory structures, but most of all it harmed the ecological stability of ecosystems. Large vacuums were formed in the landscape as well as the mosaicism and contouriness of land-tenures decreased (Bučas, 1988). According to the agricultural inventory data of 1935, the agricultural land in Alytus, Lazdijai and Vilkaviškis districts made up from 79.81 to 92.02 % (according to the agricultural data of 1930 – from 77.3 to 90.75 %) of the total district area. In the districts of the southern part of Lithuania in 1935 farming lands made up from 83.7 to 92.0 %, forests – from 1.3 to 5.1 %, wetlands and peatbogs – 2.5-3.1 %, land under the buildings – 2.2 % and other landed property (water reservoirs, roads, sands, etc.) – 2.1-5.9 % (Žemės..., 1938), respectively. After the comparison of the agricultural inventory data of the years 1930 and 1935 it was defined that in Alytus, Lazdijai and Vilkaviškis districts the area of farming lands (arable lands, orchards, meadows, pastures) had increased by 0.5 % during five years, however, the areas of wetlands and peatbogs had decreased by 0.3 %. The areas of forests, lands under the buildings and other land areas remained unchanged. The area of arable land in analyzed territories within the period of 1935–2013 has changed marginally. The areas of arable land during the prewar period had increased, and it was determined by important historical processes related to establishment of granges. Agricultural production increased even in economically unproductive lands. Later these areas had also stabilized. However, not all arable land was used efficiently. A lot of land were lying waste. The difference between present areas of arable land and crop (fig. 1) show that cultivated land was not used efficiently.

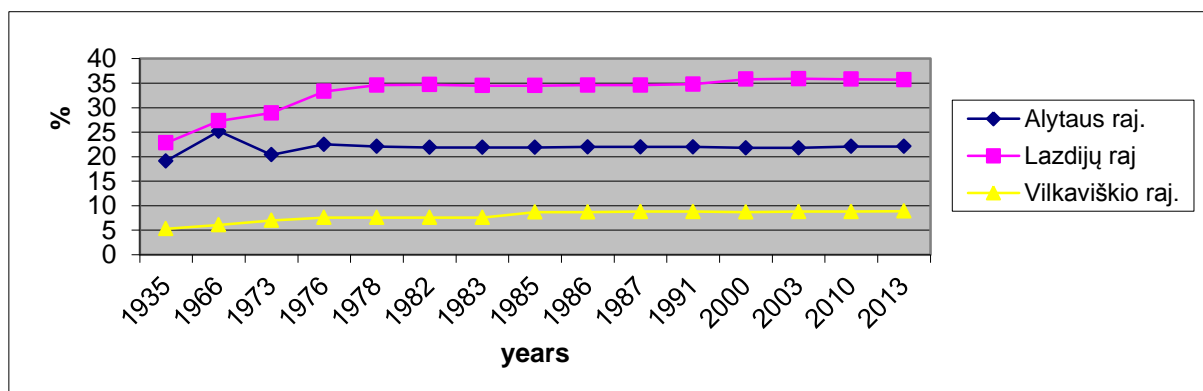


Fig. 1. The difference between the areas of arable land and crops.

It was influenced by land transfer to non-agricultural land, spontaneous deterioration of farming land (origin of swamps, shrubbery, afforestation) due to natural processes and wrong human economic activity (owners not always properly maintained land after repossessing it) as well as to afforestation of unproductive farming land.

More detailed analysis of southern Lithuania districts reveals that areas of farming land in the major part of the studied territory has decreased. The analysis of the period of the last 10 years shows that the area of farming land decreased by 753 ha in Lazdijai district and by 194 ha in Vilkaviškis district but increased by 5.5 ha in Alytus district on average per annum. The main reason of abatement of farming land areas was afforestation of farming land. It was encouraged by the support of structural funds for afforestation of agricultural land. The development of urbanized territories has also caused such changes. The development of a market economy and emerged possibility to have one's accommodation in the country determined territorial changes of the rural occupation and usage. The area of territory with buildings and intensity of building have been increasing; violations of cultural heritage are observed; the landscape of ecologically and esthetically most valuable territories is changing. Intensifying the sale of the land sale to non-Lithuanian citizens might cause occurrence of negative tendencies forming consumer approach towards protection, management and use of landscape.

After comparing the land fund data with the agriculture inventory data (Table 1) it is seen that there is more farming land according to the land fund data.

