LITHUANIAN RURAL LANDSCAPE DEVELOPMENT AND SUSTAINABILITY

Romualdas Misius[1], Justina Tomkevičiūtė[2]

[1]Technologies and Landscaping Faculty, Kauno Kolegija, University of Applied Sciences, Pramonės pr. 22, LT-50387, Kaunas, Lithuania

[2]Department of Food Safety and Quality, Lithuanian University of Health Sciences, Tilžės g. 18, LT - 47181, Kaunas, Lithuania

Abstract

In the historical development of the formation of Lithuanian rural landscape the changes were affected by the natural conditions, agricultural tools, technique and technology, political, economical and social factors, and agrarian reforms. The factors of social ad agrarian reforms have changed the forms of the agrarian landscape essentially. As the agrarian structures were changing together with the network of settlements and roads, the structure of the agrarian plantings was also changing. The distinctive spatial systems of the agrarian plantings were formed in each period of the changes and they used to pick up the most vital elements from the previous system in order to adapt them to the new conditions. When the general soil melioration was done, the historical development of the formation of agrarian plantings, the continuity of their types and forms was not taken into account, as well as the planting traditions and adaptation possibilities.

The article analyzes the historical development of the spatial system of agrarian plantings in the Lithuanian rural landscape, the change of its components, and continuity of the types and forms of agrarian plantings with regard to the historical types of rural landscape. There were determined the formation traditions of the spatial system of agrarian plantings and their components, there were suggested the possibilities, how to use them, while doing the ecologic melioration of agrarian landscape, optimizing the spatial structure of the rural landscape with the help of the agrarian plantings, and recovering its ecologic stability, visual quality, esthetic attractiveness and national distinctiveness.

Key words: *agrarian landscape, eco–stability, spacial system of agro–plantations, historical inheritance*

1. INTRODUCTION

Looking through historic retrospective, the changes of Lithuanian rural landscape has been influenced not only by inner political, economical and social factors, but by reciprocal relations of neighboring counties and Europe‘s geopolitical situation as well. That is why national and etnoregional singularity of rural landscape is exceptionally important for Lithuanian regional culture and its identity, international image and its appeal. By this approach, the exceptionally valued indication of rural landscape is *singularity*, and its preservation issue is relevant not only for Lithuania, but also in European countries.

In Western Europe landscape assessment and planning set in the concept of landscape character (singularity). In researching rural landscape singularity forming elements physical, visual, esthetic and perceptual aspects are associated (LCA, 2002; LIS, 2001; LAC, 2002; LCAI, 2006). The main objective of studying landscape singularity is associated with identification of *common types of landscape* and areas of *individual expression* landscape. The determination of rural landscape areas is based solely on site-specific physical, visual and mental perception of the landscape properties. The landscape singularity (character) assessment of Great Britain, Scotland and Wales, although including visual landscape analysis, however, is limited to the determination of physical landscape unit borders. Landscaping solutions are settled regarding landscape‘s singularity more than its value. Until then prevailing environmental science and landscape art confrontation is replaced by an integrated

approach to landscape ecology and esthetics, regional and local singularities are opposed to universality and ideality (Meyer, 2000).

Foreign scientists believe each region has its own distinct visual expression associated with human perception. Esthetic quality of landscape visual expression is the complex result of physical, visual characteristics and the perception of the landscape (Kaplan, 1989; Antrop, 2000; Palmer, 2003). Landscape quality is not in itself a *value*, if the landscaping is not linked to the survival of the human (Lothian, 2000), natural landscape and its environmental sustainability (OMED, 1992; Antrop, 1997).

