

ALEKSANDRAS STULGINSKIS UNIVERSITY (Lithuania)

LATVIA UNIVERSITY OF AGRICULTURE



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FOREWORD

BALTIC SURVEYING (ISSN 2255 – 999X) is international scientific journal. The periodicity of the journal is 1 or 2 volume per year.

Universities from Latvia and Lithuania joined their efforts to publish international scientific journal BALTIC SURVEYING. It is jointly issued by:

- Department of Land Management and Geodesy of Latvia University of Agriculture
- Institute of Land Use Planning and Geomatics of Aleksandras Stulginskis University (Lithuania).

In the 3rd volume of the journal are included original articles on land administration, land management, real property cadastre, land use, rural development, geodesy and cartography, remote sensing, geoinformatics, other related fields, as well as education in land management and geodesy throughout the Baltic countries, Western and Eastern Europe and elsewhere. The journal is the first one in the Baltic countries dealing with the issues mentioned above.

This scientific journal contains peer reviewed papers. For academic quality each paper has been reviewed by two independent anonymous academic reviewers having Doctors of science degree. Editorial Board has made the final decision on the acceptance for publication. Each author is responsible for high quality and correct information of his/ her article.

We believe that in the future scientists from other foreign countries will become authors of research articles, and the topics of articles will range widely.

We believe that journal will disseminate the latest scientific findings, theoretical and experimental research and will be extremely useful for young scientists

Scientific journal BALTIC SURVEYING already is indexed in Agris database. Published scientific papers will be submitted to CAB Abstracts and EBSCO Academic Search Complete databases. The data bases select the articles from the proceedings for including them in their data bases after individual qualitative and thematic examination.

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ACTUAL PROBLEMS OF AGRICULTURAL LAND MARKET IN LATVIA

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Abstract

Agricultural land is one of the most valuable natural resources which can be found in Latvia, since agricultural land has long time served as an important resource of economic activity and food production. Efficient use of this valuable resource depends not only on technologies and knowledge at disposal of farmers but also on regulations concerning the real estate market and taxation of the real estate. Recent changes of the real estate market regulation as concerns agricultural land are analyzed in this paper to identify a possible influence on the use of agricultural land.

Key words: agricultural land, real estate market, property tax.

Introduction

Agricultural land is one of the most valuable natural resources which can be found in Latvia. It is a long time ago since agricultural land has served as an important resource of economic activity and food production. Land in agricultural holding is a productive factor of a special kind since, unlike other things used in agricultural production process, it does not undergo the process of moving and increasing. It should be taken into account that many factors influence a situation on agricultural land market, of which only part are directly connected with economic situation in agriculture and agricultural policy. Changes occurring within the framework of the national economy and on a global scale are of crucial importance strongly influencing the changes occurring in the agricultural structure (Sikorska, 2010). It should be also taken into account that an impact of the size of cultivated land on the scale of agricultural raw material production is decreasing. Therefore economic success does not require involving in an agricultural activity carried out in a considerable area of land (Majerova, 2007).

As the world population and global demand for food is permanently growing, availability of agricultural land for food production becomes more important. The world population has increased from 2.5 billion people in 1950 up to 6.9 billion in 2010 (United Nations, Department of Economic and Social affairs, 2012). Another important global trend that should be noted regarding the use of agricultural land is an increasing conflict among food production, on the one hand, and production of renewable energy, on the other. An increasing level and volatility of prices of energy produced from fossil resources as well as the necessity to slow down the speed of the climate change require that a larger share energy is produced from renewable resources as well as less GHG emissions are emitted. The climate change has a great impact on agriculture as the vegetation period changes, the climate becomes either more dry or wet, various types of animal species migrate that result in changes of local biodiversity. These trends and challenges have encouraged many countries to set such goals as to protect available agricultural land and to ensure that it is used in an efficient and sustainable manner.

As regards Latvia, some additional aspects have caused a very intensive public debate and even legislative proposals. One of such problems is abandoned agricultural land which is not used for economic activity therefore it can be assumed that a significant economic potential is not used as well as opportunities to decrease unemployment rates which are substantially higher for rural and more remote areas. The necessity to use agricultural land more efficiently is also stressed in the National Development Plan, particularly in the chapter "Sustainable management of natural and cultural capital" (Saeima, 2012) where two important goals are set: 1) to increase the share of agricultural land used for organic farming; 2) to increase the share of used agricultural land. 87.9 % of agricultural land was used for economic activity according to the National Development Plan but the rest was not used and can be counted as the abandoned land. The main reasons behind the problem of abandoned agricultural land are partly efficient land reform implemented in the nineties or re-nationalization and the rural depopulation. The main concern of the land reform was to return the ownership rights of land and real estate to people who were owners before the loss of independence of Latvia in 1940 or descendants of the owners therefore the momentum of historical justice was a cornerstone of the land

reform, as it is stated in the law “On land reform in the rural areas of the Republic of Latvia”. Only later it was recognized that such an approach created the sort of land owners who were not farmers themselves or they were living abroad and therefore their capacity to manage agricultural land was limited. Many of those who restored the land ownership rights lacked sufficient resources and necessary equipment to start efficient and modern agricultural business. It is recognized in the land policy guidelines that inefficient use of land and land degradation are among the core problems of land policy therefore knowledge of landowners about sustainable use and protection of land resources should be improved (Ministry of Regional..., 2008).

Despite the fact that Latvia had joined the EU since May 2004 and had become a member of the EU single market, Latvian farmers were not able to achieve the capacity to compete equally and successfully with foreign investors for agricultural land as the production resource. According to the Latvia – EU accession treaty, restrictions for citizens of other EU Member States to buy agricultural land in Latvia were into force during the transition period until 2011. This exception was applied to other newly acceded states and such a decision was justified by possible agricultural land market distortion. The main idea was that farms of new member states were not developed enough to compete with foreign capital as they have not accumulated enough capital. Another threat was that agricultural land could be an object of illegal deals as prices were and they are also now significantly lower in comparison to agricultural land prices in those EU Member States which entered the European Union before 2004. Another very important factor is competition for land within the agricultural land market. Many farmers usually have an interest to expand their production in order to increase a farm’s productivity and profitability by means of its size. Taking into account increasing competition for agricultural land and expansion interests, prices of agricultural land have risen over the years. Several authors (Marks-Bielska, 2013; Dale, 2006) propose various methods for evaluation of land market. They point out that land market analysis might be accomplished using a comparative analysis of prices, profit and return on investment. According to data of the Central Statistical Bureau, an average price of agricultural land has grown from approximately 870 euros per hectare in 2011 up to 1,998 euros per hectare in 2013 or by 130 per cent just in two years which indicates that agricultural land market is booming. It is no surprise that local farmers were not happy with so rapidly growing prices of agricultural land therefore politicians, on principle, were obliged to respond to this increase of prices, especially taking into account that agricultural land market was to be opened on 1 May, 2014. A well-functioning land market provides clear benefits for governments, individuals, companies and investors. In addition, the real estate market, as well as land market promotes the transition to a fully market-based economy and creates a new source of capital, encouraging greater economic growth (Kardokaite – Šimanauskienė, Sudeikiene, 2013).

Therefore the law “On privatization of land in rural areas” put a number of restrictions on foreign citizens and companies to acquire land in rural areas putting most restrictions on acquisition of agricultural land in particular. In 2011 Latvia used the possibility to prolong this transition period by three years, however, in the 1st of May, 2014 this additional transition period ended. Recognizing situation that agricultural land can in near future become more as an object of speculation deals rather than being a resource of the productive economic activity, the Ministry of Agriculture prepared and submitted a proposal for amendments in the law “On privatization of land in rural areas” to the government. An annotation of this law proposal (The Cabinet of Ministers, 2013) stated that the main aims of the new legislation are to ensure that the use of agricultural land is rational, sustainable and efficient, maintaining the current share of agricultural land in the whole territory of the state as well as ensuring protection and availability of agricultural land for population.

However, it was rather clear that restrictions on acquisition of the agricultural land cannot be set depending on citizenship as such regulation would break the EU legislation which sets out several basic freedoms of which the freedom of capital mobility here is of a particular concern. It should be also noted that according to the information of the State Land Service, an impact of foreign capital on the real estate market in Latvia is substantial only in the segment of new and exclusive apartment projects in Riga and Jurmala cities, but as for other segments of the real estate market, there is no considerable influence of foreign capital and consequently there is no influence on cadastral values (State Land Service, 2013). In the first half of 2014, a more detailed review on agricultural land market concluded that around 8% of agricultural lands belong to enterprises with foreign-owned share capital. There is also a conclusion that approximately 10% of agricultural land could be potentially

involved in purchases of speculative capital and such land is envisaged for sale with profit in future. Such likely speculative capital enterprises are holding approximately 2% of agricultural land (State Land Service, 2014).

A legislative proposal which included amendments in the law “On privatization of land in rural areas” was adopted by the Parliament on July 3, 2014 and the amendments came into force on August 1, 2014. Some of the amendments were to be enforced from November 1, 2014 as there were regulations of the Cabinet of Ministers necessary as procedures of the law implementation. The **aim of the article** is to analyze consistency of the new legislation with the defined aims of the legislative proposal as well as to predict its possible outcomes and an impact on agricultural land market. The **tasks of the research** include:

- 1) to analyse the existing literature on the regulation of agricultural land markets;
- 2) to analyse the current situation as concerns the use of agricultural land and its efficiency;
- 3) to analyse the freshly adopted legislation and assess its impact.

It is important to ensure that all agricultural land as an important resource is properly used and achieves the best possible economic result. Investments in agriculture and better management could increase efficiency of the agricultural sector. In addition, social aspects of land governance should not be forgotten. Rural territories should be inhabited, vibrant and with diversified economic activities therefore it is important to balance economic efficiency with availability of agricultural land for everyone who wishes to start farming business. Changes to the legislation adopted in 2014 created a number of restrictive conditions as regards agricultural land market, therefore it is important to assess whether the newly adopted legislation will help to achieve the aims that were stated by the Ministry of Agriculture and what possible side effects may appear.

The available scientific literature, reviews of the State Land Service, policy documents, legislative acts as well statistical data were used. The methods of synthesis, descriptive analysis and deduction were applied.

Discussions and results

The newly adopted legislation includes several substantial changes for agricultural land market.

First of all, transactions of agricultural land are subject to the special eligibility procedure at the local municipality if a property proposed for sale consists of agricultural land only or the dominating share of property is agricultural land. However, there are also a number of exceptions as regards the special eligibility procedure and most important of exceptions is one which states that a natural person can buy agricultural land if the total area of agricultural land owned by the respective natural person does not exceed ten hectares; as regards legal persons, this threshold is fixed at five hectares. Other exceptions are cases of the hereditary right, insolvency, land consolidation, land owned by public bodies, transactions between spouses and relatives.

Secondly, if the special eligibility procedure is necessary according to the legislation, natural and legal persons should comply with a number of law requirements such as official registration of economic activity and no tax debt. In addition, the law also requires that at least one of the following requirements are fulfilled:

- 1) income from farming in previous years is at least one third of total economic activity;
- 2) a person has received area payments or direct payments according to the EU regulations;
- 3) a person has relevant tertiary, vocational or training education.

In fact, the above mentioned legislative requirements mean very substantial and unprecedented intervention of the state into land market. Until the adoption of the latest legislative changes, agricultural land market functioned rather freely and every Latvian citizen was eligible to buy agricultural land of any size. Now the scope of persons who are eligible to own more than 10 hectares of agricultural land is substantially narrowed because of the above mentioned requirements included in the law. It is also required by the law that municipal commissions are to be set up to evaluate fulfilment of the new requirements of the law which puts additional administrative burden on municipalities without clearly stated allocation of additional resources for municipalities. It should be noted that transfer of land ownership rights on agricultural land now will take much longer time and will require much more resources in comparison to the procedure before. Another issue is that the new regulation includes rights for a leaseholder to step into a purchase agreement if agricultural land is not offered for sale to a leaseholder. If a leaseholder does not use this right, the State Land Fund are also

entitled to use this right in case of certain conditions. It means that even if a person wishing to buy agricultural land might fail to do so since the leaseholder or the State Land Fund can buy this land instead of him/her. The scale and necessity of the state intervention can be assessed from several aspects. Firstly, it is important how many land properties will be subject to the special eligibility procedure and how large administrative burden is put on landowners. Secondly, if the goal of legislation was to ensure that all agricultural land is used for agricultural activity and to increase efficiency of its use, it is important to analyse the changes in the share of abandoned land and to assess whether productivity of farming businesses is increasing. According to the regulation No.748 of the Cabinet of Ministers regarding land transfer decision making process, all rural municipalities will have to establish municipal land commissions which will be obliged to assess cases of agricultural land selling agreements. Therefore it is reasonable to ask whether this new administrative burden will help to achieve the stated goals and whether the burden will be worth it. According to the data of Agricultural Census done by the Central Statistical Bureau, the area of agricultural land per farm has increased to 24.9 hectares in 2013. According to the same data the number of farms with the total area of land less than 10 hectares were 32,981 or 40.3 per cent of all farms. The number of farms with an area of agricultural land less than 10 hectares were 49,786 or 61.0 per cent of all farms. It means that 39.0 per cent of all farms fall under requirements of the current regulation and the special eligibility procedure should be fulfilled if the selling agreement is to be made. However, it may be said that this threshold is even lower because if a present landowner having, for example, six hectares seeks to buy additional agricultural land of just five hectares, then the special eligibility procedure should be performed according to the law as the total amount of agricultural land owned by the respective landowner would exceed 10 hectares of agricultural land as a result of such land purchase. Figure 1 shows that an area of used agriculture land as well as an average size of agricultural land per farm have increased.

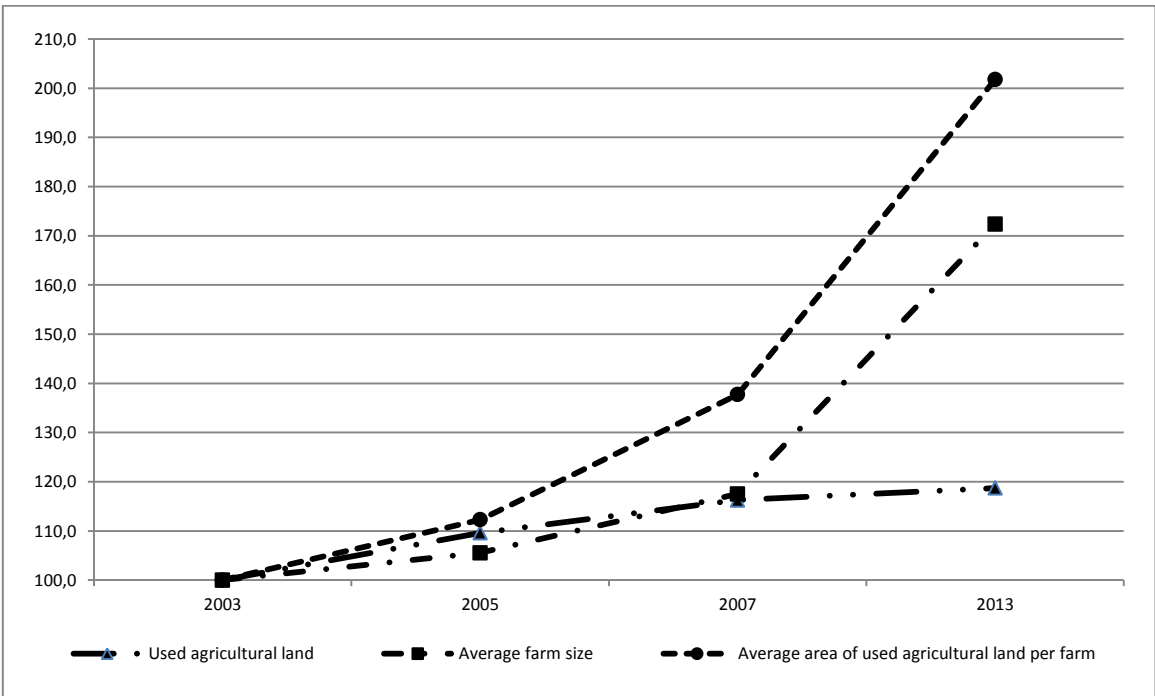


Fig. 1. Changes in use of agricultural land and the size of farms.

From this perspective the necessity of the approved regulation is hardly justified as positive trends are already visible, i.e. farming has become more efficient due to the less fragmented agricultural land and its increasing use for agricultural production. In addition, the new regulation sets out requirements for relevant tertiary, vocational or training education in order to prevent that agricultural land gets into the hands of speculators or people that have no knowledge of farming. However, according to the data of Agricultural Census, it should be noted that the share of farmers having relevant tertiary or vocational education has risen from 21.4 per cent in 2005 to 28.4 per cent in 2013. The data prove the trend that

agricultural land is increasingly used by educated people who have relevant knowledge for agricultural business. Another factor of efficiency is the share of farms that sell their production.

Figure 2 shows that an average area of agricultural land per farm in 2013 has increased twice compared to 2003. The similar observation can be made about efficiency gains as the share of farms selling more than 50 per cent of their products has almost doubled from 13.4 per cent in 2003 to 25.3 per cent in 2013. From such a perspective it may seem a positive trend, however, the situation can hardly be welcomed if the share of farms selling at least some part of their products to market has not increased substantially during the last ten years and the number of such farms are less than a half of all farms. Additional administrative burden for land market and narrowing the scope of people eligible to buy agricultural land might make this situation even worse.

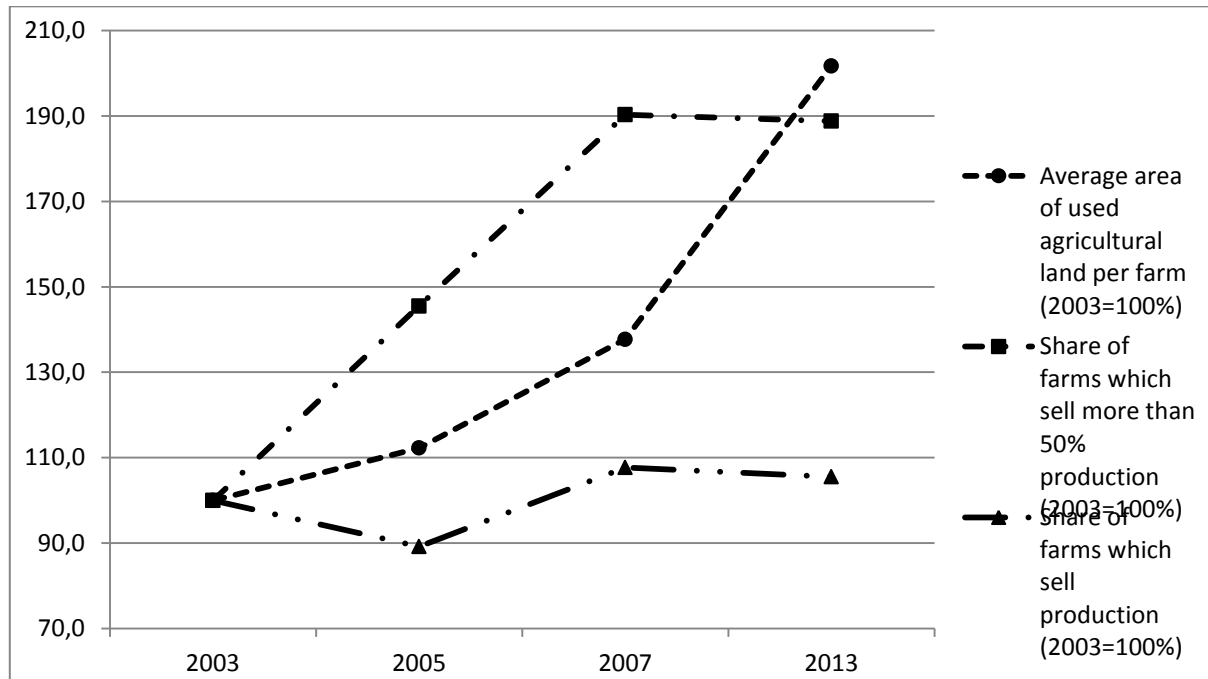


Fig. 2. Share of farms selling their production.

Another substantial state intervention is the requirement that maximum amount of agricultural land which one person is allowed to own in Latvia is 2,000 hectares. However, this does not include that agricultural land which at the moment of law adoption is leased by a person or land for which this person receives area payments. Local municipalities while taking into account their long-term development view, strategic priorities and spatial development perspective are entitled to set out respective restriction on maximum of agricultural land area within their territory while not exceeding national level threshold of 2,000 hectares per person. Such a regulation was intended to ensure wider availability of agricultural land to potential new landowners, however, this regulation has several serious disadvantages. It is possible to buy agricultural land and register it for family members and, by doing so, increase the area of agricultural land belonging to the farm for several times. Secondly, it is almost impossible to control indirect change of land ownership if shares of companies are subject for sale and those companies own agricultural land, as parties of such selling agreement are not requested by the law to submit this agreement to the municipal land commission which is responsible for evaluation and approval or disapproval of land purchase agreements as this agreement does include shares of the company but not an agricultural land as a deal subject. Finally, such necessity to check that this requirement is respected puts one more additional administrative burden to the municipal land commission. It can also be discussed whether the amount of 2,000 hectares is a relevant threshold to ensure wider availability of agricultural land and whether such a limit restricts a large share of farmers from further development. Table No.1 provides information on changes in the number of farms depending on the size of their used agricultural land. It is possible to conclude from the table No.1 that the number of farms has decreased substantially after 2005 and the lion's share of it is to be attributed to smaller farms with an average agricultural area up to 10 hectares which have halved during the last

ten years. There are only 480 farms which own more than 500 hectares of agricultural land and probably even much less of farms larger than 2,000 hectares. An average area of agricultural land per farm is 24.9 hectares therefore the decision to put the threshold on land ownership per person which is approximately 80 times higher than average can be hardly justified.

Table 1

Number of farms grouped by size of used agricultural land

Size/Year	Number of farms			
	2003	2005	2007	2013
līdz 0.9	19,919	17,640	10,607	10,301
1.0–2.4	21,093	20,924	16,309	10,180
2.5–4.9	27,087	25,760	21,313	13,290
5.0–9.9	29,624	30,401	26,837	16,105
10.0–19.9	20,070	22,226	20,633	15,791
20.0–29.9	5,580	6,533	6,402	5,323
30.0–39.9	2,416	2,687	2,802	2,504
40.0–49.9	1,298	1,529	1,549	1,634
50.0–99.9	2,246	2,515	2,870	2,695
100.0–199.9	890	1,128	1,60	1,454
200.0–499.9	446	541	662	961
≥500.0	179	230	288	480
Total	130,848	132,114	111,532	80,718

It would be necessary to start a discussion on real estate taxation policy with an aim to reduce opportunities for speculative deals with agricultural land and to ensure that agricultural land is properly used. The current taxation legislation envisages a possibility to to apply additional tax rate for abandoned agricultural land (Saeima, 1997) but there is still an open issue how often such a possibility is used by municipalities. Another option would be to increase income tax from capital gains which could be used for imposing a tax on income from selling of agricultural land and thus decreasing an interest to speculate with agricultural land. However, none of these options were discussed as an alternative option despite the fact that they would possibly achieve the stated aims more efficiently avoiding much of administrative burden. Latvia Sustainable Development Strategy until 2030 sets out the goal of keeping balance between rural and urban population so that rural population is at least 30 per cent of the total population (Latvijas ilgtspējīgas attīstības..., 2010). Such a high threshold of possible land ownership will not prevent but rather facilitate further concentration of agricultural land in largest farms while people from smaller ones will abandon them and move to cities. It might increase unemployment in rural areas and then consequently cause further depopulation of the countryside, the number of abandoned residences and degraded areas.

Conclusions and proposals

1. Prices of agricultural land and competition for it have grown substantially prior to opening of agricultural land market for citizens of the European Union, European Economic zone. An increase of prices, possible loss of local farmers in a competition for agricultural land and fear of speculative activities created demand for stricter regulations of agricultural land market.
2. The necessity of the new regulation of agricultural land market from the perspective of efficient use of agricultural land is not justified as used agricultural land and an average farm size are increasing. Options for improvement of taxation policy as concerns agricultural land market were not analyzed and used but those might achieve better results without putting restrictions and additional administrative burden.
3. Is impossible to assess fully an impact of the new regulation as it came into force rather recently, however, some disadvantages can be identified: more time-consuming transfer of land ownership, a larger amount of administrative burdens and municipal resources for control of agricultural land

market, while delayed consolidation of land and limited economic effect and an impact on the use of agricultural land, is present at all.

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ANALYSIS OF DECLARATION DATA OF FARMING LAND AND CROP AREAS

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Abstract

Declaration data of farming land and crop are analyzed in the article. Ukmergė district is chosen for the more detailed analysis. Statistical data of farmers and other land users are analyzed in the article; the declaration data of farming land and crop are analyzed and mathematical statistical dependence between the declared area and soil productivity index is determined. The results show that there are 2,506 registered farms in Ukmergė district and they manage the area of 18,430.07 hectares. The average parcel size amount to 7.35 ha. The number of farming persons in Ukmergė district as well as in Lithuania have considerably decreased during 7 years period. In 2014, the number of farming persons was by 38.12 percent smaller in Ukmergė district and by 41.24 percent in the whole territory of Lithuania compared to 2007. The comparison of the declaration data of 2011 with the data of 2014 shows that the declared area of farming land and crop in Ukmergė district has increased by 2.46 percent although the number of received applications has decreased by 22.2 percent. During the period of 2011–2014 the majority of assessed applications were received in 2013, i.e., 99.04 percent of all applications received that year. It shows that the size of land parcels has increased. Cereal crops (oat, wheat, triticale, barley, rye, buckwheat and corn) composed the major part of the declared areas in Ukmergė district in 2013–2014 (48.84 percent of all declared crops in 2013 and 53.79 percent in 2014). The analyzed agricultural holding “Egvila” during 2011–2014 period declared the area of approximately 272 hectares annually. This company grows white clover for seed, timothy for seed and cumin. Direct payments are received for all land areas. The analysis shows that farmers generally declared their own land. The analysis of the declared land distribution in Ukmergė district by land property right shows that 75 percent of the declared land are private and the remaining 25 percent are leased either from the state or from natural persons.

Key words: farming land, crop, declaration.

Introduction

Since 2004 the support scheme under which the direct payments are paid for owned area of farming land is applied in Lithuania. Since 2009 the State Enterprise Agricultural Information and Rural Business Centre is responsible for applications' and other documents' reception, registration, initial inspection and entry into the information system in the neighborhoods and agricultural departments of municipalities. A few years ago this Centre had started to implement an electronic system for crop declaration in Lithuania. Crop declaration is one of the most important tasks for farmers allowing supplement of a farm's and family's income. Farmers receive payments and increase their income only for proper maintenance of used land and growing certain crops.

The agriculture and rural development law of the Republic of Lithuania (Lietuvos..., 2002) is the main law regulating the principles of agriculture and rural development policy formation and implementation. Administration rules of 2014–2020 years' program of Lithuanian rural development (Lietuvos..., 2015) determine a general order of rural development administration. Direct payments are paid only to active farmers; this status is provided following the common criteria of the EU members.

According to G. Bunevičienė (Bunevičienė, 2010), 368,043 applications of payment for areas of farming land and crop were provided in Lithuania in 2008. Comparing years 2008 and 2014, it is seen from statistical data of the National Paying Agency that the number of provided applications is significantly smaller as only 140,445 applications were received in 2014.

Only 72 percent of farming land are declared in territories of unproductive land (Molėtai, Zarasai, Utena, Trakai, Vilnius, Ignalina, Šalčininkai and Švenčionys municipalities) and 87 percent in other localities. Less crop products are obtained in territories of unproductive land, and thus there are less declarations in these areas (Abalikštienė, 2013). The support for declared crop is also provided in less favorable for farming areas. The aim of the Less Favoured Areas (LFA) Support Scheme is to develop agricultural activities and also to maintain and encourage balanced farming systems, to improve environment of such locations following the EU legislation. However, the support only partly achieved the goals during 2004–2006, because LFA support did not promote agricultural production activity, besides fertility had decreased. LFA farms in Lithuania are smaller compared to other farms

in the country (Kriščiukaitienė et.al., 2007). The average farm size in Lithuania is by one third larger compared to average LFA farm. The same can be said about the farms of the analyzed holding “Egvila” which are also smaller as they belong to LFA.

The development of ecological farming accelerated after Lithuania had entered into the EU and compensatory payments for ecological farming increased. The size of compensatory payments has a great influence on development of ecological production in Lithuania. Ecological production is a promising economic sector in Lithuania, too (Pekarskas, 2012).

The aim of the article is to perform the analysis of declaration data of farming land and crop declaration. The following tasks are set for achievement of the aim:

1. to study the statistical data of farmers and other land users,
2. to analyze declaration data of farming land and crop in Ukmergė district,
3. to determine the dependence between the declared area and soil productivity index.

Land users use the information system with provided orthophotographic material when declaring farming land and crop. Declarants draw the fields of farming land and crop into auditorial land plots. An auditorial land plot (hereinafter referred to as ALP) is an entire land plot limited by natural and artificial objects (rivers, forests, roads, buildings etc.) possessing its characteristic natural features, dominant cover type, peculiarities of economic use. Each ALP has a provided unique identification code in the database of auditorial land plots. The size of this plot is used to control the size of applicants' declared fields (the sum of areas of fields declared in ALP is compared to ALP area or/and area suitable for the support).

Methodology of research and materials

Literature sources, statistical data, applications to receive direct payments for farming land and crop areas, cartographic material were used to perform the research. The collected data were analyzed using methods of literature analysis, statistical and comparative analysis and cartographic studies. Ukmergė district was chosen for a more detailed analysis. This district is situated in the middle of Lithuania. Data of the chosen district were compared with statistical data of the whole Lithuania. The data were received from agricultural holding “Egvila”, Statistics Lithuania, the Geoportal, the Agricultural Information and Rural Business Centre, National Paying Agency etc. The total declared area in 2014 in neighborhoods of Ukmergė district and an average soil productivity index were used to determine mathematical statistical dependence. The data of the agricultural holding “Egvila” were analyzed in more detail. “Egvila” declared land plots that belong to ecological farming, also these parcels belong to LFA, and therefore within the new financial period of Lithuanian rural program for 2014-2020 a corrected LFA map of 2007-2013 period was applied. Areas of two categories were isolated in it. The first category of large natural obstacles involved former areas of important and minor disfavor. The second category involves areas with specific obstacles, i.e. overflowed territories and territories of intensive cave (Lietuvos..., 2015). The agricultural holding “Egvila” was established on 18th March, 2011. It is a legal entity of limited financial responsibility; assets are separated from shareholders and members of the holding. There are two founders and shareholders who have equal rights in decision making. The holding performs activity in Lyduokiai neighborhood, Ukmergė district. The main field of activity is crop production: growing and realization of cereal crops and aromatic crops. The holding has the status of an ecological farm. Currently all production grown by the farmer is sold in Lithuania: joint stock company “Baltic Agro” and joint stock company “Litagros prekyba”. Agricultural activity is performed following European standards adopted in the fields of environment and food. New technologies and new farming techniques are being implemented in the holding. New technologies reduce costs and thus ensure the safety and quality conformity with the EU requirements of production placed on the market. Hereby the problem of competitiveness is being solved in the holding.

Discussions and results

Statistical data analysis of number of people working in agriculture in Ukmergė district in 2007 and in 2013 revealed the decrease of workers by even 33.92 percent in 2013 (Table 1).

Table 1

Number of people working in agriculture in Ukmergė district municipality and in Lithuania in 2007 and 2014

	All farms							
	Number of people employed in agriculture, in total		Farming persons and their family members		Permanent employees		Temporary workers	
	2007	2014	2007	2014	2007	2014	2007	2014
Ukmergė district	7,884	5,210	7,516	4,651	335	523	33	36
Lithuania	482,002	300,274	449,833	264,069	28,331	33,881	3,838	2,324

A downward tendency is also observed in the whole Lithuania. The total number of people working in agriculture decreased even more in Lithuania than in Ukmergė district municipality, i.e. by 37.70 percent.

During 7 years period an impressive decrease of the number of farming persons in Ukmergė district as well as in Lithuania is observed. The comparison between 2014 and 2007 shows that the number of farming persons has decreased by 38.12 percent in Ukmergė district and by 41.24 percent in the whole of Lithuania. Employees of Ukmergė district municipality in 2007 composed 1.64 percent of the total number of people working in agriculture in Lithuania.

The analysis of statistical data of the Land Fund of Ukmergė district municipality of years 2011-2014 proved that the amount of the used (declared) farming land has increased. The comparison between 2010 and 2014 shows that the declared farming land in Ukmergė district has increased by 14.71 percent. The analysis of the data of the whole of Lithuania revealed the increase by 12.97 percent accordingly. Therefore it can be concluded that the amount of the used (declared) farming land in Ukmergė district has increased more than in the whole of Lithuania.

It can be seen from the statistical data of direct payments for farming land and crop areas in Ukmergė district within 2011-2014 that the number of applications for declaration has decreased yearly (Table 2).

Table 2

The statistics of direct payments for farming land and crop in Ukmergė district

Year	Received applications, units	Declared area, ha	Requested support sum, EUR	Assessed applications, percent	Authorized sum, EUR	Paid amount, EUR	Paid off (from assessed support)
2011	3,488	62,552	7,181,486	98.62	6,843,394.48	6,843,379.64	99.99
2012	3,335	62,623.48	7,426,237.73	99.04	7,277,285.01	7,275,300.99	99.97
2013	3,102	63,348.49	8,328,428.43	99.13	7,936,355.22	7,934,401.50	99.98
2014	2,748	64,130.17	8,163,604.09	86.79	7,298,548.84	7,294,164.47	99.94

The comparison between 2011 and 2014 shows that the number of received applications has decreased by 22.2 percent, i.e. by 740 applications, although the declared area from 2011 to 2014 has continually been increasing. The growth of the declared area shows that the size of farms owned by land users has increased. It means that there is a constant process of appearing of farmers who expand their holdings and thus increase their income gained from agricultural activity.

On the whole, farmers declare their own land. The analysis of declared land distribution in Ukmergė district by land property rights showed that 75 percent of declared land is private and the rest is leased either from the state or from natural persons.

The use of arable land is very much dependent on soil productivity. Surveillance data show the dependence of declared farming land from soil productivity index. If soil productivity index has increased, the area of farming land also increases. To delineate the relations between the declared farming land and productivity of farming land, a linear equation was obtained:

$$y = 31,7446 + 1840,6768x, \quad (1)$$

where:

x – average productivity index of farming land;

y – the size of farming land, ha.

