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Impact of Abandoned Land on Environmental Protection, Landscape and Economic Benefit in Lithuania

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Abstract. Human economic activity is defined as an anthropogenic process that has a negative impact on natural environment. The urbanisation and agricultural development influence the environment mostly. In order to receive economic benefit to the above-mentioned activities, the landscape is changed, the soil is affected and pollutants are released into the environment. In the light of the fact that the identified processes and problems caused by them are global, the variety of international directives are designed to minimise the impact of anthropogenic activities on the environment.

The territory of the Republic of Lithuania has a considerable amount of areas, where the economic activity is suspended, i.e. the land is abandoned. This is due to a variety of social, natural and economic reasons. This process can be perceived as opposite to the anthropogenic activity, however it is important to examine how it affects the environment, landscape or economic needs. These processes are relevant on the local and international level, therefore, the scientific results of this article may be useful for the professionals in various areas and further research.

The research investigates the territory of abandoned agricultural land, which is to be urbanised in the future. Land cadastre data, spatial planning documents are analysed, a questionnaire-based survey is conducted, and the actual inspection in the area is carried out. The research results identify the causes for non-use of the land, and the impact of no economic activity on the environment, the landscape and the economic performance. To reach the set objectives, the data analysis, synthesis, induction methods have been used.

Keywords: abandoned land, unused land plot, environmental protection, landscape, economic benefit

Conference topic: Environmental protection.

Introduction

The territory of Lithuania includes a considerable amount of unused land plots which are suitable for agriculture. According to the data of 2013 there were approximately 537 thousand ha of such areas (Aleknavičius et al., 2014). This area is not sufficiently accurate, since the data are taken from different sources that have been drawn up by applying different methodologies. J. Šepetienė, A. Gavenauskas and A. Dautartė (2014) have pointed out that in 2010 abandoned land amounted to approximately 168 thousand ha in Lithuania. In accordance with The State Enterprise Centre of Registers (The Centre of Registers..., 2015; 2016) in 2015 there were approximately 77 thousand ha of such territories, and in 2016 approximately 70 thousand ha. Although lately the plot of abandoned land is being determined by the advanced methods of remote-mapping (Lithuania, 2013), practical experience has shown that the plots of these territories are bigger than those determined in accordance with the specific maps. In any case, the spatial extent of the abandonment is big, and this is due to various social and economic reasons. Prof. P. Aleknavičius (2014) states that one of the reasons is the land reform carried out in Lithuania. The majority of landowners live distantly (often even in other district) from the owned land plot, therefore, it is inconvenient to be engaged in agricultural activities. G. Kuliešis (2011) indicates that this process is influenced by natural factors (quality of the soil, terrain), social (population migration), demographic (old farmers, low birth rate), economic (risks due to the increased demand for agricultural products, the prices of resources, small payments) and historical (a low land-use, a collapse of collective farming system).

Due to the adopted land reform and the decline in agricultural product market, the neighbouring Latvia has approximately 320 thousand ha of abandoned agricultural land, which is unproductive mostly due to its natural characteristics (Liepins et al., 2008). According to the authors, it is unlikely that such areas will succeed in reviving the agricultural activity and, therefore, it is appropriate to use them for the development of bio-fuels or forests.

However, there are different views, therefore the question arises is it better to use the land actively or to desolate it?

The land is one of the most important natural resources, which has limited quantity. According to R. Velička and R. Pupalienė (2010), the historical development of mankind showed that an overly intense use of resources may lead to the disappearance of the whole civilisation. The global market integration, changes in competitiveness of the world and changes in consumer habits create a complex set of forces. S. Sinkevičius (2012) argues that human social, economic and political activities have long gone beyond the administrative borders of the individual states and continents. People should be concerned about the sufficiency of natural resources, that they would not be depleted, since the needs of the future generations have to be met. In order to achieve the objectives of sustainable development, in 1987 World Commission on Environment and Development (WCED) of the United Nations provided the concept of sustainable development.

The world's scientists are quite actively analysing the changes of land plot use. Different regions deal with different concerns of land use. In some places deforestation is monitored, other regions look at drainage of wetlands or the urbanised areas. The dependency of the land use on the increasing number of population and the dependency of land use on the climate change or the impact that the land use has on this global process is observed (Turner et al., 2007).

The largest cities of the world are in China, and 7 out of 10 of the most polluted cities in the world are in China as well. It is not surprising that when studying various Chinese indicators, various concepts for sustainable development are introduced (Liua et al., 2014). It has been noted that Chinese provincial areas face problems when different areas conflict, i.e. nature with the agrarian commercial farms, thus causing the changes in the traditional landscape, forests, flora (Cotter et al., 2014).