Table 1

The comparison of data of land accounting (2013-01-01) and agriculture inventory (2010)

Municipality	2013-01-01 agricultural land, thousand ha			Vacant land of state and horticultural community			The data of agriculture inventory (2010), thousand ha	
	Total Area	Farming land	Arable land	Total area	Farming land	Arable land	Farming land	Difference with accounting
Alytus	94.59	79.29	61.82	82.2	70.97	56.82	64.84	-6.13
Lazdijai	75.19	57.39	44.89	56.95	46.42	33.97	39.12	-7.3
Varėna	53.59	46.84	34.98	46.03	39.31	28.33	27.84	-11.47
Kazlų Rūda	19.22	16.27	11.9	17.87	15.98	11.65	13.73	-2.25
Marijampolė	57.07	52.43	44.72	53.21	51.17	43.96	47.57	-3.6
Šakiai	107.09	96.95	91.79	99.98	95.15	91.08	89.4	-5.75
Vilkaviškis	105.14	94.67	81.94	90.98	75.99	73.6	80.52	4.53

The largest difference of agricultural land is in Varėna district municipality, and the smallest is in Marijampolė municipality.

The consolidated data of declarations provided by subjects of agricultural activity can be used for the accounting of farming land areas. These declarations are presented to the National Paying Agency in order to receive direct payments for crops, meadows, grassland, gardens and berry plantations, or for farming land of good agrarian state. Declaration data represent not all areas of farming land but only those that are used for growing crops. Conformity of crops grown on arable land to the recommended crop structure can be used to judge about decreased intensity of land usage. In 2013 fallow composed over 7.0 %, perennial grass ca. 34 % and the rest areas (annuals) constituted ca. 59 % (1250.8 thousand hectares) in total in Lithuania. The largest areas in this crop group are composed of cereal and crops grown for processing and food. The percentage of annuals is higher in the districts with rich soils or with light soils unsuitable for growing perennial grass. The findings showed that the areas of farming land declared during 2008–2013 in the investigated districts were unequal (Table 2).

Table 2

The comparison of declared areas within 2008–2013 with the data of farming land accounting

Municipality	Declared area			Area of farming land according to land fund composition, 2013	Undeclared area	
	2008	2010	2013		ha	%
Vilkaviškis	79,264.23	79,702.81	79,883.33	97,303.17	17,419.84	17.90
Marijampolė	44,892.40	45,460.78	46,354.11	53,851.17	7,497.06	13.92
Šakiai	90,263.68	90,449.73	91,040.62	98,796.12	7,755.50	7.85
Kazlų Rūda	12,767.16	12,530.90	12,558.50	16,758.49	4,199.99	25.06
Lazdijai	36,609.11	36,208.37	37,294.01	59,163.49	21,869.48	36.96
Alytus	60,715.08	59,118.30	58,765.66	81,892.64	23,126.98	28.24

The data in Table 2 shows that the highest amount of undeclared farming land is in Lazdijai district, where the land less favorable for farming is dominant.

Usage of cultivated land is very much dependent on land's productivity. Mathematical analysis was accomplished and the dependence, showing how productivity score influences the area of cultivated land located in different cadastre locality, was determined. The average area of cultivated land and average productivity score of cadastre localities in Vilkaviškis district were calculated. Girėnai, Vištytis and Gražiškės cadastre localities were not included in the analysis because they are attributed to low productivity lands and agricultural activity in these territories is minimal, though areas of cultivated land are quite large.

The observation data (Fig. 2) show the dependence of cultivated land on agricultural productivity score.