Cognition, formation and preservation issues of Lithuanian rural landscape identity in the legal acts are considered to be a priority. The Republic of Lithuania Ethnic Culture Principles of State Protection Law one of the tasks is to guarantee the Lithuanian all five ethnographic regions traditions preservation, recognition, fixation and rendition (EKVPĮ, 1999). In the Lithuanian Republic Landscape Policy Guidelines (KPKA, 2004) and National Sustainable Development Strategy (NDVS, 2003) it is noted, that the landscape singularity preservation, handling and forming to meet the economic, social, cultural, aesthetic and ecological needs of the society is one of the main goals of the country. Only a nation relying on its ethnical culture can uphold its members to maintain their civic maturity in the presence of world civilization as an equal partner, maintaining dignity, independence and identity necessary for such partnerships and cooperation.

In the second half of XX century, intense land cultivation work has fundamentally changed one of the main Lithuanian rural landscape components - agrarian structure (land - ownership and land - use organization model). Agricultural intensification has caused conflict between the agricultural productivity improvement measures and actions that support agro - landscape naturalness, regional identity and ecological stability. Land reclamation affected complex spatial, functional and ecological relationships of agro - landscape. Rural landscape became cleaner, cultured, but ecologically impoverished and spatially hypertrophied.

In order to determine major negative changes of Lithuanian rural landscape and to provide actions that could restore functional connections and ecological stability of the landscape, esthetic - visual attractiveness and ethnocultural singularity, it is necessary to analyze the historical change of protective greenery spatial system of Lithuanian agrarian landscape. Following literature analysis and research, it is found: 1) common types, forms, functions and effects to the environment of protective greenery; 2) the transformation (alteration / change) of protective greenery spatial system and planting traditions; 3) usability of planting traditions.

2. RESULTS AND DISCUSSION

2.1. Spatial system of protective greenery and its functions

Protective greenery is a combination of woody (trees and shrubs) and herbaceous plant communities, growing naturally on its own, transformed by agrarian activity or intentionally planted in agrarian landscape areas for ecological functions, forests are excluded. Taking into account the plot size, that is overgrown with trees and shrubs, the amount of plants and their layout properties, protective greenery is divided into types: array, grove, group, belt, row, alley and a solitary tree or shrub. The types of protective greenery, with the exception of a solitary tree or bush, are divided into forms: geometric, free, mixed. These natural volumes, being protective greenery spatial structural components, divides and restricts spaces with vertical planes (Bučas, 1988).

Protective greenery in agrarian structures protects the soil surface from deflation and erosion, maintain favorable moisture regime, create favorable microclimate conditions, more evenly distributes the snow on the fields, reduces and absorbs chemical pollution, provides refuge for fauna, improves growth conditions for agricultural crops. In the scarcely wooded areas protective greenery increases the environmental sustainability of the landscape, biodiversity, aesthetic quality and creates conditions for short-term rest.

Protective greenery performs its functions best when intersecting stripes of various types and forms of plantation community form a purposeful network, which performes a microclimate, bio-ecological, emotional and aesthetic functions. This structure is called the spatial system of landscape protective greenery, which includes protective greenery of roadsides, fields, water ponds and areas unsuitable for farming as well (Misius, 2006).

2.2. Historical change of protective greenery spatial system

Pre – wallachian period. The formation of rural landscape dates back to the stone age, the agriculture of incidence gardening and pastoral cattle rearing in forests gave rise to more active use of natural resources. Residents gathered hazelnuts, cane roots, dried berries and mushrooms, acorns, seeds of various plants, wild apple, hawthorn, thorns and pear fruit. The seeds of these plants found in archaeological excavations date back to 6500 - 3000 m. BC (Girininkas, 2005). This means that wild apple and pear, hazelnuts and other plant's "friendship" with the man extends at least for 8 thousand years. Nutritious Hazelnut nuts were highly rated as a long-lasting food, and Hazelnut milk fed babies (who have lost their mothers) survived. (Šimkūnaitė, 2001). In Spring, sap from birch and maple was extracted and later people produced syrup and wine. Birch buds were used to produce disinfectant infusions. The peasants produced mead (drink) from honey, wax from honeycombs and medicine from various herbs, f.e. *Tilia* blossoms and fruit (Daukantas, 1955). The man created spaces in surrounding environment where fruited plants and flourishing meadows (for domesticated livestock herds) could grow.

At the end of the New Stone Age in a natural landscape, open and consolidate settlements and farming lands appeared. After producing first metal tools in Brass century, farming by land burning method evolved. In Iron Age areas used for agriculture expanded by deforesting easily cultivated forest areas of natural landscape (table 1).

Table 1. Changes in the structural elements of the spatial system of agrarian plantings in the rural landscape

Structural elements of the system of agrarian plantings	Historical types of the rural landscape				
	Pre-Wallachian (until 1557)	Wallachian (1557-1820)	Grange (1820-1940)	Kolkhoz (1940-1990)	After the reestablishment of independence in 1990
Forests in the easily reclaimed areas	x	-	-	-	-
Forest and forest regions in the easily reclaimed areas	+	x	-	-	-
Forest and forest regions in the humid areas and areas of average humidity	+	+	x	-	-
Flanks of bigger incline, springy, waterlogged areas grown with forest, small swamps and moors, plantings along the coats of the streams	+	+	+	x	-
Forests and groves in the areas unsuitable for agriculture	+	+	+	+	+
+ – present plantings; x – destroyed plantings; - – tamed areas.					

During *Pre – Wallachian* period, natural landscape forms dominated. With selection method farmland was being expanded. In farmlands, where small – plot agrarian structure has formed, land - use elements were separated by forest arrays and belts, which in three-dimensional agrarian landscape

structure performed as land plot frames with protective greenery functions (Bučas, 1988). In settlements grew scattered, various size and free-form groups of trees and busies. Buildings of dispearsed settlements, houses of homesteads, plots of arable land and meadows were located erratically, with no particular plan, divided in small plots with intertwined boundaries (fig.1). In settlements grew groups of scattered trees and bushes. The disordered layout of the settlement elements is determined by natural conditions: forest, water bodies and terrain.

Wallachian period. In XVI century, feudal political, industrial and social factors determined the formation of wallachian rural landscape. Network of settlements consisted of manors, country-seats and wallachian street-type villages, surrounded by land – use of compact three – field stripes and scattered manor plots. Manors and country-seats were the first professional and landscape architectural objects in rural landscape (Bučas, 2001).

Manor settlements were being established in scenic locations, like slopes or valleys of rivers and lakes. The plantings of homesteads and parks were well adapted to the natural elements - the relief, natural water bodies and coastal forests. Spatial system of homestead plantation communities consisted of parks, the groups of trees and shrubs, rows, alleys and belts. The plantings of manors and country-seats settlements mostly consisted of local vegetation assortment and introduced plant diversity (Januškevičius, 2004). In most cases those plantings were connected with the surrounding forests, water bodies and the slopes of the coastal plantations, blending in with the spatial system of protective greenery.