Urbanisation and industrial development actively destroys natural areas and crops. The destruction of the soil, vegetation, the pollution of air, soil and water, forest fires directly reflect the increase in the intensity of land use. It is noted that Greece accession to the European Union (in 1981), the country's economic growth was encouraged, which lead to the increased destruction of natural resources in the suburban territories. Urbanisation is the main reason, which causes the raise of the environmental temperature, and changes rainfall regime. (Mavrakakis et al., 2015).

In Spain the construction of new buildings has increased during the period of 2003-2007 (Olle et al., 2013), and most of all newly constructed buildings are intended for holiday makers.

With the increase in the population in agrarian areas of Kenya, the need for food products is felt (Mutoko et al., 2014). Whereas along with the increasing demand for food land-use intensity increases as well, it is noted that due to the improper use of land the soil degrades.

The active human economic activity strongly influences biodiversity by changing the location of the habitats. The adaptation of the flora and fauna includes the process by which species and habitats move to other locations where their residence would be more convenient and less vulnerable (Wilson et al., 2008).

The conflict between human activity and the conservation of biodiversity is obvious in all European regions, as well as in the changing landscapes. J. Young, A. Watt (2005) argue that the intensification of agriculture and forestry causes controversy between the need for living and the biodiversity conservation. In order to achieve the economic prosperity (growth) the human, consciously or not, destroys biodiversity. In order to protect biodiversity, various international directives are adopted: regarding the birds (79/419/EEC); flora and fauna (92/43/EEC), water (2000/60/EC).

As mentioned before, the essential problem is the influence of global anthropogenic activity on soil. This natural resource is limited, and its value is multifunctional. The most important fact is that the soil ensures the development of life on earth, the plant yield, food, supplies the humanity with food products and the plants with water and nutrients. Soil degradation is the reduction in soil fertility or decadence in soil physical, chemical and biological properties due to the influence of natural and technological factors (Nadzeikienė, 2012; Novara et al., 2016).

Human economic activity generates waste, such as construction and demolition waste, waste plastics, or the non-used equipment waste, which are harmful to the environment as well. There is a large variety of waste interpretation options, and, therefore, waste concepts. According to the concept of waste as hazardous substances, the presence of the waste (or its absence) shall be decided taking into account the risks caused to the environment by the substance or object. The greater the danger is, the greater the likelihood that the substance or object is a waste (Vasiliauskas, 2010).

Human economic activity has a smaller or greater impact on the landscape and in scientific literature on the evaluation of landscape a number of different methods is found (Virbašienė et al., 2005; Kalkė, 2014; Vasilevskaja et al., 2014). The listed authors define the landscape as a territorial compound of natural and anthropogenic components of the earth's surface. Humans understand it as a place (the area), which is determined by the nature of natural and anthropogenic factors and their interaction. The visual quality of the landscape is the visually perceived quality of landscape; intangible qualitative resources of living environment, which can be evaluated and adjusted. The aesthetic quality of landscape is the value of landscape perceived and sensed by all human senses (including 85% of sight).

Both these issues of land use (land use/non-use) are global and oppose each other due to different opinions of scientists and professionals. It could be argued that the abandoned territories are not a bad phenomenon, since they oppose the process to the activities for which the environmental issues occur. However, there are contrary opinions and suggestions on how to turn the non-used land into the economically useful one.

The researchers claim that the land is abandoned due to its low performance score (infertility); they offer to use such a low output (30 points) land plots for afforestation (Benayas et al., 2008), thus, developing the integrity of the forests as well as non-conventional farming, livestock farming, gardening are proposed to be performed (Ozolinčius, 2005).

Another proposed option is rural tourism as an activity which has a tremendous positive impact on any country's social, cultural and economic life (Laužadis, 2007; Ramanauskienė, 2010).

The further investment in these areas is the possibility for the development of organic farming. The production costs in organic farms are lower than in traditional farms, however at a lower production capacity the production of organic products is disadvantageous and only the support from the EU and the state for organic production farms cover the incurred losses (Jasinskas et al., 2008).

Other authors from different countries around the world suggest employing non-productive or abandoned lands for renewable energy production (Schroder et al., 2008; Jakienė et al., 2013; Abolina et al., 2015; Pfeifer et al., 2016). Constantly increasing demand for energy, the increase of greenhouse gas emission in the atmosphere, declining oil stocks trigger the search for alternative fuels. Lithuania has quite a few resources of raw materials in their fossil energy. This makes the economy of the state more economically and politically dependent on neighbouring countries.

It is observed that the active use of the land for anthropogenic needs causes huge environmental problems. However, it is known that the abandoned (uncultivated) land is also not good, due to spreading weeds, threat of fires, no economic benefit. Uncultivated land defaces the landscape, weeds and shrubs spread to neighbouring areas. It adversely affects the country's agricultural development, makes the land resources management more complicated, undermines the image of the country (Kuliešis et al., 2011).

The essence of this research is the analysis of the environmental impact of economic activities, identification of opposite consequences that arise in the absence of active economic activity. The research is also unique in that the respondents were not unauthorised persons (experts, professionals) when due to the factor of subjectivity the results of the relevant questions may be distorted, but the real owners of the land. Such a research allows understanding more accurately the decision of people not to perform any economic activity in the land plots. The attention is drawn to the fact that the international literature is focused on the rural abandoned areas, however in this case, the area concerned is within the city's administrative boundaries. Also, it should be noted that the research is carried out in different periods of time, i.e., in spring and autumn. In the autumn, some people owning the land had started to use it for its intended purpose thus it was possible to define the differences between the used and unused land. The article is richly illustrated with the real photographs of the object.

The aim of this article is to identify the reasons of why people do not use agricultural land in accordance with the intended use and the impact of non-performance of economic activities on the environment, the landscape and the economic benefit.

The objectives of this article are to determine the adverse effects of anthropogenic human activities on land at the global level. To identify the consequences when the land is not affected by anthropogenic processes. To highlight the reasons why people do not use the land in accordance with the intended use.

The research object is the agricultural land in the urbanised area.

The research methodology

The research methods: the analysis of scientific literature and data, the summary, synthesis and a questionnaire.

40 land plots of agricultural use situated in the urbanised territory of Lithuania, namely, Klaipėda city are selected for the research (Fig. 1 and 2). The entire area (approx. 38 ha) is abandoned and is not used for the intended purpose.



Fig. 1. The location of the object in the map of Europe



Fig. 2. The location of abandoned land in Klaipėda city

The area selected for the research is in the port city of Lithuania, in particular, in Klaipėda. It is the third largest city in Lithuania (the area of 98 km²), which, in 2014 had approximately 157 000 residents. Due to its uneven and uncontrollable urbanisation, the residential areas spread in the suburban territories, while a significant amount of agricultural land plots remain in the cities, which in the case of Klaipėda city accounts for approximately 11% of the territory (Gaudėšius et al., 2016). An array of agricultural land plots is selected next to the urbanised area, which in the future may be built up in accordance with the General Plan of Klaipėda City (Klaipėda..., 2007). The object for the research is selected since the unevenness of the urbanisation in this array is clearly visible. During the verification of the area, 40 land plots owned by 21 natural and 8 legal entities have been surveyed (Table 1). Almost all of the legal entities are private limited companies engaged in the real estate marketing. One of them is a small proprietorship engaged in design work. The majority of the respondents have filled in the questionnaires themselves, and some have been interviewed remotely (on the phone) by using the interview method.

Table 1. Information on the respondents and objects

The type of land plot owner (<i>status</i>)		The number of land owners	The persons residing in other district	The number of land plots managed under the property right
Natural persons	Employed	11	4	11
	Unemployed	3	3	3
	Student	2	0	2
	Retired	5	2	7
Legal entity		8	5	17
Total		29	14	40

In order to evaluate the impact of the non-use of land on environmental protection and landscape, the descriptive method of the observed items and objects has been selected. It is quite difficult to evaluate the precise economic performance as it would require a separate research where all possible expenses and income of the person according to different economic activities would be planned. In this article, only an approximate difference between the potential income and losses is assessed. The loss of income of the person due to the abandoned land can be calculated according to the formula 1.

$$N = (\check{Z}_v * k * k') + Ab + \check{Z}_s \quad (1)$$

where: N – the loss incurred by the land owner in euros;

\check{Z}_v – the market value of the land plot in euro per ha (Lithuanian..., 2011);

k – the coefficient of the tax in accordance with the purpose of land (Klaipėda ..., 2015);

k' – the coefficient for the abandonment of the land (Klaipėda..., 2015);

Ab – an administrative penalty for the non-use of land in accordance with its intended purpose in euros per ha (Lithuanian..., 2015a);

\check{Z}_s – the clearing-up of the land plot (mulching of shrubs), euros per ha.

Case study analysis and Results discussions

The analysed abandoned land plots are one of the European countries, situated near to the Baltic Sea. The object is surrounded by the urbanised land, i.e., it is surrounded by the urban formation of Klaipėda city and Klaipėda district in the Republic of Lithuania.

As mentioned beforehand, in order to find out the reason why the land is not used, the owners of the land concerned have been interviewed. Persons who participated in the survey have been divided into different types of persons, in order to define their financial situation and age. In accordance with the type of person, the owners of the land plots are distributed similarly – 58% are natural persons while 42% are legal entities (Table 2). 88% of the legal entities live in other districts, while natural persons residing in other districts amount to 43%.

Table 2. The answers of respondents regarding the land use

The type of the land plot owner (<i>the number of the survey participants</i>)		The reasons for which the economic activity is not performed in the land plot				The intended use of the land in the near future*			
		Intended to rent or sell, however, there are no persons interested	No time or desire to engage in agricultural activities	Away from home, therefore it is expensive to get there	Waiting until the land becomes more expensive for the possibility to build	It is planned to build a construction	To rent	To sell	To be engaged in agricultural activities
Employed (11)		7	7	4	3	0	4	11	0

	Unemployed (3)	0	0	3	0	0	2	2	0
	Student (2)	0	2	0	0	1	0	1	0
	Retired (5)	1	2	2	0	0	4	4	0
	Legal entity (8)	7	5	0	1	0	3	7	0

* - The respondents could choose multiple options

The respondents indicated that the main reasons for which they do not use the land in accordance with the purpose (for agriculture) is that they do not have enough time or desire to be engaged in agricultural activities, and they are trying to sell or rent the plot, however, there are no people interested in owning or managing it. Also, the respondents have pointed out that the owned land plots are far from home, and that they are waiting until the land becomes more expensive. The research has highlighted the drawbacks of the ongoing land reform in Lithuania when the land was granted to persons residing in other districts, and that is a real reason of not using the land plot in accordance with the intended purpose.

Another reason is explained by the fact that during the state's economic take-off the land plots were bought by legal entities, who wished to get profit by selling it more expensively due to the possibility to build residential houses. Today, however, the sale of land plots in Lithuania is stagnant, since businessmen still hope to get the profit on the land that they have bought expensively, and the buyers show no desire to pay such large amounts that were appointed to these land plots 8 years ago. Another reason of abandoned land is revealed in this survey– the agricultural land plots are owned by legal entities which do not intend to be engaged in agricultural activity, and the land is being re-sold due to their financial interest.

The individuals have also been asked what they think about the subject of financial sanctions for the non-use of the land, how much time they have not been to the land plots owned by right of ownership and other questions. (Table 3).

Table 3. The number of respondents who described the use of land and the transfer

The type of the land owner		Are there anyone willing to buy a land plot?			Do you know what are the spatial planning documents that are valid for the land plot?		How long has it been since you have been to the land plot?		Are the val-ued finan-cial sanc-tions for the non-use of land too high?		Do you have any agricul-tural land plots in other dis-tricts?		If so, do you use them for agricultural activities?	
		Yes	No	Do not know	Yes	No	< in 1 year	> in 1 year	Yes	No	Yes	No	Yes	No
Natural person	Employed	1	6	4	8	3	0	11	1	10	4	7	3	1
	Unem-ployed	0	0	3	1	2	0	3	2	1	3	0	3	0
	Student	0	0	2	2	0	0	2	2	0	0	2	0	0
	Retired	0	0	5	2	3	1	5	3	2	2	3	2	0
Legal entity		0	7	1	8	0	0	8	1	7	6	2	0	6

The legal entities and employed natural persons have stated that the financial penalties applied by the state for the non-use of land in accordance with its intended purpose are not high. In this case the financially sensitive social groups (retired, students, unemployed) pointed out that the penalties are high. It is interesting that the indicated groups have not even been interested in the possibility to transfer the owned assets to use of other persons while the legal entities have been clearly interested in this possibility. It can be assumed that older persons will opt to pay higher taxes and keep the owned object. This could be explained by psychological affection to things due to the relevant moral reasons.

The legal entities do not keep it a secret that they own agricultural land plots in other districts of Lithuania and do not cultivate them as well. The retired and unemployed persons are engaged in agricultural activities in other owned land plots. Among those employed there are such persons who do not perform the agricultural activities, regardless of where these land plots are located. The result shows that people are willingly engaged in agricultural activities in the possessed land plots, when they are close to the place of their residence, in addition to this, for some social groups it may be the main source of living.

Out of all the people interviewed, only one owner of a land plot has visited it over the past year. The result of this research once again confirms that the land plots are too far away from the place of residence of the owners. It also does not exclude the possibility that failing to visit the owned property shows that the owners simply do not care about the state of the property, and wait for better economic conditions of sale, when the property will be used as an additional source of financing.

The research has revealed that 72% of respondents are aware of spatial planning documents applied for their land plots. The majority of those not interested in such documents are the unemployed and retired. In practice, it is known that the person prior to the acquisition of land plot is interested in spatial planning documents, which provide the possibility of another land use, i.e. the possibility of building. This option brings up the value of the land. If a person's goal is to be engaged in agricultural activities and receive economic benefits, it is likely that he is not interested in spatial planning documents and the land development by building it up.

Having determined the reason for the non-use of land, the research seeks to determine the impact on the land owner due to his own inaction and the impact that such process has on environment.

After the analysis of scientific literature has been carried out, it has been found that anthropogenic activity related to land use affects the elements of landscape, and has environmental and economic consequences. In order to evaluate each of them, the individual criteria have to be distinguished; in this case, the following are offered:

- Environmental protection:
 - Soil erosion;
 - The potential soil contamination by chemicals;
 - The possible change of biological diversity;
 - Accumulation of waste.
- Landscape:
 - The aesthetics;
 - A variety of elements;
 - Naturalness.
- Economy:
 - The current expenditure;
 - The available income.

From the environmental point of view the area can be attributed naturally, since direct human economic activity is not carried out in this territory. The relief of the territory is even, but the area is big and open, therefore the soil erosion could occur due to wind. Such possible process is stopped by the old vegetation, therefore the soil is not affected by erosion. The soil is not leaked by chemical pollution due to fertilised fields, when a larger harvest is aimed to be obtained in the territory. However, the partial pollution can reach the territory from adjacent fields, or from the passing cars along the road, and due to the larger industrial objects in the city radiating emissions. In the abandoned territory, larger animals (birds, foxes, roes) are observed, therefore it can be assumed that the area is acceptable to some types of habitats (Fig. 3). In cultivated or build-up areas such species would not be met. Their reduction in the surrounding areas is possible as well. However, it is noted that the territory has become attractive to individuals who want to get rid of the bulky waste (Fig. 4).

Having summarised the findings on the environmental impact, it can be argued that the non-performance of economic activity does not protect the territory from the waste or chemical contamination. In order to avoid this, it would be necessary to manage the territory properly, i.e. to observe and protect it. In this case, the area is fully protected only from soil erosion. Also, it must be concluded that the territory has become more attractive for larger species.

According to the above-mentioned authors (Virbašienė et al., 2005; Kalkė, 2014; Vasilevskaja et al., 2014) the objects of visual pollution are natural or anthropogenic landscape elements (mounds of land surface, excavations, ponds, green spaces, buildings, equipment, mobile objects), which determine the nature of the landscape change and the decline of visual quality or interfere with an overview of the valuable natural landscape complexes or objects, reduce the visual impact of valuable landscape objects.

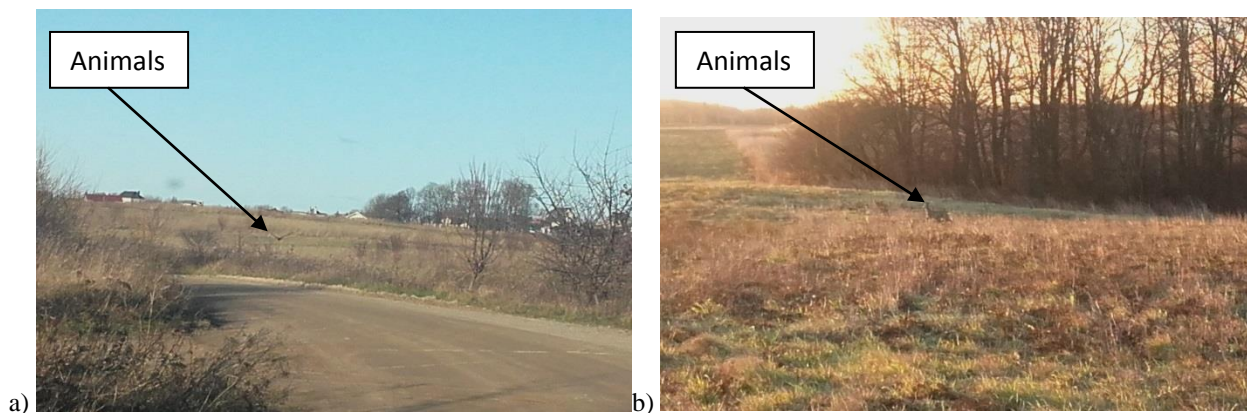




Fig. 3. The wild animals observed in the areas (a, b, c) (photos by R. Gaudėšius)



Fig. 4. The bulky waste noticed in the areas (a, b, c, d) (photos by R. Gaudėšius)

In the case under investigation, the objects of visual pollution are the unattended vegetation. The analysed territories have been visited twice and during that period some individuals (40 %) tidied their land plots, so the landscape has changed again (Fig. 5-6.).



Fig 5. The analysed land plot in 02-04-2016—the abandoned territory



Fig. 6. The analysed land plot in 02-09-2016 –already cleaned-up territory (photos by R. Gaudėšius)

The aesthetic image is more enjoyable when the area is not abandoned and not covered with stiff, low value plants. A more detailed evaluation of the selected panoramic photographs (7-8), where the abandoned (B) and the cleaned-up (A) territories are separated. As mentioned before, there are various methods of evaluation, this time the simple descriptive evaluation is selected (Table 4-5).

Table 4. The description of the abandoned landscape indicators

Indicator	Description
Form	Clear, raised, not smooth, regular, wide, long, wavy, fitting.
Line	Bright, regular, stiff, wavy, distinctive, horizontal.
Colour	Outer, dark, bright, harmonious.
Texture	Rough, uneven, non-directional, solid, compact, grouped, band.

Having evaluated the landscape it can be argued that the stiff, low value vegetation in this area is of the average visual pollution. The evaluation is carried out in accordance with the photographs, which were done from far away, however when being in the area or closer to it, the aesthetic-psychological value of the object is seen as bad, compared to the land plots on the other side of the road used for agricultural activities.



Fig. 7. The comparison of the abandoned (deserted) object with the adjacent cultivated field (photo by R. Gaudėšius)



Fig. 8. The comparison of the abandoned (deserted - B) object with the adjacent area that has been already started to handle (A) (photo by R. Gaudėšius)

Table 5. The determination of the components importance in abandoned landscape

Landscape components	The terrain				Water				Flora				Buildings			
A comparative indicator and the degree	Big	Average	Weak	Insignificant	Big	Average	Weak	Insignificant	Big	Average	Weak	Insignificant	Big	Average	Weak	Insignificant
Form																
Line																
Colour																
Texture																
The overall visual contrast	Big				Average				Weak				Insignificant			

The calculation of the potential economic benefits to the land owner shall be carried out in accordance with the above formula (Formula 1). On of the land plots is selected for the calculation. In particular, the market value of the

land shall be determined in accordance with the evaluation of the general land maps. Municipal tax rates applied in accordance with the intended use and the size of penalties for the abandonment of the land are determined. In this case, it is also considered that a person is fined for the non-use of land under Article 100 of the Code of Administrative Offences.

$$N_x = (53700 * 4\%) + 70 = 2218 \text{ (Euros)} \quad (2)$$

After the completion of calculation on the basis of one of the selected plots (x), it is determined that each year the owner can incur loss equal to 2218 euros for 1.16 ha of abandoned land.

Different literature sources indicate different farmers' incomes for 1 ha. This occurs due to the different calculation methodologies. Of course, it is very imprecise to present the average income value, since the income can fluctuate dramatically depending on the crops, the soil and etc. According to Z. Kazakevičius (2011), in the period of 2003-2009 gross profit per 1 ha of agricultural land amounted to approximately 111 euros. The Lithuanian Minister of Agriculture has approved the rates of agricultural activity income from agriculture yield per hectare (Lithuanian..., 2015), according to which the average rate was approximately 102 euro/ha in 2015.

Having carried out the economic comparison of the available data it can be concluded that, in economic terms, keeping the not cultivated (abandoned) agricultural land is very detrimental.

Conclusions and reflections

1. Having carried out the research, it was determined that the majority (55 per cent) of persons who manage the abandoned land plots under the ownership right reside far away from the mentioned land plots i.e. in other districts, therefore only one of the respondents has visited his land plot within the last year. This reason of the non-use of language is attributed to the consequences of the land reform carried out in Lithuania, when the ownership rights of the possessed land plots were restored without taking into consideration the factual place of residence of the person. It can be stated that only retired and unemployed persons opt to carry out the agricultural activities, however only in the land plots that are close to their place of residence.
2. The majority of the respondents (legal entities of natural employed persons) indicated that they do not cultivate the land plots due to the shortage of time or desire to carry out the agricultural activities. Legal entities own land plots in other districts, however do not use them in accordance with their intended use. The officially registered business activities of the majority of such legal entities are not related to agriculture, therefore it can be stated that the mentioned entities have purchased the property in hopes to sell it for a higher price, however due to the economic crisis that came to Lithuania in 2008 such land plots have not been sold. The respondents claim that they are trying to either sell or rent the land plots, however there are no interested persons. It was determined that the land use in administrative territories is mostly influenced by the circumstances of immovable property market.
3. It was estimated that the land use, which is the friendliest to the environment is a long-term meadow and pasture. It was determined that in such territories chemicals are not used, the soil is preserved thus they become a habitat of various animal species. From the ecological point of view the undrained meadows are superior, i.e. it is better for the environment, when the meadows have no drainage systems since then a greater biodiversity is seen in the habitat.
4. Having analysed the influence on environment of abandoned territories it was estimated that the non-performance of economic activity does not protect the territory from the waste or chemical contamination. In this case, the territory is protected only from soil erosion. It was determined that the territory became suitable for larger animals. From the economic perspective, the owner of a non-used land (in the analysed territory of Klaipėda city) incurs heavy financial loss which amount to approximately 2000 Eur/ha annually. The aesthetic value of the landscape was also negatively impacted, since the old flora has changed, the stiff and unattended vegetation covers other elements of cityscape, an aesthetic disorder is strongly felt in the territory.
5. The agricultural land located in the city territory is to be managed and used despite the fact that the general documents of territorial planning foresee a possibility to change the intended purpose of land in the future. In order to protect the territories and keep them natural, the owners of the land may be allowed to change the intended purpose of land into the one, which would ensure the preservation of biodiversity. In such case, the owner would not be forced to perform agricultural activities, however he must supervise that the territories would not be polluted by waste. The problem regarding the persons who acquire the agricultural land but does not carry out such activities is to be solved.

References

- Abolina, E.; Luzadis, V.A. 2015. Abandoned Agricultural Land and Its Potential for Short Rotation woody Crops in Latvia. *Land Use Policy* 49: 435-445.
- Aleknavičius, P.; Aleknavičius, M. 2014. Žemės ūkio paskirties žemės rinkos raida. *Žemės ūkio mokslai* 21: 23-36.

- Benayas, J. M. R.; Bullock, J. M.; Newton A.C. 2008. Creating Woodland Islets to Reconcile Ecological Restoration, Conservation, and Agricultural Land Use. *Frontiers in Ecology and the Environment* 6(6): 329–336.
- Cotter, M.; Berkhoff, K.; Gibreel, T.; Ghorbani, A.; Golbon, R.; Nuppenau, E.-A.; Sauerborn, J. 2014. Designing a Sustainable Land Use Scenario Based on a Combination of Ecological Assessments and Economic Optimization. *Ecological Indicators* 36: 779-787.
- Gaudėšius, R.; Gurskienė, V.; Maliene, V. 2016. Transfer of Agricultural Land for Promoting the Economic Growth in the Environment Affected by Anthropogenic Processes. *International Scientific Journal Baltic Surveying* 1 (4): 20-26.
- Young, J.; Watt, A.; Nowicki, P.; Alard, D.; Clitherow, J.; Henle, K.; Johnson, R.; Laczo, E.; McCracken, D.; Matouch, S.; Niemela, J.; Richards, C. 2005. Towards Sustainable Land Use: Identifying and Managing the Conflicts Between Human Activities and Reimbursement Conservation in Europe. *Reimbursement and Conservation* 14 (7): 1641-1661.
- Jakienė, E.; Liakas, V.; Klimas, E.; Bačkaitis, J. 2013. Energetinių žolinių ir sumedėjusių augalų auginimo technologijos. Aleksandro Stulginskio universitetas.
- Jasinskas, E.; Kazakevičius, Z. 2008. Darna vystymosi skatinimas remiant ekologinius ūkius. *Vadybos mokslas ir studijos – kaimo verslų ir jų infrastruktūros plėtrai* 15(4).
- Kalkė, D. 2014. Kraštovaizdžio estetinio potencialo tyrimų Lietuvoje apžvalga. *K. Šešelgio skaitymai* 6 (3): 273-280.
- Kazakevičius, Z. 2001. Žemės išteklių naudojimo Lietuvos ūkininkų ūkiuose vertinimas. *Management theory and studies for rural business and infrastructure development* 3(27): 94-103.
- Klaipėdos miesto bendrasis planas, patvirtintas Klaipėdos miesto savivaldybės tarybos 2007 m. balandžio 5 d. sprendimu Nr. T2-110.
- Klaipėdos miesto savivaldybės tarybos 2015 m. gegužės 28 d. sprendimas Nr. T2-107 „Dėl 2016 metų mokesčio laikotarpio žemės mokesčio tarifų ir neapmokestinamojo žemės sklypo dydžio nustatymo“.
- Kuliešis, G.; Šalengaitė, D.; Kozlovskaja, A. 2011. Apleista žemė: problemos ir sprendimo būdai. Lietuvos agrarinės ekonomikos institutas, Mokslo studija.
- Laužadis, Š. 2007. Gyvenamoji aplinka ir ekologija. Vilnius.
- Liepins, K.; Lazdins, A.; Lazdina, D.; Daugaviete, M.; Miezite, O. 2008. Naturally afforested agricultural lands in Latvia – assessment of available timber resources and potential productivity. *Environmental engineering*. Faculty of Environmental Engineering, Vilnius Gediminas Technical University: 194-200.
- Lietuvos Respublikos administracinių nusižengimų kodeksas. 2015a. Patvirtintas LR 2015 m. birželio 25 d. įstatymu Nr. XII-1869.
- Lietuvos Respublikos žemės mokesčio įstatymas (2011 m. gruodžio 21 d. Nr. XI-1829). 2011. Valstybės žinios 163-7743.
- Lietuvos Respublikos žemės ūkio ministro 2015 m. rugpjūčio 21 d. įsakymas Nr. 3D-662 „Dėl žemės ūkio ministro 2004 m. liepos 2 d. įsakymo Nr. 3D-391 „Dėl pagal sąlygines išlaidas įvertintų žemės ūkio veiklos pajamų normatyvų ir žemės ūkio veiklos pajamų iš žemės ūkio naudmenų hektaro normų patvirtinimo“ pakeitimo“. 2015b.
- Lietuvos Respublikos žemės ūkio ministro 2013 m. kovo 21 d. įsakymas Nr. 3D212 „Dėl apleistų žemės ūkio naudmenų plotų nustatymo tvarkos aprašo patvirtinimo“. 2013.
- Liua, H.; Zhoua, G.; Wennerstenb, R.; Frostel, B. 2014. Analysis of Sustainable Urban Development Approaches by in China. *Habitat International* 41: 24-32.
- Mavrakis, A.; Papavasileiou, C.; Salvati, L. 2015. Towards (un)sustainable urban growth? Industrial development, land-use, soil depletion and climate aridity in Greek agro-forest area. *Journal of arid environments* 121: 1-6.
- Mutoko, M.; Hein, L.; Shisanya C.A. 2014. Farm diversity, resource use efficiency and sustainable land management in the western highlands of Kenya. *Journal of rural studies* 36: 108-120.
- Nadzeikienė, J. 2012. Aplinkos apsaugos inžinerija. ASU Žemės ūkio inžinerijos fakultetas.
- Novara, A.; Keesstra, S.; Cerda, A.; Pereira, P.; Gristina, L. 2016. Understanding the role of soil erosion on CO₂-C loss using C isotopic signatures in abandoned Mediterranean agricultural land. *Science of the Total Environment* 550: 330-336.
- Olle, A.; Marsal, E. 2013. Do political parties matter for local land use policies? *Journal of urban economics* 78: 42-56.
- Ozolinčius, R. Aplinkos ištekliai. VDU, LMI.
- Pfeifer, A.; Dominkovic, D. F.; Cosic, B.; Duic, N. 2016. Economic feasibility of CHP facilities fueled by biomass from unused agriculture land: Case of Croatia“. *Energy Conversion and Management* 125: 222-229.
- Ramanauskienė, J., Astromskienė, A., Andriūnas, V. 2010. Lietuvos kaimo turizmo verslo konkurencingumo didinimo priemonės. *Management theory and studies for rural business and infrastructure development* 5(24).
- Schröder, P.; Herzig, R.; Bojinov, B.; Ruttens, A.; Nehnevajova, E.; Stamatiadis, S.; Memon, A.; Vassilev, A.; Caviezel, M.; Vangronsveld, J. 2008. Bioenergy to Save the World. Producing novel energy plants for growth on abandoned land. *Environmental Science and Pollution Research International* 15 (3): 196–204.
- Sinkevičius, S. 2012. Globalioji ekologija. VU Gamtos mokslų fakultetas.
- Šepetienė, J.; Gavenauskas, A.; Dautartė, A. 2014. Afforestation of unused and unproductive land in Kaunas County, Lithuania. *Journal of Food, Agriculture & Environment* 12 (1): 352 – 355.
- Turner, B. L.; Lambin, E. F.; Reenberg, A. 2007. The emergence of land change science for global environmental change and sustainability. *PNAS* 105(7):2751.
- Vasilevskaja, V.; Skorupsas, R. 2014. Esminiai kraštovaizdžio vizualinės struktūros vertinimo aspektai. *Geografija* 1 (50): 11-22.
- Vasiliauskas, M. 2010. Atliekų sampratos teisės doktrinoje: ar nepakeičiamas esamas atliekų tvarkymo teisinis reguliavimas? *Teisė* 74: 118-135.
- Velička, R.; Pupalienė, R. 2010. Demografinės padėties, klimato kaitos ir agroekologijos sąsajos. LŽŪU Žemdirbystės katedra.
- Virbašienė, J.; Leitanaitė, R. 2005. Kauno centrinės dalies Nemuno slėnyje miestovaizdžio architektūrinis formavimas. *Urbanistika ir architektūra* 1 (19): 30-40.
- VĮ Registrų centras. 2015. Lietuvos Respublikos žemės fondas 2015-01-01 ataskaita. Vilnius.
- VĮ Registrų centras. 2016. Lietuvos Respublikos žemės fondas 2016-01-01 ataskaita. Vilnius.
- Wilson, E.; Piper, J. 2008. Spatial planning for biodiversity in Europe's changing climate. *European environment* 186: 135-151.