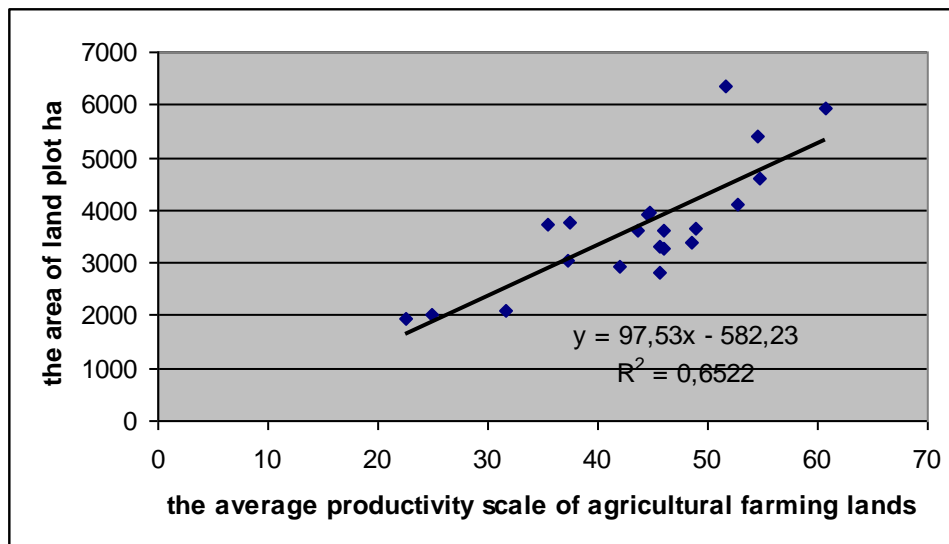


Fig. 2. The dependence between the area of cultivated land and productivity score in cadastre localities of Vilkaviškis district.

After mathematical data-processing the obtained correlation coefficient is equal to 0.8. It shows that analyzed correlations are strong. Determination coefficient is 0.65 and therefore it can be predicated that cultivated land area depends on land productivity by 65 % on average. Calculated Student's criterion is equal to 5.96, while the value of Fisher criterion was 35.62. The obtained correlation and determination coefficients are real and reliable with 0.95 confidence level.

The majority of farmers associate the economic reconstruction of the land use with the planting forests in of unproductive land join the project with the help of labour force or their small means (Česnulevičius, 2005). According to E.Knappe (Knappe, 2001), for a long time agricultural territories were connected with land cultivation and animal-breeding for the steady supply of inhabitants with food.

The areas of uncultivated lands can be found both in good soils and in less productive lands as well. It is necessary to stimulate land lease in the places with strong farms and agricultural companies. There are vicinities where land is given to use without any fees. There is another variant - to sell the uncultivated land. It is possible to reactivate uncultivated agricultural lands ecologically and economically by using alternative ways of the land use. One of such alternatives is the planting forest in such land. It should be useful to use the support for rural development and plant forest in land with unproductive soil. In such a case the environment protection should be improved as well. The investigation on the deserted lands in Kazlų Rūda municipality was carried out. With the help of digital database the plots of the deserted lands were surveyed in the vicinity in order to find out if land plots have not been actually cultivated and due to what reasons they have been left deserted. Kazlų Rūda municipality covers the area of approx. 55,400 ha. There are 909.82 ha of deserted land in the municipality. The land is distributed into 3,284 plots. The smallest area of the deserted land plot covers 0.02 ha, the largest one – 2.40 ha. One of the reasons for the appearance of deserted lands are the defects of land reclamation systems. Overlogged and starting to bog up land is an obstacle for its proper use (the largest areas of such lands are situated in Plutiškiai and Antanavas subdistricts). The other reason is the land of low productivity. Forests occupy the largest part (about 60 %) of the area in the Kazlų Rūda municipality (Kazlų Rūda and Jankai subdistricts). In the large part of the outer woods unproductive soils dominate. They often remain uncultivated and overgrow with woody vegetation. The third reason for the appearance of deserted lands is the shortage or absence of entrepreneurial farmers or companies able to rent land and cultivate it.

Currently land plots' enlargement is a relevant issue. In order to analyze land usage for agricultural activity in more detail, a survey was carried out and the results showed that the majority of land users work on the the land located in 4–5 plots (Fig. 3). The data of 335 farmers were analyzed.

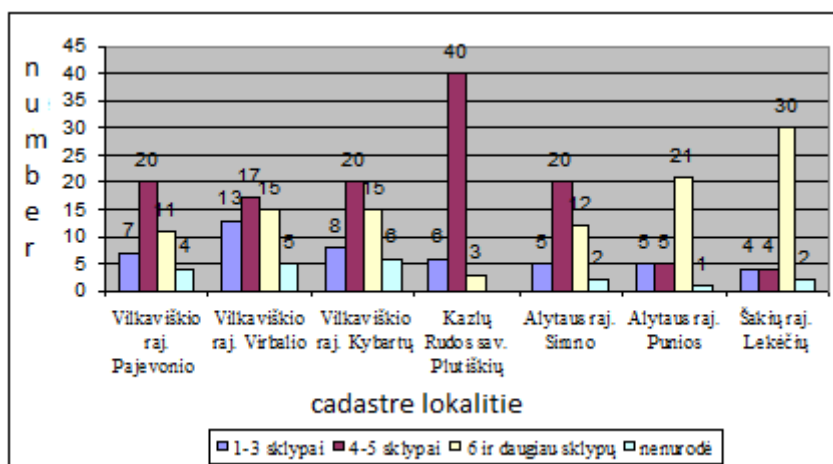


Fig. 3. Location of cultivated land in parcels.