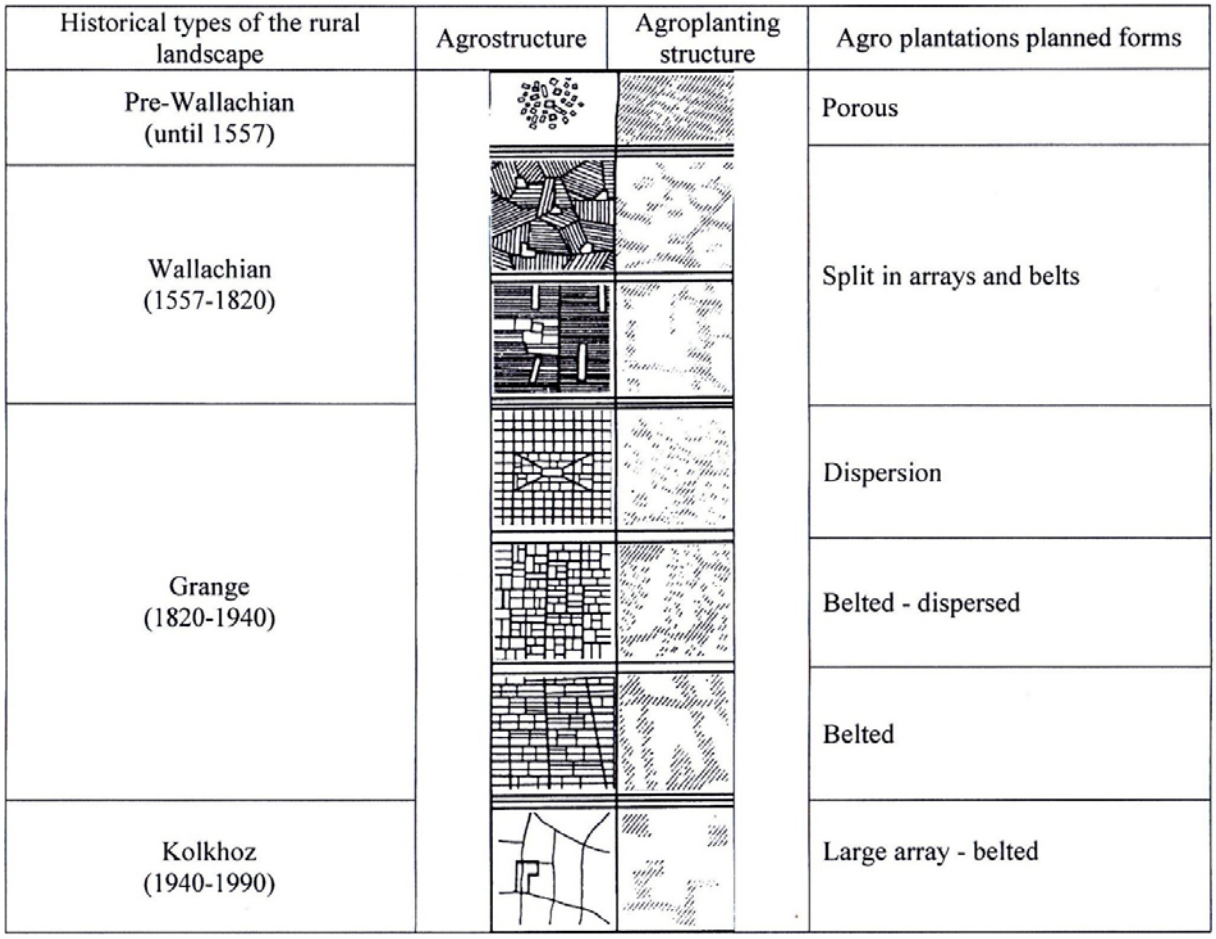


Fig. 1 The structural changes of agro plantations and planned forms (by J. Bucas, 2001).

During Wallachian reform, the lands of manors and villages were separated from forests. The peasants moved from clusted settlements to the linear ones in plain areas. Therefor rows of native leafy (deciduous) trees were planted on the roadsides between homesteads and streets, at the boundary between the neighboring homesteads. Singular or groups of trees were planted around barns as well. In rural environment the plantings of settlements stood out by the cavalcades of large trees, individual or groups of trees in homesteads (table 2).

Protective greenery spatial system took on the geometrical structure of forests, protective greenery arrays, belts and rows. It consisted of remaining forests and forest belts in non-agricultural areas, near water bodies, rural lands, between farmlands, the plantings of wallachian villages and settlements, heavily planted greenery and parks of manors and country-seats, belts and alleys of trees near the roads of settlements. Compared to the *pre - wallachian* period, protective greenery spatial system has gained a clearer geometrical structure, adding on new types and forms of plantings and new greenery of mansions, country-seats and resin street-type villages.

Table 2. Changes in the structural elements of the protective greenery spatial system of settlements, homesteads and roads

Structural elements of the system of agrarian plantings	Historical types of the rural landscape				
	Pre-Wallachian (until 1557)	Wallachian (1557-1820)	Grange (1820-1940)	Kolkhoz (1940-1990)	After the reestablishment of independence in 1990
Natural plantings of the pre-Wallachian settlements	+	x Plantings of the remained settlements	Plantings of the remained settlements	Remaining fragments	Remaining fragments
Plantings gardened in the Wallachian villages and settlements		+	x Partly destroyed	Remaining fragments	Remaining fragments
Plantings in the land lots of granges and homesteads			+	x Plantings of the remained homesteads	Plantings of the remained and newly formed homesteads
Plantings and parks in the kolkhoz settlements				+	+
Plantings in manors and country-seats		+	+	Plantings and parks of the remained homesteads	Plantings and parks of the remained homesteads
Plantings in villages and townships		+	+	+	+
Road plantings	+	+	+	x Remaining and newly planted fragments	+
Dominant planned structure of agrarian plantings	Porous	Split in arrays and belts	Belted - dispersed	Large array - belted	Large array - belted

+ – present plantings; x – destroyed plantings; - – tamed areas.

At the interface of Paganism and Christianity, monks in newly established Christian monasteries started to grow and distribute foreign spice, aromatic, medicinal and edible plants, decorative trees, shrubs and herbaceous plants, so peasant of farmsteads not only started planting native tree and shrub species, but foreign plantings as well. They complemented the sortiment of local plants and made it possible to diversify the environment of homesteads (Juknevičienė, 2006). The mission of this later

contributed to the rectory, manor houses and country - seats owners. Medicinal, culinary and aromatic plants cultivated in flower gardens under the windows, flavored environment and accommodation. Aromatic plants were used in rituals to strengthen the religious emotions. The people of manors and monasteries taught peasants farming, encouraged the cultivation of useful plants, distributing them seedlings and seeds. The peasants took over the innovations of farming, cultivated vegetables, medicinal and decorative plants, learned how to plant gardens.

Grange period. During Wallachian reform created linear villages with chopped limits, did not meet the new and advanced farming requirements. From the beginning of the XIX century, Lithuania followed the Western European example and divided Wallacian villages into individual farmsteads (dispersed villages were formed). Gradually formed small - scale elemental structure of the rural landscape with dispeased individual homesteads as the dominant element. During this period, the farmers in their fields and gardens cultivated various in Western Europe prevalent nutritional, medicinal, spice and feed crops.

Dispearsed homesteads has become the dominant element of the rural landscape. Along with wallachian rural territorial structures, evolved and spatial system of protective greenery. It contained forests and forest belts in non-agricultural areas or near water bodies, roadside plantations, large individual trees and rows or groups of trees remaining in areas of thined out or evicted wallachian villages and homesteads, the remaining belts of greenery in the outskirts of villages and its farmlands, surviving mansions, country-seats and their connecting roads. Farmers, expanding their farmlands, continued to cultivate forest areas. The landscape of dispearsed homesteads now included the plantings of newly established farmsteads, road alleys and rows of trees indicating farmers' land boundaries. In addition to in Wallachian period prevailing types of protective greenery spacial system (forest arrays, rows and belts of trees), in *Grange* period formed new additional ones: individual trees, small groves of trees, belts of trees and shrubs, groups forming a hybrid or geometric forms. Richly planted dispearsed settlements of farmsteads, remaining manors and country – seats became a part of the protective greenery spatial system. Compared with *Wallachian* period, protective greenery spatial system gained chopped dotty - belted structure. Because protective plantations became smaller in size, agrarian space has become vaguely contoured but remained aesthetically attractive and psychologically acceptable (Bučas, 1988).

Kolkhoz period. Under the new political, economic and social conditions after the formation of the socialist economic structure, new type of the rural landscape formed – the landscape of Kolkhoz villages. The changes were attained through industrialization, concentration and specialization of agricultural production, transforming the network of settlements and the global land reclamation. The small – plot planned structure of individual farms has been transformed fundamentally. In the course of draining and drying the lands, green spatial systems of fragmented farms were destroyed, brushes, small swamps, waterlogged lands and rocky areas were cultured, small streams were straightened and converted into melioration canals, along the edges natural belts of plantations were destroyed.

In the course of cultivating, draining the soil and connecting farmlands into larger fields, dispersed homesteads were moved into the collective (*Kolkhoz*) settlements. The balance of ecosystem was disturbed by the elimination of homesteads and natural greenery, so the Republican Water Management Design Institute methodological instructions for the project of land reclamation (issued in 1973) indicated to save all groves, tree groups and valuable plantations of evicted farmsteads that hold household and aesthetic importance. (Melioracija..., 1994). Since 1975, the projects of integrated plantation of farms, forming protective greenery as a single system, began to develop (Survila ir kiti, 1988), but due to the economic downturn, the realization of these projects failed. The people of economically strong Kolkhoz farm settlements established parks, planted greenery in the surroundings of administrative and social service buildings, industrial facilities, cultural centers, schools and other institutions, planted fruit – trees and protective greenery.

Compared with *Grange period*, protective greenery spatial system of *Kolkhoz* has become a system of large components, since the agrarian landscape was left only with arrays and a small portion belts of greenery, that compartmentalize and frame spaces. As a result, the spatial system of protective

greenery has lost its integrity and became fragmented. Protective greenery in plain areas pooled to form a large, usually rectangular arrays, in hilly areas - oval or undefined shape groves and belts (Bučas, 1988). In reclaimed, domesticated, merged and flat terrained fields of Kolkhoz agrarian landscape, dominated sparsely located, usually geometrically shaped arrays and belts of protective greenery. It formed fragmented spatial system, which did not serve the microclimate regulating, biodiversity promoting, landscape singularity and beauty highlighting features.

Until the Second World War, similar processes of cultivating agrarian landscape took place in neighboring Belarus and Poland. After the war, in Poland the number of cultivated fields was increased, but the system of individual farms was not destructed. Since 1950, new protective greenery has been integrated, therefore, types and various forms of their spatial system remained, as well as aesthetic appeal and integrity (Tloczek, 1966). Latvia hosted similar agrarian landscape transformation processes as well as Lithuania, but due to a larger area of low productivity soils, Latvia remained higher wood density and had less areas of oped agrarian spaces (Latvijas..., 1999).

The period after the restoration of independence. After the restoration of Lithuania's independence, prerequisites for the new, free market-oriented land reform was created (Žemėtvarka..., 2000). Due to formation of private property relations, agrarian structure of small - area private properties was forming and traditional farming system of individual farms developing. Still, in the territories of newly established agricultural companies, the agrarian landscape of *Kolkhoz* period remained. With increasing number of cultivated fallow land areas, their re-naturalization (self - induced) started, which led to concerns about the agrarian landscape management. 1998 State Land Management Institute prepared a publication "Applied landscape management" for landscape formation practical activities, the optimization and increase of landscape natural diversity (Survila and others, 1998), and “Guidelines for the establishment of a new farmstead” (Survila and others, 1996) with complex management guidelines for the farm areas and examples of greenery plantation.

Nowadays, dispearsed agro plantations and in soviet period established expressionless, poorly planted Kolkhoz villages in the Kolkhoz rural agro landscape aggregated fields can be seen. Agro landscape is varied by silhouettes of villages and towns submerged in greenery of large trees. However, after the restoration of independence, almost unregulated urban expansion has created preconditions for chaotic urban development in the village. According to J. Bucas (2010) in suburbs, agricultural and even forest lands legally or illegally "sprang up and expanded low-rise buildings of the new "villagers" or simply building groups of a commercial interest, which were usurping the roll of new agricultural areas.

2.3. Evaluation of the results

Formation traditions of agrarian greenery spatial system. In all Lithuanian rural landscape development periods planned - spacial structure of protective greenery evolved. Some component types vanished, new ones appeared, the others were taken over by the newly emerging rural landscape type. Wallachian rural protective greenery (planted by man) remained for about 260 years and spatial system of agrarian plantings in individual farms existed for another 120 years. Rural landscape of individual farmsteads, formed by the Western Europe's rural landscape principles, took over the valuable legacy of previous social formations, gave exceptional singularity characteristics of visual expression and territorial underlying for Lithuanian rural landscape and shaped Lithuanian ethno-cultural landscape giving it an artistic significance (Bučas 2005). This rural landscape and its cultural values can be defined as *ethno - cultural*. It is understood as ethnic cultural and natural heritage in general, as peasant labor, recreation and self-expression, and economic and social activities exclusive location with different ethno-cultural identity and distinctiveness signs. Rural settlements and the homesteads of peasants can be defined as ethno - cultural as well. In ethno-cultural aspect peasant homesteads has long reflected the uniqueness of ethnographic regions, the diversity of historically developed rural landscape and the features of Lithuanian national rural landscape singularity (Misius, Bučas, 2009; Misius, 2012).

The policy for destruction of agrarian greenery areas and consolidation of cultivated fields during the Soviet times was oposed by A. Basalykas, Č. Kudaba and other scientists. According to A. Basalykas, Lithuanian natural conditions (hydrographic network, relief, lithological surface conditions) allows to create an average of 50 - 60 hectares size of crop rotation fields, rarely larger, and in hilly areas - even smaller. He also suggested protective greenery cultivation, which protect fields from soil erosion and deflation, and bodies of water - from sediment and chemical pollution.

Furthermore, A. Basalykas criticized the explotation of identical landscaping measures used for different natural regions. He proposed to keep the surviving territorial fragments and green areas of historical periods to maintain the diversity of the landscape, for scientific purposes, and for future generations (Basalykas, 1977).

Agricultural production industrialization, all accommodation system reorganization of the village, construction of new collective farm settlements, land reclamation and destruction of individual farmstead system greatly reduced the variety of protective greenery types and forms, its vitality and historical continuity conditions. Moreover, accelerated the degradation of landscape management traditions and local and national singularity, significantly decreased the number of adopted subcomponents of protective greenery spatial system, such as rows of trees and shrubs, groups and individual trees. These subcomponents support the continuity of agrarian landscape singularity, the perspective of historically developed agrarian landscape evolution and ecological balance stability.

In transition from one system reorder period to another, the traditionality of protective greenery spatial system in Lithuania‘s non meliorated rural lands, hilly and wooded areas was preserved due to the remaining fragments and traditional structural components of protective greenery spatial system of *pre – wallachian, wallacian and dispearsed village periods.*

During long rural landscape formation process, due to the Lithuanian peasants’ respect for the environment, nature and historical heritage, arose following traditions of protective greenery spatial system formation:

- Planting protective greenery to mark private property boundaries and roads;
- Adapting protective plantings to the hydrographic network and natural forms of the agrarian landscape;
- Adapting the sortiment of trees and shrubs to the existing soil conditions;
- Leaving non-agricultural areas for vegetation of field protective plantations;
- Planting local, mostly leafy (deciduous) trees and shrubs, taking into account their bio-ecological needs;
- Forming the spatial system of protective greenery out of the communities of various trees and shrubs (small groves, belts, rows, alleys and groups of trees and bushes, individual trees or combination of various forms) and taking into account the peculiarities of the terrain;
- Forming the plan of protective greenery spatial system in plains: geometric, hilly terrain - free, undulating terrain - mixed.

Factors behind degradation of agrolandscape ecological balance. Lithuanian rural landscape agro structure changed from small - plot multi-plan with 50-250 meters structural elements of space radius in pre – wallachian period to a major - plot with a radius of 1500 meters to the horizon in Kolkhoz period. The perception of agrarian spaces changed from easily comprehensible and psychologically acceptable to hypertrophied and psychologically unacceptable. One-sidedly reaching economic objectives (maximum crop yield at the lowest price) and not regarding well-established ecological links of the landscape elements, the number of plantings in aggregated agro structures significantly decreased. Mentioned plantings slow the speed of wind. Due to their absence - agrolandscape gets harmed by meteorological factors and negative processes caused by agromelioration - soil erosion, depletion, pollution. As a result, harmful meteorological factors are strengthened – even more dry and cold winds, worsening microclimatic

conditions of large fields, that affect crop yields because of a violation of agro landscape ecological balance.

In the seventh decade of the twentieth century, these phenomena and processes in Lithuania were treated indifferently (Vasinauskas, 1969), although their effects were known in the United States, Canada, Australia (Owen, 1971), Russia, Belarus (Konstantinov, Struzer, 1965), Germany (Kreutz, 1975) and others. The experience of other countries has shown that while drying and cultivating the soil, deflation can not be avoided unless existing natural protective plantations are preserved, new ones planted, creating their spatial system.

During consolidation of fields, in order to make more efficient use powerful and high-speed agricultural machinery and aviation, plantational (organic) land reclamation (melioration) was abandoned. Planning and design of reclamation work has been guided by political, social and economic criteria, regardless of the natural and ecological conditions and the experience of other countries. Comparing performed agro melioration in Soviet period and newly proposed ecological reclamation objects, the prevailing criteria for the evaluation, environmental improvement techniques and measures, the pros and cons, we can see that the positions are fundamentally different (table 3).

Lithuanian agro - landscape ecological balance degradation rezulted due to the following main anthropogenic negative factors:

- Agromelioration (field reclamation) and field consolidation;
- Unreasonable application of farming and agrotechnological measures;
- Intensive use of plant protection chemicals and fertilizers;
- Technical noise, dust, chemical pollution caused by agricultural, industrial companies and vehicles;
- Chemical and nuclear pollution caused by neighboring countries with air masses.

Agro landscape spatial system as agro landscape optimizing measure. Agro landscape spatial system formation is one of the most important and complex rural landscape restoration issues. As together must be solved agro landscape ecological stability, ethnocultural singularity, aesthetic appeal, flora and fauna enhancing and recreational problems. Protective agro greenery system should be developed based on the following optimization criteria: the biological viability, technological quality, psychological acceptability, cost-effectiveness (Kavaliauskas, Bučas, 1982).

Table 3. Comparison of some aspects of agro-melioration and eco-melioration

Aspects	Agro-melioration	Eco-melioration
Types of melioration	Agrotechnical, hydrotechnical, chemical	nature-protective, climatic - hygienic agro protective, recreational
Object of work	soil improvement	the restoration and maintenance of damaged farmland ecological stability
Main anthropogenic criteria	economic and ergonomic	biological, psychological, social
Ways to improve environment	technical and chemical	biological
Main improvement means	technical and chemical	different types of plantations
Positive sides	drained land, cultivated soils, established cultural meadows and pastures, equipped with artificial water reservoir	increases the forest cover, removes harmful anthropogenic factors, stops harmful anthropogenic processes, restores rural landscape singularity, psychological acceptability of spaces, maintains ecological balance
Negative sides	Reduced natural greenery areas and biodiversity, expanding agrarian spaces, water erosion and deflation of soil, pollution of air, soil and water, damaged ecological balance of agro landscape	decrease in arable land plots
Solutions	The restauration of rural landscape with ecologically based biological improvement measures, based on Land Management science.	The promotion and encouragement of the developing organic farming, traditional and non-traditional businesses.

In low forested areas it is necessary to shape agro plantations spatial system that meets the ecological, aesthetic and hygienic requirements, complements the agro natural landscape with supporting elements and preserves its visual quality and ecological stability. In formation of the spatial system of rural landscape agro plantations, it is necessary to consider the following deterministic landscape (Basalykas, 1977) principles:

- *Functionality* - agro greenery component of the visual expression must comply with its function and reflect the diversity of agro landscape;
- *Adaptation* - agro greenery system must fit into the natural landscape conditions and perform protective and aesthetic functions;
- *Ethnography* – agro greenery system and its components should reflect the uniqueness of ethnographic regions and historically developed landscape diversity;
- *Administrative division* - keeping planting differences, which appeared when other jurisdiction circumstances prevailed in the Klaipeda region, North Užnemunė, