

ANALYSIS OF RURAL LANDSCAPE STRUCTURE USE IN SOUTHERN LITHUANIA

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Abstract

Rural landscape of the southern part of Lithuania as well as its use is analysed in the article. The defects of land reclamation system cause the rise of deserted lands. Dampness and bagged up soils are a large obstacle for the proper use of deserted lands. One more reason is lands of low productivity. The third reason of the rise of deserted lands is the shortage and default of perspective farmers and agricultural companies who are able to lease and cultivate land. Analysis of suburban territories development has also been fulfilled and the decrease of farmland due to the increase of built on territory has been established.

After analysis it is established that forests area mostly increased in a period of 1945 – 1966 because farmland of poor productivity were planted with trees.

After analysis of built-up territory alteration it is established that alteration of built-up territory in a period of 11 years from 1996 to 2007 the greatest tendency had buildings in arable land - 4.5 ha, in settlement territory - 2.4 ha and the least part was in homestead - 1.6 ha.

Keywords: rural landscape structure, landed property, built on territory.

Introduction

Structures of Lithuanian rural landscape are constantly changing: the areas of built on territories have increased, road net has developed, great reaches of forest and afforestation have increased, etc.

Expedience of lands formed in interaction of natural processes and human farming determines the development and variety of rural landscape, whereas its structure is highly influenced by general principles and methods of land management. Land reform has greatly changed the structure of rural landscape for the last decade.

There are more abandoned areas in the territories with large variety of landed property. It is believable that a considerable part of them will be used intensively again and the other part (especially areas with soaked lands) will be left in a natural state or planted with trees.

The purpose of this article is to analyse the use of rural landscape structure.

The object of the investigation is the structure of rural landscape in Southern Lithuania.

The tasks of the investigation are: to analyse the composition of rural landscape structure; to determine the reasons of unusable abandoned lands; to establish the reasons of landed property lessening in suburban territories.

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

Archival data and cartographical material reflecting rural landscape structure of Marijampolė, Šakiai, Kazlų Rūda, Alytus, Lazdijai and Vilkaviškis municipalities were analyzed. Information was gathered from the yearbooks of Lithuanian state institutions, archives and other source. Additional information was received from specialists working on land management projects according to the land reform.

On purpose to ascertain quantitative and qualitative composition of rural landscape structure investigations, in which 64 land owners from Šakiai District Griškabūdis cadastre terrain were questioned about the composition, usage and fertility of lands property, were carried out. Analyzing linear regression Maple programme has been used.

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.

6 panchromatic and 6 multispectrum orthophotographic maps of flights M 1:10 000 of 1996 and 2005 years, presented in Digital TIFF case form were used in the analysis about the development of built on territory.

Results

Agricultural farming was the main source of people subsistence in the country for a long time. Cutting trees in order to create a small area of farmland people changed natural landscape and created a new landscape – an agrarian one. While improving earthwork technologies and means, the landscape was

also continuously changing. Not only new technologies and human possibilities but also various political circumstances, alternation of landed property forms and even traditions had influence on vicissitude of rural landscape (Ribokas G., 2009). On purpose to fulfil the controversy of landed property successfully, sufficient and well-timed sponsorship is required (Ribokas G., 2008).

According to the Convention on European Landscape, landscape plays an important society concerned role in cultural, ecological, environmental and social spheres. It is also friendly to economic activities because protection, administration and planning can establish new working places. Landscape helps to form local culture and is one of the main components of cultural heritage, which improve human welfare and consolidate European sameness. Statistic data show that lands property amounts to more than 44% of all European lands usage. The greatest part of landed property is situated in Denmark, Ireland, the United Kingdom, Spain etc.

After the nationalization of the land and after the establishment of collective farms (kolkhozs) the boundaries between peasants' farms and historical villages have 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 country's territory, 20-50 km² of reclaimed uncultivated plains with the islands of thin forests and other plantings of trees and shrubs in the territory of Lithuania started to predominate (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 have formed in the landscape as well as the mosaicism and contouriness of land-tenures has 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) have increased by 0.5 % during five years, however, the areas of wetlands and peatbogs decreased by 0.3 %. The areas of forests, lands under the buildings and other land areas remained unchanged.

After analyzing 2003 census, it was established that agricultural landed property forms the greatest part in investigated territory of Southern Lithuania (Fig.1).

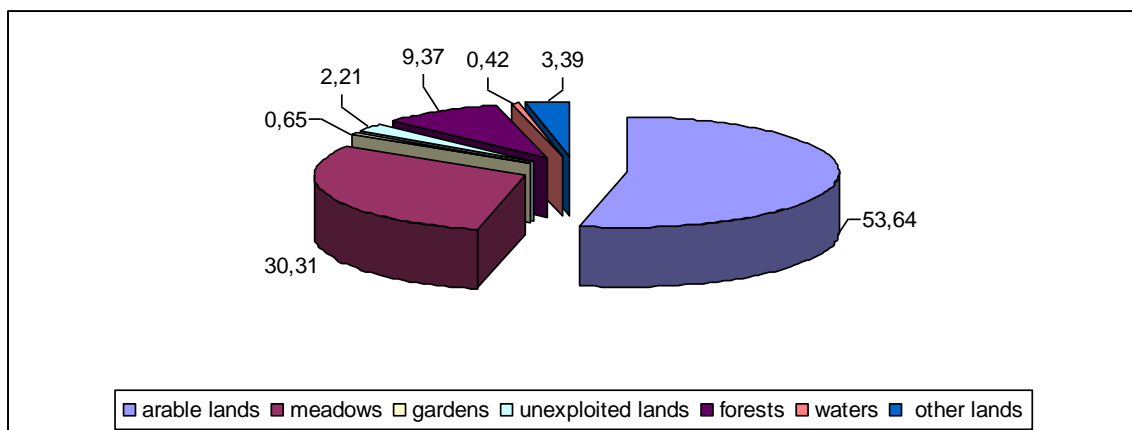


Fig.1. Distribution of landed property in the analyzing territory according to 2003 census in per cent

During the census it was established that 2.21 per cent of lands are unexploited. Arable soil forms the largest area..

Forests is very important element of landscape. After analysing forest alternation, it was established that woodland areas increased in a period of 1945 – 1966, because reforestation was used to replant arable landed property though of poor productivity. Later this process was stabilized (Fig.2).

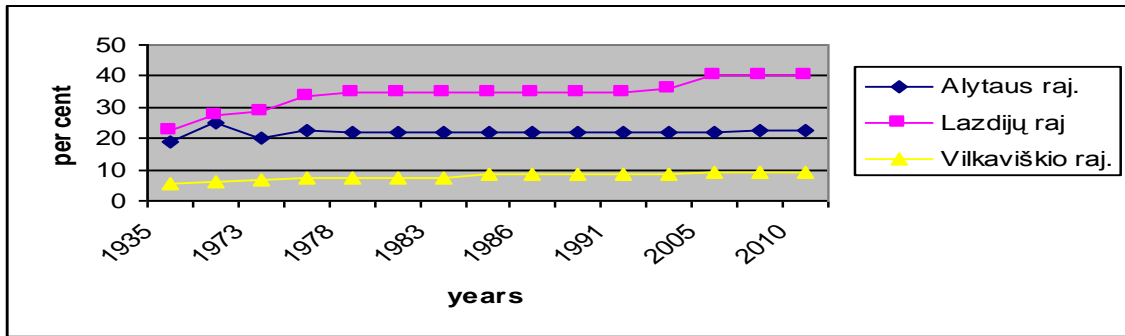


Fig. 2. The area of forests in the analyzed districts, in percentage from the total district area

The woodedness of the districts in the analyzed part of Lithuania differs significantly – from very low (in Vilkaviškis district) up to very high one (in Kazlų Rūda municipality of Alytus district). The area of forests in Vilkaviškis district covers 6.45 % of the total forest area in the southern part of Lithuania, in Alytus and Lazdijai districts – 17.42 and 76.13 %, respectively. The size of forest massives is very different as well (from small forests up to large ones). Land reclamation and the reconstruction of the system of populated localities as well as the system of farming had significant impact on the change of rural landscape structure in the period from the beginning of collectivisation and the shake-up of agricultural enterprises (Aleknavičius..., 2000).

Reduction of landed property was suspended by land reclamation works owing to natural transformation to bushes, swamps and unexploited lands and helped to preserve and even enlarge arable soil.

In the period of 1991-200, with the important economical reforms and land reform going on the structure of land-tenure and landscape has changed significantly. After the decrease of farming lands the culture of agriculture has declined (Grecevičius, 2002).

The area of landed property depends on the point of productivity. The regression analysis was carried out with the help of the data that was obtained after the direct questioning of 64 landowners from the Griškabūdis cadastre vicinity of Šakiai district. These landowners manage the land area of 392.27 ha. The average plot size is 7.52 ha. The average productivity scale of agricultural land is 42.6. The configuration of the majority of analysed plots of land is close to the shape of trapezium. It is established that land areas hosted by farmers also depend on soil productivity.

The following equation has been derived for the calculation of the interrelation between the area of land plot and the average productivity of agricultural farming lands:

$$y = 0,2571 + 39,5389x, \quad (1)$$

where:

x – the area of land plot, ha;

y – the average productivity scale of agricultural farming lands.

The obtained correlation coefficient is 0.78. It shows that interrelations are direct and strong. The determination coefficient is 0,61. The obtained correlation and determination coefficients are considered as reliable ones when they equal 0,95.

The majority of farmers associate the economic reconstruction of the land use with the planting of unproductive lands with forests and they should join the realisation of this 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 purposeful to stimulate land lease in the places with strong farmers and agricultural companies. There are vicinities where land is given to use without any payment. Another variant is 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 of such land with forest. It should be useful to use the support for rural development and plant unproductive

soils with forest. In such 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 clear out if land plots have been actually not cultivated and due to what reasons they have been left deserted. Kazlų Rūda municipality covers the area of approx. 55400 ha. There are 909.82 ha of deserted lands in the municipality. These lands are distributed in 3284 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 Plutiškes 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 enterprising, perspective farmers or companies able to rent land and cultivate it.

Suburban territory of Alytus City has been chosen for alteration of landed property. According to the general plan of Alytus District municipality, Alytus City is situated in the zone of city growing.

The territory of Alytus City occupies the area of 3944.8 ha in administrative frontiers. Prospective territories that can be joined to the city amount to 962 ha, consequently, the territory of the city will increase in 20%, and total area of Alytus City will amount to 4889.8 ha (Alytaus, 2009).

While investigating the alternation of built on territory in a period of 9 years, it is established that 70.5 ha has been covered with buildings. The major part of newly built buildings is situated in arable land and amounts to 4.1 ha; situated in the territory of a settlement – 2.0 ha and in the territory of homestead – 1.1 ha. The alteration area depicts only the territory, which is built-up. The alteration of Alytus suburban zone territory is presented in a graph in Fig.3.



Fig.3.

Arable land in 1996

Built-up territory in 2005

In the picture it is clearly seen that arable land was without buildings in 1996, whereas, 3 new buildings were built in 2005. In summary, it can be proved that the area of arable land has a tendency to lessen.

While analyzing the data of 2005 – 2007 and using multispectral orthographical maps it was established that 77.7 ha were built-up during the period of two years. Buildings built in arable land (0.7 ha) made the largest part of the whole territory. Alteration is significantly smaller than in earlier investigated period, because the period is shorter. It is established that the largest development of homestead is situated in the land of agricultural destination (Fig.4).

While analysing and storing KDB10LT data of 1996 and having vectorised building layer of 2007, territorial objects – buildings – have been interpreted and alteration of built-up territory in a period of 1996 – 2007 have been established. Data of newly built buildings have been discharged and analyzed separately identifying the place of buildings and allotting them into certain groups: buildings built in arable land, in the territories of settlement and homestead in order to evaluate lessening of arable land. Built-up land amounted to 79.3 ha in 2007.

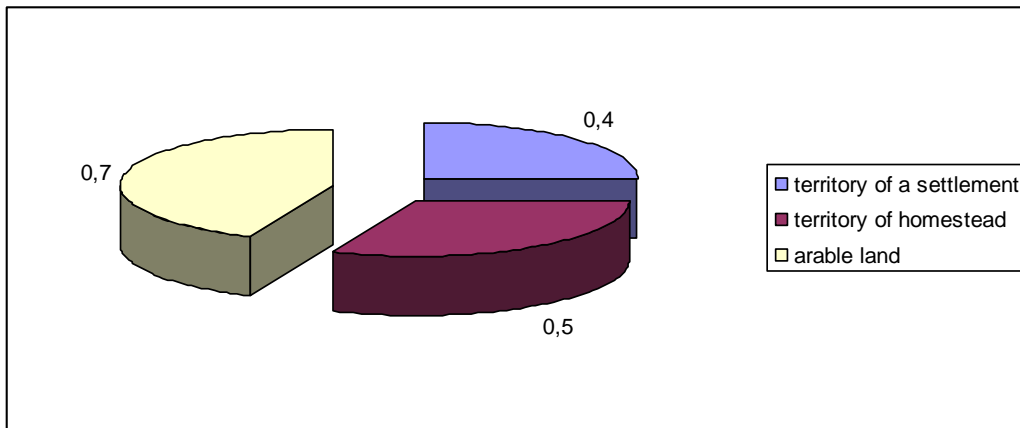


Fig.4. Alteration of newly built buildings in Alytus suburban zone in other landed property in a period of 2005 - 2007

Summarizing everything up, it can be stated that the greatest tendency of building constructing 4.8 ha prevailed in arable land, in settlement territory – 2.4 ha, and the least amount of buildings was constructed in homestead territory 1.6 ha. Investigating orthographical maps, it also was noticed that the largest concentration of buildings prevailed in the settlements close to the city.

Conclusions

1. Arable land (51 %) makes up the largest part in the rural landscape structure of the analysed part of Lithuania. Part of the agricultural farming lands (2 %) in this territory remains uncultivated.
2. After analysis it is established that forests area mostly increased in a period of 1945 – 1966 because farmland of poor productivity were planted with trees.
3. After analysis of built-up territory alteration it is established that alteration of built-up territory in a period of 11 years from 1996 to 2007 the greatest tendency had buildings in arable land - 4.5 ha, in settlement territory - 2.4 ha and the least part was in homestead - 1.6 ha.
4. Investigating orthographical maps it was established that the greatest concentration of buildings prevails in the territories and homesteads near the city.

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Резюме

ВИЛЬМА СИНКЕВИЧИУТЕ, ДАЙВА ГУДРИТЕНЕ. АНАЛИЗ ИСПОЛЬЗОВАНИЯ СТРУКТУР СЕЛЬСКОГО ЛАНДШАФТА В ЮЖНОЙ ЛИТВЕ

В статье анализируется сельский ландшафт южной части Литвы и его использование. Установлено, что в исследуемой части Литвы произошли большие изменения ландшафта. В представленной работе обсуждаются тенденции и причины этих изменений. Также проводится анализ причин не использования заброшенных земель. Одна из них – дефекты мелиоративных систем. Сырая и начинающая заболачиваться земля сильно затрудняет ее использование надлежащим образом. Другая причина – малая производительность земли. Третьей причиной, из-за которой земли забрасываются, является отсутствие или недостаток предприимчивых, перспективных фермеров или сообществ, способных арендовать землю и работать на ней.

Проведен анализ развития пригородных территорий. Установлено сокращение обрабатываемых земель за счет увеличения застроенных территорий.

В результате проведенных исследований выявлено, что наибольшую долю в структуре сельского ландшафта анализируемой части Литвы составляют пахотные земли (51 %), часть территорий этих сельскохозяйственных угодий – залежные земли (2 %). Лесные массивы существенно расширились в 1945-1966 годах, так как обрабатываемые, но малопродуктивные площади сельскохозяйственных угодий были засажены лесом.

На основе проведенного анализа изменений ситуации застроенных территорий установлено, что за одиннадцатилетний период (с 1996 г. по 2007 г.) в наибольшей степени тенденция строительства зданий проявилась на территории обрабатываемых земель и составила 4,5 га, на территории населенных пунктов – 2,4 га, а в наименьшей степени была застроена территория усадеб – 1,6 га. Анализ ортофотографических карт показал преобладание наивысшей концентрации сосредоточения построек на территориях, прилегающих к городам или населенным пунктам.

***Ключевые слова:** структура сельского ландшафта, угодья сельскохозяйственного назначения, застроенная территория.*

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