There are also quite a few land users (107) whose cultivated land is located in more than 6 fields. The location of cultivated land area in several parcels is also determined by land productivity. Farmers look for productive land and either buy or rent it.

The intensity of agricultural land use is described by:

- the area of unlegalized to use state land. Less of unlegalized land indicates more intensive land use;
- the areas of free state land. Larger amounts of the privatized state land also indicate more intensive land use;
- the declared area of farming land compared to the statistical area. A relative increase of areas of declared farming land denotes higher degree of farms' formation and activity of land use;
- the relation of area of labour-intensive or commodity production agricultural plants with the total area of farming land. Annual crop, gardens and berry plantations are ascribed to these plants. The remaining area is comprised from perennial grass, meadows, grassland, fallow and unbroken soil;
- the level of viable farms' formation. The larger area is occupied by the land used by farmers and legal entities of agricultural activity (where relatively more agricultural plants for commodity production are grown), the more intensively land is used (Table 3).

Table 3

The indexes of the intensity of agricultural land usage 2013 01 01
(data: Land Fund of the Republic of Lithuania, 2014)

No	Indeces	Units	Kalvarija municip.	Kazlų Rūda municip.	Marijam-polė municip.	Šakiai district	Vilkaviškis district	In Lithuania
1.	Farming land in agricultural land (2013-01-01)	Thous. Ha	31,181.96	15,906.21	52,438.45	97,256.71	94,672.99	29,1456.32
2.	thereof – in state land	Thous. Ha	10,166.68	28,62.33	7,681.58	14,899.97	24,373.98	59,984.54
3.	thereof – unlegalized to use	Thous. Ha	5,205.36	125.19	547.70	2,505.42	2,698.60	11,082.27
	(3:2)	%	51.20	4.37	7.13	16.81	11.07	18.48
4.	The area of free state land (farming land)	Thous. Ha	2,582.80	1,031.57	970.92	2,173.96	7,844.72	
	(4:1)	%	8.28	6.48	1.85	2.24	8.29	
5.	Farming land used by farmers' farms (declared)	Thous. Ha	17,796.65	10,143.88	28,372.67	64,529.78	66,278.20	187,121.18
	(5:1)	%	57.07	63.77	54.11	66.35	70.01	64.20

6.	Number of farms registered in the register of farmers' farms	Units	1030	703	1972	3122	3201	10,028
7.	Farming land of farmers' farms	Thous. Ha	8,282.48	4,687.36	14,017.77	22,711.52	29,451.38	79,150.51
8.	Farming land of legal persons' private farms	Thous. Ha	63.97	95.29	921.87	1743.25	1149.62	3,974.00
9.	In total (7+8)	Thous. Ha	8,346.45	4,782.65	14,939.64	24,454.77	30,601.00	83,124.51
	(9:1)	%	26.77	30.07	28.49	25.14	32.32	28.52

The data (Table 3) show that unlegalized to use farming land in Vilkaviškis district municipality comprises 11.07 %. Farming land of farmers' farms and private farms of legal persons composes 32.32 %. Agricultural land is used intensively enough. Other indices are similar indices of other municipalities in Marijampolė County and in the state on average.

Conclusions

1. Arable land (51%) comprises the largest part in the rural landscape structure of the analysed part of Lithuania. The part of the agricultural farming land (2 %) on this territory remains uncultivated.
2. The mathematical analysis shows that use and location of cultivated land highly depend on land productivity.
3. The most of undeclared farming land is in the districts where land less favorable for farming is dominant.
4. The analysis of the period of last 10 years shows that the area of farming land decreased by 753 ha in Lazdijai district and by 194 ha in Vilkaviškis district but increased by 5.5 ha in Alytus district on average per annum.

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Vilma Sinkevičiūtė. Assistent at the Land Management department of Lithuanian University of Agriculture. Address: Universiteto 10, LT-53067 Akademija, Kauno distr. Tel. +370377523372, e-mail: vilma.sinkeviciute@gmail.com