According to surveillance data, it can be stated that areas of farming land increased by approximately 1,840 hectares, if soil productivity index had increased by one point. The calculated correlation coefficient is equal to 0.76. It shows that analyzed relations are direct and strong. The determination coefficient is equal to 0.58. Hence, the declared area of farming land in Ukmergė district by 58 percent depends on the productivity of farming land. The estimated correlation and determination coefficients are reliable with confidence level 0.95.

According to statistical data of assessed applications from received applications for years 2011-2014, it was determined that the most of applications were evaluated in 2013 – even 99.13 percent of applications received that year, and the least of them in 2014 – 86.79 percent, respectively.

In accordance with statistical data of direct payments for farming land and crop areas in the whole of Lithuania within 2011-2014 it was determined that the number of received applications decreased in Lithuania as well as in Ukmergė district (Table 3).

Table 3

Statistical data of direct payments for farming land and crop areas in Lithuania within 2011-2014

Year	Received applications, units	Declared area, ha	Requested support sum, EUR	Assessed applications, percent	Authorized sum, EUR	Paid amount, EUR	Paid off (from assessed support)
2011	166,758	2,737,801	317,598,111	99.85	299,377,456.13	299,023,659.77	99.88
2012	157,895	2,752,574.51	325,576,539.57	99.49	318,620,290.77	318,437,454.16	99.94
2013	149,314	2,765,851.38	363,626,587.82	99.41	347,479,860.27	347,295,320.06	99.95
2014	140,445	2,800,258.55	359,935,244.20	87.37	319,015,647.55	317,769,476.40	99.61

The declared area increased in proportion during 2011-2014. Comparing the declared area in Ukmergė district and in the whole Lithuania, it was observed that the declared area has increased both in Ukmergė district municipality and in Lithuania. The analysis of what Ukmergė district's share was in the declared land of Lithuania in the time period 2011-2014 revealed that the largest (2.29 percent) declared land plot at Lithuanian scale was observed in 2013 and 2014, and the smallest one (2.27 percent) – in 2012. The statistical data of assessed applications from received applications in Lithuania in the time period 2011-2014 allow to conclude that the most of them were evaluated in 2011, i.e. even 99.85 percent of applications received that year. The largest number of applications assessed in Ukmergė district were in 2013. The analysis of data of Lithuania and Ukmergė district of 2013 concerning the assessed percentage of all received applications revealed that by 0.72 percent more applications were evaluated in Lithuania compared to Ukmergė district. The largest amount both in Lithuania and in Ukmergė district were in 2013. The largest difference between the requested and paid amounts in Lithuania were in 2014 when only 88.29 percent of the requested sum were paid off. The comparison of Ukmergė district with Lithuania in 2014 shows that the difference between the requested and paid off amount in Ukmergė district was 8.51 percent less compared to Lithuania.

The statistical data of the declared crop areas show that winter and spring crops in 2013 composed 48.84 percent of all declared crops and even 53.79 percent in 2014. Comparing the fields of winter and spring crops in 2013 with the fields in 2014, the number of hectares has increased by 4.95 percent (Table 4).

Table 4

Cereal crops declared in Ukmergė district in 2013-2014

Cereal crops	Composition	In total in 2013	In total in 2014
Winter cereal crop	Wheat, rye, triticale, barley	14,447.93	14,120.45
Spring cereal crop	Oat, wheat, triticale, barley, rye, buckwheat, corn	14,174.11	17,102.07
Pulses	Peas, beans, vetches, lupines, soy	1,729.49	1,285.99
Industrial crop	Beet, rape, hemp for seeds and fiber, first year and second year caraway, aromatic and spicy plants	7,028.24	6,632.75
Grasslands and pastures	Pastures-grasslands (up to 5 years), perennial pastures-grasslands (more than 5 years), natural and semi-natural grasslands, perennial pastures (grasslands) (more than 5 years), intended for merchant herbaceous production	20,580.88	18,292.68
Potatoes and vegetables	Potatoes, vegetables	385.37	376.25
Orchards and berry plantations	Orchards, berry plantations	255.16	232.65

Grasslands and pastures also composed a large part of all declared crops: 35.12 percent in 2013 and 31.51 percent in 2014. The least part consisted of orchards and berry plantations: 0.44 percent of all declared crops in 2013 and only 0.4 percent in 2014 accordingly.

The comparison between 2013 and 2014 shows that the total number of declared hectares has decreased by 558 ha or 0.95 percent of the total declared area.

One agricultural holding was also chosen for a more detailed analysis. Almost all land used by agricultural holding “Egvila” is leased from private persons. According to the data of 2014 the land area of the holding was equal to 272 hectares. All parcels belong to LFA but productivity of grown crops is quite high. The compliance to agrochemical requirements and qualitative seeds ensure such productivity. Currently the owners of leased parcels would like to sell their land, and therefore agricultural holding is planning to purchase it. “Egvila” leased only 7 parcels from private persons in 2011; several land plots were divided into separate fields. Buckwheat, rye, mustard were grown, and pastures (grasslands) (up to 5 years) also composed a large part. Direct payments were received for all land plots. In 2013 the agricultural holding already leased 16 parcels from natural persons. Several land plots were divided into different fields. White clover for seeds, timothy for seeds and cumin were grown in the fields. Direct payments were received for all land plots. All land parcels managed by the holding participated in 2007-2013 Lithuanian rural development programs: ecological farming and belonging to less favoured areas. All land plots were certified as the ones that follow the requirements of ecological production. The analysis of the data of the agricultural holding “Egvila” in the time period 2011-2014 proved that cumin composed the largest part, i.e. 30.95 percent of all crops declared by the company.

The comparison between the areas of farming land declared by the holding “Egvila” and the areas of farming land declared in Ukmergė district in the time period 2011-2014 allows to conclude which farming land declared by the agricultural holding is located in Ukmergė district (Fig. 1).

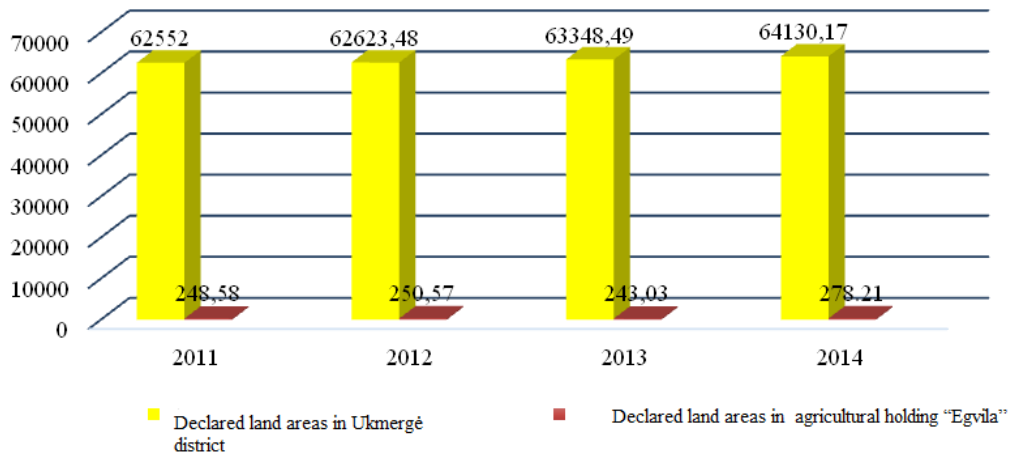


Fig. 1. Declared land areas in Ukmergė district and the agricultural holding "Egvila".

Revision of the farm's areas is performed every summer. The areas declared by agricultural holding "Egvila" coincided with the plots measured during the revision. The data presented in applications corresponded to the real situation in the farm, thus the holding "Egvila" did not receive any sanctions and no violations were determined. The agricultural holding operates according to the European Union standards adopted in the fields of environment and food. New technologies and new farming techniques are being implemented in the holding. New technologies reduce costs and thus ensure the safety and quality conformity with the EU requirements for products in the market. Hereby the problem of competitiveness is being solved in the holding.

On the whole, the analyzed data shows that agriculture activity in Ukmergė district is determined. Land users declare farming land and crop, and it results in obtained support from both Lithuania and the EU. Although the number of farmers has decreased, the amount of the total declared area remains steady.

Conclusions

1. The decrease of number of farming persons in Ukmergė district as well as in Lithuania is observed. During 7 years period, the comparison between 2014 and 2007 shows that the number of farming persons has decreased by 38.12 percent in Ukmergė district and by 41.24 percent in the whole Lithuania.
2. The comparison of the declaration data of 2011 with the data of 2014 shows that the declared area of farming land and crop in Ukmergė district has increased by 2.46 percent although the number of the received applications decreased by 22.20 percent. During the period of 2011–2014, the largest number of assessed applications were in 2013, i.e. 99.04 percent of all applications received in that year. It shows that areas of properly used land has increased.
3. Cereal crops (oat, wheat, triticale, barley, rye, buckwheat and corn) was used in the major part of the declared areas in Ukmergė district in 2013-2014 (48.84 percent of all declared crops in 2013 and 53.79 percent in 2014, respectively).
4. The statistical analysis shows that the areas of declared crops and farming land have increased if the recorded soil productivity index is higher.

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APPLICATION OF FOREIGN EXPERIENCE FOR IMPROVEMENT OF LAND RELATIONS IN AGRICULTURE OF UKRAINE

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Abstract

The main peculiarities of land relations abroad are highlighted in the article. Basic principles of foreign experience of land use regarding market circulation of land, concentration of major land resources by right of ownership as well as the process and ways of reformation of land relations are generalized and systematized. Some peculiarities of lease relations, collection of rents and restrictions on title to land for foreigners are analyzed. Some positive aspects are distinguished in order to use them in Ukraine. Some ways of improvement of land legislation in Ukraine are suggested taken into account foreign experience.

Keywords: foreign experience, land relations, title to land, land market.

Introduction

Evolution of land relations in different countries of the world happens in diverse ways because of differences in the historical development of economy, levels of economic and social development as well as the structure of agriculturally used areas and a number of other factors. The analysis of such experience leads to the conclusion that success of land relations improvement depends on the level of scientific validity, an extent of state regulation prudence and a degree of coordination of participants' interests of transformation and land market transactions. The aim of this research is to characterize the main peculiarities of land relations abroad as well as to generalize and systematize the main principles of foreign experience of land use and to suggest some proposals as to their implementation in Ukraine. As the question of application of foreign experience to improve land relations is important one, a lot of publications are devoted to this topic. Such scholars as Antipova L. I., Dankevych A. Ye., Kvitka H., Yurchenko A. D., Tkachuk L.V., Tretiak A. M., Cherevko H. V. and other well-known scientists are involved in researching, organizing, looking for some opportunities to implement international experience and its various aspects in Ukraine.

Methods of the research and materials

The research of works of domestic and foreign scientists, concerning application of foreign experience in the improvement of land relations in agriculture, data of State Office of Statistics in Ukraine, State Agency of Land Resource in Ukraine, scientific publications of scientists and results of personal research of the author were used.

Methods, applied in the presented research are based on dialectic approach, enabling the study of social and economic phenomena in correlation and dialectic mutual development. The method of abstraction was used in the process of investigation described in the given article. The method entitled a gradual transition from concrete issues to general notions and laws of development. The authors also applied the method of system analysis enabling the study of foreign experience of rational land management as a combination of elements and factors, creating the whole system of relations. The monographic method of the research helped to inspect and study scientific publications on the issue. The statistic method assisted in the analysis of dynamics of quantitative parameters as to lease payment.

Discussions and results

In Germany the federal act on land use is the basis of modern land policy and relevant regulations are adopted on its basis in each federal land (Balan, Ivanov, 2011). The legislation provides balance compliance between land areas and livestock numbers taking into account environmental balance on territories. In general, agriculture is considered as one of the main factors of environmental security of the country.

A detailed plan of land and its use in accordance with its designated purpose is projected in the Netherlands, where it is provided a separate type of activity for each land use with prohibition to engage it in any other type of activity except for the determined one.

In order to use such experience in Ukraine one should adopt a special law that would predict the need for zoning of the country, as well as to determine areas for agricultural purposes and an opportunity to obtain a special permission for construction of each non-agricultural building in such area. In addition, when calculating the effective ratio of agriculturally used areas, one should take into account the social need and products one should get on them. These calculations should be based on the consideration of physiological requirements of crops to environmental conditions.

In China land can neither be bought nor sold, but illegally Chinese can sell and buy it. But the government turns a blind eye to it understanding the limitation of carried out agricultural reforms and the necessity to open the land market based on the introduction of private ownership of land (Land as an..., 2002). Thus, formally the state maintains state and collective ownership in agriculture and denies any possible evolution towards private ownership of land and private business activity in agriculture (Tkachuk, 2009). The success of land transformation of China is not connected with egalitarian redistribution of land, but with creation of opportunities for circulation of land in order to create optimum sized of land plots and their effective use (Yurchen et.al., 2009).

In the UK all land formally belongs to the royal family, but titles to land are sold freely, allowing using it rather effectively, but it is very difficult to change the designated purpose of a land parcel. Owners of land are forbidden to sell their land plots to foreigners (Thomson, 1997).

In Italy the main purpose of land reform was to increase the effectiveness of use of land concentrating it in hands of those who involved in it farming as well as to intensify land market. Thanks to the state regulation of this process, farmers were able to buy land at the price lower than the market one. Besides, they were able to pay for land due to bank loans granted even for 30 years. Credit rate of such loan did not exceed 3.5% per year (Kvitka, 2009).

In Israel all land belongs to the state and its use is under strict government control (Cherevko, 2004).

In most European countries lease is the most common form of agricultural land use. For example, in Ireland only 0.2% of the country's land is sold in a year, in France - 1.4%, in England - 0.6%. As regards agriculturally used areas, 71% are leased in Belgium, 48% in the Netherlands, 47% in France, respectively, however, only 12% of land is leased in Latin America (Balan, Ivanov, 2011). Obviously, this is due to the fact that there is no private ownership of land in such countries as England, Denmark, Norway; land reclaimed from the sea in the Netherlands belongs to the state (Diiesperov, 2010).

The analysis of land reforms and their progress in the EU allows to conclude that those reforms had strong government support and they were aimed at concentration of land plots in order to increase their efficiency. A common feature for these countries is also state restrictions on purchase and sale of land underlining that there is relative freedom of land market there. But there are some regulations that outline specific benefits for some entities as to land lease. In the Netherlands and Israel, lease is the most common form of land relations providing high efficiency of agriculture. There are some possibilities for changing the designated purpose of agriculturally used areas in Italy, Slovakia, Lithuania, Sweden and the Czech Republic, however, in such countries as France, Germany and the UK it is extremely difficult to change agriculturally used areas (especially of high quality) into the category of non-agricultural land. In France legislation system is oriented to improve agricultural structure, redistribution of land, regulation of agricultural land market as well as it is oriented to preserve the designated purpose of agricultural land, that is why it is not even allowed to develop urban settlements in rural areas, and building works are limited only to construction of necessary buildings for husbandry on certain agriculturally used areas. In order to perform any transactions with land, an owner needs permission from the Special Administrative Committee (Diiesperov, 2010; Filatov, 2010). Norway is a model of the state's impact on the market circulation of agricultural land (Fedorov, 2007). Fragmentation of farms and plots of land during the change of owners or inheritance is one of the main risks of land market in these countries, thus land is mostly passed to only one owner.

Land relations and ways of their regulation are slightly unusual in the United States. The history of land relations in this country can be divided into two stages: in the first stage the major way of state regulation of these relations was aimed at expanding private ownership of land; the next stage of the formation of land relations was characterized by the restriction of land areas to be privately owned as

well as by buying them out by the state, monitoring their conditions and using them in private. Nowadays, 40% of land resources of the United States belong to the federal government, but arable land is not owned by the federal government (Holoida, 1999).

Lease of agricultural land as an organizational form of land relations is widely spread in countries of Western Europe. More than 70% of land is leased in Belgium, over 60% — in Germany and France and 35% — in the Netherlands. On average 40% of agriculturally used areas are leased in the EU (Dankevych, 2007; Lee, 1997; Tkachuk, 2009), as it is more profitable to lease land than to buy it in these countries and a leaseholder can lease two times more per unit area of owned land (Antipova, 2007). But among the developed countries there are also those where lease relationships are not so highly developed as to the amount of agriculturally used areas. For example, in Canada - only 30 % of agriculturally used areas is leased, in Japan – 20 %, in New Zealand – 14%, in Australia and Argentina - 5% (Ferenczi, 2005; Larsson, 1991). In these countries, private and public ownership of land prevails. For example, in the Netherlands 65% of agriculturally used areas are owned by the state, which is a major landlord in the country. However, hallmark of leasing relations in this country is the most attractive long-time lease of land - even for 99 years (as in Israel). Among leased 35% of land, 20% of land is leased from the state, 15% - from private owners. The largest plot of land (farm) to be leased is 3,000 ha in the Netherlands, it is leased from a private investment firm. Land is leased only by professional farmers who may run the farm without age limits, but the leased land can be transferred to son or daughter (Antipova, 2007).

The process of lease has different ways of implementation in different countries. In France, for example, landowners can get their land back after the expiry of a lease contract only if they declare intention to do farming by themselves. Otherwise, the agreement between a landowner and a tenant will continue automatically during the entire time if the tenant performs agricultural production during that period on this land. The minimum leasing period was nine years, but three decades ago it continued to 18 and 25 years (Antipova, 2007; Diiesperov, 2010).

In Germany, an extension of lease contract is done automatically only for one year, but if a landowner proves economically that the reduction in the term of lease will cause him property loss, this agreement will be in force after the expiry. Thus, in these cases the legislation protects mainly the rights and interests of tenants. In such countries as England, Sweden, Italy, a tenant does not have such protection, except in England, where agricultural lease can be inherited. Obviously, this is due to the fact that the most common form of lease of land relations in England is the long-term lease, but quite effective state regulations of these relations is carried out as well (Antipova, 2007).

In countries of Western Europe, almost 90% of agreements are concluded for more than nine years enforcing a full cycle of crop rotation and average — recouplement of capital assets. The minimum period of lease in different countries is regulated differently by the law: 6 and 12 years in the Netherlands and Italy, 6 and 9 years in Luxembourg, 9, 18, 25 years and until the end of employment in France, 10 in Sweden, 9-18 years in Belgium, 10 years in Portugal (using hired labor force) (Berezianko, 2009; Dankevych, 2007; Oleksiuk, 2008).

The rental value in various European countries varies from 20 EUR per 1 ha in Lithuania to nearly 400 EUR in Italy. In Eastern European countries, the figure hovers around 20-25 EUR, in Western European countries - 129 (Sweden), in Western Germany - 261. The rental value varies regarding the quality and purpose of agricultural land — for example, the rent of 1 ha of arable land is worth over 320 EUR, but of pastures — 230 EUR (Tkachuk, 2009). Nowadays land relations of economically developed countries are carried out in conditions of the developed land market, which is a real form of expression of these relations. It covers virtually all land transactions, or at least concerns them: land lease and exchange of land plots particularly with regard to the purchase and sale of land. At the same time carrying out market transactions with land as to purchase-sale of land plots is meant buying and selling of titles (rights of ownership to these areas, rights to use them, or rights of ownership and use simultaneously).

The legislation regulating the land market relations in the United States and some other countries (Germany, Belgium, France and Spain) allows removing land plots forcefully (if they are used ineffectively) and transferring them to owners and farmers who manage land efficiently. It is a positive feature of the legislation system of land market relations.

The orientation towards conservation of soil fertility in any organizational form of land relations is an advantage of foreign land legislation. But in Ukraine, there are no such mechanisms either legal or

economic which would encourage land users to comply with crop rotation as well as there are no such mechanisms regarding almost all aspects of efficient use of land funds and soil fertility recovery.

In Czech Republic, Poland, Hungary and Bulgaria some specialized funds are established. They buy small plots of agriculturally used areas and put consolidated land array to lease to large effective producers. Thanks to the work of specialized funds, organizational costs of land lease are reduced as well as costs to cultivate consolidated land array are less than to cultivate small land plots (Tretiak, 2009). In Poland the Agency of Agricultural Property of the Treasury, in which State Land Fund was transformed, deals with such transactions. The agency buys land and real estate from individual farms and sells to expanding owners (Balan, Ivanov, 2011).

In Bulgaria, foreigners can only inherit land, because in this country they are not covered by land title, as well as legal entities whose share of foreign capital is higher than 50% (Kvitka, 2009). Land reforms in Albania were a little bit different from those in Bulgaria. In Albania in the 1990s, agricultural cooperatives were completely eliminated and privatized free of charge by their former members in proportion to the number of members of their families. That is why agriculture of Albania is characterized by the high level of fragmentation - the average area of farm is 1.2-1.4 ha, which prevents farmers from efficient use of land and predetermines the need to implement ways to strengthen agricultural enterprises as well as to consolidate land array (Tkachuk, 2009). But since the 90s of the 20th century it has been prohibited to trade freely by land (Hudz, 2007).

In Switzerland and Germany there are no restrictions for foreigners to buy land, although in Germany there are some difficulties, as the authority that issues a permission, cannot let do it, if such an action is in the conflict with measures as to improvement of agricultural structures or in other cases. That is why foreigners have relatively insignificant share of land. In France, for example, such limitations are applied only to land occupied by vineyards, as they are considered to be a part of national wealth or if such a transaction is accompanied by the sum of more than 250 million francs.

In the USA foreigners are allowed to have private land, but in 28 states there are some restrictions as to land title by foreigners and, as a rule, they have title to agriculturally used land in states known as rest areas (Atta, 1998).

In New Zealand only a special court on the protection of land can conclude to buy or lease a plot of land over 2 ha by foreigners, but this decision requires detailed justification in each case.

Canada, regarding land titles by foreigners, has stricter regulations that are carried out at the level of provinces. For example, there are some limitations as to land area - not more than 8 ha of agriculturally used land as well as foreigners are not provided with preferential loans for purchase of land.

Thus, participation of foreigners in land relations of the country has a positive value; secondly, the participation in land relations of each country can be regulated by the state; thirdly, in Ukraine participation of foreign capital in agriculture through buying or leasing of land plots can be evaluated as a positive phenomenon, and it may increase investments in this sector of the economy, and the very participation, following the example of other countries, can reasonably be limited by government regulation. Nowadays only potential domestic buyers can deny this idea because they want to buy land after the abolition of the moratorium on its sale as well as they want to buy it at the lowest price and in low level of competition due to the absence of foreigners in the domestic land market.

In Armenia, Georgia, Azerbaijan, Moldova almost all land can be sold, but in Kazakhstan and Tajikistan it is allowed to lease it, however, it is forbidden to sell land plots. It is not permitted to foreigners and legal persons to buy land in Estonia, Hungary and Latvia as well, while in Belarus, Turkmenistan and Uzbekistan not only land plots but also rights to use them cannot be alienated (Hudz, 2007). Obviously, this specificity of land market in these countries is due to general attitude to private ownership of land.

It is necessary to add that there are some other restrictive points in land relations in the countries mentioned above. They are: limiting the size of land plots that can be used by one owner; the state planning of use of agricultural land; compliance with mandatory implementation of sustainable land management; zoning of land territories of the country and defining of the designated purpose of land in zones of certain regions; providing with integrity of land array and preventing land from fragmentation; monitoring of compliance with the designated purpose of certain land plots and maintenance of their fertility.

Of course, we cannot blindly follow foreign experience using it in our conditions. For example, in Ukraine there is economically an unjustified attempt to introduce mass farming like in the USA. Of course, a private farmer, like any other agricultural producers, has the right to exist and function. But it is necessary to create appropriate conditions for every phenomenon, not only of an economic nature. These conditions have not actually been created, that is why in Ukraine farming does not play such a role as it has been provided for and this situation, in its turn, greatly influences a low level of land use in agriculture. On the other hand, it is illogical and quite wrong to ignore foreign experience, but it is necessary to learn and use it, adapting to local conditions.

Conclusions

Thus, in order to improve land legislation in Ukraine with the aim of increasing efficiency of land relations as to transfer (purchase) of ownership (use or inheritance) of agriculturally used areas, taking into account foreign experience, it is reasonable to consider the following things: prevent farms and especially land array from fragmentation; concentrate on land array in order to increase the efficiency of its use; prevent the change of the designated purpose of land plot; ensure effective use of land plot according to the purpose by ensuring transfer of the ownership and use of it by a person who has appropriate qualification, experience and possibilities for effective management of this land; facilitate consolidation of population in rural areas; provide reservation of land plots for public purposes; promote the development of agriculture in less favorable regions; the trend for a gradual increase of the share of agricultural land in the state ownership in order to lease them.

To sum up, the experience of the development of land relations in foreign countries is a good guide for Ukraine to establish a system of the state regulation of this process as well as to avoid mistakes of these countries in its implementation.

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ARGUMENTATION OF ECONOMIC EFFECT FROM USE OF FOREST ECOSYSTEM SERVICES IN CASE OF LAND CONSERVATION

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Abstract

Solution of ecological problems is an urgent and extremely important task at the present stage of social-economic development of Ukraine. Unreasonably high degree of economic (mostly agricultural) reclaiming of area causes spreading and intensification of degradation processes in ecosystems. Conservation of lands, including the one carried out by means of foresting of degraded lands, is the principal way to renature environment. The article concerns an issue of land conservation in the context of ecosystem services of forests. The aim of the article is to assess the economic value of ecosystem services of forests in case of land conservation. To achieve the aim the authors developed a classification system of ecosystem services of forests according to their functional purposes; provide the calculation of prospective economic value of ecosystem services while foresting of a land plot with heavy eroded soil. The research was carried out using system, monographic and abstract-logical methods. The integral evaluation of prospective ecosystem services of forest in case of foresting of degraded land resulted in: minimum – 5. 07 thousand UAH per 1 ha in a year, maximum – 35. 91 thousand UAH per 1 ha in a year. The calculation of economic costs of ecosystem services should be applied for assessment of the economic value from protection of nature-protective areas as well as implementation of economic stimulation for land conservation.

Key words: land degradation, land conservation, ecosystem services of forests, economic estimation.

Introduction

An anthropogenic impact on environment is a topical issue in the world. Human activities are accompanied by negative ecological and social-economic consequences: exhaustion of resources, degradation and desertification of land, shoaling of rivers, deterioration of the quality of water and air, poverty, level of diseases and forced migration of population, etc. (Polovskyj, 2013; Ecologizaciya lisokorystuvannja, 2014).

As regards Ukraine, an anthropogenic impact has resulted in high agricultural reclaiming of land – 68.8% are occupied by agricultural farms, including arable land – 53.9%, forests – only 17.6%, peat land – 1.6% (Derzhemahent). It has caused land degradation: 32.1% of agricultural lands suffer from water erosion, 22.0% - from deflation (Kolmaz, 2015).

Land conservation is one of the measures to protect and recover potential of natural resources (Stoiko, 2014). In spite of the approved nature-protective programs (Concept of national ecological policy of Ukraine for the period till 2020, State focused program “Forests of Ukraine” for the period of 2010-2015), implementation of them is a rather difficult task, mostly because of the absence of an effective system of economic regulation and financing of nature-protective activities. In Ukraine, only 0.02% of degraded agricultural land are in the process of conservation (Kolmaz, 2015).

It is necessary to establish national ecological policy, securing implementation of approved nature-protective agreements and programs, in particular extension of an area of ecologically stable territories (forests, natural meadows, peat lands). The attention should be concentrated on the ecosystem services as an economic category, being a central element of modern complex system of relations between performing of natural ecosystems, activity of economic subjects and well-being of society (Mishenin, Oliinyk, 2010). The above mentioned has defined the *subject* and the *aim* of the given article, i.e. assessment of the economic value of ecosystem services of forests in case of land conservation. To achieve the aim we have set the following *tasks*: to develop characteristics of ecosystem functions of forests; to calculate prospective economic benefit of some ecosystem services from foresting of a land plot with heavy eroded soil.

Methodology of the research and materials

The following methods were used in the research: system (considering the object as an integrity of elements in combination of relations between them); monographic (studying leading experience,

leading and progressive methods to ground measures directed at the further development); abstract-logical (making theoretical generalizations and conclusions).

The authors used methods of determination of current economic value of ecosystem services of forests (Vrublevska, 2007) in case of foresting of a land plot with heavy eroded soil (13.5 ha) within the boundaries of Romaniv village council of Peremyshliany district in Lviv region.

Discussion and results

In Ukraine, the study and introduction of the concept of ecosystem services is at the initial stage, whereas foreign scientists started to investigate the issue of ecosystem services since the second half of the 20th century (Table 1).

Table 1

Definition of the notion of “ecosystem services”*

Author, year	Definition
G. C. Daily (1997)	Functions of ecosystem, being used to support and improve human life, secure existing of biological variety, produce ecosystem goods
De Groot R. S. (2002)	Potential of natural processes and components to supply goods and services, being used directly or indirectly for satisfaction of human needs; perform functions of regulation, biotopic, productive, informational
Millennium Ecosystem Assessment (2005)	Functions of ecosystems, securing economic benefits for consumers of the services and are aimed to satisfy different kinds of regulating function by means of nature
Mishenin Ye.V., Oliinyk N.V. (2010)	Economic benefits, obtained by economic subjects, using existing functions of ecosystems, as well as those, resulting from regeneration, reproduction, support, regulation of ecosystem processes, focused activity of different economic subjects of different forms of ownership and levels of hierarchical management
Zahvoiska L.D. (2013)	Economic category, taken to define contribution of ecosystem into human well-being; it is reconceptualization, determination of benefits, obtained by people and biota from ecosystems

*Completed by the authors on the basis of sources Daily, 1997; De Groot, 2002; Millennium Ecosystem Assessment, 2005; Mishenin, Oliinyk, 2010; Zahvoiska, 2013.

The interpretation of the notion of “ecosystem services” is still ambiguous and conceptual. However, it is obvious that “economic services” is considered to be an economic category and benefits from them should be economically identified.

Land conservation is one of the ways to decrease a negative anthropogenic impact on environment. The method envisages withdrawal of land from economic circulation (agricultural or industrial) to fulfill measures of recovery of soil fertility, protection of land resources and support of biological diversity of the landscape (Stoiko, 2014).

An important environment-stabilizing role of the biosphere is performed by forests, performing a unique function of absorption of carbon dioxide and supply of oxygen (The Economics of Ecosystems and Biodiversity, 2010). In addition, forests influence both microclimate and the climate of the whole planet. To determine a possible effect from foresting of degraded lands we worked out the classification of ecosystem services according to their functional purposes (Fig. 1).

It is difficult to evaluate a multiple character of forest ecosystem services. The importance of ecosystem services of forests depends on direct (forest logging, berry gathering, recreation, hunting, etc.), indirect (regulation of climate, water exchange, carbon deponation etc.) and possible (value of existing, heritage) use (Zahvoiska, 2014). Benefits obtained from the forest ecosystem are not uniformly distributed in space and time (“diffusion of ecosystem benefits”). The estimation is also complicated because of the latent (hidden) character of many benefits from ecosystem services of forests which are free (underestimated). It causes degradation of ecosystems (Sotnyk, Horobchenko, 2012).

Applying methods of determination of the current economic value of ecosystem services of forests (Vrublevska, 2007), the authors have calculated prospective economic value of some ecosystem services provided by foresting of a land plot (Table 2).

The research presents estimation of some services supplied by forests, but there are some issues which are impossible to be evaluated, e.g. esthetic, scientific, spiritual value.

Conclusions and proposals

In Ukraine degradation of land is one of the negative consequences of an anthropogenic impact. An important measure to solve the problem is to increase the area of ecology-stabilizing lands by means of land conservation, first degraded lands. Forest ecosystems are of the most environment-stabilizing importance for the biosphere.

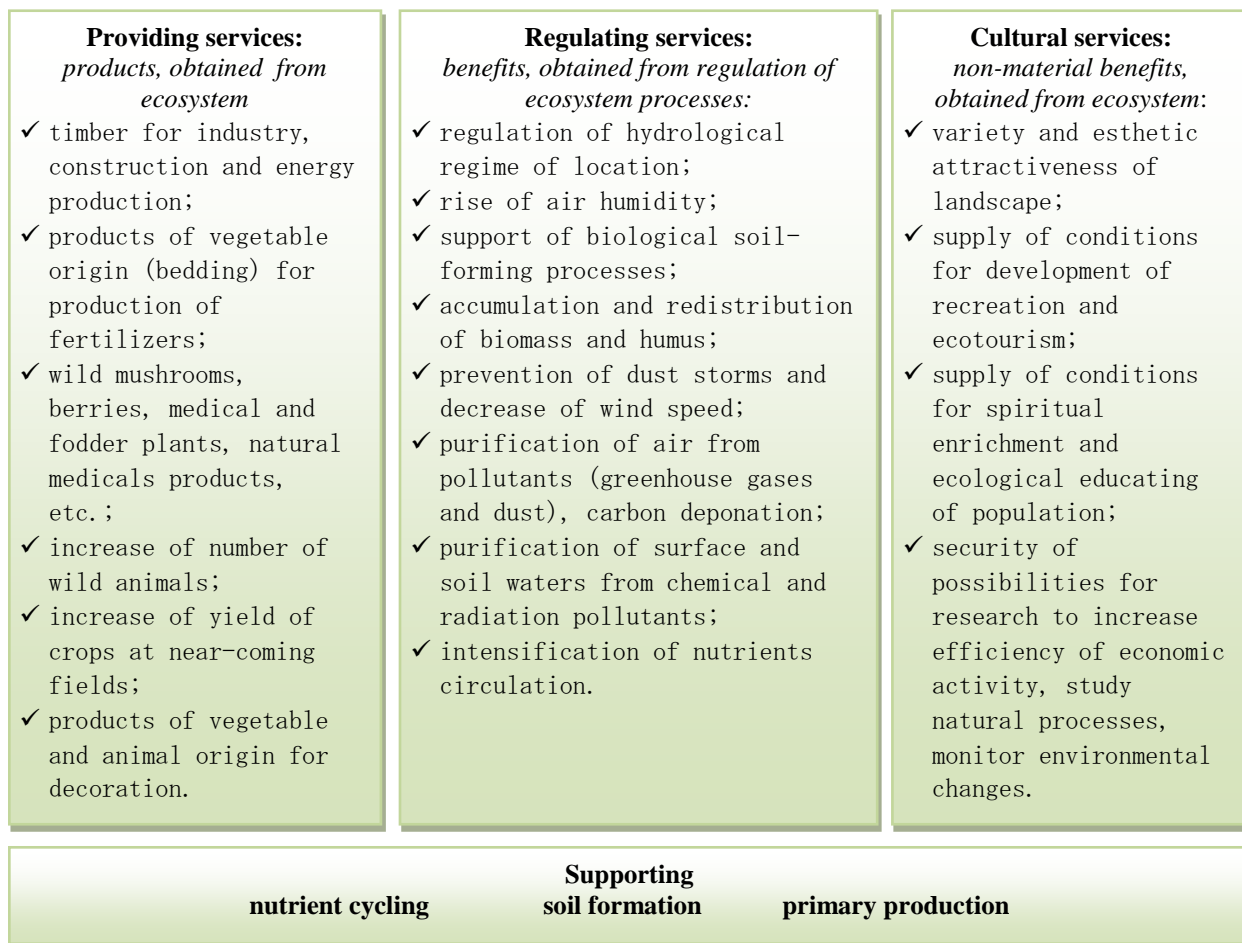


Fig. 1. Classification of ecosystem services of forests according to their functional purpose (developed by the authors on the basis of “The Economics of Ecosystems and Biodiversity, 2010; Millennium Ecosystem Assessment, 2005; Petrovysh, 2014; Mishenin, Dehtjar, 2015)

An integral appraisal of prospective ecosystem services of forest in case of foresting of land created: minimum – 5.07 thousand UAH per 1 ha in a year, maximum – 35.91 thousand UAH per 1 ha in a year. The calculation of the economic value of ecosystem services should be applied for justification of economic effect gained from existing, protection and creation of nature-protective territories, as well as implementation of economic stimulation of land conservation.

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Table 2.

Determination of prospective economic evaluation of main ecosystem services of a land plot, subjected to foresting*

Name of an ecosystem service	Formula of calculations	Notations	Value of ecosystem service per 1 ha, thou. UAH in a year (min – max)	Value of ecosystem service at forested area, thou. UAH in a year (min – max)
Economic estimation of non-wood forest vegetation	$EE_{nwf} = \sum p_i \times Q_i / S$	P_i – corrected value of readiness to pay for a unit of a resource of i-type, UAH/kg (Vrublevska, 2006); Q_i – economically available volume of a resource of i-type, kg (Vrublevska, 2006); S – area of lands, covered with forest vegetation, ha.	0.02	0.27
Economic estimation of hydrolytic impact of forest	$EE_i = N \times Q_B / S$	N – norm of payment for specialized utilization of water resources, UAH/m ³ (Cabinet of Ministers of Ukraine, 1997); Q_B – additional amount of water resources, available to be used to satisfy demand for water of population and industrial consumers, m ³ (Mikhovych, 1986); S – area of lands, covered with forest, ha.	0.14	1.89
Economic estimation of forest impact on agricultural production	$EE_{agr} = \Delta P \times S_{agr} / S$	ΔP – additional profit, obtained from 1 ha of an agricultural land plot, being under the impact of forest, UAH (fluctuates from 11 % to 15 %); S_{agr} – area of agricultural lands, being influenced by forest, ha**; S – area of lands, covered with forest, influencing an agricultural land plot, ha;	0.49 – 1.62	6.62 – 21.87
Economic estimation of benefits from carbon deponation	$EE_{cd} = M \times P$	M – mass of CO ₂ deponation to forest vegetation, in ton per 1 ha of vegetation area in a year: 1) in the first 10 years - 2,5 ton of CO ₂ are absorbed; 2) all next years – 3.5 ton of CO ₂ (Los, 2007) P – price of 1 ton of CO ₂ at the international market of quotas for discharge of greenhouse gases, UAH (5-20 € in correspondence to currency rate of the National Bank of Ukraine) (Vrublevska, 2007);	1) 0.32 – 1.25 2) 0.38 – 1.75	1) 4.32 – 16.88 2) 5.13 – 23.63
Economic estimation of benefits from recreation	$EE_r = R \times P$	R – normative recreational load for a forest plot, person-day of rest per 1 ha (Shparyk, 2006); P – readiness to pay for 1 person-day of rest, UAH (fluctuates within 3-5 UAH).	4.10 – 32.88	55.49 – 443.88
Integral value*			5.07 – 35.91	68.59 – 484.79

*Calculated by the authors according to (Vrublevska, 2007). Area of the land plot constitutes 13.5 ha with heavy eroded light loamy soil. The plot is located within the boundaries of Romaniv village council in Peremysliany district of Lviv region and is subjected to foresting, according to (Nakaz Ministerstva agrarnoi polityky ta prodovolstva Ukraine, 2013).

** the total area of favorable ecological impact of forests on surrounding lands by 40% exceeds the area of the very forests (Smoliarshuk, 2013).

CONDITIONS AND PROSPECTS OF UTILIZATION OF LAND BELONGING TO RECLAIMED FUND OF LVIV REGION UNDER CONDITIONS OF LAND RELATIONS' REFORMING

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Abstract

In the Western region of Ukraine, melioration is both of economic and social importance. The area of reclaimed lands constitutes 2.2 million ha or 24 % of the total agricultural lands in the region. Thus, melioration is of great importance for social-economic development of agro-industrial complex of the territory. Under conditions of the land reform in Ukraine, reclaimed lands were subjected to sharing and privatization causing a negative impact on efficiency of its utilization and technical conditions of the reclaimed land infrastructure. The aim of the research is to analyze conditions and suggest practical recommendations as to rise of productivity of reclaimed lands, peculiarities of land organization on privatized reclaimed areas, consolidation of shared lands within the boundaries of acting drainage systems. Timeliness of the research is connected with the issues of improvement of agricultural utilization and protection of drained lands of the region. The authors used economic-statistical, monographic and logistic methods in the research. The example of Lviv region was used to analyse conditions and problems of reclaimed lands of western regions of Ukraine under conditions of land relations' transformation. It is mentioned that only 70 % of drained areas feature satisfactory water-air regime of soil for cultivation of agricultural crops. Prospects of an increase of their utilization efficiency are connected with reconstruction of the systems consolidating common technological melioration complexes, support of both-side regulation of soil humidity.

Key words: Reclaimed lands, farm drainage system, water regime of soil, land utilization, consolidation of lands.

Introduction

The area of drained lands in Ukraine constitutes 3,307 thou. ha, including agricultural land – 90.8 %. Agricultural lands include arable land taking 55.0 % (1818.3 thou. ha), hay making area taking 17.2 % (567.1 thou. ha), pastures – 16.7 % (517.4 thou. ha). The largest area of reclaimed lands in the western regions of Ukraine, i.e. 2,200 thou. ha, accounting for 24 % of the total agricultural lands in Lviv region, takes 21.8 thou.km² or 3.6 % of the territory of Ukraine. The area of agricultural lands in the region makes up 1.2 million ha; it is 0.48 ha of agricultural land per one resident that is by 50% less than on average in Ukraine (Kozlovskiy, 2005).

Almost 856 thou. ha (about 86%) of the total area of agricultural lands belong to the reclaimed fund, i.e., over-moistened and water-logged lands. At the end of 80s of the previous century, the area of drained lands in the region amounted to 513.2 thou. ha, or 60 % of reclaimed fund. They included 490.3 thou. ha of agricultural land and 390.1 thou. ha (79 %) were drained by tile drainage (Kozlovskiy, 2005; Vashchyk, 2011).

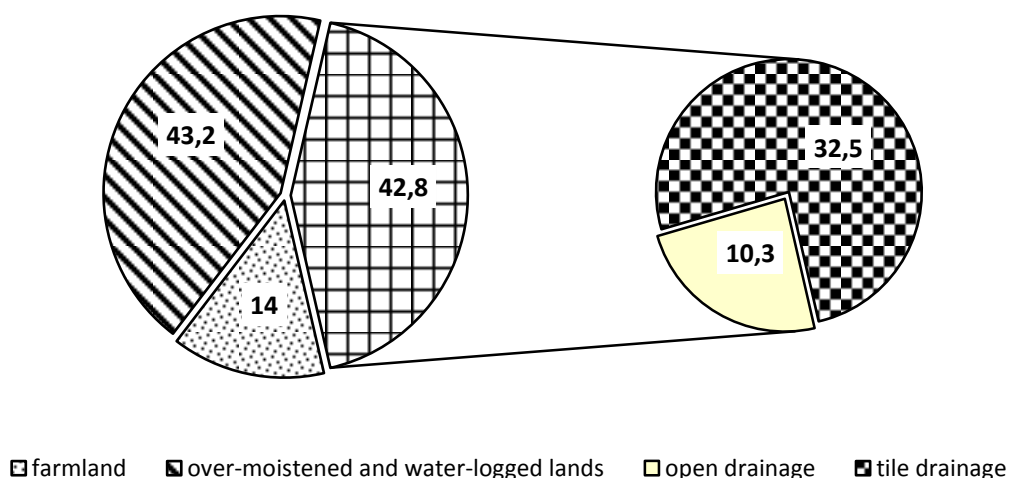


Fig 1. The proportion of land reclamation fund consisting of agricultural land in Lviv region (%)

Recently the area of arable land has decreased to 32.5 % in the structure of reclaimed lands of the region. The area under weeded layland has increased to 31.8 %, all other drained areas (35.7 %) are used as poor productive pastures and hay-making lands. Both-side regulation of water-air regime of soil is carried only in 6.4 % of reclaimed lands. Nowadays, the region calculates almost 12 thou. ha of lands with technically broken systems, which do not secure control of water regime and require complete reconstruction (Vashchuk, 2011).

According to Enactment of the Cabinet of Ministers of Ukraine № 1253, Lviv region has got above 337 thou. ha of farm melioration systems into communal property of village and settlement councils. Their worth is evaluated to be 832.1 mln UAH. Inspection of their conditions shows that reclaimed land was transferred to the balance of territorial communities, in fact formally and farm reclaimed funds have stayed without a manager and adequate maintenance. Melioration systems were not exploited in a proper way: channels are overgrown with weeds, drainage has not been cleaned from mud for 15 years, metal and concrete elements of hydrotechnical constructions are demounted and broken. One observes a considerable fall of efficiency of drained agricultural lands under such conditions.

Nowadays, technical conditions of drainage systems largely do not secure regulation of water-air regime of soil decreasing efficiency of agricultural land utilization. Obsolescence of fixed assets being on the balance of Lviv department of water economy amounts to 56 %. It proves that practically all water economic objects need to be repaired. In fact, regional office of water economy has satisfied 50-60 % of needs from the state budget only in the recent years.

That is why the average yield capacity of agricultural crops on reclaimed land of the region has decreased in the last 15 years, i.e. cereals – by 15-20 %, vegetables – by 10-17 %, technical – by 25-35 %, annual and perennial herbs – by 17-25 %.

It is necessary to support optimal water-air balance for the plants to obtain high yields of agricultural crops on drained fields. Norm of draining is a characteristic of water-air regime of soil, i.e., depth of soil waters level (SWL) optimal for a certain crop in different phases of its vegetation. According to [4], average values of draining norms are: 0.9 – 1.1 m for cereals, fodder, vegetables, pastures; 0.6 – 0.8 m for hay-making land.

Under conditions of land relations' reforming, problems of efficiency increase of utilization of reclaimed agricultural lands of Ukraine are developed in scientific works of B.I. Kozlovskiy, M.S. Bohira, A.M. Rokochynskiy, L.F. Kozhushko, M.O. Lazarchuk (Kozlovskiy, 2005; Vashchuk, 2011; Bohira, 2008; Lazarchuk, 2006). The scientists described problems of establishment of market of drained lands with consideration of technical conditions of melioration infrastructure, peculiarities of land management on reclaimed areas, increase of efficiency of agricultural melioration. At the same time there are still unsolved problems of technical exploitation of farm systems, financing of their maintenance and reconstruction. Consolidation of shared lands within the acting melioration systems is a topical issue.

Methodology of the research and materials

Rational utilization of land of the reclaimed fund of Lviv region – regions – is a planned problem, the solution of which is possible to be done under conditions of complex consideration of legal, organizational and ecologically economic issues.

The tasks of the research are to analyze current conditions of drained land utilization under conditions of reformation of an agro-industrial complex, to find out problematic issues and develop scientifically grounded ways of their solution.

The authors used materials of the State Agency of Land Resources of Ukraine, the regional department of water resources, statistical data of the State Office of Statistics of Ukraine, normative-legal acts in the research.

Economic-statistical, analytical, monographic and statistical methods were applied in the research.

Discussion and results

Water-economic and melioration complex of Lviv region covers the area of 513.2 ha of reclaimed lands, including 102 drainage systems: 98 inter-economic being in the state ownership and 4 farm ones being in communal ownership. Total number of landowners and land-users amount to 207,154 units, including:

- state agricultural enterprises - 28 units (8.8 thou. ha);
- non-state agricultural enterprises – 273 units (92.5 thou. ha);

- citizens – 206,811 units (337 thou. ha);
- among them: farming economies – 447 units (18.9 thou. ha),
- others – 42 units (74.9 thou. ha).

Technical characteristics of drainage systems in terms of districts of Lviv region are presented in Table 1.

Table 1.

Technical characteristics of drainage systems in terms of districts of Lviv region
(as of 2014, according to the data of Regional Department of Water Resources)

Districts	Area of melioration, thou. ha	Tile drainage, thou. ha	Systems with both-side regulation, thou. ha	Length of channels, km	Presence of hydrotechnical constructions, units	Protective dams, km	Pump stations
Busk	39.1	26.7	6.9	1,579.3	869	18.2	0
Horodok	27.9	23.4	1.5	805.1	644	55.2	2
Drogobych	30.0	24.6	2.3	716.6	662	123.0	3
Zhydachiv	22.4	21.1	0.2	615	502	29.8	1
Zholkva	50.3	35.4	3.4	2,025.4	1,377	38.9	0
Zolochiv	28.0	22.4	0.3	1,248.6	1,017	0.3	0
Kam'yanka-Buzka	32.7	31.2	2.0	1,409.4	882	0.0	0
Mostyska	21.4	20.4	0.0	501.2	444	12.1	0
Mykolaiv	21.9	13.9	2.0	856.8	669	123.4	2
Peremyshlyany	14.7	13.0	0.0	505.9	402	0.0	0
Pustomyty	32.9	27.1	0.0	1,199.3	647	64.2	0
Radekhiv	23.8	15.1	0.6	1,110.7	808	0.0	0
Sambir	42.1	29.2	4.6	1,310.2	758	169.5	5
Skole	0.3	0.3	0.0	6.2	15	7.6	0
Sokal	52.0	29.7	3.4	1,933.1	1,481	47.0	1
Starosambir	11.7	11.2	0.0	303.7	240	1.2	0
Stryi	25.4	22.0	0.2	706.4	637	49.9	0
Turka	0.1	0.1	0.0	12.7	12	2.4	0
Yavoriv	18.2	15.1	1.3	749.8	566	28.3	0
In Lviv region	494.9	381.9	28.7	18,444.8	13,257	771.0	14

The analysis of Table 1 shows that Lviv regional department of water resources has 18,444.8 km of channels and 4,869 km of hydrotechnical constructions on them, 14 pump stations, 771 km of dams and barrels. The balanced value of fixed melioration assets of the department amounts to 435.1 million UAH.

To utilize melioration systems in Lviv region they established ten offices of drainage systems (ODS): Buske, Drohobyske, Zhydachivske, Zhovkivske, Zolochivske, Kamianka – Buzke, Lvivske, Mostyske, Sambirskе and Sokalske. The largest are among them are: Zhovkivske, maintaining area of 68.5 thou. ha; Sambirskе – 59.9 thou. ha; Kamianka – Buzke – 56.5 thou. ha; Drohobyske – 55.8 thou. ha.

Nowadays, melioration systems are listed in the balance of two subjects of farming: inter-economy part – in the balance of regional department of water resources, farm part – in the balance of local councils. Costs required for exploitation of the farm part are absent, because financing sources required for their exploitation have not been determined. Expenses for maintenance of inter-economy part of the systems are financed from the state budget in the volume necessary for fulfillment of required repair-exploitation works.

To obtain high yields from reclaimed lands, it is necessary to make substantial capital investment for recovery of sustainable work of the farm net. Financing of the works should be made by means of regional budgets and other sources (owners and leasers of drained lands, village and settlement councils). The coordination of fulfillment of repair-exploitation works will be made by the regional department of water resources by means of district ODS.

One should note that the cooperation between local councils and district ODS is getting better. Thus, 1,080.9 thou. UAH were directed by local budgets and agricultural entrepreneurs at fulfillment of repair-exploitation works in 2013. In particular, in Sokal district – 416.1 thou. UAH, Zhovkva – 222.2 thou. UAH, Busk – 123.8 thou. UAH. Agreements were completed and melioration was carried on the area of 18.8 thou. ha.

Reformation of AIC resulted in the break of organization of territory of drained lands. Peculiarities of reclaimed lands are revealed in positioning of open drainage channels on them dividing area into separate land plots. It is necessary to organize the lands in the way that boundaries of crop rotations, fields and working plots neighbor the open channels. It is required to cultivate one or several agricultural crops in each field with almost similar requirements to water-air regime of soil. In the fields, where cultivated crops have different requirements as to water regime, soil humidity should be regulated individually, depending on the needs of crops.

It is necessary to introduce a system of measures directed at improvement of ecology-melioration conditions of drained soils, including:

- withdrawal of degraded and poor productive lands out of agriculture and conservation of them;
- utilization of peat soil in grass rotation applying annual and perennial herbs;
- decrease of intensity of principal soil cultivation;
- renaturing of former drained lands according to early developed projects and required financing (Lviv Main Department of Land Resources 2003).

Nowadays, agricultural producers on reclaimed lands are differentiated and financially weak. According to the article 26 of the Land Code of Ukraine, land plots obtained by citizens due to land privatization which contain operating melioration systems should be used commonly on the basis of agreements. A way out of the situation is to establish societies (unities) of owners of reclaimed lands. The foreign experience of cooperation of small producers envisages establishment of agricultural cooperatives, associations of land-users to carry common construction and exploitation of melioration systems. Such organization of work helps to join costs of landowners for financing of exploitation works and measures of farm systems.

The principal document regulating utilization and protection of lands at the level of village and district councils for the prospect of 15 years include schemes of land organization and technical-economic argumentation and protection of land. On the basis of the approved schemes of land organization, they complete documents of land management, planning and financing, which cover:

- projects of land organization as to establishment and arrangement of the existing land economies;
- projects of reconstruction of the existing drainage systems with consideration of land economies (cooperatives, communities), established on reclaimed lands as well as new melioration construction;
- working projects as to conservation of degraded and poor productive lands, recultivation of deteriorated lands, protection of soil from dumping, underflood and water erosion.

Projects of land organization should be developed on landscape-ecological basis planning measures as to liquidation of drawbacks in land organization, including the ones of reclaimed lands, secure rational utilization and protection of land and water resources.

To solve a problem of improvement of technical conditions, security of sustainable performance of farm melioration systems, it is urgent to develop a regional program of renovation and maintenance of farm melioration net, being in communal ownership of territorial communities of Lviv region.

The priority tasks of the program are the following:

- security of persistent regulation of water-air regime of land with farm melioration systems;
- restarting of operation of melioration systems, being in unsatisfactory conditions, but still possessing resources' potential;
- protection and recovery of soil fertility on melioration systems by means of agro-melioration measures (input of organic and mineral fertilizers, liming);
- consolidation of lands within the boundaries of farm melioration systems, arrangements of land relations at reformed agricultural enterprises and farms;
- improvement of ecological-melioration conditions of lands;
- protection of settlements and agricultural lands from harmful effect of water.

At the first stage of the program fulfillment it is necessary to cut out trees, bushes and water vegetation in melioration channels and clean them from mud. The works will secure operative export of excess water in case of floods to avoid dumping and underflood of reclaimed lands.

The repair of hydrotechnical constructions in channels and close drainage makes conditions for spring field works optimal, regulate water-air regime of soil and moisten agricultural crops in dry periods of vegetation.

Along with the above mentioned works, it is necessary to carry out organizational measures as to consolidation of drained lands. Melioration systems make a joined complex, which is not able to operate if divided into separate parts. Thus, landowners and land-users should cooperate within the boundaries of farm melioration systems.

Conclusions

To improve utilization of land with farm melioration net one should immediately:

- develop and approve the program of renovation and maintenance of farm melioration net being in communal ownership of territorial communities of villages and towns of Lviv region. The department of agro-industrial development of district state administrations, district and inter-district departments of water economy should be attracted to development of the program;
- attract funding of regional and district budgets, village and settlement councils as well as funding of land-users and landowners of reclaimed lands for financing of the regional program;
- carry out inventory procedures of farm melioration systems, determine the degree of obsolescence and resource potential of each system;
- make reconstruction and re-equipment of working systems, supply conditions for both-side regulation of water regime of soils;
- carry out in terms of the program, annual deep hoeing of lands in the area of 60 thou. ha, liming of acid soil in the area of 5.5 thou. ha;
- supply conditions for consolidation of drained lands to achieve more effective utilization of land and water resources within the boundaries of melioration systems.

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GLOBAL NAVIGATION SATELLITE SYSTEMS TECHNICAL SOLUTIONS DEVELOPMENTS OF FARMLAND PROCESSING IN LATVIA

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Abstract

Global Navigation Satellite System (GNSS) services in Latvia nowadays provide not only for a variety of navigation and surveying needs, but also they are used in agricultural production. The time period when satellite navigation systems equipment and services in agricultural businesses appeared in Latvia and were treated as objects of interest and research has passed. GNSS equipment and enabling modules are purchased, installed and used in agricultural equipment extending their capabilities. A growing number of entrepreneurs provide for this service segment. In the publication of 2014, the authors pointed out that a preparatory and investigation phase in using precision farming systems (including GNSS technology related to them) in Latvia has come to an end transforming into massive practical implementation in the process of agricultural business. The analysis of the obtained information confirmed that during the last year further satellite navigation technology usage in agricultural machinery has grown from simple and approximate level usage to high accuracy and stability navigation services. Growth dynamics and its further development forecasted earlier by the authors coincided with the last year's actual development indicators of a stable and growing demand for global navigation system services for farming machinery and technical solutions for their user segment.

The aim of the article is to justify the forecast expressed in the last year's publication regarding the increase of the use of precision farming systems thus confirming the fact that their application has moved from a research phase to massive practical implementation and operation in agricultural production.

Keywords: precision farming systems, global positioning systems, Geoinformation, real-time adjustments.

Introduction

During the time period of 2011 - 2013 the authors performed the research activities on technical solutions of farmland processing elements using global navigation satellite systems in Latvia, the results of which were presented in the article "Global Navigation Satellite System as farmland processing elements Latvian technical solutions" (Engineering for Rural ..., 2014). The authors came to the conclusion that at the end of the last century and the beginning of this century in the world's developed countries, agricultural technology development direction, known as precision farming systems (Celms, Ratkevics, Baumanė, 2014), has become increasingly popular in agriculture. With this we understand effective field management technology systems (EASY) which are based on four components: 1. the management of tractors, harvesters and similar units as well as operation optimization techniques directly from the driver's cab; 2. Increased productivity and efficiency of resource use; 3. Agro technologic process control on the field; 4. Information technology support to find better technology and business options for agricultural business (CLAAS Braukšanas optimizēšana, 2012).

In order to successfully ensure effective realization of field management technology systems' (EASY) main components, agricultural holdings form local geographic information systems (GIS) whose essential component is computerized spatial (geographical) oriented information system of soil properties research materials focused on resource-saving soil processing technology use opportunities. Effective field management technologies envisage a global navigation system (GNSS) comprehensive application including global positioning system (GPS) belonging to this group of systems (Celms, Ratkevics, Baumanė, 2014). Along with navigation and positioning systems various sensor systems and technology software options are used in both cases. It must be recognized that development and usage of the GNSS systems with the possibilities of attached sensors together with information technology and software development pace continues to significantly outpace the development of agronomic thought and practices which are currently unable to follow synchronously the new technological advancement and possibilities.

It was found that the introduction of the latest technologies in Latvia is negatively affected by the limited intellectual agro service support by this meaning trained specialists (Blackmore, Moore, 1999). The lack of agro appropriate specialist training did not contribute application of new technologies - even in cases when equipment was available for local farmers. However, researchers of the Latvia

University of Agriculture carried out the research in this direction already in 2004 (Lapiņš, Cers, Putniece, 2013).

Besides, the studies carried out in Latvia to date give evidence that:

- effective field management systems increase productivity with the working element accurate and repeated motion in parallel routes by managing driving steering systems.
- Professional and properly organized GNSS - GPS application in parallel management systems of tractors and harvesters is a prerequisite for the implementation of resource-saving technologies.
- When working with several harvesters in one farm, it is necessary to use compatible, adjusted, validated navigation systems and programs (such as "GPS Pilot" and "Auto Pilot", "Agrocom Net NG" - "Agrocom Map" (Ess, Morgan, Parsons, 2012).

The available sources of literature and research publications point out that information of harvest and farmland treatment results is required for at least five years' period, which is not a one-time measurement or observation, because the data-matching quality from different years is very important to determine stable agricultural land areas and transform them accordingly (Celms, Ratkevics, Baumanė, 2014).

To obtain more reliable results in addition to the direct measurement of the formation of the yield, it is necessary to apply indirect distance measurements associated with aerophotogrammetry measurements, remote sensing with digital image analysis and different light spectrum sensor measurements. These technological solutions demand specific knowledge and experience in organizing the collection and processing of the necessary information and matching it with the data obtained either earlier or from other systems. It is required to have the knowledge of GNSS application options and conditions for obtaining the position and positioned accuracy, data matching/transformation rules (Celms, Ratkevics, Baumanė, 2014). As was noted in the previous study, "In spite of the short history of development of precision farmland in Latvia, such services niche offer in recent years is not empty, there are entrepreneurs who several years takes and develops various technological processes of production and transport - up segments using directly GNSS and related opportunities". The company "CLAAS" operates in farming business providing implementation of the guaranteed compatibility program 'Telemetric' systems and service. The company provides control of technical systems and organize the logistics in large farms and partly provides security guards for the equipment (CLAAS Braukšanas optimizēšana, 2012).

The specialized agricultural services company "iAgro.lv" was formed in 2013 and expanded its activities in 2014 dealing with navigation and sensor package installation and service for agricultural machinery.

The publication of 2014 set the aim to confirm that a preparatory and investigation phase in using precision farming systems including GNSS technology related to them in Latvia has come to an end transforming into massive practical implementation in the process of agricultural business. The obtained results of the study showed that in recent years the use of modern GNSS solution volumes in Latvia for agricultural equipment and technology has increased and GNSS correction signal permanent station network "LatPos" can be regarded as an essential source of information for the identification of this growth in Latvia, especially with the respect to the exact user data segment. Using selected and keying the information source data for the period from 2011 to 2013 inclusive, it was determined that the period of GNSS service users - such as agricultural land processing a number of companies experiencing rapid growth. The aim of the article is to justify the forecast expressed in the last year's publication regarding the increase of the use of precision farming systems thus confirming the fact that their application has moved from a research phase to massive practical implementation and operation in agricultural production (Celms, Ratkevics, Baumanė, 2014).

The following tasks were set to achieve the aim:

1. Make sure that there was not the identification source of alternative and reliable GNSS precise data users for agricultural businesses during the 2014 in Latvia;
2. By using the selected information source, to obtain and systematize information on the precise GNSS system users in Latvian agricultural businesses in 2014 and identify the growth rate of users;
3. In framework of the research aim, to find out the growth dynamics of the number of users and used GNSS services during the period up to January 2015 and a compare it with the forecasted growth of the previous study;

The research findings proved that in 2014 there was a rapid increase in the demand for accurate global navigation system services in farmland processing equipment and technical solutions in the user

segment. The source of information continues to show sufficient effectiveness and availability, and currently there is not an effective substitute to it.

Materials and methods

In order to assess the situation of the exact farmland processing system implementation and its results, the authors continued to examine performance of the previously identified GNSS real-time adjustments station system "LatPos" - as an information source of the number and qualitative date of active users of precision farming systems of numerical and qualitative indicators of information sources. At the same time, using all possible sources of information (surveys with equipment suppliers, service users and the community members, exploring public sources of information), taking into account the world practice recommendations, alternative precise data delivery systems' offers and real fixed cases in Latvia were searched and examined.

The selection and analysis of options was based on equivalent systems which offer GNSS / GPS systems precision of application for agricultural land with accuracy not less than 1 meter (actually examining the position accuracy of 0.1m). Others are not valid to be included among precision farming systems according to the available international literature on the criteria (Celms, Ratkevics, Baumanė, 2014). To verify the precision farming technology user growth during 2014, the information that showed to convincing signs about system users was selected from the available DGPS system "LatPos" data archive and customer service information system – they were agricultural businesses where the intended usage and the facts were associated with corresponding agricultural machinery operation. The companies - which required services as precision farming machinery distributors and maintenance service operators were searched and identified. The results led to the accumulation of statistical information, selection and systematization. The available users were clearly identifiable as customers and users of precision agriculture, as well as those who ordered DGPS services for more than one unit of agricultural machinery. The analysis of the data was based on the results of the previous years and singled out those companies, which registered as precision farming equipment users in 2014 and which had former customer commitments.

The obtained information was arranged according to years, the previous years were checked and the analysis of the information performed resulting in the table of the number of users and use, the diagram of the growth dynamics and dynamics characteristics for the time period of 2011 - 2014 year. In conclusion, a comparison between the forecast for 2014 and the newly acquired actual growth was performed to find out convincing answers to tasks of the study.

Results and discussion

The precision farming system requirements for the determination of spatial coordinates accuracies require that the accuracy not less than 1 meter, but in practice it is 0.1 meters accuracy approximation. Other systems, according to the criteria mentioned in the international literature, are not added to the precision farming systems. The projected accuracy certainty today is only relevant in the civil application systems, which are capable of using GNSS / GPS data that are corrected online by DGPS (differential GPS correction) data in real time. Today two basic DGPS data extraction options - individual systems and network systems solutions are found in practice. In previous study it was found out that the developed countries' practice today is dominated by a network solution (collective) DGPS data acquisition systems use but individual systems' users in agriculture are not considered to be significant. The assessment of the situation in Latvia in 2013 showed that network solution DGPS - national base station network "LatPos" functions in Latvia without serious competition (Celms, Ratkevics, Baumanė, 2014).

When the precise field management technologies research was initiated in Latvia in 2004, the cereal harvester "CLAAS Lexion 420" was used to form the first yield map in SIA "Vecauce", Ltd, in Glūdaini field (Lapins et.al. 2008) (Dinaburga, 2011). Using a specially equipped harvester, the location in the field was fixed with the accuracy of 1 meter, which was obtained by combining the signals of GPS and DGPS (differential GPS correction) - taking an individual data correction system because the collective DGPS at this time did not work in the country. As a result the harvest map with different productivity levels at intervals depending on the grain capacity in certain parts of the area was obtained relatively characterizing the soil fertility of certain areas. The yield map provided the opportunity to characterize the level of yield from a variety of field plots (Lapins et.al. 2008; Lapins et.la. 2012; Dinaburga et.al. 2008; Lapins et.al. 2011; Moore, 1997). Such maps created opportunities to assess the real situation in certain fields, and even parts of the harvest to identify influencing factors

(Dinaburga, 2011). It should be noted that in 200, the researchers of Latvia were forced to buy additionally (without a sensor kit and agricultural machines) and operate a special, relatively expensive individual, professional GPS permanent station set of systems management software, data transmission system and have additional costs of regular maintenance activities, calibration and the necessity to ask the help of highly qualified specialists. The result showed that in Latvia, like it is in developed countries, such individual equipment users in agriculture are not considered to be significant users. Individual system application is also difficult to control and therefore the study of individual systems was not further considered.

The practice of network solutions (collective) DGPS data acquisition system for use practices dominate in the developed countries, often these collective systems are built and maintained by the state. In the world there are cases where non-governmental bodies or several keepers (even competitors) maintain a collective system. It should be remembered that the collective system users' benefits are reinforced by the structural characteristics - when a large area is covered with DGPS station network, which provides a guarantee of high-precision data acquisition and covers a large area. For individual stations, if the distance from DGPS stations increases, then the positioning accuracy is reduced (Celms, Ratkevics, Baumane, 2014).

Repeating the identification process of a competing precise DGPS service providers in Latvia, it was confirmed that the first national DGPS base station network "LatPos" was established in 2005 providing today all the coverage of the territory with high-precision adjustment data and position coordinates accuracy in real-time with more than 1 dm. Later a similar station network for city of Riga - "EUPOS" was set up. In recent years, the company "Trimble" is trying to realize the precise DGPS services in the virtual network. Furthermore, the information on the installment of an individual correction station by the companies "Topcon" and "Hadnet invest" was found providing separate correction station installation for the needs of 5 farms in 2013 as well as on the expansion of base station network "Hadnet". The analysis of the obtained information led to the conclusion that only one system continues to dominate and grow as a serious DGPS signal supply structure in precision agriculture. It is the government established DGPS system network "LatPos", which is the only guaranteed accurate data covering system for the whole territory (Celms, Ratkevics, Baumane, 2014). The system's customers' base has even more in one year's time on the basis of users which used applications installed as individual stations holders and the "Trimble" virtual network users. The station network of the city of Riga "EUPOS" continues to maintain its limited service area, limited to Riga and its surroundings and is not therefore widely used in agriculture and not competitive. "Trimble" virtual network of practical use has not developed in that direction during the year. Even more, agricultural navigation systems supplier and service provider in Latvia "i Agro" has become the largest customer of "LatPos" system by means of which the number of subscribers during the year increased by 25 connections. LatPos customer base has also added virtually all agricultural entrepreneurs, those who by 2013 were individual DGPS stations' users.

So, once again, we can conclude that "LatPos" system network has no alternative in the precision farming sector covering the entire territory of the country by providing real-time measurement accuracy of more than 1 meter (Celms, Ratkevics, Baumane, 2014).

The DGPS service users' information obtained from "LatPos" regarding the precision farming systems was included in the table, which contains both the 2014 forecast and the actual figures achieved this year (Table 1).

Table 1

DGPS “LatPos” services for precision agriculture system users

	User of system	Years				
		2011.	2012.	2013.	2014. prognos	2014. Realy
1	„Cors Group Agrospeed u.c.”	5	5	5	5	5
2	„Hofer&Pautz”	2	2	2	2	2
3	„Kone Kesko Riga”		1	1	1	2
4	„Agrikula”		2	2	2	2
5	„Tērvete” (iAgro)			1	1	3
6	z/s „Brasliņi” (iAgro)			1	1	2
7	z/s „Katlauki” (iAgro)			1	1	2
8	z/s „Ķauli”			1	1	1
9	z/s „Ķīveļi”			1	1	1
10	z/s „Klagāti” (iAgro)			1	1	2
11	z/s „Zariņi” (iAgro)			2	2	2
12	iAgro.lv - equipment supplier				8	25
13	Second equipment supplier				1	1
	new users/connections prognosis 2014				9/3	
	Other real users with iAgro DGPS connections support					11
Summary: users/connections		2/7	4/10	11/18	22/30	24/50

The analysis of the information shown in the table confirms the volume growth dynamics of the accurate farming system users (see Fig. 1.) in relation to 2014 forecast and according to the real achievements of 2014 (see Fig. 2.).

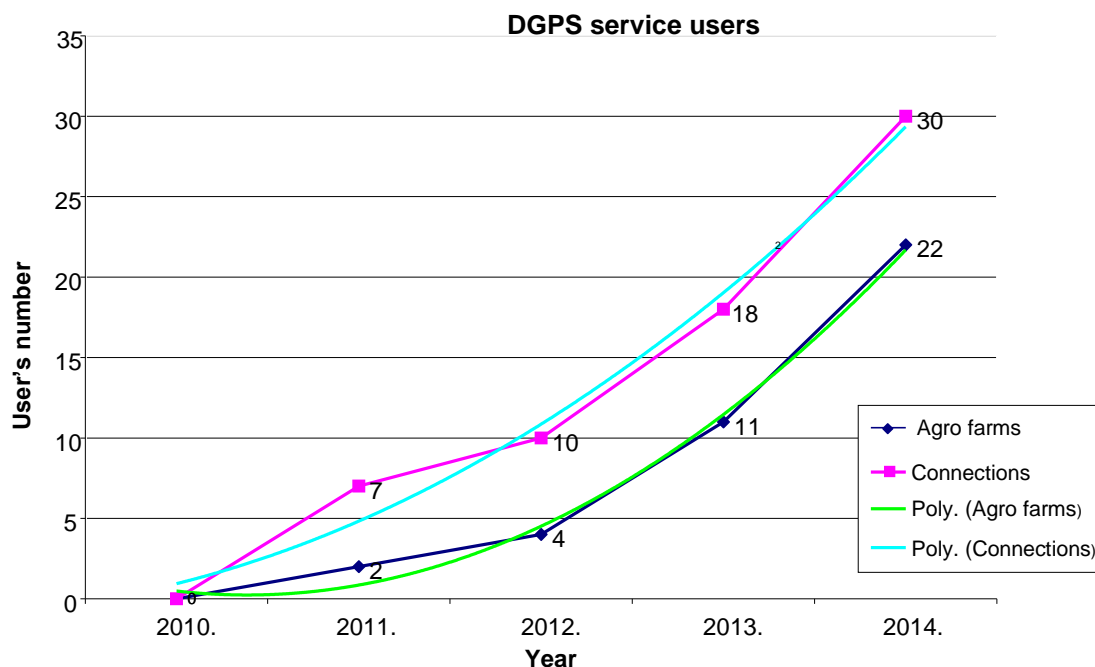


Fig.1. Accurate farming systems users and forecast to 2014.

DGPS service users

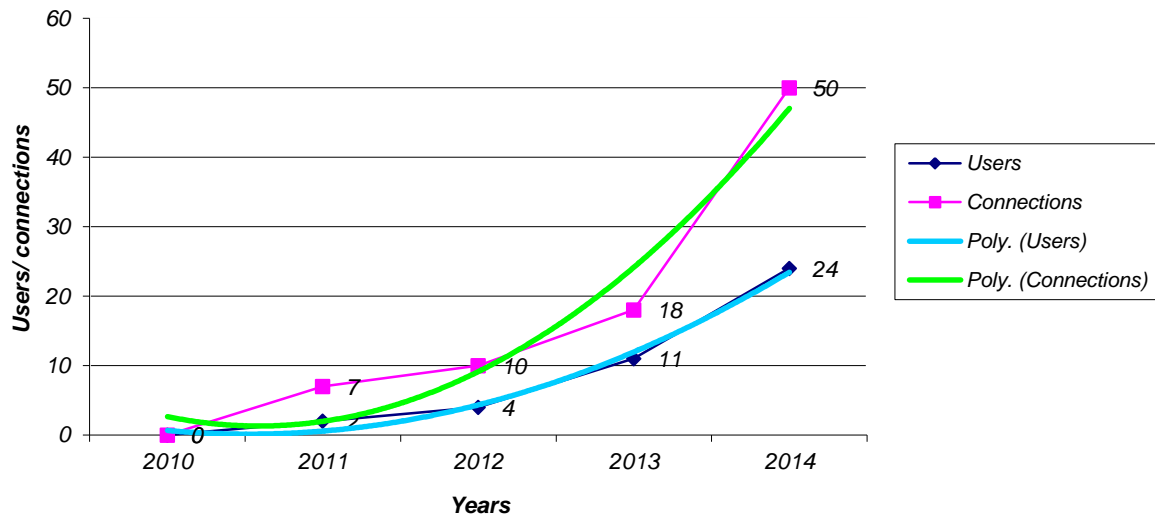


Fig. 2. Accurate farming systems user's realities to January 2015.

The differences are identified only in the fact that forecast in 2014 proved to be considerably modest and suggested by 22 users with 30 connections less than it has proved in practice with 24 users and 50 connections, which can clearly be considered that the numbers from 2011 year approximately doubled over the previous year. The assumption was also proved that the number of registered customers (Agro farms) is less than the number of connections. During the last year the number of connections increased for both existing customers and new subscribers - who have more than one service connection. As a new trend can be considered the fact that the equipment supply and service contractors (iAgro) also enters as a mediator among service functions "LatPos" and agro firms - as the ultimate beneficiaries. This is evidenced by the fact that the company ordered 25 steady working DGPS connections (half of the country's existing connections) - but for the company needs regularly no more than 2 connections are used (advertising and equipment installation needs), the other connections are operated on machinery supplied to customers. This situation is somewhat complicated by determination of end users - the number of farmers with a connection not changing the total amount of connection. Taking into account the fact that at least two more DGPS connections have been requested by the next agricultural equipment distribution businesses - one can foresee an even sharper increase in the number of users in the next few years. According to various calculations of experts and comparisons with the experience of the developed countries about 300 agricultural entrepreneurs could become relevant users of precise agricultural systems. By contrast, if we consider that potential users are all companies with 500 ha or more of registered agricultural land, then there are 491 potential users in Latvia, and the large number of users can also have much smaller land areas.

The previously predicted forecast is justified that even with a negative impact of different levels of economic and other crises, a common path will continue and will rely heavily on numbers of businessmen and professionals, their qualifications - who will be able to offer the adequate quality and the scope of services to farmers. It is also possible to confirm the findings that precision farming systems' introduction in Latvian agriculture is no longer considered an exclusive phenomenon which only large and rich holdings of developed countries can afford, even here they are becoming an everyday reality. The amount of precision farming systems using agricultural business identified in the research at the end of 2014 could be regarded as the beginning of the introduction to precision farming and further increase in the dynamics of the system implementation could be expected for several years. In addition, an assumption has been clarified that "LatPos" system data about users and their real-world activities is a great advantage - they are available in one place and are accurate last day data without the need for time-consuming surveys, questionnaires, declaration, follow-ups, official reports according to different standards. The source of information almost completely eliminates the subjective factors of human influence on the results (Celms, Ratkevics, Baumane, 2014). System features also allows for a much broader analysis of the material extraction of DGPS system practical applications in agriculture, the aspects of the use and users.

Conclusion

The obtained information and the results of the research with confidence confirm the growth dynamics of the precise GNSS systems' users in the agricultural sector in the country and support the hypothesis that the current period of development of the GNSS-related precision farming systems implementation and use presents systematically increasing dynamics in Latvia.

The dynamics of growth shows that an initial stage of preparation and research in precision farming system use in relation to GNSS technology by agricultural businesses and the practical implementation process in Latvia have been completed.

The forecast expressed in the last year's publication regarding the increase of the use of precision farming systems has been justified thus confirming the fact that their application has moved from a research phase to massive practical implementation and operation in agricultural production.

Latvian DGPS system "LatPos" nowadays can be considered as an alternative, almost perfect and wholesome scientific and statistical source of information on the Global Navigation Satellite System for precision farming in the agricultural sector offering simple, fast and timely information necessary prospectively.

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IMPROVEMENT OF THE PROCEDURE OF DIVISION OF RENTED LAND PARCELS IN UKRAINE

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Abstract

The current situation in land leasing in Ukraine is analyzed, when a tenant of a land parcel with immovable property is sold in part, which causes the following controversy: the land parcel in someone's lease has buildings or constructions owned by another physical or legal person (other than the tenant). The interested party wastes a lot of time on resolving this controversial situation with the existing procedures in Ukraine. This problem is not always solved professionally because of the lack of sellers' and buyers' knowledge of specific features of land management and geodesy. Three main variants of mutual location of the seller's and the buyer's buildings and constructions are defined, which determines the possibility of dividing a land parcel. Recommendations on the improvement of the procedure and normative legal acts of Ukraine concerning the issue are developed, aimed at significant acceleration of signing and registering new lease agreements.

Keywords: land parcel, land parcel division, technical documentation on land management, lease agreement, tenant.

Introduction

According to the Land Code of Ukraine (1990, 2001), Civil Code of Ukraine (2003) and the law of Ukraine "On Land Lease" (1998) a large number of businesses and individuals received land parcels for rent for the construction of different objects as well as for operation of existing property. With time, circumstances change and land parcel tenants – owners of real estate, sell part of their property. Sometime the whole area of rented land parcel cannot be rationally used or no new building can be constructed to expand the activities. In this case, the tenants want to get rid of the part of leased land parcel and new property owners want to formalize documents on rent of the relevant part of the main land parcel. At first glance, all this can be easily solved. However, procedural steps are rather complicated and it does not take less than during the first time privatization of the land parcel.

Part 2 of Article 377 of the Civil Code of Ukraine (2003) states that "The size and cadastre number of land parcel, title transfer due to the transfer of ownership of a house, building or structure are essential terms of the contract that provides for the acquisition of ownership rights of these items (except for apartment buildings)". This article is also violated if the seller hesitates or does not want to document a part of the land, especially when they have the state act for perpetual use of land. Besides, a buyer cannot register only part of the land parcel in the state land cadastre and registry because there is lease contract or the act of the permanent use of the whole land parcel. In addition, it is impossible for a person to have two different rights on one land parcel. The new owner of the building can apply to the court, but it is also a complex and long procedure.

From the above it is clear that the improvements in the procedure for signing and registering of new lease contracts are important for businesses and individuals, as well as for the land reform in Ukraine as a whole. Such propositions will improve the social conditions of our society.

Research methodology and materials

The division of land parcels is the subject of many legal acts of Ukraine (Land Code of Ukraine (2001), Civil Code of Ukraine (2003), the law of Ukraine "On Land Lease" (1998), the law of Ukraine "On Land Management" (2003) and others, some scientific and academic papers by famous scientists of our country have analyzed it, but the detailed study of this issue is not found except for the research paper of Riabchii V.A., Riabchii V.V., 2014.

Article 31 of the Law of Ukraine "On Land Lease" (1998) defines the cases of termination of the lease, however, there are no cases of transfer of ownership of the property.

The aim of the article is the development of proposals for improving the procedure for signing and registering new lease contracts in cases when the landholder does not sell whole real estate, but only part of it.

First we introduce the following terminology. The main land parcel is a land parcel on which the real property of the main tenant (landholder) is situated. The main tenant is a seller of the property. The buyer of the property is the purchaser of the right to lease (future tenant) on the part of the main land parcel.

In most cases, the seller at the time of the transaction or after its conclusion gives the buyer a notarized consent of withdrawal of the land parcel with specified area of land parcel. Everything seems to be fine, but at best the boundary during the division of a land parcel is firstly established visually. So after establishing a geodetic boundary there must be discrepancies in the area specified in the agreement and it is good if there is space to change (shift) this boundary.

A thoughtful reader can fairly argue here: "What is the division of land parcel? Land parcel is not in ownership but in use! If it were his property, then it would be a different matter, divide as you want". Definitely.

According to Article 56 of the Law of Ukraine "On Land Management" (2003) there must be the consent of the owner of land on the division. Moreover, these land parcels have been registered as state or municipal property since the beginning of 2013. But in reality the land parcels have always been divided and it used to be called as determination of the order of use of land. In addition, it may be that land parcel, depending on the location of buildings is indivisible in general, however, neither the seller nor the buyer knows about it. Therefore, the following steps are proposed: the seller must order a draft of land-management division of a land parcel from the land surveying company, so that the work can be continued with the use of it.

After drafting the division of a land parcel, the seller and the buyer can address the notary to develop the agreement and authorize the project. Project division of a land parcel is certified by a notary, because it indicates the boundary of the division of the main land parcel and areas of parts obtained as a result of its division. After finalizing the transaction at the notary, both the seller and the buyer order technical documents from the land surveying company on land management for the division of land for the seller and the technical documentation of land use to install (restore) the boundaries of land parcel for the buyer. However, it is necessary to obtain the consent of an appropriate council for the division of a land parcel and the land management documentation. It is also necessary to set the terms on which lease contracts will be signed between the seller and buyer.

Discussion and results

To solve the issues, the following should be considered. In fact, part of the property from the seller is alienated without anyone's permission (consent), but only by mutual agreement. In accordance with Part 2 of Article 377 of the Civil Code of Ukraine (2003), the right to use land transfers with the sale. Obtaining a permission or consent to perform these operations on land management may take long (a few months or longer). And then there is a conflict between the seller and the buyer: "Who has to pay the rent?" The tenant does not want to pay rent for the entire (main) land parcel, a future tenant has no reason to pay the rent. Ironically, both the buyer and the seller are right.

Thus the need appears to establish such a procedure that would meet regulatory legal acts of Ukraine and, at the same time, significantly reduce the period during which the seller and the buyer are able to establish the right to lease the relevant parts of the main land parcel.

Justification of division of land parcel

From the practical experience, we point out individual customers' considerations regarding authorization or consent for the division of land parcels. Which state legal acts of Ukraine and who can prohibit the rightful owner of property renting a land parcel from selling or donating part of it, rather than the whole? The answer is: "Nobody!". And then the seller and the buyer ask unnecessary questions: "Why then is there a necessity of obtaining a permit if land parcel can be divided or partially divided?" No comments.

In addition, there are strong arguments for not obtaining this permit, namely the boundaries of a land parcel are approved and adopted, and there is signed and valid lease contract on the main land parcel. Two new land parcels do not go beyond the outer boundaries of the main land parcel. The purpose of

all buildings of the main tenant has not changed. And the terms of new lease contracts of parts of the main land parcel shall not exceed the term of the lease remaining for the main land parcel.

But there is a rule and it must be followed. Therefore, the main tenant and the purchaser of the right to lease must file a petition to the chairman of the relevant Council to provide guidance to the appropriate services to perform the required operation for the conclusion of the lease. The council needs to know about the changes on the land parcel granted on lease, which have already occurred and are only planned.

For this, technical documents on land management for the division of a land parcel are developed for the seller and the technical documentation of land management to establish the boundaries of the land parcel for the buyer. Developed technical documentation of the project on land management division must be sent to departments of State Land Agency in cities to check and determine cadastral numbers. After obtaining the extracts from the State Land Cadastre, relevant documentation is forwarded to the City Council to draft a decision. The decision must state that the lease on the main land parcel is terminated by agreement of the parties and new land parcels become the property of the respective council, and they must be registered by this Council and tenants, and the new lease contracts must be signed.

Consequently, it is necessary to make amendments to point "e" of Article 56 of the Law of Ukraine "On Land Management" (2003), namely, the expression in brackets as follows: "except for the cases of the division of land parcel concerning the acquisition of ownership of a residential house or part of it, and non-residential buildings for various purposes situated on it".

The necessary documents for signing a lease agreement:

Now it is necessary to consider what documents are necessary for the lease. Under Article 15 of the Law of Ukraine "On Land Lease" (1998) "... an integral part of the land lease agreement is:

- the plan or scheme of a land parcel that is leased;
- the cadastral plan of the land parcel with the mapping restrictions (encumbrances) in its use and prescribed land servitudes;
- the act defining the boundaries of a land parcel;
- the act of acceptance and transfer of leased facility;
- the project of land allotment if it is developed under the law".

If this list is compared to the list set out in Article 56 of the Law of Ukraine "On Land Management" (2003), we can see that even in case of presence of all documents, the lease cannot be concluded, as no act of defining the boundaries of land parcel; and there should be a project of land management on land allotment. In addition, the technical documentation of land management for the division of land parcel is prepared by order of the main tenant of land parcel. It is enough to get an act of acceptance and transfer of boundaries marks. And for the purchaser of the right to lease it is necessary to have the act of acceptance and transfer of boundaries marks on storage for all boundaries of the newly formed land parcel, not just on the boundary of division.

Documents on land management

Let us find out what documentation should be on land management and what it must contain for the purchaser of the right to lease. Obviously, this documentation on land management for the division of a land parcel should be supplemented by the act of establishment (updating) of the boundaries of the land parcel. This act is signed only by the purchaser and lease rights tenant. There should be developed technical documentation on land management according to applicable laws and regulations of Ukraine, except for the coordination of boundaries of the land with the owners or users of adjacent land parcels, and as already noted, without obtaining permission. Once the main land parcel boundaries were agreed with the main tenant and they have not changed and the purpose of buildings has not changed as well (Riabchii, Riabchii, 2014). In addition, the project of land parcel division should be added to this technical documentation of land management.

Variants of division of a land parcel:

The possible cases (options) of the division of the main land parcels should be considered:

1. The best option is when buildings stand apart. There are two separate driveways and walkways to both owners' buildings, no common parts of buildings and structures. In this case, no comment, and the basic land parcel can be called "divisible".
2. There are no passages in site conditions of placement of buildings on the land, and they cannot be built. In this case, it is offered to divide the basic land parcel into three parts. Two separate land parcels are allocated for the seller and buyer, while the third one is common – in their joint lease for passage, walk and more. In this case, this basic land parcel might be called "partly divisible".
3. One cannot perform the division of land parcel by mutual arrangement of buildings, structures. For example, the first floor belongs to the seller, and the second – to the buyer. In this case, the only possibility is a joint lease. The rental payment for the land in common use is proportional to the parts (areas) of real property owned by the seller and the buyer. This basic land parcel's title is "indivisible".

A list of the main documents for the project of land parcel division:

Now we will define the list of main documents in the division project of land parcel and their functions.

1. A copy of the lease contract to the main land parcel will testify that the lease is valid (validity has not expired) and customer ordering the division is really a lessee (the person who has the right to use this land). This allows the performer to sign a contract to implement the project division of land parcel.
2. Actual topographical plan scaled 1:500 with the boundaries of land parcel and signatures of the purchaser and the tenant of the right to lease. This plan is required for review, illustrative purposes and vision of relief throughout the land to be divided. This plan is a graphical application to the act of establishment of the boundary of the main land parcel.
3. The act of establishment of the boundary of main land parcel signed by the tenant and the purchaser of the right to lease with a graphical application. The signed act will attest that the latter agreed on the boundary of division of the main land parcel.
4. Cadastral plans for each part of the land on which it is divided, with the lengths of sides between the points of boundaries marks, the perimeter and area of the land parcels as well signed by the tenant and purchaser of lease rights. These plans will testify that these people know exactly the size of each project land parcel and their areas.

There is another important aspect to be done in the project and the appropriate division of land management documentation, namely, to determine restrictions and encumbrances that have been established; determine the boundaries and areas of land parcel parts which are subject of restrictions; development of appropriate plans. These plans must also be signed by the tenant and the purchaser of the right to lease.

It should be noted that the project of division is necessary to timely determine the possibility of separation of the main land parcel; and the seller and the buyer will address the notary and write a petition to the local authority, which brings the clarity and precision of the possibility of separation and area of land parcel. In addition, the project will be the basis for the development of appropriate documentation of land division.

Conclusions and recommendations

Summing up, the proposals developed for the division of land parcel for lease significantly reduce procedure and the time spent on issuing new lease contracts on part of the land. Also, these proposals can be applied to the land parcels which, according to the previous Land Code of Ukraine (1990), were granted for permanent use to private and not utility legal entities having state acts on the right of permanent use. But according to the Land Code of Ukraine (2001) newly created land parcels of the main land user and purchaser of land use rights may be granted only for rent for the maximum period (up to 50 years).

The prospect for further research is to detail the procedures and the list of documents required in cases when the main land parcel is indivisible and to improve procedures for combining the land parcels.

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INSTITUTIONAL SUPPORT OF THE SYSTEM OF TERRITORIAL PLANNING IN UKRAINE

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Abstract

From a theoretical point of view, the authors have grounded a new paradigm of theoretical planning of land management, which is based on space definition of a complex of factors of rational use of the existing land resources in correlation of interests of subjects-land-users and corresponding land relations in the terms of support of a balanced social-ecologic-economic environment.

From a methodological point of view, the authors have proposed a set of methodic approaches as to determination of mechanisms of arrangement of the process of territorial planning in land management according to institutional fundamentals of land relations harmonization at different space levels of management.

It is proposed to consider planning of land use as an obligatory and logically inevitable stage of the process of territorial space management that is determined as a primary link, because it specifies aims of the management. It is proved that effective territorial management of land resources and land-use is caused by its territorial planning, which determines the aims of an object development and activity of a managerial subject.

A regional link of management should secure the supply of appropriate conditions for living standards of population, effective utilization of territorial resources and development of mutually favorable inter-regional relations. Implementation of efficient regional policy on the basis of market mechanisms requires further improvement of institutional fundamentals.

Key words: strategic planning, social and economic development, regional policy.

Introduction

Ukraine's present system of territorial planning has been established on the basis of long-term domestic experience, but lately it has developed in accordance with the leading principles of sustainable space development of the European continent, other documents of CEMAT/the Council of Europe and the European Union. One observes reorientation to security of social unity, strengthening of independence and the territorial integrity of Ukraine as well as specific separation of competences and responsibilities of state authorities, local authorities offering principally new possibilities for the further democratic development of our society.

Thus, the importance of territorial planning has grown as it is an effective instrument of integration of not only local, regional and state interests in a certain area, but also interests of different sectors determining prospects of their balanced development. The modern world demonstrates growing importance of space in social development. It is caused by the fact that space is viewed not as a passive container of different kinds of activity, but as a complex bio-social-economic system possessing differentiated peculiarities and thus making an active impact on a choice as to directions and intensity of space use.

Methodology of the research and materials

The research is based on application of the following methods: system, economic-statistical, observation and comparison, graphic and abstract-logical ones.

Information and normative base of the research include corresponding legislative and regulatory acts of Ukraine, first of all the Laws "On fundamentals of city planning", "On regulation of city planning activity", "On architectural activity", "On protection of cultural heritage", "On General scheme of territorial planning in Ukraine", "On responsibility of enterprises, association of them, institutions and organizations for violation of law in the field of city planning" (Laws of Ukraine) as well as analytical and statistical materials and theoretical works of domestic and foreign authors, particularly M. Datsyshyn, M. Dolishnii, V. Keretsman, M. Lendiel, etc.

The object of the research is processes of establishment of directions in the institutional support of the system of territorial planning under conditions of market environment.

Discussion and results

Implementation of regional policy requires some "administrative center" in the system of executive branch that makes principal decisions of tactical character and provides a coordination of activities of other institutes and institutions involved in the process of such implementation. Depending on the stage of regional policy development in a country and goals of the state regulation of regions'

development, European countries established either specialized ministries or non-specialized central executive authorities, coordinating fulfillment of regional policy with the help of corresponding structural departments (Datsyshyn, 2007; Lendel, 2001).

Optimization of relations between the state and regions is the responsibility of the Ministry of Regional Development and Building in Ukraine (further in the text: Minregionbud), established in 2007. Nowadays, the Ministry is the main (leading) authority in the system of central authorities of executive branch on the issue of security of implementation of the state regional policy and policy in the field of building, architecture and city planning, improvement of administrative-territorial organization of Ukraine.

One of the principal task of the Minregionbud is to participate in the establishment and implementation of the state's regional policy, particularly on the issue of security of sustainable territorial development. The Ministry has developed a set of documents aimed to regulate the problems of space development of the country; in particular, it has worked out projects of Concepts of the state's regional policy, Concepts of the reform of administrative-territorial organization, Concepts of the reform of local authorities. On the basis of these documents, they prepared the Budget Code, new editions of the Laws "On principal fundamentals of state regional policy", "On local authorities", "On local state administrations", "On administrative-territorial organization".

Specialists are expected to do a lot of work on territorial planning (mapping out) and city planning projecting under current conditions, in particular, development of new schemes of planning of administrative regional territories and projects of rural administrative districts, projects of planning of large territories (suburban area of cities, recreational area of regions, border area, revival of deteriorated and degraded area etc.) as well as updating of general plans of almost thirty thousand settlements. Updating of documents is happening at a slow rate and the reasons are known. It deals with the problems of trained staff, being able to do such complicated tasks; financing of the works that were financed from the state budget before, but now – by local authorities with limited budget possibilities; organizational contradictions, inter-department incoordination, complicated procedural issues etc., which demotivate specialists being able to fulfill similar tasks.

However, the process is going on. As the experience shows, the fact is proved: efficiency of updated projects and documents is low. The updated documents do not influence the attraction of investments in a district or town, improvement of the system of territorial management, system and culture of territorial economy. Without exaggeration of importance of city planning documentation for settlements and territories, we stress that the documentation is necessary and the fact is proved by the European countries' experience.

The reasons of such low efficiency of the documents are numerous. They are connected with both methodology and theory, and practical issues of implementation of separate stages of the work. We affirm without the detailed analysis that a normative-forecasting approach based on demographic forecast and determination of economic prospects of territories and towns, is substituted with a resource-environmental approach. The approach sets the requirement that maximal consideration of local conditions and resources, assessment of the system conditions (diagnostics), determination of problems and contradictions in the system, estimation of space potential and argumentation of directions of its effective utilization for solution of the problems as well as security of development of territories and towns in effective direction should be in the center of work fulfillment.

The pre-project analysis and evaluation of the system conditions is an extremely important part of the work, because its results form the basis for conceptual conclusions and concrete project decisions. As it deals with a complex system, it is important to argue a set of indicators of the evaluation of conditions, oriented at essence and tasks of space organization and regional development. The methodology chosen by the authors for fulfilment of the stage of work enables rather complete estimation of the existing development potential defining disproportion and contradictions (problem elements) and analyzing internal and outer elements of the space. However, the analysis lacks methodological integrity. Some important issue are out of the consideration. The idea is concentrated on inventory analysis, not the analysis of potential and problems of existing conditions. The investigation of landscape component is not a sufficient one. It should be reasonably grouped according to the main types of landscapes, i.e., urban, agrarian and open (recreational). An esthetic component of regional landscapes is completely ignored which is especially important for recreationally prospective regions and requires consideration and development.

After completion of the factor analysis, a complex estimation of regional conditions (diagnosis of the existing space situation) is made. However, complexity and methodological exactness of coordination

of different space characteristics are absent, and in some cases, old-fashioned methods of investigation are applied.

To perform the complex estimation of conditions of space system in a region, it is reasonable to make a broader application of methods of the multi-criteria analysis. However, there are tasks and problems of combination of various characteristics – social, economic, ecological, mapping-out etc., when, in one case, a peculiarity can be a restriction (barrier) for the development, and in the other, vice versa, determines a prospective direction.

According to the results of the analysis and estimation of regional conditions, we have grounded restrictions, priorities and the algorithm of solution. A principal attention is paid to typical tasks. Thus, it is worth to make a more precise outline of special tasks, happening only in a certain space situation and requiring deeper investigation of separate characteristics of the space.

The principal aim of development of materials for district (regional) mapping-out is to establish effective space structures of territorial systems, optimal economic activity of the space as an integrity and use of landscapes on the basis of protection, esthetics and order. Thus, landscape component should be a crucial one in such works and materials. The domestic practice of economic activity in a space proves that there is no respect and careful attitude to environment in Ukraine in contrast to the European countries where this issue is of great importance and everyone has social responsibility for environmental conditions as well as understanding of the fact that comfortable conditions of living depend on nature. The comparison of fulfilment of the mentioned stage with the practice in Poland and Germany demonstrates that:

- 1) one should make more exact formulation of the analysis methodology, series of macroindicators of assessment of landscape conditions, which should result from the aim and tasks of space organization of a region and be coordinated with the indicators of sustainable development. It is important to investigate the reaction of landscape structure of a region to social and economic changes in the state and the region;
- 2) the pre-project analysis is declared as a problem-oriented one, but analysis of the problems is incomplete, particularly as to problems in the system of nature management and landscape conditions. One should gather problems in a common system ranging according to their importance, study interrelation and mutual impact, perform cause and effect analysis of their appearance and development;
- 3) it is reasonable to pay more attention to the analysis of special aspects of landscape situation, particularly only for a certain region, as well as research of its complex structure, improvement of it as one of the main tasks. Schemes are the following, i.e. systems of land utilization, forestry activity, development of relations between different types of landscapes and estimation of elements' connection.

In Ukraine at the current stage of development, transformation of the whole complex of economic, public and power relations is happening. It is of great importance that the changes are carried out most effectively considering determined and scientifically grounded priorities. Current tendencies happening in foreign environment and inside our country cause the necessity and reasonability to introduce strategic planning of enterprises' performance as well as activities of organizations, the state and local authorities of Ukraine.

In the context of prospective development of towns, the above-mentioned tendencies can be conditionally divided into global, the state's and local tendencies.

As regards the global tendencies forcing the strategic planning of territorial development in Ukraine, one should note:

- activation of globalization processes in the world, free flow of capital and technologies among regions of different countries;
- intensification of inter-regional competition for investments;
- acceleration of changes in foreign environment, necessity of fast adaptation to them.

General tendencies within the state determine both the necessity and possibility to apply strategic planning of territorial development in present Ukraine. The necessity to look for new regulation instruments of social and economic growth is forced by growing disproportions in the levels of regional, including urban, development, as well as lack of the funding by the state to be directed at overcoming of the disproportions and stimulation of further move.

As concerns the indicators favoring a possibility of strategic planning of our future, we would mention the following ones:

- gradual strengthening of the system of local authorities and the further decentralization of the system of decision making;
- growing responsibility of local authorities for improvement of all branches of life activity at a territory, increase of quality of public services supply.

The law of Ukraine “On local authorities in Ukraine” (Article 27) determines that the most important proper responsibilities of executive authorities of city/town councils include the following: preparation and organization of fulfilment of programs of social-economic and cultural development of a town/city, special-purpose programs on other issues of self-government; security of a balanced economic and social development of corresponding territories, effective utilization of natural, labor and finance resources. Thus, a legal base has been established in Ukraine to help territorial communities of towns and their representative authorities plan the development of proper territories independently.

The reasonability of strategic planning introduction is determined also by a set of local factors, such as:

- local authorities have lost any hope their problems to be solved by the “top power”;
- territorial community is getting more active requiring satisfaction of its social needs at a corresponding level from local authorities;
- local authorities have realized they are not able to solve all problems by themselves and understand the importance of cooperation with all other principal subjects of local development for common solution of social-economic issues and establishment of the expected future.

It is worth mentioning that theory and practice of territorial development prove that the concentration of main efforts of local power only at fulfilment of current tasks causes not social-economic growth, but the further degradation of the system of life supply of the territories, including towns/cities. Considering the fact, it is important to act with the view in the future creating the basis for qualitative transformations.

Urban territorial communities should play a principal role in security of their own economic stability and appropriate quality of life. According to the definition of the international Organization on Economic Cooperation and Development (OECD), the principal tasks of territorial community development are as follows:

- strengthening of competitive position of regions and separate territories within the boundaries of a region due to development of their human and natural potential;
- support of local economy growth by means of search of new markets for the products and services, produced at a certain territory;
- increase of employment level and supply of a broader choice of possible kinds of professional activity for territorial residents;
- growing participation of financially disadvantaged citizens in the economic process;
- improvement of material infrastructure and environment of territories as an important component in establishment of corresponding climate for business development and rise of life quality for territorial community.

Fulfillment of the mentioned tasks is supported by an introduction of strategic planning of social and economic development at the local level. This approach enables:

first, improvement of scientific and practical argumentation of social-economic and organizational measures, considerable broadening of a range of participants of the planning process, more complete consideration of their interests and needs;

second, creation of clear and determined opportunities to achieve a common aim, integration of material and financial resources of subjects of different forms of ownership, that helps to cut terms for achievement of final aims of the program;

third, directing of common efforts of local authorities and local self-government at aimed solution of urgent economic problems, active influence on stabilization of a situation in social-economic and social-political fields;

forth, use of great potential of territories for activation of economic transformations and development of human resources.

We should mention that positive changes in local economy is an important condition for the revival of the country’s economy in general. Local development is considered also to be a reaction to the state’s economic changes and a positive attitude to opportunities to look for optimal social-economic

decisions on the basis of separate territories without consideration of an effect of higher-level indicators.

Conclusions and proposals

The search of objective fundamentals to improve territorial planning of land management in terms of municipal arrangement is an extremely important task of establishment of active space for life activity. In our opinion, the problem is connected with the processes of self-organization of land use system. Possessing characteristics of high integrity, the space of life activity rapidly reacts to changes of social relations. It is necessary to find out and support positive tendencies in time. Generally, one can state that new social-ecological-economic space of development is being established in Ukraine. It should be considered in the process of territorial planning of land management.

To solve the problem of improvement of land relations management at the local level, it is necessary to establish a possibility to choose land plots by investors for entrepreneurship activity as well as to implement clear and anticipated land and infrastructure policy. It is also required to support stability of legislature in the field of land relations and payments for land, to include possibilities to change goals of land plots use in case of ineffective use of objects situated on them, to establish joint enterprises with investors and participation of authorities (with an introduction of the right on lease and pledge of land plots into their statutory fund).

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METHODICAL APPROACH TO IMPROVEMENT OF ORGANIZATION OF LAND UTILIZATION AND PROTECTION IN EROSION-UNSAFE AGRO-LANDSCAPES

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Abstract

The search of effective methods of agricultural land protection from soil erosion under conditions of land relations' reform in Ukraine is a complex ecological and economic issue requiring a system approach to its solution, adequate organizational and economic support and scientific argumentation. The topicality of the research is based on the importance of the problem of arable land protection from soil erosion, and its solution is related to ecologically safe land utilization keeping to the principles of balanced development of land management. The aim of the research is to develop scientific basis for the recommendations how to improve the system of erosion-safe agricultural land management under conditions of reforming land relations in Ukraine. The article presents scientific fundamentals of organization of erosion-safe land management in the context of the balanced development of nature management, analyzes conditions of utilization and protection of land in erosion-unsafe landscapes, develops scientifically grounded recommendations as to improvement of a system of erosion-safe agricultural land management at a local level. In the process of the investigation a combination of methods were used: monographic, induction and deduction methods, system analysis, cartographic, experimental projecting. A contour organization of the territory is recommended to apply to protect arable land from soil erosion. Reimbursement of money payments and tax privileges can motivate landowners and land users to introduce anti-erosion measures. It is required to consider use value and non-use value of land resources in the process of their estimation for land payments.

Key words: agricultural land use, soil erosion, contour organization of the territory, incentives.

Introduction

In Ukraine, soil erosion is one of the most common degradation processes in land utilization. It covers almost 57% of the country's area (Pro shvalennya Koncepciyi..., 2014). Because of water erosion of soils every year nearly 500 million tons of humus, 1 million tons of nitrogen, 0.7 million tons of phosphorus and more than 10 million tons of potassium are washed out of soil. For the last 20 years in Ukraine the average content of humus has decreased by 0.22%. The loss is estimated in 453.4 billion UAH (Yacuk, Panasenko, 2013). The shortage of reserves of humus and mineral substances causes the decrease of soil fertility. As a result, lowering of biological activity of eroded soils is a reason of getting inadequate yield of agricultural crops (the yield can decrease by 30-80% due to eroded soil depending on a degree of erosion) (Lopiryev, Ryabov, 1989).

In Ukraine, the model of contour-meliorative agriculture was introduced in 1987 to protect arable land from erosion (Tarariko, Mironov, Saiko, 1987). Because of reforming of land relations (since 1991), agricultural lands were divided into land plots, which were given to private ownership. The establishment of new farms on the basis of leasing land plots is often ecologically unreasonable and is carried out without land protective measures (Yacuk, Panasenko, 2013; Solovyanenko, 2013).

The aim of the research is to develop scientific basis for the recommendations how to improve the system of erosion-safe agricultural land management under conditions of reforming land relations in Ukraine. The principal tasks of the research are the following: to determine the main indicators of soil erosion development in Ukraine on the basis of scientific literature analysis on the issue of land degradation; to analyze erosion threat of agricultural land utilization in Ukraine; to develop scientifically grounded recommendations for the improvement of the system of erosion-safe agricultural land management at a local level under conditions of reforming land relations in Ukraine.

Methodology of the research and material

The following research methods were used: monographic, inductive and deductive methods, system analysis, cartographic, experimental projecting.

The object of the research is conditions, process and consequences of the land reform in Ukraine in relation to erosion-safe utilization of agricultural land. The subject of the research is theoretical, methodological and applied aspects in the search of means and mechanisms to improve the system of erosion-safe agricultural land management under conditions of reforming land relations in Ukraine.

Scientific articles on soil erosion and ecologically safe land management, the legislation of Ukraine, data of the land cadastre and documents on land structure have been used in the research. The analysis

of erosion threat of agricultural land utilization was carried out applying the methodology GOST 17.4.4.03-86 “Method of determination of potential threat of erosion caused by rains” (GOST 17.4.4.03-86, 1986). The potential rain-wash of soil is calculated by the formula:

$$A = R \cdot K \cdot L \cdot S \cdot C \cdot P, \quad (1)$$

where;

A – is annual soil losses (potential), ton/ha;

R – is a factor of erosion effect of rains (erosion index of rainfalls during the warm period on a map);

K – is a factor of soil capability to fall under the influence of erosion, ton/ha;

L – is a factor of a slope length;

S – is a factor of a slope stiffness;

C – is a factor of vegetation in crop rotation;

P – is a factor of efficiency of anti-erosion measures.

Discussion and results

Indicators of soil erosion in Ukraine. Soils erosion is a natural process. Natural conditions are principal factors of erosion, but the main reason of modern development of soil erosion is an exceeded anthropogenic impact on land resources, including those of agriculture (European Environment Agency, 2006, O’Geen A. T., 2006). Formation of soil-protective and melioration equipped agro landscapes, basing on contour-meliorative organization of the whole territory, being the most suitable for the structure of natural landscapes is an effective measure of land protection against soil erosion (Burakov V.Yi., Dubinskiy H.P., 1985). Because a landscape is a complex and multifunctional natural-territorial complex, optimization of mutual relations between natural phenomena and anthropogenic factors can be achieved by creation of a “cultural landscape” (Poiker H.Yi., 1987).

Studying a concept of a balanced development of ecosystem, which includes a process of interaction of a society and environment and can result in optimal correlation between economic activity, security of material and spiritual needs of population and protection of quantitative conditions of natural environment (Bulygin S. Yu., 2005, Stoiko N., 2005), one should mention that a contour organization of territory is one of scientifically grounded approaches to achieve a balanced development of land management. Such organization of the territory secures not just protection from soil erosion but it is also of ecological importance for preservation of biological variety, cleaning of water sources, etc. Having analyzed scientific literature on land degradation, one can distinguish three groups of indicators of development of water erosion of soils in modern land management (Table 1).

Table 1

Indicators of development of soil erosion in modern land management¹

Group of indicators	Characteristics	Criterion
Biophysical	Soil cover	Parent rock, depth of humus horizon, mechanical content of soil.
	Relief	Stiffness, length, form, slope exposition, depth of erosion basis.
	Climate	Amount of rainfalls, intensity of heavy rains.
	Vegetation cover	Field cultivated crops, field thick-cover crops, natural herb vegetation, bush or wood vegetation.
Social-economic	Low level of economic development	Lack of money for introduction of land protective and soil protective measures, meliorations, innovative technologies, growth of culture of agriculture, etc.
	Consumption approach	Attempts to get the most of land and give the least for its protection, improvement and reproduction.
	Low ecological culture	Lack of knowledge, norms, stereotypes and “rules of behavior” of a man in his/her environment, which can help consideration of practical needs of a society and “attempts” of nature to support stability of its own normal conditions and thus, preserve conditions for existence and development of humanity.

¹ Compiled by authors on the basis of (Evaluation and Selection, 2013; Compilation of selected, 2009; European Environment Agency, 2006; O’geen, 2006).

Table 1 (continued)

Group of indicators	Characteristics	Criterion
Institutional	Lack of institutional support	Undeveloped infrastructure of the sphere of market and lease relations (commercial crediting, leasing, mortgage etc.); absence of consistent state policy as to stimulation of land protection (privileged taxation, grants, insurance etc.); deprivation of local authorities from the issues of land relations.
	Ineffective policy of management of land and natural resources	Absence of a target program of development of land relations for long-term prospective; underestimation of the importance of recording of amount and quality of lands, state registration of nature protective and technological limitations in land utilization; imperfection of norms and standards in the system of estimation of loss reimbursement, because of breaking of nature protective laws; absence of argumentation of estimation of project works and their impact on the environment.

The analysis of the information in Table 1, allows to conclude that intensity of soil erosion development in Ukraine is forced by a considerable impact of anthropogenic activity, ineffective system of management of land resources, lack of institutional support of a balanced land utilization, poverty and low ecological culture.

Analysis of arable land utilization in Ukraine. According to data of the State Agency of Land Resources of Ukraine, 6.8 million citizens have got certificates of the right to land plot in 2014. Among them 4.8 million citizens fulfil the right on land by means of lease relations (Solovyanenko, 2014; Doslidzheniya dogovoriv orendi ..., 2014). Agricultural enterprises and farms use 41.9% of agricultural lands on the basis of land plot lease agreements; 38.1% of agricultural land of the country are utilized and possessed by households. The data prove the existence of large, middle and small agricultural farms.

Peculiarities of land utilization are demonstrated on the example of land management of the farm “Halytskyi shliakh” located in the territory of Ushkovychi village of Peremyshliany district in Lviv region. Land possession of the farm is made by lease of land plots. The area of the lands amounts to 120.2484 ha (92 land plots). Soil cover is made of: dark-grey podzolic cover gleyic and cover gleyic slightly washed light loamy soils (49 g) occupy 59.9251 ha (49.9%); dark-grey podzolic gleyic slightly washed with spots of medium washed 10-30% medium loamy (49) – 27.8277 ha (23.1%); dark-grey podzolic cover gleyic medium washed medium loamy (50) – 19.5318 ha (16.2%); dark-grey podzolic gleyic medium loamy (45) – 9.6256 ha (8.0%); podzolic washed gleyic medium loamy (208) – 2.2641 ha (1.9%); heavy washed soils and rock outcrops (215 g) – 1.0229 ha (0.9%). The relief of the farm is characterized by slopes from 3° to 5° (Fig. 1).

To compare characteristics of erosion threat in utilization of arable lands we calculated losses of soil because of erosion according to two variants of area organization: Variant 1 – according to a scheme of division into land plots (Fig. 1); Variant 2 – according to requirements of a contour-meliorative organization of the territory proposed as one of the variants of land protection from negative erosion effects (Fig. 2).

Annual soil losses (*A*) are classified according to a scale: insufficient – up to 0.5 ton/ha; weak – 0.5- 1 ton/ha; medium – 1-1.5 ton/ha; heavy – 5-10 ton/ha; very large – more than 10 ton/ha.

According to the data of GOST 17.4.4.03-86 for Ushkovychi village of Peremyshliany district, erosion index of rainfalls during the warm period is $R = 12.9$.

The factor determining soil capability to fall under influence of erosion (*K*) characterizes quantitative wash of soil from a sample land plot because of rain, erosion index $K = 1$ (Zaslavskiy N.M., 1983). In the farm area, slightly washed light and medium loamy soils prevail according to their mechanical content. The factor determining an influence of erosion on soil (*K*) is determined according to nomogram of GOST 17.4.4.03-86 as a weighted average indicator $K = 2.6$ ton/ha.

Factors of length and stiffness of slopes of arable lands under conditions of Peremyshliany district are important. Mutual impact of the length and stiffness of a slope is revealed by the only topographic factor. The topographic factor (*LS*) is determined on the basis of results of morphometric analysis of relief and in the process of route examination. According to the examination data, an increase of slope

stiffness causes the increase of a value of the factor of a slope length (L) in geometric progression. A rapid increase of a value of slope stiffness factor, starting from stiffness 3° and higher, transforms land plots of such surface into potentially dangerous ones in relation of intensification of erosion processes.

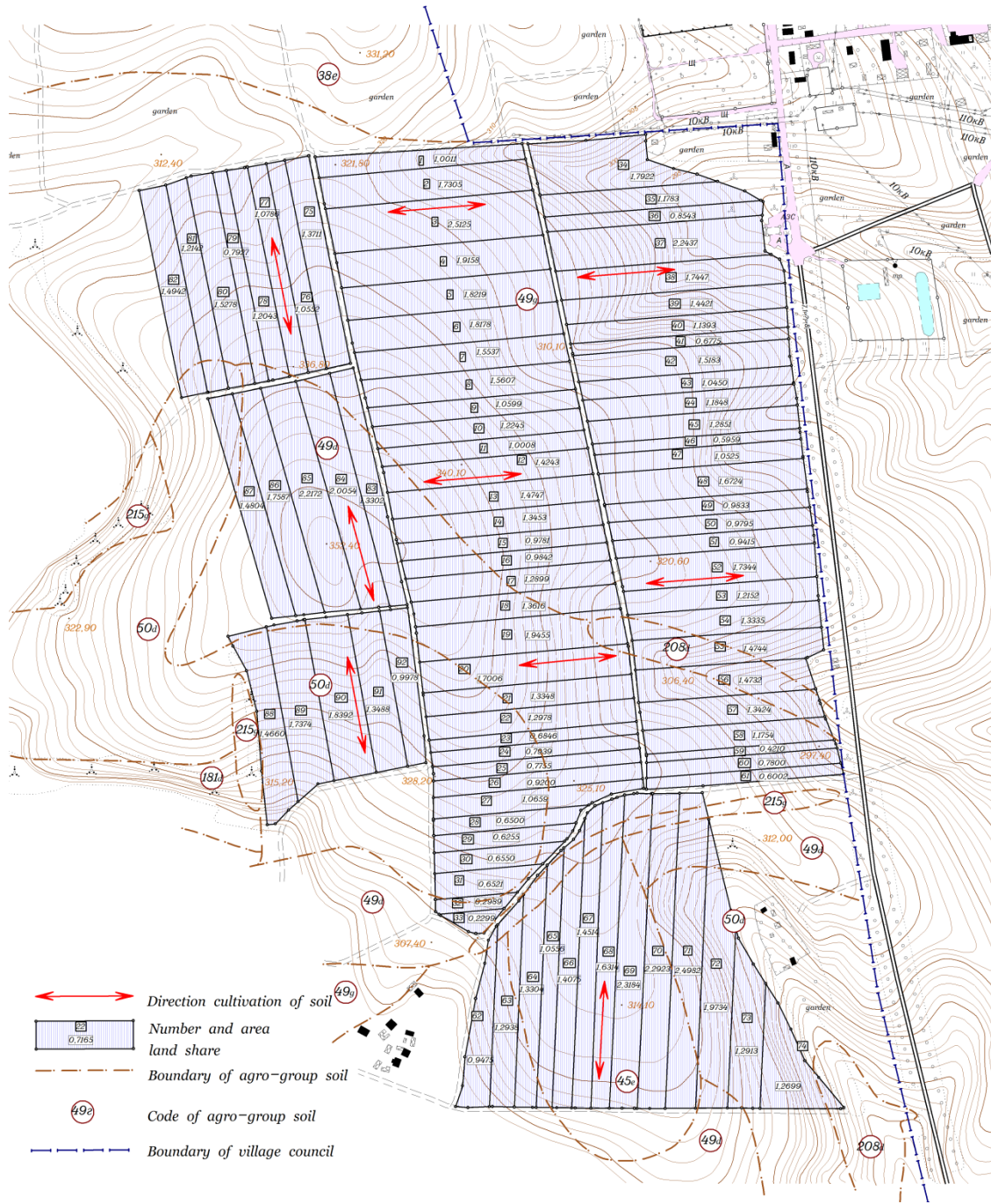


Fig. 1. Scheme of division of a farm's land into land plots.

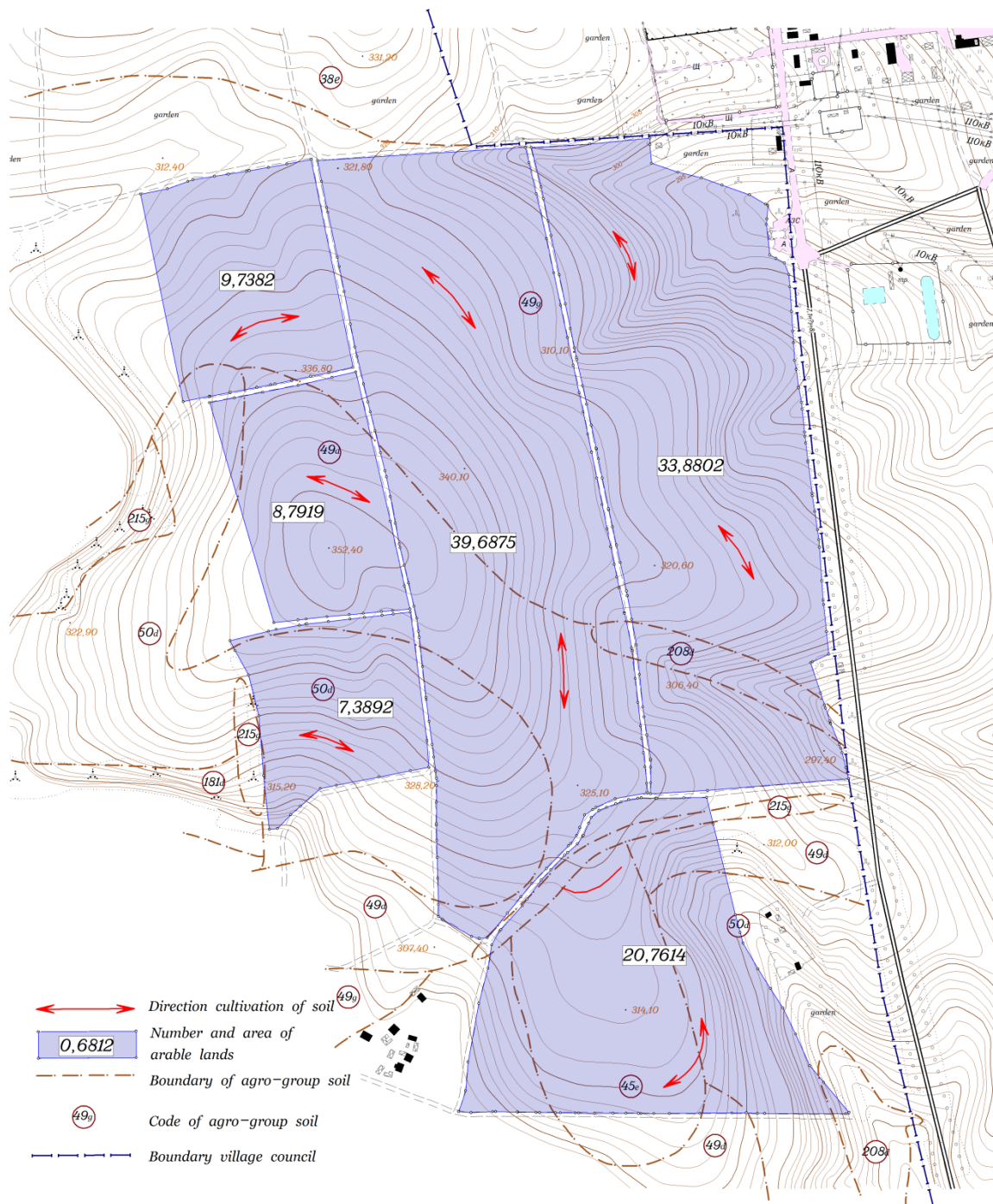


Fig. 2. Scheme of a contour organization of a farms' area.

The length of slopes as a distinguishing factor of potential wash of soil under conditions of farming activity is characterized by a high changeability. Among the peculiarities of the factor value, one should underline its dependency on the slope stiffness. Land plots with high stiffness of slopes, as a rule, are not long and vice versa. An average length of a slope flowing, determined by route examinations, makes 350 m.

Since intensity of erosion is directly proportional to the square root of a slope length, deviation of values of indicator L of the average value makes smaller impact on quantitative estimation of a forecast of soil wash in comparison to other factors.

The analysis of references (Zaslavskiy, 1983), the factor of vegetation cover (C) can change ten and hundred times. The coefficient C can have the value 0.003 on crops of perennial herbs, 0.05 on crops of winter wheat, 0.4 on maize. Considering variety of vegetation cover and different degrees of its deterioration in conditions of the mentioned territory, the average value of the factor $C = 0.01$ in calculation of potential intensity of erosion processes was used.

Coefficient P refers to the decrease of erosion because of contour cultivation of soil, benching of slopes, cropping by strips etc.

The calculation of a potential threat of erosion under the impact of rains according to the two variants is presented in Table 2.

Table 2

Calculation of a potential threat of erosion caused by rains

Indicator	Using lands according to a scheme of land division into plots	According to a contour structuring of the area
Annual soil losses (potential), A , т/ha	5.90	1.49
Factor of erosion effect of rains, R	12.9	12.9
Factor of soil capability to fall under influence of erosion, K , т/ha	2.6	2,6
Topographic factor, LS	2.93	1.78
Factor of vegetation in crop rotation, C	0.1	0.1
Factor of efficiency of anti-erosion measures, P	0.6	0.25

Thus, utilization of arable lands according to a contour organization of territory decreases annual losses of soil.

Recommendations as to security of erosion-safe agricultural land utilization. In Ukraine, an issue of land protection from degradation can be solved by means of land management, aiming to secure rational utilization and protection of land, creation of favorable ecological environment and improvement of natural landscapes (Zemelniy kodeks Ukrainy, 2015, article 182). However, establishment of a system of erosion-safe utilization of land is complicated due to functional variety of agricultural land utilization (according to forms of ownership, groups of land users, natural characteristics).

Under conditions of market economy, regulation of land relations on the basis of a balanced development with consideration of the interests of the state, landowners and land users, is possible to fulfill by means of effective ecologic and economic instruments. To stimulate landowners and land users to introduce anti-erosion measures (contour soil cultivation, strip cropping, creation of buffer strips, temporary conservation etc.), it is recommended to use:

- lease payments for use of agricultural lands of better quality or location, mentioned in its technological characteristics (slope stiffness, mechanical soil content etc.);
- reimbursements for deterioration of quality of agricultural lands because of economic activity;
- tax privileges for reproduction and protection of land resources.

Interest of land user to make investment in land protection is a considerable condition for an ecologically oriented system of land resource management. Land users should ground a decision as to utilization, protection and reproduction of land resources, seeing potential benefits and expenses. Making estimation of land resources it is necessary to consider their use value (goods, being able to be consumed; functional benefit) and non-use value (value of deferred alternative; value of heritage; cost of existence) (Korgenyev M. M., 2005). Thus, a land resource is considered not just from the position of direct benefits, but also indirect ones, i.e. from the position of protecting the resource for the future generations as an important constituent of ecosystem.

Conclusions

1. To protect arable lands from soil erosion, it is necessary to apply a contour organization of territory, decreasing potential loss of soil.
2. In Ukraine, system of land resource management should be ecologically directed and secured by economic stimulation of erosion-safe utilization of agricultural lands by means of reimbursement and tax privileges.
3. It is required to consider use value and non-use value of land resources in the process of estimation for establishment of land payments.

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METHODS OF ECONOMIC-MATHEMATIC PROGRAMMING IN MANAGERIAL DECISION MAKING

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Abstract

The article reveals difficulties to make managerial decisions as to optimization of recreational objects' location considering economic and technological parameters of an impact with application of fuzzy modeling. The authors propose methods of evaluation of alternative variants of managerial decision making applying programs of Math Cad with the further prospect of choosing alternatives.

Key words: managerial decision, fuzzy modeling, optimization, land resources, rational use.

Introduction

While planning organization of land utilization, insufficient attention is paid to the application of economic and ecologic-mathematic modeling, especially considering the fact that intensive development of information technologies provides researchers with a powerful calculative and mathematic instruments, helping to set and solve particularly complicated and large tasks of nonlinear nature.

Methodology of the research and materials

The issue of application of the methods of economic-mathematic modeling in utilization of land resources provoked interest to its study in the late 50s of the 20th century. The interest got a scientific character in the middle 60s and has been growing ever since. These issues make an inseparable component of land use optimization and many domestic scientists devoted their works to the problem, among them are D.I. Babmindra, S.Yu. Bulyhin, D.S. Dobriak, O.P. Kanash, M.V. Kalinchyk, V.O. Leonets, A.H. Martyn, L.Ya. Novakovskiy, N.V. Palapa, B.I. Parkhuts, I.A. Rozumnyi, A.Ya. Sokhnych, M.S. Siavavko, A.M. Tretiak and others.

However, some scientific regulations require methodological and methodic argumentation of the system of land resource management under conditions of economic transformations.

The research was carried out on the grounds of the dialectical method of cognition of ecological and social-economic phenomena, system approach to the analysis of establishment process of directions of special-purpose land utilization.

The choice of the research methods was made with a consideration of a complex general theoretical comprehension of objective natural-economic processes of establishment and development of land management.

The search of efficient managerial decisions in a great variety is possible to be done if technologies of ecologic and economic modeling as well as corresponding mathematic instruments are applied. Thus, there appears a possibility to create an analytical definition of the most effective use of land for certain territory with the consideration of economic, ecological and other conditions and restrictions.

It is the very approach to optimization of land utilization with application of methods of economic-mathematic programming that determine timeliness of the given article.

Discussion and results

In land resource management, optimization is of great importance. Moreover, optimization of land utilization, being based on integrated social-economic and nature-protective factors and criteria (Sokhnych, Smolyarchuk, Sokhnych, 2005), is an urgent and the most important task of the system of land resource management under conditions of a stressed economic and ecological situation in Ukraine.

Considering land resources as an object of optimization, one should specify the most important natural and acquired peculiarities of them, viewing from ecological, economic and social aspects. Only a complex analysis and estimation of them allows making concrete conclusions as to the list of problems in land utilization in the investigated territory. It is reasonably to apply methods of mathematic modeling to solve the issues.

Application of mathematic programming in the agrarian sector of the economy enables determining of reserves in direction of saving. One observes a possibility to secure optimal use of resources in agriculture increasing the volume of output (Akulich et.al., 2003).

Such an approach helps to bring the problem of search of the most rational variant (in ecological and economic terms) of land management to a complex determination of the land area, ecologically and economically available for certain directions of utilization considering permanence of total area of land resource in space as well as to establishment of some optimized structure of land economies in the territory (Snitynskyi, Siavavko, Sokhnych, 2002).

Most tasks of land management feature multi-variant character. Thus, the main task is to choose an optimal variant among the numerous allowable ones corresponding to a defined criterion.

Under conditions of a definition for the tasks of decision making, it is particular that each separate choice gives only one value of an objective function. It means that there are no difficulties to describe advantages according to an outcome. Thus, each decision-making person works with numerous exactly defined goals and determines required advantages on the basis of them.

We propose to apply such an approach for optimization of a recreational object location in the territory of Zhovkva district in Lviv region.

We propose economic indicators of optimization of a recreational object location in the territory of Zhovkva district in Lviv region:

- *Distance to the district center (DC)* – this factor is rather important, because comfortable connection and a location is required to increase a number of resting people.
- *Forests (F)* – forest favors a healthy rest of resting people and it is reasonable to have it in the territory of the recreational object or near it.
- *Shape of land plot (ShL)* – this indicator influences a compact location of constructions and buildings securing normal functioning of the recreational object.
- *Road connection (RC)* – presence of well-developed road net enables fulfilment of passenger transportation, as well as the supply of the object of recreation with necessary goods, food etc.
- *Water sources (WS)* – it is almost the most important factor for a choice of the location for the recreational center, because it provides a better rest of population.
- *Relief of place (RP)* – is not of less importance in choosing of land plot for the location of the recreational center, because it helps to choose different tourism routes: treks, skiing, bicycle, riding.

The indicators influence location of the recreational center and come out of the project requirements.

We propose grading of factors in Table 1, influencing the location of recreational center on the basis of an expert estimation, according to which paired comparison of the factors is made (Table 1).

Table 1.

Grading of factors, influencing the location of a recreational center

Factor	Grade
District center (DC)	29
Forest (F)	24
Water sources (WS)	19
Road connection (RC)	20
Shape of land plot (ShL)	15
Relief of place (RP)	7

Plots, determined for the choice, are similar in their area, but differ by the indicators.

To solve the task, we analyzed the known approaches (Martyn A.H., 2002) and applied the method of fuzzy programming (by program of Math Cad), providing mechanism for making of grounded decisions.

We consider: if n objects A_1, \dots, A_n ; we take up

$$\omega = (\omega_1, \dots, \omega_n) \tag{1}$$

the vector of relative importance of them, and also

$$\sum_l^n \omega_n = 1 \quad (2)$$

The comparison of objects (in a form of the matrix) allows to find the value of correlation between them:

$$\begin{matrix} & & A_1 & & A_2 & \cdot & \cdot & \cdot & A_n \\ A_1 & & \omega_1/\omega_1 & \omega_1/\omega_2 \dots & \omega_1/\omega_n & & & & \\ & \dots & & & & & & & \\ A_n & & \omega_n/\omega_1 & \omega_n/\omega_2 \dots & \omega_n/\omega_n & & & & \end{matrix} \quad (3)$$

The matrix is characterized:

$$A\omega = n\omega \quad (4)$$

or

$$(A - n \cdot I)\omega = 0, \quad (5)$$

where:

I – is a unit of the matrix;

ω – vector (relative weight).

In the calculation, we consider that elements of the matrix a_{ij} – are expert estimation. In such case, we take the equation:

$$(A - \lambda_{max}I)\omega = 0, \quad (6)$$

where:

λ_{max} – eigen value of the matrix (maximal).

We consider three variants of the location of land plots, where one can organize a recreational center. The variants A, B and C, variant A in the Rata village, B – in the village of Soposhyn and C – in the village of Maidan, respectively (Smolyarchuk, 2006).

The land plot of the variant A is situated in north-west part of Zhovkva district in the village of Rata. It borders roads of the district importance. The land plot is situated at the distance of 30 km from the district center, Zhovkva town, and joins the borderline of Ukrainian-Polish boundary, having a favorable position for grouping of tourists. The plot has a rectangular shape.

The land plot of the variant B is situated in the central part of Zhovkva district in Soposhyn village. The land plot is of a stretched form. The land plot borders the settlement and forest area. A road of the district importance surrounds southern side of the plot. The plot is prospective for tourism development, viewing from a favorable geographical position, particularly it is a small distance to the regional center of Lviv city, as well as the district center of Zhovkva town. The distance to the district center makes 1.5 km. It is planned to build a memorial complex near the land plot that is going to attract tourists in the future.

The third variant C of the land plot location is situated in the southern part of Zhovkva district, in Krekhiv village council, near Maidan village. The land plot is surrounded by forests from the western and southern-western side. The variant has great recreational capabilities: picturesque landscapes, forests, mushrooms and berries, water objects and sources of mineral waters (chloride-sodium). The distance to the district center makes 3 km.

We introduce the matrix of paired comparison of factors into a computer and determine eigen values of the matrix according to Math Cad program.

In the same way, on the basis of an expert's estimation, we grade variants according to each of six factors (DC, F, WS, RC, ShL, RP), influencing the location of a recreational center and performing a paired comparison of them and determine the value of their eigen values in Table 2. Afterwards, values n and Z_{max} are compared.

Table 2

Paired comparison of factors influencing the location of a recreational object

	DC	F	WS	RC	ShL	RP	Σ
DS	1	29/24	29/19	29/20	29/15	29/7	11,261
F	24/29	1	24/19	24/20	24/15	24/7	9,319
WS	19/29	19/24	1	19/20	19/15	19/7	7,378
RC	20/29	20/24	20/19	1	20/15	20/7	7,766
ShL	15/29	15/24	15/19	15/20	1	15/7	5,825
RP	7/29	7/24	7/19	7/20	7/15	1	2,700
Σ	3,931	4,750	6,000	5,700	7,600	16,286	44,259

$n=6 \quad Z_{max} = 6,000,$

where:

n – is the size of matrix;

Z_{max} – maximal eigen value of matrix.

The next step is to determine the vector of the matrix according to its maximal eigen value with the use of Math Cad program:

$$\begin{aligned}
 &0,586 \\
 &0,485 \\
 &0,384 \\
 &0,404 \\
 &0,303 \\
 &0,141 \\
 &\Sigma=2,303
 \end{aligned}$$

We determine a particular value of the matrix:

$$\mathbf{W}_o = \frac{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6}{0,254 \quad 0,211 \quad 0,167 \quad 0,175 \quad 0,132 \quad 0,061}$$

On the basis of the calculation, we normalize data in Table 3.

Table 3

Normalized matrix

Variant	Characteristics						
	DC	F	WS	RC	ShL	RP	Σ
A	0,087	0,508	0,408	0,238	0,240	0,331	1,812
B	0,603	0,197	0,244	0,159	0,327	0,290	1,847
C	0,283	0,294	0,345	0,603	0,433	0,379	2,337
Σ	1	1	1	1	1	1	6,000

Having made the calculation, we get the value: $W_A = 1,812$; $W_B = 1,847$; $W_C = 2,337$.

Results of the calculation show that it is the most reasonable to make a positive decision in favor of the variant C, which is by 18% better than the variant A, more than by 21% better than the variant B. Thus, results of the calculation lead to the conclusions that a recreational center is reasonable to be located on the land plot C. Therefore, the suggested indicators with application of fuzzy programming enabled making of managerial decisions on the basis of concrete calculations.

Conclusions

In everyday life, the situations of decision-making do not satisfy requirements of the presented scheme. Nowadays, the theory of production management achieves the level when uncertainty plays a substantial role. The capability to solve uncertainties or work with them requires careful attitude to environment. It causes the necessity to consider decisions making, in which aims and restrictions are not exactly determined. It is important to be able to identify tasks of such type, characterize peculiarities of their solutions and develop methods of the solutions. Such approaches can be applied in a wide range of optimization tasks of land utilization.

In Ukraine, development and efficiency of land utilization will depend on its conditions and use as well as on changes in the structure of land fund of the country caused by the land reform and land policy of the state. Thus, progressive land utilization of each country in any period should be based on the combination of three dimensions – past, present and future. One can realize its progress or regress only by combination of the three dimensions, because they help to open genetic code of the national land management. Comprehension of the essence of growth or reduction of land utilization efficiency of past ages and presence, which was based and is based on organization of social relations concerning land, labor on it and use of optimal profits, i.e. capital, is an important precondition for a break in the future.

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NEMUNAS LOOPS REGIONAL PARK FORMATION AND APPLICATION POSSIBILITIES OF DIGITAL MAP

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Abstract

In order to preserve protected areas and to reduce their devastation, it is important to know the most common violations of these areas. The created map will provide the information about areas where the damage occurs most often. The Nemunas Loops Regional Park was selected for the research, the main aim of which was to identify the most common violations and the most problematic areas. The objectives of this research were to carry out a detailed analysis of violations in the Nemunas Loops Regional Park and protected areas for 2007-2014 period of time and to create a dot distribution map of these violations. The main tasks were the following: 1) to review the aim of the Nemunas Loops Regional Park establishment, prohibited and promotional activities, 2) to carry out the classification of violations in these areas during 2007-2013 according to the Code of Administrative Offences of the Republic of Lithuania, 3) to group the violations of 2007-2013 according to the timing and to create a dot distribution map in order to provide its application possibilities.

The study led to the following conclusions: most violations were made contrary to the requirements of the protected areas (Clause 76). For instance, arbitrary constructed mobile homes, environmental pollution, violations of visiting regime in the nature reservation, water protection requirements (Clause 55), parking a car in the protected area of the water reservoir, agricultural land, storing agricultural equipment which is not used etc. The map highlights the most problematic areas where violations occur every year. These are: Punios Šilas Strict Nature Reserve and the areas around it, Pociūnai and Balbieriškis towns, Birštonas. In 2014 the form of reports was changed and it was not possible to analyse the violations in detail. It was a negative factor for this research because no accurate violations and areas could be recorded. For this reason the map was not created. 230 various violations happened in the Nemunas Loops Regional Park during the period of 2007-2014. The created map can be used as an additional measure for prevention of violations.

Key words: digital map, protected areas, LIS (Land Information System), GIS (Geographic Information System), administrative violations of law in the field of environmental protection.

Introduction

The main problems in the protected areas are associated with the locals, land users, tourism and recreation. It is very difficult to preserve the area when it is used for other purposes. The priorities of tourism development should not enter into conflict with the environment. (Heberlain, 1993; Howarth, 1993). Solving environmental problems, it is important to attract local communities, scientists and their latest achievements and to carry out educational activities. In order to protect these areas it is necessary to know the information about most common violations and the areas where they are carried out. When the recurring problems are known, more attention can be paid in solving them.

Lithuanian and foreign authors analyse this situation and provide statistical data. The attention of scientists proves the relevance of this problem. The main principles of nature conservation in the management of protected areas were identified by Mefee. G. K. and Caroll. C. R. (1994). The authors state that ecological processes must be maintained. The goals and objectives must come from ecological characteristics, features and the knowledge and understanding of systems.

The elimination of external threats, comprehensive utilization of positive factors and conservation of the evolutionary processes play important roles. The control must be versatile.

It is stated in the publication "Guide to Sustainable Tourism in Protected Areas" that protected areas are vitally important to our natural resource heritage. They are meant to preserve the species, ecosystem and the landscape. The natural heritage can be saved only if the nature is rationally used.

It is very important for natural resource conservation to smartly plan and organise everything. In the publication two parks in Lithuania (Žemaitija National Park and Kurtuvėnai Regional Park) are mentioned, although there is not much information about the main violations in these parks. Nemunas Loops Regional Park is not mentioned, but the types of violations in these parks are quite similar (Guide, 2014).

Most of the authors provide statistical material in the form of tables and graphs. This information is important, but not always detailed. It is not oriented in space, indicating a fairly large area. GIS technology allows to store data in the attribute tables and to orientate it in space, in other words, to link it to a specific area (Papišienė, 2014).

These methods are applied to the accounting of agricultural areas (Bykovienė et. Al., 2014; Gudritienė et. Al., 2015), the analysis of agricultural land usage tendency (Abalikštienė et. Al., 2013; Abalikštienė et. al., 2015). At present, georeferenced data are applied in a lot of fields in Lithuania (Kryžiauskas et. Al., 2010; Gudritienė et. Al., 2014a). It helps in the formation of thematic data sets and various maps (Gudritienė et. Al., 2014b). It is also possible to create the maps of protected areas with these data according to the results of the research. These maps may help solving environmental problems and might be used for the prevention of violations.

In order to preserve protected areas and to reduce their devastation, it is important to know the most common violations on these areas. The created map will provide information about areas where the damage occurs most often.

The Nemunas Loops Regional Park was selected for the research, in which the main aim was to identify the most common violations and the most problematic areas.

The objectives of the research: to carry out a detailed analysis of violations in the Nemunas Loops Regional Park and protected areas for 2007- 2014 period of time and to create a dot distribution map of these violations.

The main tasks:

- 1) to review the aim of the Nemunas Loops Regional Park establishment, prohibited and promotional activities,
- 2) to carry out the classification of violations in these areas during 2007-2013 according to Republic of Lithuania Code of Administrative Offences,
- 3) to group the violations of 2007-2013 according to the timing and to create a dot distribution map in order to provide its application possibilities.

Methodology of research and materials

Legal acts, books, scientific articles, foreign literature, statistical data were analysed, an interview with a specialist was carried out. The information was collected from the State Service for Protected Areas (www.vstt.lt), Land Information System (www.geoportal.lt), State Cadastre of Protected Areas.

The authority reports of violations of 2007-2014 in the Nemunas Loops Regional Park were analysed. The violations were grouped according to the year when they occurred and Chapter seven "Administrative offenses of environmental protection, natural resources, nature, historical and cultural monuments protection" of the Republic of Lithuania Code of Administrative Offences. Moreover, the analysis of cartographic material was applied. The violations were displayed on the map according to the addresses of areas using geoportal.lt website and ArcGis software package. A more detailed analysis was carried out for 2009 because the most violations were made during this year. The data analysis of this year was performed by grouping and presenting attributed data which were stored while creating a digital map.

The object of research is the Nemunas Loops Regional Park. This area was selected because of its purpose of establishment, areas of functional priority and a perfect geographical position. The Nemunas Loops Regional Park was established to preserve unique Great Loops of Nemunas, Punia landscape, its natural ecosystem and the values of cultural heritage in order to control and use it rationally. The main territorial planning document, which sets the measures to protect, control and use properly this unique Lithuanian territory, is the Nemunas Loops Regional Park planning scheme.

Results and discussion

The Nemunas Loops Regional Park was established in Lithuania on September 24, 1992, in order to preserve unique Great Nemunas Loops and Punia landscape, its natural ecosystem and the values of cultural heritage (Baškytė, 2006). The total area of the park is 25,095.6 hectares. The regional park is under the authority of the State Service for Protected Areas of the Ministry of Environment of the Republic of Lithuania.

It is forbidden in the park:

- to build and keep caravans and other portable items for accommodation, nutrition and other similar purposes;
- to drive motor vehicles off the road;
- to allow afforestation, construction of buildings, which may block the objects of heritage and damage the distinctness of it in the protected areas;
- to allow afforestation of agrarian land in conservation priority areas;

– to fence forests, lakesides, riversides, observation decks, educational paths, internal roads etc.

The buildings in the park can be projected, constructed, reconstructed and capially repaired only when the projects are approved by the authority of the park.

The analysis of the data showed that during 2007-2013 period of time most of violations in the territory of the Nemunas Loops Regional Park were carried out against the requirements of protected areas and water protection.

A map of the Nemunas Loops Regional Park violations during 2007-2013 was created which highlighted the most problematic areas according to the year they had happened. The majority of violations repeating every year were recorded in Punia natural reservation and around it (Fig. 1).

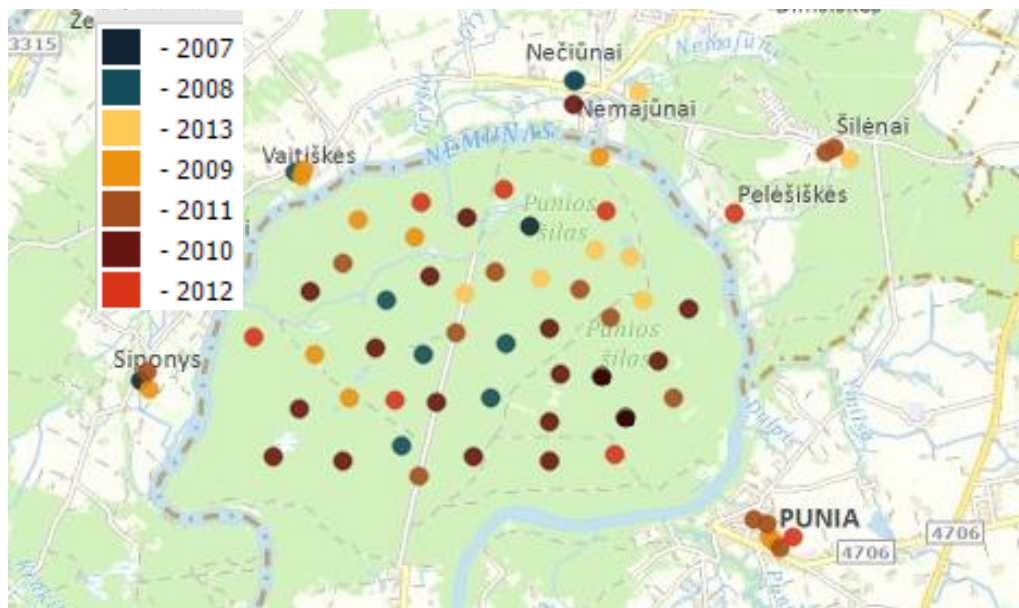


Fig. 1. The violations of Punia Natural Rezervation and around it during 2007-2013 period of time.

Moreover, 17 violations were carried out in Pociūnai during the period of 2007-2013 (Fig. 2). In this town the most common violations were against protection zones of water coastal areas and fishing regulations.

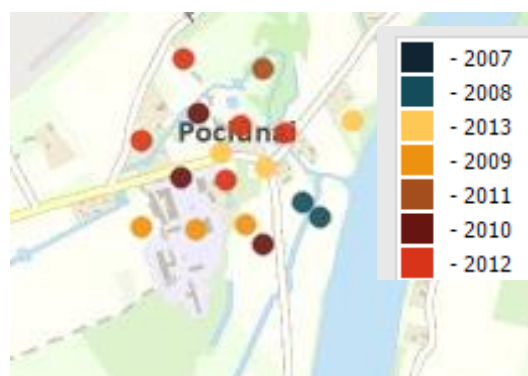


Fig. 2. Distribution of violations in Pociūnai in the period of time of 2007-2013.

The other area where violations have been repeating year after year is Birštonas. In this city 20 violations were carried out during the period of 2007-2013 (Fig. 3).

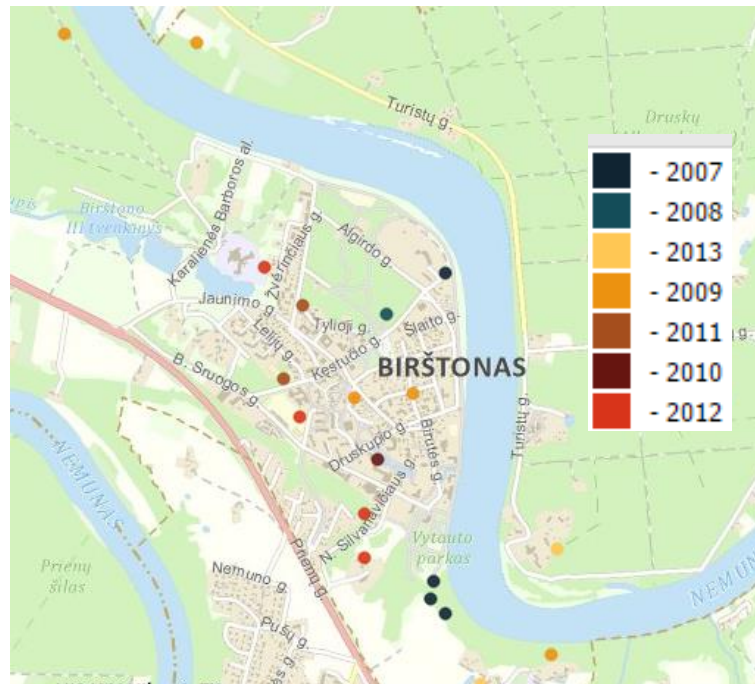


Fig. 3. The distribution of the violations in Birštonas during the period of 2007-2013.

7 violations were carried out in Balbieriškis town and more than a half of them were carried out in a year (2007) (Fig. 4).



Fig. 4. The violations in Balbieriškis town.

These kinds of maps are simple, well understood and informative. They can be created by specialists with ArcGIS program. If they do not have this software package, the map can be created by using tools of www.geoportal.lt

It is possible to create not only a graphical view but also to store the information about the analysed objects while creating the map. The map above in the attributive table stores the following: a year of a violation, the place and the nature of the violation. The filling of attribute information allows to group the data of each year separately. For example, there will be presented the violations of 2009 because most of violations were carried out in that year.

According to the code of administrative violations of law, the section of the seventh paragraph, almost half or 43% of the violations were carried out against the regulations of water protection (Clause 55). A quarter (24%) of violations were carried out against the regime of the protected areas. The rules of forest visiting violations represented 17 % of all violations in 2009. A little bit less, 12% of violations occurred against (Clause 78) protection and management of green plantation in non-forest land. Arbitrary destruction and cutting of trees and bushes in the state forest land happened only in 2% of cases, because this violation was carried out only once. Also, 2% occurred against the requirements of forestry and fire protection (Clause 77).

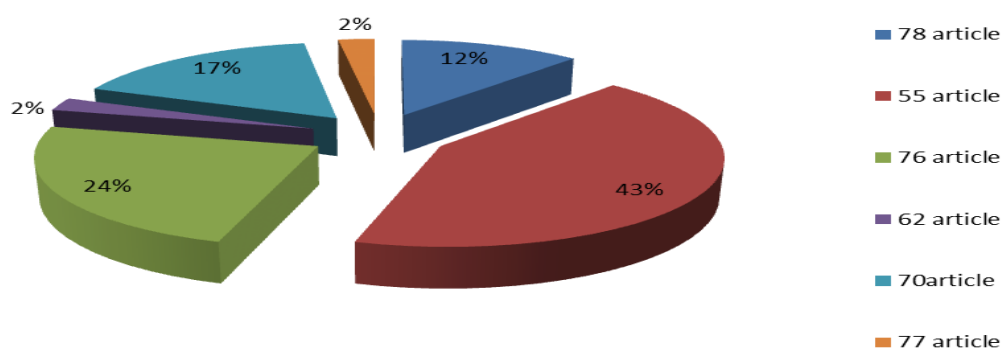


Fig. 5 The groups of violations in 2009 according to the code of administrative violations of law, the sections of the seventh paragraph.

The violations can be reviewed in a detail. It can be grouped according to the number of specific violations. The list of violations carried out in 2009 can be seen in the Table 1

Table 1

List of violations in 2009

The list of violations	The number of violations
Arbitrary pruning of trees in non-forest land	2
The violation of riverside security zone	2
The violation of park security regulations	1
Arbitrary cutting of trees in a forest land	4
Building a fence in the riverside security zone	1
Arbitrary tree pruning in non-forest land	2
Unauthorized excavation	2
Parking a car in the riverside security zone	8
A fireplace in forbidden area	4
Littering in the environment	3
Cutting down a tree in the riverside security zone	1
Driving a car where it is forbidden	2
Fencing forest	1
Arbitrary building mobile home	1
Careless behavior with fire in a forest land	1
Excavations in waterside protection zone	1
Arbitrary building of a wagon in the private area	1
Arbitrary building of hunting cabin, arbitrary moving of the sign of reservation	1
Cultivated land in waterside protection zone	2
Arbitrary building of summerhouse	1
Arbitrary felling of protected green areas in the waterside protection zone	1
In total	42

Quite common violation is a car parking in the water protection zone. In 2009 this happened 8 times. Arbitrary felling of trees in the forest land and making fireplaces in protected areas occurred 4 times. The pollution of the Nemunas Loops Regional Park got 3 warnings. The violations carried out 2 times are the following: arbitrary tree pruning in non-forest land, driving a car in the forbidden area,

ploughed and cultivated land in the coastal zone of water protection and arbitrary excavation. Other violations were detected one at a time.

Summarizing the results it was found that during the time period of 2007-2013 most of violations were carried out against the requirements of the protected areas (arbitrary constructed mobile homes; environmental pollution, the violation of visiting regime in nature reservation). Also, the violations of water protection requirements stood out (the car parked in the protected area of water reservoir, agricultural land, stored agricultural equipment which is not used etc.).

It was not possible to analyse the violations of 2014 the same way as the violations of 2007-2013. This is because the reports of violations were changed by the authority of the Nemunas Loops Regional Park. It was not required to indicate a specific violation and the location of it in the reports. It only indicated the sphere and the number of violations. For this reason violations of 2014 were not distributed according to the code of administrative violations of law, the section of seventh paragraph. Besides, the violations of 2014 were not included into the map. On the whole, during 2014 there were 34 violations. 41 % of it were carried out in the field of landscape and protected areas. 9 violations (26%) were recorded in the field of water protection requirements. 15% of violations were recorded against the rules of the forest. Unauthorised construction happened in 12% of violations. One violation (3%) was made in the field of fishing and air pollution.

230 various violations happened during the time period of 2007-2014 in the Nemunas Loops Regional Park.

Conclusions

1. Summarizing the results of the research it was found that during the time period of 2007-2013 most of violations were carried out against the requirements of the protected areas (Clause 76) (arbitrary constructed mobile homes; environmental pollution, the violation of visiting regime in the nature reservation) and the violations of water protection requirements (Clause 55) (parking a car in the protected area of water reservoir, agricultural land, storing agricultural equipment which is not used etc.).
2. The created a map highlighted the most problematic areas, in which the violations occurred every year. The majority of violations repeating every year were recorded in Punia natural reservation and around it, Pociūnai, Balbieriškis and Birštonas towns.
3. In 2014 the form of reports was changed and it did not let to analyse the violations in detail. It can be seen as a negative factor in this research because there were no accurate violations and areas. For this reason, the map was not created. It is known that 34 violations happened during 2014, which have been grouped into 6 groups: violations of use and visits of forests, fishing rules, landscape and protected areas, water, atmosphere and construction.
4. During the time period of 2007-2014 230 various violations were made in the Nemunas Loops Regional Park.
5. The created map may be used for prevention of violations as an additional material.

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PREVENTION OF LAND DEGRADATION PROCESSES

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Abstract

Land degradation is a topical issue not only in Latvia, but also in Europe. Even the real estate additional tax rate of 1.5% does not prevent agricultural land from overgrowing, and there is no other legal mechanism to control it. One of the mechanisms of prevention of land degradation process is reconstruction of drainage systems, change of worthless agricultural land (less than 25 points) to forest land or improvement and return of agricultural land (more than 25 points) to economic production. Although such actions require financial resources, there may be a variety of financial support programs, for example, the decrease of the real property tax rate (in case of afforestation).

Key words: land use, land degradation, valuable agricultural land, afforestation

Introduction

One of the tasks of land management is to ensure sustainable use of land. Due to existing soil degradation risks in Europe and Latvia, sustainable use of land is restricted. The Land Administration Law has been implemented since January 1, 2015, to promote sustainable land use and its protection. Land and soil protection and quality assessment in this law are based on the guidelines of the Thematic Strategy for Soil Protection approved by European Commission (September 22, 2006). The main purpose of the Thematic Strategy for Soil Protection is to ensure the sustainable use of soil (Nikodemus et.al, 2008). As regards Latvia, there was not any single soil protection policy document before 2015. Some issues referring soil protection have been included in:

- The National Development Plan of Latvia for 2014-2020;
- Sustainable Development Strategy of Latvia until 2030;
- The National Environmental Policy Plan, 2004-2008;
- Rural Development Plan of Latvia 2007-2013 (Nikodemus et.al, 2008).

The Land Administration Law was based on several conditions of use of land and its protection:

- the preservation of valuable agricultural land with the quality assessment of more than 50 points, limiting its fragmentation and change of the land use category;
- land use planning and determination must be done in territorial planning documents of local government;
- a land user should preserve land and soil quality and land degradation;
- a land user should be informed in case of damage of topsoil;
- in case of alienation of land, which is located in the brownfields area, an owner of real estate shall be informed.

The Land Administration Law defines preservation of valuable agricultural land, restricting use of the land. Until 2015 the Regulations of the Cabinet of Ministers of the Republic of Latvia No. 291 "Regulations on agricultural areas of national significance " restricted the use of agricultural land, if the size of a plot of land is at least 50 ha (no matter of property borders) with land quality assessment more than 60 points, and if the land parcel was located in one of the municipalities of Zemgale. From 2015 all local governments have to ensure the preservation of agricultural land with quality assessment of more than 50 points, setting limits on land fragmentation and the change of the land use category.

In Latvia average quality assessment of agricultural land is 38 points. More than half (57%) of agricultural land quality assessment of Latvia has not more than 38 points. Results of the research by A.Ruža show that agricultural land with average quality assessment less than 25 points is not economically viable for use in agriculture (Pilvere, 2012). *Land reforestation or afforestation has to be mentioned as an option for the use of not valuable land.* Results of the research made by State Forest Research Institute "Silava" from Latvia show that new afforestation is suitable for:

- land with quality assessment less than 30 points;
- land with hilly terrain;
- stony soil;

- small land parcels with restricted access;
- land with wet clay soil;
- land with loose sand soil and weakly cultivated (Daugaviete, 2007).

The Forest Law regulates that afforestation includes actions to make forest grow on the land, which is not registered as forest land in the State Real Property Cadastre Information System. Land afforestation may be limited by specified requirements in the spatial development planning documents. If afforestation is not directly specified in planning documents, then the planned afforestation should be clarified by the local government. On the other hand, land covered by forest is increasing every year according to the Cadastre Information System recorded areas of land use categories. Over the past 14 years, the area of land covered by forests has increased by approximately 161 thousand ha. Even more, from 2009 to 2013 the forest area has increased by 62 thousand ha. A further increase of forest area is forecasted for the coming years. The main reasons for the increase of forest area are:

- natural overgrowing of unused agricultural land;
- artificial afforestation of abandoned agricultural land.

However, the Land Administration Law determines that planning of new areas for building must be carried out on brownfields. According to the law, the brownfields are recognized as areas of land in which the upper layer has been destroyed or damaged, as well as areas of abandoned building, extraction of mineral resources or former territories of economic or military action. However, land degradation explanations in the scientific literature mention that degraded areas are previously used or abandoned populated parts of cities, and that intervention is required to return them to effective use. It is considered that brownfields usually result from industrial or structural changes occurring in a country. For example, the transition from a socialist to market economy in many central and eastern European countries, including Latvia, created brownfields. The economic situation in Latvia does not contribute to the return of brownfields into productive use (Jackson et.al, 2010).

Methodology of research and materials

The analysis of prevention of land degradation is based on the information recorded in the Cadastre Information System, such as situation plans, soil maps, maps of qualitative assessments of the land, as well as regulations of the Land Administration Law on processes causing land degradation. The case study of economic justification of prevention measures of land degradation processes was carried out in the farm “Veckuiņi”.

Discussion and results

Land and soil degradation is widely distributed across the world, for example, in Belarus, land degradation processes have been identified and distributed in eighteen types (Pomelov, 2013). The Land Administration Law regulates that land degradation decrease or even destroy economic and ecological value of land and land-related resources. The human activity or inactivity as well as natural processes may cause land degradation. The legislative acts provide that land degradation may cause:

- ingrowth of bushes on agricultural land;
- coastal erosion;
- inefficient maintenance of drainage systems and land bogging;
- abandonment of land as well as built-up area;
- pollution;
- landslides;
- soil degradation.

Results of inspection of agricultural land carried out by the Rural Support Service in 2013 showed that 85% of agricultural land was cultivated. Agricultural land is considered to be cultivated if grass mowing, harvesting or crushing as well as spreading at least once by September 1. There is a legal mechanism to limit the growing of bushes on agricultural land - additional rate of real property tax (1.5%), but there is no mechanism either to improve the technical condition of the drainage system or to reduce land abandonment. Investments required for the reconstruction of drainage systems, as well as for returning agricultural land to economic activity are instruments to avoid processes causing land degradation.

However, afforestation is another possibility for worthless agricultural land. One of the possibilities to prevent agricultural land from degradation could be the reconstruction of drainage systems as well as afforestation of worthless (less than 25 points) agricultural land. As regards valuable agricultural land (more than 25 points), it is necessary to return its economic activity. Prevention of land degradation process could be based on the results of soil mapping – a soil map and land qualitative assessment map (Fig.1.).

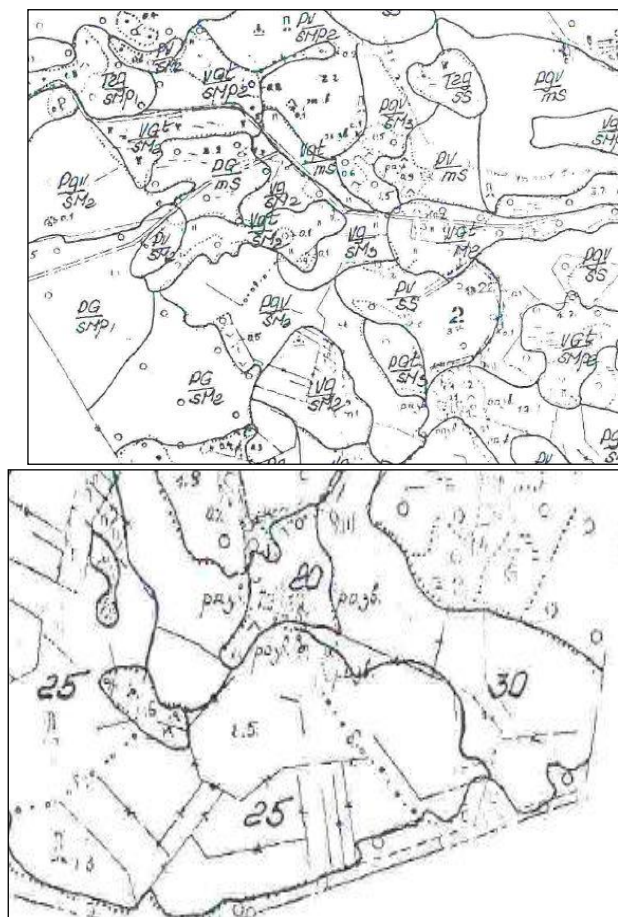


Fig.1. Examples of a soil map and land quality assessment map.

Results of the research carried out by Latvian scientists show that classification of soil can be divided into 3 classes, 12 soil types and 54 subtypes (Kārklīņš, 2008; Kārklīņš et.al, 2009). Soil classes are separated from each other by their water modes – capacity of water accumulation. Partly hydromorphic soils are characterized by temporary surface water accumulation, but increase of humidity forms clay soil, which is characterised by blue, greenish or grey coloured spots, because the soil continuously has been located in water saturated conditions. Podzolic clay soil has been formed by bogging up of podzolic soil and turf podzol soil. Bogging usually occurs in plains with poor water drainage and on edges of swamps (Kārklīņš et.al, 2009). It is necessary to ensure surface water run-offs for several soil types. Construction of new drainage systems, restoration of open or closed drainage systems as well as their elimination may be provided in the process of reconstruction of drainage systems.

The amelioration project can also provide designing of new melioration systems. Agricultural land quality assessment depends of several factors like soil subtype, granulometric composition and level of cultivation. Land quality assessment determines an individual assessment contour. Average quality assessment for all land is calculated, knowing assessment of a certain contour (Nikodemus et.al, 2008). Although Latvian legislation regulates the use of land of high value (more than 50 points), economically reasonable is afforestation of land with the assessment of 25 points.

The case study. The financial impact of prevention of land degradations processes has been assessed from three aspects:

- reduction of real estate tax in case of afforestation;
- calculation of expenses of arrangement of drainage systems and afforestation;
- analysis of the amount and type of the support payments.

The farm “Veckuipji” with an area of 60 ha has planned reconstruction of drainage systems and land afforestation. The financial analysis was performed from three aspects – expenses, support payments and reduction of real property tax (Table 1).

Cadastral valuation is a massive periodic assessment of real properties carried out by the State Land Service. Cadastral valuation consists of development of the basis of cadastral value and the calculation of cadastral value. Cadastral values are mainly used for the calculation of real property tax.

Table 1

Financial analysis of prevention measures of land degradation processes in the farm “Veckuipji”

Category of financial impact	Euros
Reduction of real estate tax	168 (per year) 6,726 (in 40 years)
Expenses of arrangement of drainage systems and land afforestation	30,955
EU support payments	30,959

The process of *cadastral* valuation is determined by specific rules for all cadastral objects registered in the Cadastre Information System. The cadastral value has to be calculated directly when characteristics having an influence on cadastral value have changed. On the other hand, the Law on Immovable Property Tax determines objects which are subject to real property tax, for example, tangible items which are located in the territory of Latvia and cannot be moved from one place to another without damaging them, such as land and buildings, including registered non-operational buildings and engineering structures in the cadastral information system. Secondly, the law states which properties are not taxable for property tax purposes, for example, the local government-owned real properties, public water reservoirs, the land under public highways, roads, underground roads, tunnels, streets, railway tracks, city rail roads, bridges and piers. It is necessary to know the cadastral value of property, to calculate the amount of real property tax. The cadastral value of land (Kv), located in the rural area, is calculated using the following formula:

$$Kv = (P_{LIZ} \cdot BV_{LIZ} + P_M \cdot BV_M + P_{P_Z} \cdot 0,8 \cdot BV_{LIZ_I} + P_{P_D} \times BV_{LIZ_{IV}} + C_{maja}) \cdot K_{apgr} \cdot K_p, \quad (1)$$

where: P_{LIZ} : area of agricultural land [ha];

BV_{LIZ} : base value of the zone of agricultural land [EUR/ha];

P_M : area of forest [ha];

BV_M : base value of the zone of forest land [EUR/ha];

P_{P_Z} : area of other land [ha];

BV_{LIZ_I} : base value of the 1st quality group of agricultural land [EUR/ha];

P_{P_D} : area of yards and fish pounds [ha];

$BV_{LIZ_{IV}}$: base value of the 4st quality group of agricultural land [EUR/ha];

C_{maja} : constant of effect of a dwelling house;

K_{apgr} : ratio of correction of encumbrances.

The change of the category of land use – an area of agricultural land (P_{LIZ}), an area of forest (P_M) and an area of other land (P_{P_Z}) directly affects the cadastral value as well as the rate of the real property tax. However, the Regulations of the Cabinet of Ministers of the Republic of Latvia No. 76 state that land occupied by cultivated forest stands is not taxable for property tax purposes. The legislation provides that the real property tax does not apply to young stands of conifer and hardwood trees to 40 years of age, young stands of soft deciduous (except grey alder) trees to 20 years of age and young stands of alder trees to 10 years of age. Reduction of real property tax could be as a result of afforestation.

Financial resources needed for the reconstruction of drainage systems can be calculated for the following measures:

- deepening of the ditches;
- digging of new ditches;
- moving and levelling of excavated soil;
- construction of culverts and footbridges;
- installation of main drainage collectors;
- installation of drains;
- construction of drains outfall;
- harvesting of bushes;
- removal of ruins;
- filling of ditches;
- cultivation of soil (Kļaviņš, Sudārs, 2010).

Financial resources needed for afforestation according to the calculation of "Skogssallskapet", Ltd, can be calculated for the following activities:

- preparing of necessary specific soil;
- planting of forest stands;
- planting material itself;
- improvement of young stands of trees;
- adding of saplings in young stands of trees.

The European Union covered various activities of programs related to rural development until 2014. For example, the Rural Development Programme of Latvia for 2014-2020 developed by the Ministry of Agriculture is a base document to receive granted 1.53 billion euros in the framework of the Common Agricultural Policy 2014-2020. As a main points in the Rural Development Programme of Latvia for 2014-2020 are stated:

- generation of income from efficient production increasing value-added and market-oriented products;
- support to small and medium-sized farms;
- creation of value of each one hectare of land and forests as well as water objects;
- countryside management, where people are able to earn money and keep a family;
- development of science and improvement of the level of knowledge.

Conclusions and proposals

1. Common processes of land degradation in rural areas of Latvia include overgrowing of agricultural land, land abandonment and inefficient maintenance of drainage systems.
2. Afforestation of unused agricultural land facilitates sustainable use of land.
3. The prevention of land degradation process requires financial investments, which can be covered by several support payments.
4. The spatial planning documents may be improved by development of thematic plans which represent the land quality assessment map with areas up to 25 points for afforestation of less worth agricultural land, but not unused or abandoned valuable agricultural land.

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PROBLEMS OF UNINHABITED HOUSING IN LATVIA

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Abstract

The aim of the research is to find out the causes of emergence of uninhabited dwelling houses, to state the criteria of their defining and identification, to work out possible solutions for improvement of the situation. The information from the Central Statistical Bureau, the data from the census of 2011 and the information about buildings or slums gathered by the local municipalities have been used in the research. As a result, the classification of uninhabited buildings and recommendations have been worked out.

Key words: dwelling house, housing fund, uninhabited dwelling.

Introduction

One of the most vital problems in the second half of the previous century in Latvia was the lack of housing fund and its inadequate management. As a result of migration strong demographic growth occurred, and an issue of the shortage of housing was addressed by setting restrictions on living space per person as well as by intensive construction of new urban neighbourhoods and villages. By contrast, the resources for maintenance of historic and existing dwelling houses were inadequate or were not provided at all leaving them without repair for decades. Only when a dwelling house was in a critical condition, funding was assigned for its overhaul.

During the Soviet era, the state had exclusive ownership rights to the land, and it was handed over to state or municipal enterprises as well as to individuals for building dwelling houses or creating farms. Unlike land, buildings could belong to different entities: local councils, the state, cooperative and public organizations as well as to individuals (citizens). Dwelling houses were built and maintained by using the funding of the state, municipalities, agricultural enterprises, collective fisheries and private money of individuals. All housing fund, depending on its ownership, was divided into two groups - public and private. A dwelling house was part of the public sector housing fund, if it was built by using state or municipal funding and if it belonged to the state or local government institutions, agricultural enterprises or collective fisheries.

At the time of restoration of independence in Latvia, the private sector of dwelling houses made up 30% of the total housing fund. As a result of privatization of dwelling houses belonging to the state and local governments and thanks to the rapid pace of construction of new dwelling houses, the structure of ownership of the housing fund has changed and the share of the private sector of the housing fund in late 2009 has reached already 89% (Industry, construction, housing ..., 2013). Multi-apartment dwelling houses built during the Soviet era and the historic dwelling houses that were still preserved accounted for the largest part of the housing fund; a person could claim ownership in the process of privatization of dwelling houses which at the end of the century. It was necessary to invest considerable financial resources into the property acquired by natural persons that previously had not been adequately maintained, but such resources were not always available. Previously the state or municipalities were able to attract resources in critical situations, however, now it was more difficult or even impossible for individuals. As a result, buildings deteriorated even faster than before and became uninhabited or even dangerous.

The aim of the research is to identify the causes of emergence of uninhabited dwellings and the problems connected with their maintenance in Latvia. There have not been made extensive studies on the use of dwellings and the reasons for not inhabiting them; solutions to these problems are in hands of dwelling house owners and local governments. In order to achieve the aim, the division of housing fund in statistical regions of Latvia, data of construction of new dwellings and their occupancy rates as well as households' satisfaction with the existing dwelling were analysed. The research results show that the occurrence of uninhabited dwellings is affected by economic, legal and social factors for the solution of which there is no single regulatory framework at present, and there is not any established practice for solving particular problems. As a result, there is no target at the national level regarding the maintenance and renewal options of uninhabited dwellings or slums, and each municipality takes measures according to the available resources, which in some cases are not big enough to keep the existing historic buildings. The author believes that there is a need to develop laws and regulations for dealing with these problems, therefore the author offers to use part of the national housing acquisition and reconstruction support fund for restoration and conservation of privately owned dwelling houses

that are national historical and cultural monuments. In turn, local governments, when assessing the housing fund existing on their territory and its physical wear and tear, should incorporate criteria into the municipal binding regulations and a possibility to provide support for the preservation and development of the housing fund.

Methodology of research and materials

The statistical data of the Central Statistical Bureau and the information obtained in the census of 2011 were used to identify and analyse the current situation in the study of causes of emergence of uninhabited housing in Latvia. Methods of descriptive statistical analysis (graphs, tables, figures) and the time series analysis were used for data processing and analysis. The author examined the information gathered by local municipalities about unsuitable for living and dangerous buildings existing on their territory to find out possible factors that cause the emergence of the buildings unsuitable for living and the solutions to combat the problem. The method of the empirical research was applied for evaluation of facts and determination of the overall relationships as well as for making conclusions; the methods of logical design and interpretation were used for describing findings and drawing conclusions.

Discussions and results

Views of households about suitable dwellings change in different periods of time, while new possibilities create wishes and needs of households for another type of dwelling. The housing fund of Latvia is not always able to provide the level of comfort that meets people's expectations. Housing is considered the main feature of the environment necessary for human life and existence, at the same time it is also one of the nation's welfare indicators.

The number of dwelling houses changes as new ones are built, physically and morally outdated dwelling houses are pulled down, but in some cases, if it is economically viable, they are rebuilt or restored. The changes in the housing fund are connected with the developments in the national and world economy. Changes have different dynamics: they are possible in the direction of an increase and a reduction. Active construction of new dwelling houses and restoration or rebuilding of the existing houses takes place during the boom of economic development, thus creating new dwellings and increasing their availability and quality. These measures include demolition of morally and physically worn-out dwelling houses, which, in turn, reduces the volume of the housing fund. (Sideļska, 2011) The housing fund is reduced also by damage caused by natural disasters (storms, earthquakes, volcanic eruptions, floods, etc.) or human activities (fires, acts of terrorism, acts of war, etc.).

The structure of Latvian housing fund is characterized by a considerable number of dwelling houses which were built thirty or more years ago (Fig.1). Only 5% of the total number of dwelling houses in Latvia were built after 2000, but 10% of dwelling houses have been built a hundred or more years ago (CSP, 2015A). The largest proportion of buildings built a hundred or more years ago are in such countries as Luxembourg (21.8%), Denmark (19.7%), France and Great Britain (17%). The smallest number of old buildings is in the Czech Republic (3.4%) and Romania (3.9%) (Ministry of the Interior and Kingdom Relations, 2010; Sideļska, 2011A).

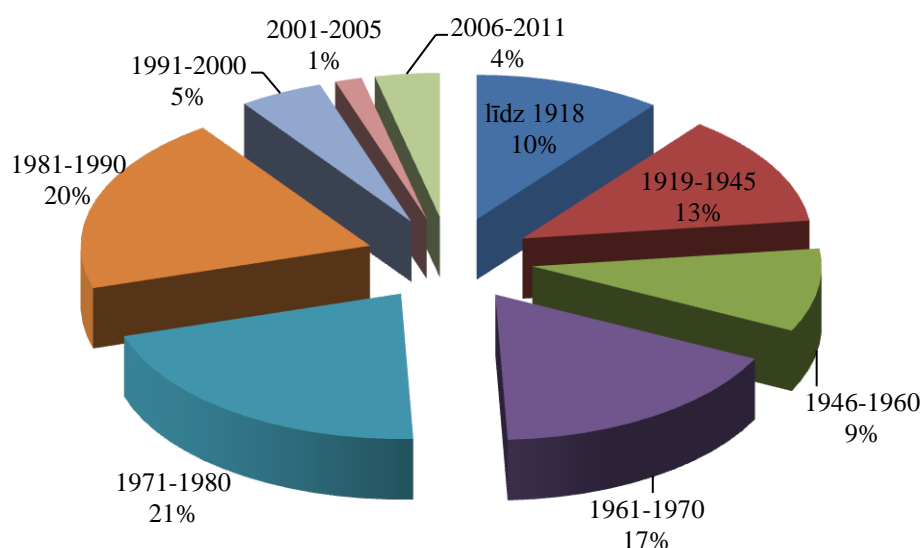


Fig. 1. Division of dwelling houses in Latvia according to the year of their construction.

Latvia, like almost all EU member states, suffered during the Second World War, and in some cities the housing fund was completely destroyed, therefore in the post-war period there was active construction of the housing fund, when 67% of the total number of dwelling houses were built in the time period from 1946 to 1990. As the study of the Ministry of the Interior and Kingdom Relations of Great Britain 'Housing Statistics in the European Union 2010' shows, the largest number of dwelling houses was built in Germany (46.3% of the existing housing fund) and Romania (37.3%) from 1946 to 1970. The number of dwelling houses built in other EU Member States accounted for 15.9% in Ireland, up to 37% in Sweden. The time of construction of buildings, the materials and facilities used, the maintenance of the building and its wear and tear as well as arranged property rights are the factors affecting the use of the dwelling houses and their compliance with the requirements of today's households. Since 2009 the state continued to provide support to improve the heat insulation of the apartment houses built in the pre-war period and during the Soviet era in the scope of the activity 'Heat Insulation Improvement of Apartment Houses' of the working programme 'Infrastructure and Services' using the ERAF co-funding. Mostly apartment houses are in poor technical condition and are characterized by low heat resistance, which, in turn, contributes to an increase in payments for heat. A society of apartment owners may receive the support for thermal insulation of apartment houses and their renovation if construction of the building was begun before 1993, and it was put into operation by 2002, with the exception of the buildings, included in the National list of protected cultural monuments. It is also available for buildings with a small number of apartments if they are located in areas with high spatial development index. According to information collected by the Ministry of Economy (July 6, 2015), 1,440 applications for building insulation and renovation projects have been submitted, 625 of the projects were completed and 190 are still in the implementation process (Ekonomikas ministrija, 2015).

According to the author, energy efficiency issues should be addressed not only in apartment buildings, but also in private houses the total number of which is much larger than apartment buildings. In the majority of cases the energy efficiency of private houses is lower than of apartment houses, as they were built using the financial resources available for the household, therefore the materials selected and the quality of construction of buildings were consistent with the available resources.

There are one million and 19 thousand dwellings in Latvia, and their total area in 2014 was 71 thousand square meters - 35 m² per one inhabitant. The distribution of the living space between regions is not even, and 26.0% of all living space is situated in Riga, where 32% of all people live. The second largest region in terms of living space is Pierīga region – 23.6% of total public housing. It is in this region, where there were the most newly built dwellings and their area - 51% from the total growth of housing in Latvia since 2000. Comparing to other regions, including Riga region, the growth of housing was 8-12%, while in Latgale only 7% of the total growth of living area during this period. The concentration of the living area in the vicinity of Riga was linked to the offered job

opportunities and services available. In other regions the distribution of the housing fund ranged from 11.1 to 13.2%, and only in Latgale region it reached 14.2% of all housing area, which was influenced by the location of the second largest Latvian city by the population - Daugavpils in it. (CSP, 2015A)

According to the census results of 2011, 20.6% of housing were not permanently inhabited in Latvia (Fig.3). The least number of unoccupied housing is in Riga – only 16.7%, which is explained by greater employment opportunities than in other Latvian regions as well as by a wide range of educational and social networks.

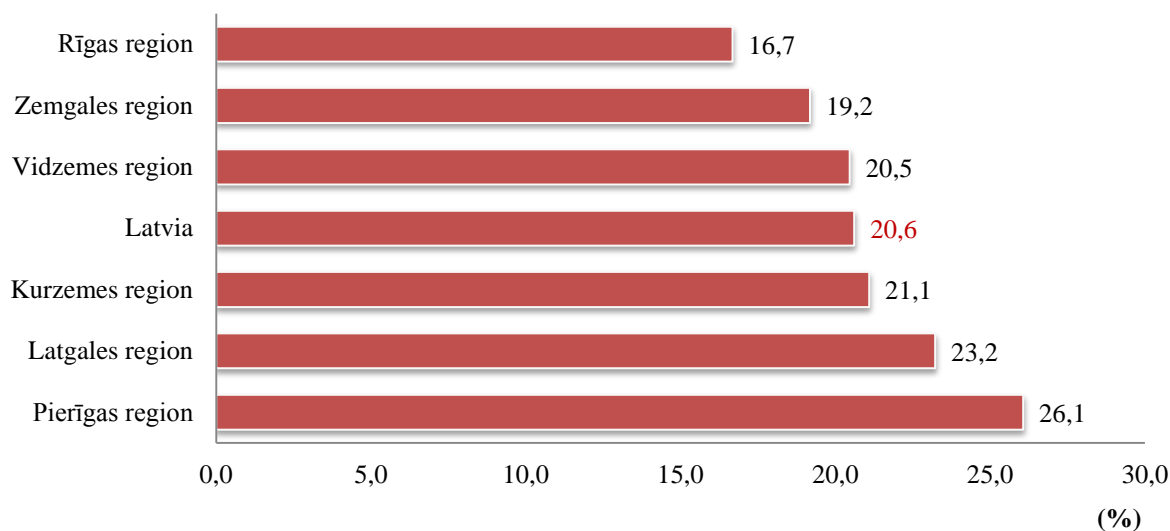


Fig. 2. Division of uninhabited housing in Latvian regions in 2011 (%).

By contrast, most uninhabited housing was in Pierīga region – 26.1% of the total number of dwellings that exceeds the volume of uninhabited housing in Latgale region (23.2%). Pierīga region comprises territories along the coast of the Gulf of Riga, where summerhouses have been preserved and built. Unlike the summerhouses built in the previous century, now availability of amenities enables people to live in them all year round, and, accordingly, they are classified as dwelling houses.

Dwellings which are empty and unused for living comprise several groups of buildings, including buildings, which have not been used for a long time, buildings with unfinished construction process or buildings recognised as ownerless property. After 2008 crediting institutions laid hands on a significant amount of housing fund during the period of economic downturn in Latvia, consisting of real estate developers' unfinished dwelling houses, completed dwelling houses that did not have adequate demand in the housing market and seized housing of households unable to cover loan obligations. For these reasons as well as to maintain the market value of the housing acquired in possession, crediting institutions were cautious in issuing new loans for construction of housing, which manifested itself in the form of a slowdown in the construction of dwelling houses.

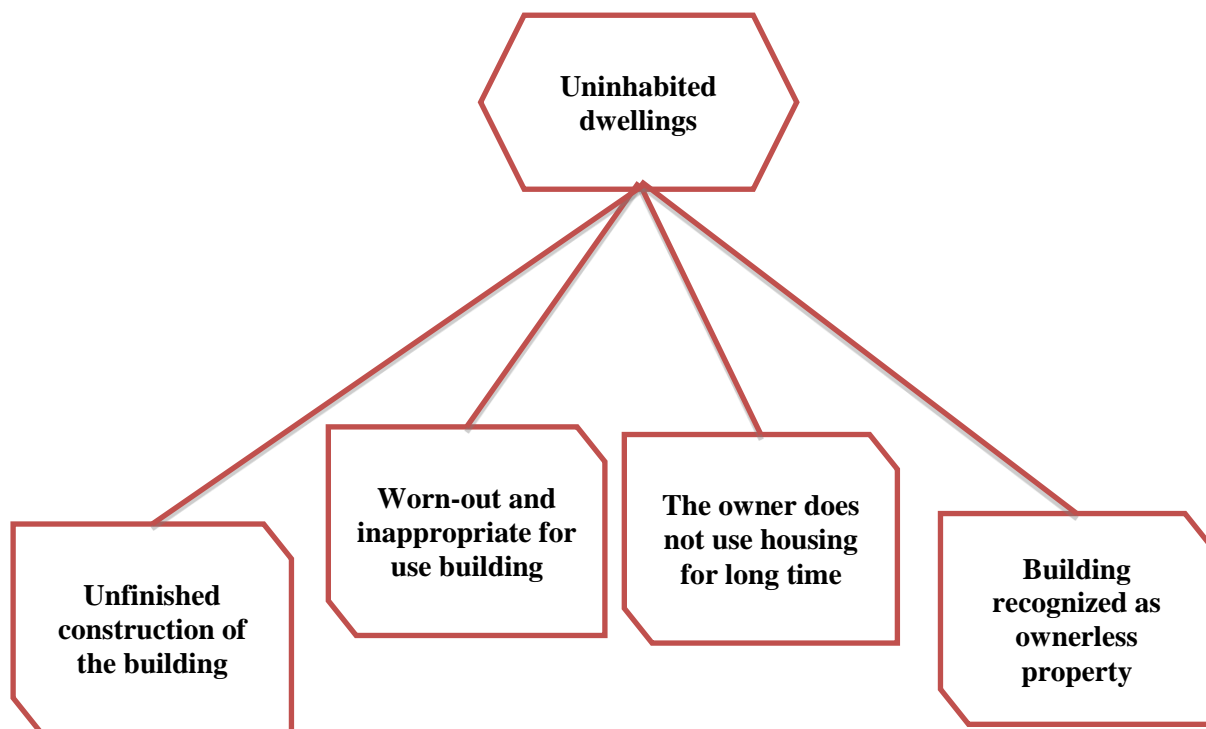


Fig. 3. Groups of uninhabited buildings.

The total area of the Latvian housing fund is made up of all dwellings, regardless of whether they are or are not inhabited and even buildings that are unusable for living or slums. There are abandoned and uninhabited dwelling houses both in remote areas of Latvia and also in small towns and cities of national importance, including Riga. The glossary of the Latvian language explains the term '*grausts*' (English: a slum) as 'a worn object or a building invalid for use' (Latviešu valodas vārdnīca, 1987). It would be analogous to the English term '*slum*' or German – '*elendsviertel*'. However, these terms abroad are used to denote slum districts – areas, where socially disadvantaged and vulnerable groups of people live in substandard or arbitrary constructed buildings, which are characterised by a high degree of criminogenic risk.

The total area of the housing fund is made up of all dwelling area, including the degraded housing fund - uninhabited buildings and even buildings unsuitable for living or slums. Abandoned and uninhabited dwelling houses have become a common sight in the landscape not only in Latvian suburbs and small towns, but also in Riga and other major cities. In 2011, Riga City Council Property Department recognized 452 buildings in Riga administrative territory as complete or partial slums, 109 of which were on the brink of collapse. In the second largest Latvian city, Daugavpils, there were listed 58 slums in 2011, but in Jurmala 146 buildings did not comply with the requirements of municipal binding regulations (Ozols, 2013). Comparing information given by different local municipalities, the first criterion for recognition of buildings as slums is the discrepancy with municipal binding regulations. As the municipal binding regulations are being developed in each municipality in accordance with its specific objectives, it is impossible to clearly define what criteria were used to identify the degraded buildings. The author considers that it is necessary to establish uniform basic criteria for the identification of degraded buildings in the existing laws and regulations and to leave only the municipality-specific regulations in municipal binding regulations.

The absence of common criteria is also a reason for the lack of uniform accounting of degraded buildings nationwide. The Cadastre Information System that registers real estate and its constituent parts - real estate objects as well as their characterizing data, currently does not have signs for degradation of the building. Such information is not available also in any other of the existing real estate accounting systems. Information about the criteria to determine the degraded buildings and the number of buildings identified is available in each municipality, but the overall survey is missing.

Handling buildings unsuitable for living is further burdened by the fact that some of them have been recognized as cultural historical monuments or some have been built by famous architects, giving them extra significance. For example, the author of the building in Riga, Marijas street 6, is one of the most famous Latvian architects - Konstantins Peksens (Konstantīns Pēkšēns). One of the first Art

Nouveau buildings in Riga, which was built according to the project of Rudolfs fon Cirkvics (Rūdolfš Heinrihs fon Cirkvics) is a dwelling house in Riga, Vīlandes street 11, but the author of the tenement house in Lomonosova street 5 was Mihails Eizenšteins (Mihails Eizenšteinš), etc. (Ozols, 2013). During the process of rebuilding or renewal of such buildings, people are faced with substantial additional resources, because rebuilding is restricted by legislation, which provides for the preservation of the historical look of the buildings – cultural monuments, with their characteristic elements. Often it is the unavailability of resources that hampers the desire of owners of the building to improve its condition. Considering the fact that the preservation of cultural monuments is in the interests of the whole society, it would be necessary to ensure closer cooperation between an owner of the building, the state and municipal bodies. Thus public resources should be combined with resources of the owner of the building in restoration and preservation of the buildings that have received the status of national cultural monuments. Similarly, local government in the territory of which the particular building is situated would participate in the process of upkeep of local cultural monuments. Implementation of the above mentioned proposals would require additional resources from the state and municipal budgets and it will be cumbersome to find them, therefore it would be possible to provide support to the owners of such buildings, for example, granting tax relief or supporting business development in the particular property.

One of the reasons hindering the process of putting in order the buildings unsuitable for living, is the unsettled property rights of these buildings that are associated with long-term legal proceedings and that prohibit the owner to freely dispose of the property, for example, to sell, to demolish buildings, or to attract additional resources. The local government is entitled to take action and put its immovable property in order, but it does not have legal authority to demolish the privately owned properties.

In the territory of Riga out of the 452 slums listed, 378 buildings belonged to private owners, and 197 of them were dangerous (Ozols, 2013). To improve the environment and to prevent the hazards of the rundown buildings, each municipality takes individual solutions, as the normative acts of Latvia do not address the problem mentioned. The municipality has the right to appeal to the owner and to point to the need to arrange the real estate or to impose an appropriate administrative penalty for the degraded environment. If the building is in such a condition that it is necessary to demolish it, it can be done also by using local government funding and then recover the damages from the owner. One of the ways of influencing the owner of a degraded building is considered by local governments the possibility to determine an increase of 3% in real estate tax rate for poorly maintained real estate. In this case it should be taken into account that the cadastral value of the building of which the real estate tax is calculated is inversely proportional to its physical condition and degree of depreciation – when depreciation increases, the value decreases. In this case, the solution would be to set a specific value for the buildings, which are registered in the Cadastre Information System with a degraded building sign.

The degraded housing fund comprises not only old, worn-out dwelling houses, but also unfinished, dangerous buildings. Unfinished newly constructed buildings make up 9% of all buildings unsuitable for living, and in some cases they may be even more dangerous than the well-aged buildings. Also in this case a regulatory framework is required that would ensure accountability of the owner of the building if the construction is not finished within a specified period.

In some cases, the local government may have an interest to obtain the degraded dwelling house in its possession and restore or rebuild it so that afterwards it can be used to ensure the municipality functions. The local government would need the rights to expropriate the degraded property to achieve this. However, the expropriation of buildings and arrangement would require significant financial resources and, therefore, only large municipalities could take such actions.

The proposed changes in laws and regulations as well as involvement of the state and local governments and granting of additional rights would make it possible to reduce the volumes of the uninhabited and degraded housing fund and in the long run would improve the environment. Information about uninhabited and degraded buildings would serve as the basis for the development and implementation of further action plans, as well as for planning the necessary resources.

Conclusions and proposals

The state support programme for reduction of degraded housing fund would improve and put the environment in order as well as reduce the number of dangerous objects.

Information about the uninhabited and degraded housing fund is available only in some municipalities, but it is not gathered and stored systematically about the entire territory of the country.

Each municipality chooses individual criteria for identification of degraded buildings that are found in its territory. That hinders the possibilities to compare and assess the condition of buildings in different municipalities and in the country on the whole.

The information about the features of degraded buildings given by a local government is not available and binding to others.

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ROLE OF LAND RESOURCES IN REGION'S ECONOMY

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Abstract

The article describes aspects of maximum application of economic potential of land resources as an economic category for territorial organization of production. The author has analyzed indicators of estimation of efficiency of economic potential of land resources on the territory of the region, where volume of gross output of agricultural production is considered a principal one.

Key words: economic potential, land resources, regional economy, efficient utilization, production of gross output.

Introduction

Ukraine has a rather powerful potential of land resources for agriculture, rational utilization of which determines efficiency, profitability, competitive capacity of regional economy. Efficient utilization of them is a guarantee for sustainable development of a region and the state. Thus, estimation of the resources' conditions and tendencies determining changes of their characteristics requires considerable attention. Conditions and prospects of social and economic development of a region directly depends on rationally developed regional policy, concepts of sustainable development, establishment of investment-innovation mechanism in utilization of land resources. Under present conditions, one should consider social and economic, ecological and historical peculiarities of a region in order to raise efficiency of land resources utilization. Performance efficiency of national economy largely depends on an increase of efficiency of utilization, reproduction and protection of land resources of the region. Economic-ecological efficiency of land utilization is not substantially studied and described with consideration of an internal regional aspect, particularly within the boundaries of separate administrative-territorial regions, including Lviv region. Thus, there is a need to carry out a research on efficiency of utilization, reproduction and protection of land resources in Lviv region, including one from a perspective of districts as an important agro-industrial region of Ukraine, having favorable natural-climatic conditions for establishment of regional economy. The fact has determined the topic research, its aim and tasks.

The aim of the article is to provide theoretical-methodological fundamentals and ecological-economic bases as well as develop practical recommendations and proposals for the increase of efficiency of land resources' utilization as an economic category in the structure of regional economy.

Methodology of research and materials

Theoretical and methodological basis of the research includes principal fundamentals of economic theory, economics of nature management and environmental protection, regional economy, scientific works of domestic and foreign scientists in the field of the investigated topic, legislative and normative-legal acts as well as the concept of sustainable development and rational utilization of land resources.

Discussions and results

Under conditions of establishment and decentralization of regional economies, reforming of agrarian sphere by means of maximum application of economic potential of land resources as an economic category is a topical issue for territorial organization of production. However, irrational utilization of land and the decrease of soil fertility have caused the fall of economic potential and deterioration of ecological conditions of land resources.

Effective land management is a major challenge of modern sustainable development of economy because rational land use pays an important role not only in agricultural development, but also in the economic development of the country on the whole.

Modern ecologic and economic problems of regions are a serious obstacle to further economic development. Rapid and unsustainable use of non-renewable natural resources and the exploitation of renewable resources at a rate that exceeds the possibility of recovery are realities of our time. Agricultural land use was no exception. The main problem in the system of agricultural land use is the transformation of land relations in Ukraine to market conditions without effective mechanisms for the reform. The state policy in the agricultural sector accelerated not motivated privatization of land and

property causing destruction of major agricultural production. But the formation of new productive forms of production was not effective. The tendency of creating unsustainable agricultural land use is enhanced as a result of blocking the market of private farmland (Shkuratov, 2013).

Land and resource potential is a condition required for the sustainable development, a precondition for a constant performance and the basis for economic security of a region. Utilization of land is considered an efficient one in case it secures scientifically grounded economic effect of farming and improves soil fertility and ecological conditions of environment. Lviv region is a region possessing potentially effective land resources. Total land area of the region amounts to 2,039,550.5 ha, while agricultural land occupies – 1,368,131.7 ha, i.e. 67.01 %, production of gross output accounts for 8,720.1 mln UAH.

Table 1

Characteristics of land resources and production of gross output in Lviv region

Cities of regional importance	Land area, ha	Agricultural land, ha	Production of gross output, mln UAH
Brodivskiyi	116,205	67,166.1	447.9
Buskyyi	85,006.1	56,786.7	397.3
Horodotskyyi	72,555	55,267.3	405.2
Drohobyt'skyyi	120,598	63,623.5	364.6
Zhydachiv'skyyi	99,595	67,678.6	460.3
Zhovkiv'skyyi	129,423	84,658.3	639
Zolochiv'skyyi	109,700	73,679.9	558.8
Kamianka-Buzkyyi	86,758	59,496.9	430.6
Mykolaiiv'skyyi	67,469.5	39,937.8	343.2
Mostyskyyi	84,534	61,345.5	335.9
Peremyshlianskyi	91,794	57,664.4	369.1
Pustomytiv'skyyi	94,607	67,703.5	659.1
Radekhiv'skyyi	114,384	74,205.7	420
Sambir'skyyi	93,374	72,055.2	469.1
Skoliv'skyyi	147,091.1	36,502.6	135.4
Sokalskyi	157,011	104,994.8	745.3
Starosambir'skyyi	124,517	57,825.2	309.3
Stryiskyyi	80,771	46,140	525.4
Turkiv'skyyi	119,340	154,403.2	233.6
Yavoriv'skyyi	44,817.8	66,996.5	471
Total	2,039,550.5	1,368,131.7	8,720.1

Skole district is characterized with a direct relation between the land area (157,011 ha) and production of gross output (745.3 million UAH). A reverse relation is observed on the territory of Turka district, where lands occupy 119,340.0 ha, and production of gross output accounts for 233.6 million UAH.

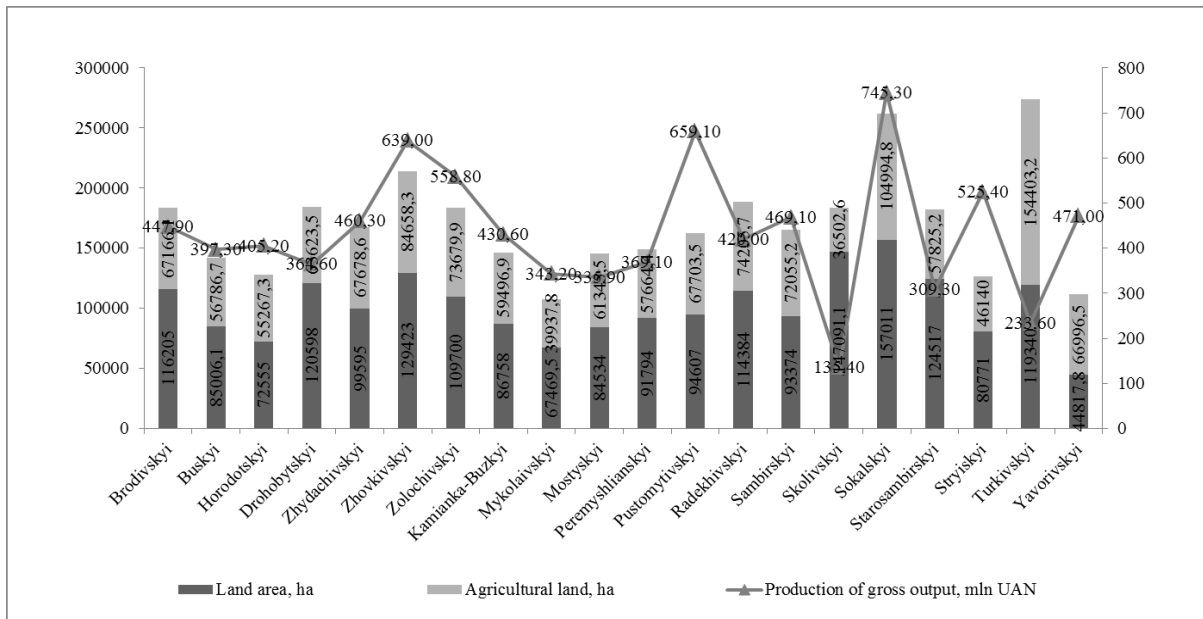


Fig. 1. The distribution of the land fund and production gross output.

The growth of gross output is a principal indicator in the process of evaluation of land resources' utilization. General gross output of agriculture accounts for 8,813.3 million UAH in the region and it corresponds to 3.5 % of the total volume in the country. Thus, the region takes the 16th place in the rating of regions.

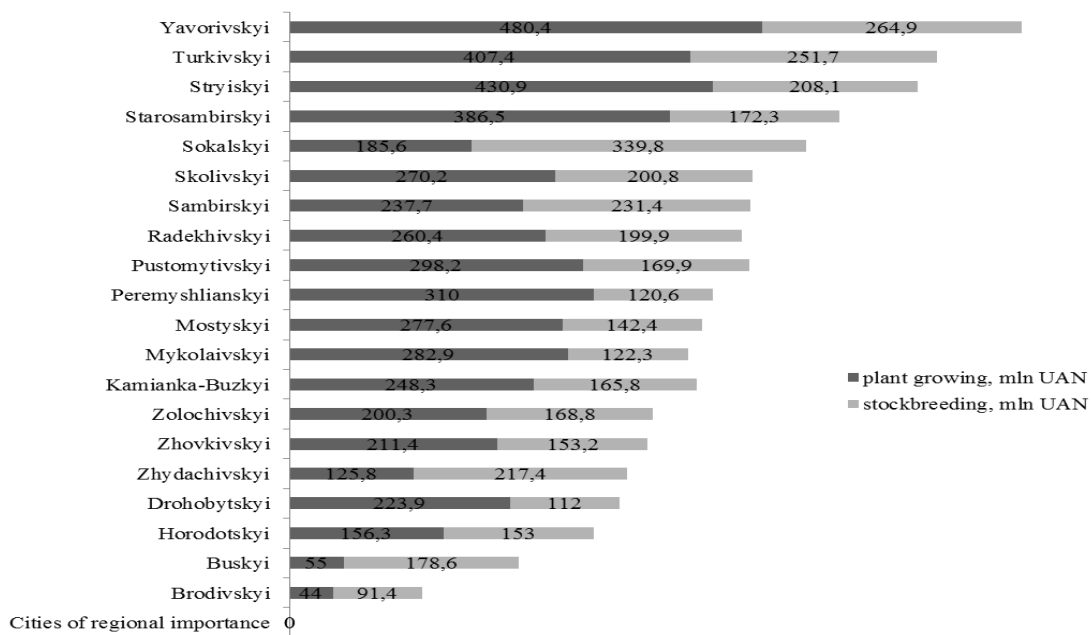


Fig. 2. The distribution of the land fund and production gross output.

Land resources in agriculture combine such features as territorial basis to place productive forces, properties of natural resources and main production means. The level of their reproduction is determined by the nature of economic impact of economic entities managing them.

Environment and economic feasibility of territorial redistribution of land resources based on relevant national and regional forecasting developments has not been conducted in the region. Implementation of transformation of the structure of land resources deepened ecological imbalance of land resources, caused the loss of efficient land use and land protection, natural ability to restore soil fertility. The current system of agricultural production and land use in the region does not meet the requirements of sustainable environmental management. The ratio of environmentally acceptable ratio of cropland size, natural grasslands and forest plantations are violated (Bordyuzha, 2014).

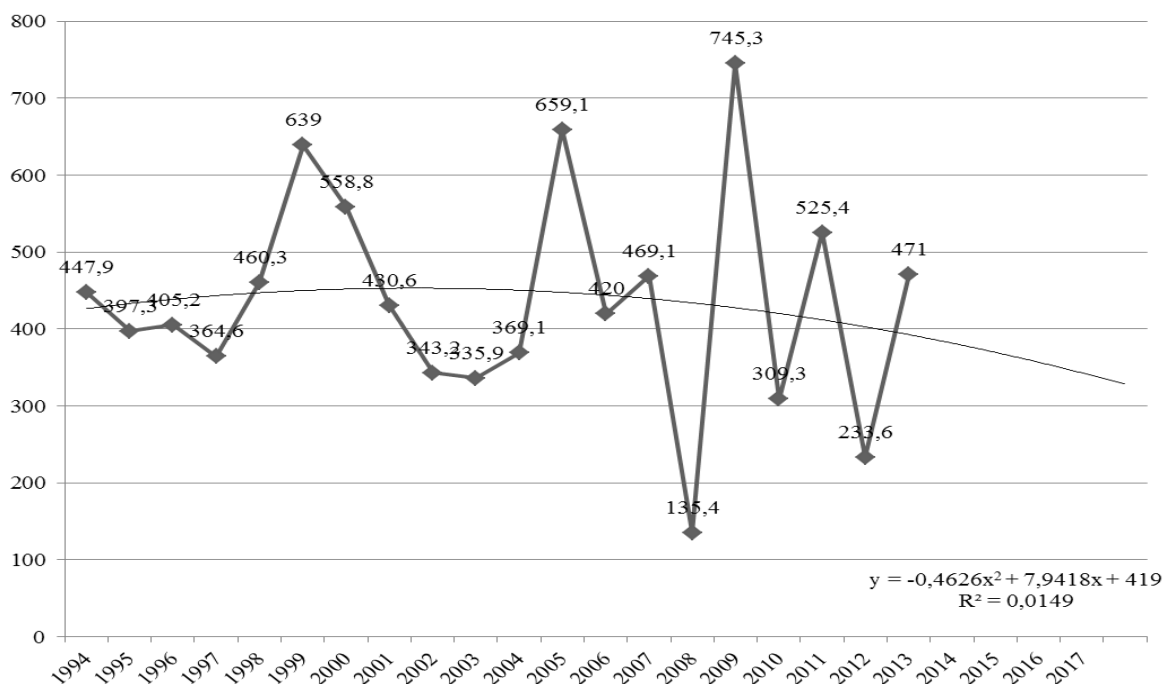


Fig. 3. The forecast of production gross output.

It is known that the indicator of production of gross output of agriculture is a partial, generalizing one, thus it can change because of the space aspect, time range, an impact of organizational, economic and innovative mechanisms. The indicator increases because of sustainable land utilization of the region under market conditions. That is why, performing evaluation of economic potential of land resources one should consider such indicators as net income from sales – 5,741.5 million UAH, financial result from sales – 1,517.5 million UAH, level of profitability – 35.9 % and cost price of cereals production – 134.17 c/ha (Agriculture Lviv region, 2014).

The level of Ukrainian economic development, revival of its economic power in the global society is mostly determined by the agricultural sector progressive development with high resource potential. However, in the current state of the Ukrainian economy, the agrarian sector fails not only to provide the state with significant competitive advantages in the world market, but also to solve the main problems of the domestic food market. The available potential is not actually implemented. It is obvious that the problems of the branch development are caused not only by limited production factors, but also by the absence of the state regulation integral system concerning their distribution and use. The process to form the market of production resources in Ukraine is slow and it is not characterized by a high socioeconomic efficiency owing to the peculiarities of the transition period, inefficiency of the legal framework and population's biased attitude to formation of private property and introduction of market relations in rural areas.

The solution of these problems should be undertaken by the state. Public policy in the agricultural sphere should be based on new approaches in decision-making concerning rational use and protection of land resources, creation of optimal conditions for social development, land investments and productive potential, its transformation into an independent factor of economic growth. The state can achieve this goal by using both economic (involving the use of incentives) and administrative methods (based on the power of authority, discipline, responsibility), which would be realized in the overall economic reform (Koval, 2014)

Economic methods of management of land resources reproduction are the means of achieving economic management objectives through the implementation of economic laws. In other words, economic methods in the contemporary sense are economic calculations based on the conscious use of the entire system of economic laws and categories of market economy.

A set of economic methods is conditioned by the ownership of basic means of production. Economic methods of land resources' reproduction management aim at creating economic conditions triggering the rational use and protection of land without the impact of administrative measures. In terms of paid use of land, a group of economic methods refer to financial, marketing and fiscal tools. Their implementation is carried out by public financing of certain types of land use, creating reserve budgets

for the development of territories, creating favorable and burdened conditions to use land, payment of damages, valuation of land and real assets, formation of developed market, land taxation (Ainur, 2014).

The effective land market is the main prerequisite of high socio-economic efficiency of land relations, sustainable socio-economic development, improved living standards, food security, improved agricultural production. The efficiency of land use depends on how properly land market will be organized. Agricultural land market is an essential condition and means for the development of agricultural sector. Land is a commodity that is the object of sale, lease, and mortgage. Involvement of land or rights to use it in the market economy promotes business and investment activity increasing the efficiency of land ownership in country. Taking into account international experience, it may be noted that well-established land market is the guarantee of the basic needs in the modern society and in the state in general (Kozlova, 2014).

Conclusions and proposals

The research results lead to the conclusions that the potential of land resources is an economic category demonstrating material efficiency by means of criteria and indicators of economically profitable agricultural production, where gross production output is the principal one. As regards the territory of Lviv region, it accounts for 8,813.3 million UAH in 2013 or 85.1 % in relation to 1990 and 126.4 % in relation to 2000, demonstrating a tendency to increase. Having analyzed the indicators, we are able to confirm an insufficient output of production obtained from one hectare at minimum expenses on land resources with consideration of particular natural-climatic conditions on the territory of the region.

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THE CHANGE OF FOREST COVERAGE IN LITHUANIA

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Abstract

The article presents the Lithuanian forest land change in the period of more than a hundred years. The causes leading to forest land use change are analyzed in the article. The beginning of forestry in Lithuania can be traced back to Sigismund Augustus times starting from 1557, when Wallach reform was launched. However, over time forest land and its use evolved for a variety of political, social and economic factors. In 1795 the state-owned forests in Lithuania amounted to 35% of the total area of forests; other forests were owned by landlords, churches and kulak farms. Later forests were cut down quite rapidly, many of them burned down, but reforestation work was insignificant. The smallest forest coverage during the analyzed period was in 1945, just 16.5%. Forests were thinned out, wastelands and waterlogged areas dominated. Later, albeit with different variations, the forest coverage of Lithuania increased and today forest area accounts for more than 34% of the total area of the country, the majority of which are private forests. More detailed characteristics of forest land use and user trends as well as their causes are presented in the article. It also looks at the possible prospects.

Key words: forest uses, forest coverage, afforestation, forest land, agricultural land use, land-use features, abandoned land.

Introduction

Lithuania is situated in forest area, where the natural vegetation is the forest. But over time forest coverage in Lithuania has declined due to human economic activity. 200 years ago the forest occupied almost 40% of the country, in 1914 – just 19.7%, whereas in 1939 – only 16.7%. After the Second World War, the deportations and later collectivization resulted in a lot of uncultivated land and the forest began to grow. Specific indicators of forest were analyzed by professors P. Matulionis (1930), M. Lukinas (1967, 1977), S. Karčiauskas (1971), N. Eitmanavičienė (1976), S. Karazija (1979; 1988), G. Pauliukevičius (1982), J. Kenstavičius (1995) and others. According to the state forest accounting data, in 1948 forest coverage of Lithuania was 19.7%, in 1956 – 22.6%, in 1966 – 24.6%, in 1983 – 27.9%. Before the restoration of Lithuania's independence, i.e. in 1990, the country's forest coverage was 28.5%. After the restoration of independence, the forest coverage of the country has been increasing and in 2000 it amounted to 30.9%, but in 2015 the total forest area is 2,220.5 thousand ha, i.e. the figure for forest coverage is 34.01% according to the Land Fund data of the Republic of Lithuania. The forests are dominated by conifers, they represent 64% of all stands. In individual regions of the country, the forest coverage is very uneven. This relates to the fertility of the lands.

Forests are one of the most important treasures of Lithuanian nature, having significant economic, social and ecological value. Lithuania has formed the long-term forestry policy and its implementation strategy in order to ensure sustainable forestry development, meet society needs for forests and ensure forest preservation for future generations recognizing the long duration of forests and different forms of ownership and their interaction, while promoting the conditions of correctly managed forests that would bring economic benefits.

Lithuanian forestry policy is formulated in accordance with: the Lithuanian Constitution and other laws; the European Convention for the protection of wildlife signed in Bern in 1979; the Biodiversity Convention signed in Rio de Janeiro in 1992; the world's forest conservation principles adopted in the United Nations Conference on Environment and Development; Ministers' Conferences (held in 1990 in Strasbourg, in 1993 in Helsinki and in 1998 in Lisbon) of European forest conservation resolutions; the European Union's forestry policy and strategy principles; the European Union directives, forestry and nature conservation issues. The European Union's forestry strategy (the latest version was adopted in 2013) approved by the European Council is guided by basic principles, namely: sustainable forest management, forest multifunctional role in maintaining the balance and ensuring forest protection; resource efficiency, forestry and the forest sector's contribution to rural development, economic growth and job creation optimization; responsibility for the world's forests by promoting sustainable forest production and consumption (Europos ..., 2013).

As can be seen from the above statistics, forests cover quite a large part of the territory of the Republic of Lithuania and the forest coverage is slightly higher than European average, but the forestry policy states that the country's forest coverage should increase to at least 35% taking into account the natural frame and landscape needs.

The aim of the research is to distinguish forest land use peculiarities of Lithuania. The objectives of the research is:

1. to examine the strategic documents, laws and regulations related to the forestry administration;
2. to examine the basic statistical indicators that characterize forest use and forestry system's development change in Lithuania;
3. to present major forest use change characteristics after the fulfilment of the analysis.

Methodology of research and materials

Scientific literature and legal documents, analysis and synthesis, statistical analysis and mathematical processing and comparative analysis were used to achieve the aim. The Lithuanian forest development and forest policies' change, forest utilization statistics, the laws, regulations, the afforestation program, strategy, research papers, rural development programs and other available literature were analyzed.

The main legal instruments that were analyzed in the research included the land and forest laws determining forest policy issues. Rural development programs are important in the context of forests growing. The State Forest Service statistics were analyzed as well: forestry statistics and the national forest inventory. One of the most important sources were the data of the State Land Fund describing all private, state and municipal land situated in the territory of the Republic of Lithuania. The collected data and information were structured and summarized.

Results and discussion

Lithuanian forestry by 1990. The times of Sigismund Augustus (since 1557, when Wallach reform was started) should be considered as the beginning of the forestry in Lithuania. It can be said that until the Union of Lublin (1569), Lithuania applied the field system, hunting in the forests and beekeeping were more important than wood. In the sixteenth century trees were already an object of trade. This is proved by forest-related references enlisted in the law of Wallach reform: forests were separated from the fields; stands were released (given) for the construction purposes and other matters only to those farmers who did not own the forest; the Law also dealt with deforestation and afforestation, reforestation, however, the purpose of afforestation was not forest cultivation, but the maintenance of hunted animals.

Lithuanian state forests in 1795 (Lithuanian-Polish division) amounted to 309 thousand ha (35% of the total forest area), other forests were owned by landlords, churches and kulak farms. Later forests were cut down quite rapidly. "The Forest Protection Act", released in 1888, could not stop deforestation any more.

During the German occupation (1915-1918), the forest coverage rate in Lithuania decreased even more. During the whole period of the occupation the clear felling was carried out in 26,512 ha and selective one – in 38,460 ha. The total volume amounted to 12 million m³. During the above mentioned period forests were not replanted, but large areas were burned down.

The Provisional Revolutionary landlords' and peasants' government of the Lithuanian Soviet Socialist Republic, which was established after the war, founded an immediate activity program by the manifest of December 16, 1918: all land with inventory as well as all the forests, waters and underground belonging to landlords, kulaks and monasteries was passed to the ownership of all working people of Lithuania.

The Soviet government protected the forests. In 1919, the Agricultural and Forestry People's commissariat issued a decree on the basis of which it was forbidden to deforest the growing forest. According to this decree the local population were allowed to use only deadwood, fallen trees and so on.

On August 18, 1920, "The Land Reform anticipatory law to alienate forests, wetlands, waters and the privilegedly acquired lands" was released. According to the law, 537 thousand ha of forests were expropriated until 1939. During bourgeois times, many forests were cut down. Forests were cut down not only for people's needs but also for export. About 260 thousand tons of wood were exported in 1929, and 420 thousand tons – in 1939.

Forests were regenerated very slightly. Since 1918 until 1939 (Fig. 1) about 260,245 hectares of forest were cut down, and 55,884 ha, i.e. only 21% of the total cut down area were sown and planted. In 1926 forests were sold in public procurement to peasants and in auctions – to forest merchants.

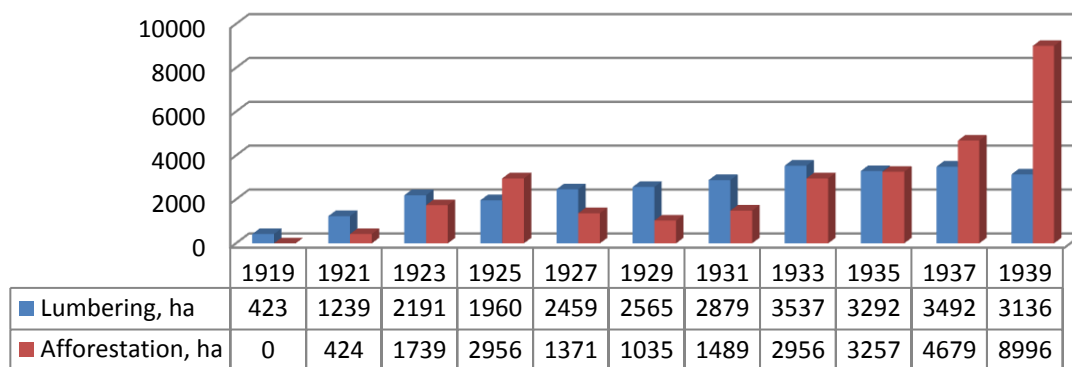


Fig 1. Deforestation and reforestation during the period between the years 1919 and 1939 (compiled from the source Ancukevičius et al., 1975)

Due to the deteriorating situation in forestry, the government was forced to adopt "Forest plantations law " on May 11, 1937. The law accelerated the forest growing work, but did not stop the destruction. The purpose of the law was to accumulate more funds for forest restoration, but it was not perfectly executed: forest enterprises exercised afforestation in their own discretion, a lot of money was returned, the quality of reforestation was poor, large areas of forests were left to natural regeneration, etc. (Ancukevičius et al., 1975).

Estimating forest land and stand groups, errors were not avoided, which over time decreased (in 1998 the error of forest land assessment was 2.52%, in 2002 – 1.14% (Kuliešis et al., 2003)). The data on the country's forest coverage (around 1980) in various sources are different, i.e., the data of the official statistics' website shows that forests in 1937 amounted to 906.482 hectares. According to the State Forest Service data from 1937, Lithuania's total forest area was 1082432 hectares, of which forest area occupied 931.986 hectares, while the non-forest area (i.e. roads, water bodies, peat bogs, soils, and grasslands) – 150.446 hectares (Lietuvos ..., 1973). Meanwhile, O. Ancukevičius et al. (1975) argued that in Lithuania state forest area was 728.913 hectares in 1937, while according to the official statistics' website – 733.822 ha. According to the forestry data of 1988, forest land occupied 1.931 thousand ha, while the Land Fund accounts for 1974.9 thousand ha. As one can see, the data really are quite different.

In 1940 forestry was neglected, forest coverage of the country amounted to just 16.7%. Forests were thinned out, while wastelands, waterlogged areas and so on dominated. In forestry, the same as throughout the Lithuanian SSR, socialist forestry system prevailed, socialist forms of work were widespread. However, in 1941 large-scale reforestation work began and about 9194 hectares of forest was re-established by sowing and planting trees. There were also concerns about the education of foresters – the Forestry Faculty of Vilnius State University was founded in the fall of 1940.

During the second occupation (1941-1944) forests in Lithuania were cut and eliminated rapidly. Under the pretence of the protection from partisans clear felling was conducted almost within 100 metres on both sides of roads and railway tracks. Immature forests with convenient access were cut down. Forest areas decreased dramatically. During the occupation, forests were destroyed by fires as well. Due to the war and other reasons, about 11.5 thousand ha of forests were burned down. It is estimated that the country's forest coverage in 1945 was below 17% (Lietuvos valstybiniai ..., 2012). At that time, an independent department of forests acted under the Kaunas General Commissariat, which handled all the forest administration activities. Forestry was dedicated to the needs of the occupants and some forests were planted only thanks to great efforts of foresters. Serious damage was done to forest management – fleeing Germans destroyed the central archive of forest management.

On January 1944 in Moscow, A. Kvedaras was commissioned to organize the Lithuanian SSR Forest Industry People's Commissariat, which was founded in July of 1944 and in 1946 was transformed into the Ministry of Forest Industry. This forest management body has been restructured for several times with the purpose of improving forest management. But the most prominent event happened in 1957 – the establishment of the Ministry of Forestry and Forest Industry of Lithuanian SSR. At that time the local administrative units changed as well: only forestries and one industrial forestry were left instead of former 34 forestries and 7 industrial forestries. The number of forestries has been gradually increasing, while reducing their size and improving the administration. Since 1964 forestries were

reorganized into four industrial forestries of a new type. Subsequently, the number of forest districts grew along with the growing number of forestries.

In 1945, Lithuanian forest coverage reached only 16.5%. However, 3257 hectares planted with forests already in 1945 and 6503 hectares in 1947. In 1946 sanitary felling was expanded. In 1948 forest coverage reached 19.7%. In 1949 the law "Concerning reforestation and forest growing measures' enhancement in Lithuanian SSR" was passed. 15 thousand hectares of forest were planted in agricultural land during the period between 1946 and 1950, in addition 11-12 thousand ha of forest were planted annually during the period between 1951 and 1970 (Lietuvos valstybiniai..., 2012). In 1951 the area planted with forest reached about 19 thousand ha per year.

Oak woodlands were restored until 1955. Larches were planted everywhere as much as possible. Forest drainage and road construction were taken care of. In 1956 Lithuanian forest coverage reached 22.6%, and in 1961 – 23.9%. Since 1961 the main forest felling in the republic has been carried out so as not to exceed the growth rate. In order to meet economic needs of the country, timber was transported from other republics. In 1965 the area of forests in the country amounted to 420 thousand ha (Table 1). Forest coverage reached 26.4% in 1973 (Antanaitis et al., 1988).

Table 1

Forest and agricultural land area (1965-1970), thousand ha

Year	Forest land	Fallow ground	Arable land	Meadows	Grasslands
1965	420	-	2,703	626	425
1966	432	25	2,505	467	442
1967	434	25	2,511	463	439
1968	451	17	2,497	454	470
1969	485	12	2,456	438	530
1970	497	9	2,458	430	551

(Source: Lithuanian Department of Statistics)

The analysis of Table 1 shows that the area of forests and pastures has increased. Forest management works expanded during the specified period, measures to protect forests have been improved. In 1983 Lithuanian forest coverage reached 27.9%. Arable lands and meadows gradually declined during that period. However, from 1975 until 1982 arable land areas began to grow slowly increasing by about 0.4 thousand ha annually and there were 2.411 thousand ha in 1985. Meadow areas decreased by 5.3 thousand ha from 1976 to 1985.

In 1985 the area of 9.9 thousand ha was cut down. During the period between 1986 and 1988 around 8.5 thousand hectares of forest were cut down, while in 1990 – 10 thousand ha. Felling area gradually increased, but efforts were made to replant it. In 1985 reforestation was performed in 8,747 hectares, from 1987 to 1989 – in about 7,800 ha and in 1990 – in 7,604 hectares (Lithuanian Department of Statistics). Farmland area decreased from 4,124.7 thousand ha to 3,373.0 thousand ha during the period between 1949 and 1989. It is likely that the area decreased due to its transfer to state forestries, due to urban development as well as the decrease in the number of individuals using agricultural land for personal use (Aleknavičius et al., 2010).

Forest area change after 1990. After the restoration of Lithuania's independence and the beginning of the land reform, the private forest area increased steadily. Forest coverage in Lithuania was about 29.8%. Before 1998 the national forest inventory was carried out irregularly and inaccurately therefore the exact information about forest resources and forest condition was not known. Since 1998 the national forest inventory (regional monitoring of forests has been carried out in Lithuania since 1987) has been organized. Currently, the inventory is carried out using a sampling method and is dedicated to the performance of Lithuanian forest monitoring. Meanwhile, the inventory of forest condition in Europe started around 1980 by means of a 16 x 16 km grid of the middle of that year (Vries et al., 2001). Forest monitoring program includes and values the crown condition, forest growth (gains), foliar and soil chemical composition (Forest intensive ..., 2001). The forest inventory was facilitated by technological progress (orthophotomaps, geo-referencing), various systems and applications (GIS). The inventory monitored cleared spaces, data on reforestation and afforestation, timber resources and other characteristics.

The analysis of the statistics shows that the biggest changes in forest coverage over 20 years were between 2006 and 2007, when the forest area has increased by 62 thousand ha. In addition, significant changes have occurred between 1998 and 2001, when the forest area increased by about 23.5 thousand ha. Forest land amounted to 1970.3 thousand ha in 1993, to 1974.9 thousand ha in 1998, to 1998.4 thousand ha in 2001. Forest land area increased by 14.7 thousand ha in the time period from 2006 to 2007 (Fig. 2).

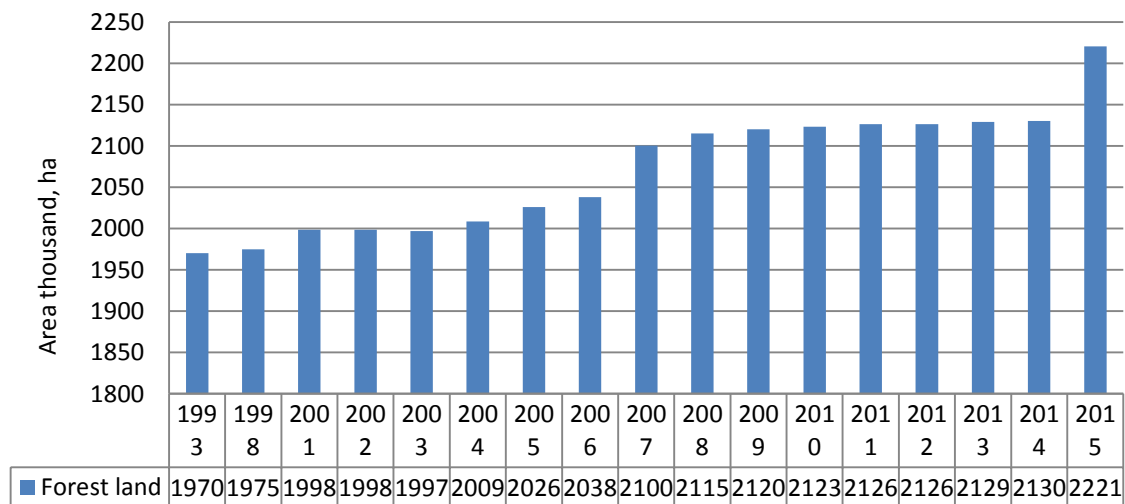


Fig. 2. Forest land area, thousand ha (Source: the Land Fund data).

Thus the country's forest coverage was 29.8% in 1990, while it reached 30.9% in 2000 and 2001. According to the long-term forest health monitoring results, the condition of all major tree species deteriorated until 1995. Since 1995 the improvement trend in the condition of forests was noticed. The condition of Lithuanian forests is average in comparison with other European countries (Lietuvos ..., 2002). Between 1993 and 1996 forests were cut down mainly due to windfalls, drought or insect damage, between 1997 and 2001 the felling of trees was done accordance with established norms. During the period between 1999 and 2002 the area from 0.8 to 1.0 thousand ha was afforested every year (Lietuvos valstybiniai..., 2012). In 1990, 7,604 hectares of state forest have been restored and planted, while agricultural land occupied 3,496.7 thousand ha. Between 1994 and 1997 forest enterprises carried out clear-felling in about 10,562 hectares, while reforestation and afforestation amounted to an average of only 7,935 hectares during the same period. Volumes of forest clear-felling in state forests has decreased since 1998. Clear-felling of trees was done in the area of 9,693 ha in the above mentioned period, while in 2007 – only the area of 9,414 ha. According to the General Forest Enterprise data, about 10,322 hectares of forests were restored and planted annually (by 2013).

Forest land area amounted to 1,998 thousand ha (30.6% of the country's area) in 2002, privately owned forest land amounted to 403.2 thousand ha (20.5%), the state forest land – 1560.3 thousand ha (79.5%). The largest part of private forests is situated in Telšiai, Panevėžys and Utena counties. 20.9 thousand ha on average were cut down annually, approximately 17.7 thousand ha of forest stands were restored, new forest in non-forest lands was planted in the area of 1.5 thousand ha in the time period between 2003 and 2007 (Kuliešis et al., 2009). The felling of trees prevailed in state forests while in private forests forests trees were cut down almost half as much during the period between 1993 and 2001 according to the analysis of the stem volume of cut trees. Clearfelling was done in 17 thousand ha of forest stands annually in the period between 1998 and 2004 (Kuliešis, 2006). As regards the period between 2004 and 2008, 16.2 thousand ha were restored annually on average, of which 8.6 thousand ha recovered spontaneously, 7.6 thousand ha were restored artificially (22.2 thousand ha were cut down, including 17.3 thousand ha of clearfellings on average). Reforestation and afforestation were carried out in unsuitable for farming lands with low productivity score as well as in cutting sites. Forest planting in non-forest land rules allow afforestation in agricultural land areas intervening between them; restrictions on afforestation were set in the rural development and other programs.

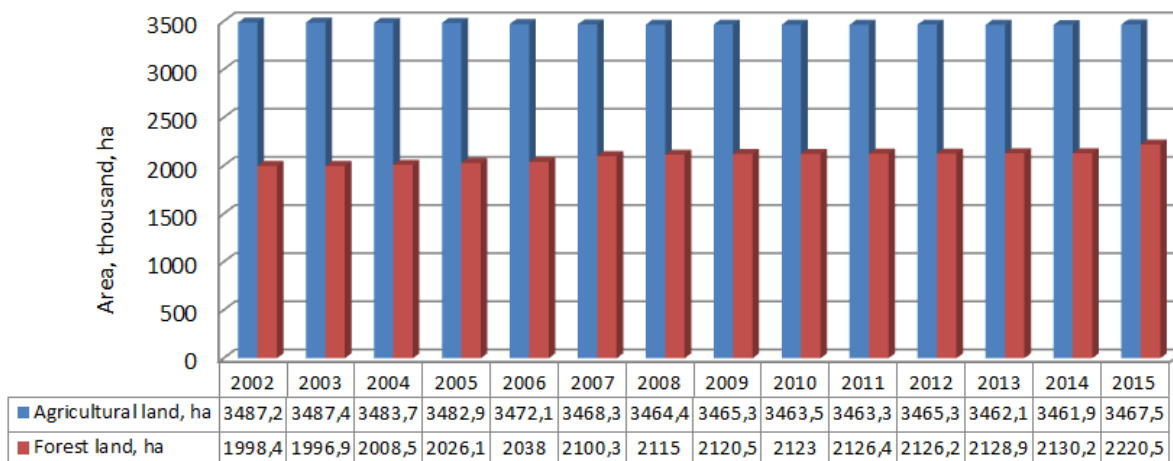


Fig. 3. Agricultural land and forest land between the period of 2002 and 2015 years
(Source: the Land Fund data)

The data presented in Figure 3 give evidence that forest land had a tendency to increase and agricultural land had a tendency to decrease in the course of more than ten years. Agricultural land decreased by 19.7 thousand hectares (about 1.4 thousand ha per year), while forest land increased by 222.1 thousand hectares (about 15.7 thousand ha per year) in the period from 2002 to 2015.

About 4-5 thousand ha of former agricultural land regenerated naturally according to the State Forest statistical data as of 2002 and 2003. Forest enterprises afforested 1,180.5 hectares of unused land and land unsuitable for agriculture in 2003 (Aplinkos..., 2003). 1,118 hectares of new forest was planted in the state forestry sector in 2004, 1.9 thousand ha of forests were planted in non-forest land each year (Kuliešis A. et al., 2009). More and more cutting sites were left for natural regeneration by forest enterprises between 2000 and 2005. Restored cutting sites in private forests amounted to 2,543 ha in 2004. From 2004 to 2008 the restored area increased by 862 hectares on average. 1,304 hectares of afforested land belonged to the state, 840 hectares belonged to the private land in 2005 (Aplinkos..., 2005).

In 2006 private landowners planted 2385 hectares of forest. The results of the survey of private forest owners, carried out during the years 2005 and 2006, show that only 36% of respondents believe that abundance of forests is too low in the county they live, more than a half (54.1%) believe that abundance of forests is enough. Respondents from Marijampolė (54.5%), Šiauliai (48.9%) and Klaipėda (47.3%) counties believe that there are not enough forests in their counties. However, overall, 77.4% of respondents say that the Lithuanian forest area is decreasing. This applies to all counties (Lietuvos miškų..., 2006). Forestry enterprises planted 1,230 hectares of new forests in the course of 2006. Between 2003 and 2006 forest enterprises planted from 1.1 to 1.3 thousand ha of new forests in vacant land of the Land Fund each year.

A declining roundwood demand and prices could be expected to result in decreasing deforestation in 2009. According to the State Forest Service data, 6.3 million m³ of merchantable timber was logged in 2002, 6.2 million m³ – in 2005, 5.7 million m³ – in 2008 and 2009. The felling of trees in state forests was carried out in the area of 138.4 thousand ha in 2008, and forest enterprises restored 9284 hectares of forest. In order to ensure sustainable forestry development, rational allocation and the use of the resources, forest enterprises passed 120.0899 hectares of land for afforestation in 2009.

10,193.7 hectares of forest were restored and planted in 2010. 38.4% of the total forest land consisted of private forests (the State Forest Service data for 2010). According to the data of the National Land Service under the Ministry of Agriculture, on January 1, 2010 there were 168,3 thousand hectares of land which was not used for agriculture and which was degraded in the country, including 145.6 thousand hectares of land not used for agriculture and 22.7 thousand hectares of damaged land. Abandoned land occupied the area of 176.9 thousand ha of the country in 2010. The survey carried out by the Lithuanian Institute of Agrarian Economics found that the majority of respondents pointed out that forest should be planted in such places (89% of specialists and 74% of farmers) answering the question, what should be done in abandoned land (Kuliešis et al., 2011).

The United Nations General Assembly officially declared that the year 2011 is the International Year of Forests. That decision was intended to draw the attention to the importance and the problems of

forests, to increase public interest in sustainable forestry and forest conservation. 10,324.2 hectares of forest were recreated and planted (in 2011 forest enterprises recreated 9.5 thousand ha, newly planted – 0.7 thousand ha). Over the past 10 years forest land area increased by 53.1 thousand hectares and a number of new forests were planted both in private and state land (22.5 thousand hectares were planted accounting for 42% of an increase in forest land area) during the same period, but the need to continue to expand forest areas remains. The land currently not used for agriculture and land inappropriate for use may be used for this purpose (Lietuvos..., 2012).

According to the data of the Land Fund of the Republic of Lithuania, in 2015 agricultural land amounted to the area of 3,467,599.20 hectare, and forest land – to 2,220,512.18 hectares (representing 34.01%). Alytus County has the highest percentage of forest coverage – 49.4%, Vilnius – 44.2% and Telšiai – 37.3%, while the lowest percentage of forest coverage is in Marijampolė County – 22.3%, in Klaipėda – 26.8% and 27.7% in Šiauliai County. The biggest change is visible in Utena County – the forest coverage increased by 2.8% there, however, the forest coverage increased by 2.3% in Telšiai and by 2.1% in Vilnius, in Tauragė County it remained the same, the forest coverage increased by 0.4% in Alytus County, by 0.5% – in Klaipėda, by 0.6% – in Marijampolė (Land Fund ..., 2015). Analyzing by counties one can see that the majority of abandoned lands that could be used for afforestation are in Utena County, which make up 2.37% of the total area of the county, in the county of Vilnius – 2.34%, in the county of Alytus – 1.37%, in the county of Panevėžys – 0.95%, in the county of Kaunas – 0.91%. The lowest percentage of abandoned land is in Marijampolė County – 0.46%, in Telšiai County – 0.47%, in Šiauliai County – 0.52%, in Klaipėda County – 0.57% and in Tauragė County – 0.66%. In the counties where productivity score is higher, the prevalence of abandoned lands is marginal, these areas are more intensively used for agricultural activities and it leads to unequal distribution of forests in Lithuania (Table 2).

Table 2

Abandoned land and forest coverage indicators in Lithuania in 2015 by county

County	Area, thousand ha	Average productivity score	Abandoned lands, ha	Forest coverage, per cent
Alytus	541.7	35.8	7,465.85	49.4
Kaunas	808.6	43.2	7,383.36	30.3
Klaipėda	521.3	38.6	2,999.47	26.8
Marijampolė	446.6	44.0	2,071.27	22.3
Panevėžys	787.8	45.6	7,529.31	28.9
Šiauliai	853.7	46.0	4,472.07	27.7
Tauragė	440.7	39.3	2,932.41	33.9
Telšiai	434.9	38.4	2,075.84	37.3
Utena	719.1	36.0	17,101.02	36.0
Vilnius	972.9	36.6	22,793.11	44.2

As it can be seen from the completed forest area change analysis, the trend of forest growth dominated in the last decade that was influenced by the successfully used financial aid from the European Union for Lithuanian rural development for the fulfilment of afforestation measures of the years 2007-2013.

The EU support for Lithuanian forestry for the period 2007-2013 was provided by means of 10 measures. According to the Lithuanian Rural Development Programme for the period 2007-2013, about 800 million Litas have been provided to be invested in the forestry sector. According to the data of the Ministry of Agriculture for the period 2007-2013, the amount of the aid to forestry reached 563.9 million (excluding 1st and 2nd measure, i.e. training and information activities and the use of advisory services). The largest part of the aid was for afforestation – 385.4 million Litas or 67.8%.

Lithuania planted several thousand hectares of new forests each year taking an advantage of the aid. This allowed not only to expand the forestry potential, but also to use the available natural resources more efficiently, because a large part of these forests were planted in abandoned and fallow land areas. According to the data of the Ministry of Agriculture, afforestation of agricultural land, non-agricultural and abandoned agricultural land increased 6 times using the support from European Union programs.

The area of newly planted forests in Lithuania during the period of 2007-2014 amounted to 30.7 thousand ha. According to the statistics, 265.5 million Litas were paid under the Lithuanian rural

development program measures “First afforestation of agricultural lands“ and “First afforestation of non-agricultural and abandoned agricultural lands“.

As it has been already mentioned before it is planned that the country's forest coverage should reach 35% by 2020, and the area of planted new forests should amount to 30 thousand ha (Lietuvos..., 2012). Currently, forests cover 2,220.5 thousand ha in Lithuania and make up 34.01% of the total area of the country, therefore we believe that this goal will be reached much earlier. Meanwhile, the European Union's support for afforestation should be extended to such an extent so as to ensure the improvement of land use procedures and prospects of long-term economic activity in rural area, i.e., that when planting forests in agricultural land plots the necessity to preserve land with productive soils as well as with the equipped drainage systems should be taken into account. Afforestation should be planned or authorized in unproductive land areas or areas uncomfortable to work with machinery, as well as in land areas situated far away from residential dwellings that do not have good access roads, where the growing of agricultural plants or the reclamation (cultivation) of abandoned, currently unused for agricultural production land requires a lot of cost and is economically unviable. It is particularly important that these issues should be addressed without harming the area's ecological diversity, without compromising conditions for agricultural activities after replanting forests in remaining farmland and grassland areas.

Conclusions

1. The Sigismund Augustus times (since 1557, when Wallach reform was started) should be considered as the beginning of the forestry in Lithuania. In 1795 Lithuanian state forests amounted to 309 thousand ha (35% of the total forest area), other forests were owned by landlords, churches and kulak farms. Later forests were cut down quite rapidly, many of them were burned down, but reforestation was negligent. In the time period from 1918 to 1939 more than 260 thousand ha of forests were cut down, while about 55 thousand ha were planted, e.g., only 21% of the total felled area. Forest coverage of the country amounted to just 16.5% in 1945. Forests were thinned out, wastelands, waterlogged areas, etc. dominated. However, from this period until 1983 forest areas in Lithuania gradually increased with different variations (ongoing sanitary cuttings, reforestation) and in 1983 Lithuanian forest coverage reached 27.9%.
2. After the restoration of Lithuania's independence and the beginning of the land reform, on the whole, the area of forests, including the private ones, increased steadily. In 1991 the forest coverage in Lithuania was about 29.8%. The national forest inventory (regional monitoring of forests in Lithuania is carried out since 1987.) was organised only in 1998. Before that the inventory of forest areas was performed inaccurately, the exact information about forest resources and forest condition were not known, the inventory was done irregularly.
3. During the period of more than 20 years, the major change in forest coverage was in 2006-2007. During the analyzed years the forest area increased by 62 thousand ha. Besides, significant changes occurred in 1998 – 2001, when the forest area increased by about 23.5 thousand ha. Later the forest area in Lithuania tended to increase on average by 4.3 thousand ha per year. In 2015, according to the data of the Land Fund of the Republic of Lithuania, forest land accounted for 34.01% of the total area of the country. The increase of forest areas was influenced by forest reforestation, afforestation of abandoned and low productivity lands, natural regeneration of farmlands. A large part of forest belongs to private owners. State and private forests ratio has a significant impact on the entire forest management structure of Lithuania.
4. In the last decades the successfully used aid from the European Union for the Lithuanian rural development for the period 2007-2013 has a significant impact on the prevailing trend of forest growth. The EU support for Lithuanian forestry for the period of 2007-2013 was provided for 10 measures. According to the Lithuanian Rural Development Programme for the period of 2007-2013, approximately 800 million Litas have been provided to invest into the forestry sector, which in reality reached 563.9 million (excluding the 1st and 2nd measures, i.e., professional training and information activities and the use of advisory services). The largest part of the aid was meant for the afforestation – 385.4 million Litas or 67.8%.
5. The country aimed to increase forest coverage to 35% by 2020, but as the analysis shows, this goal will be reached much earlier. The European Union aid for afforestation should be extended to such an extent so as to ensure the improvement of land use procedures and prospects of the long-term economic activity in rural areas, i.e., the necessity to preserve land with productive soil as well as

with equipped drainage systems during the afforestation of agricultural land plots should be taken into account.

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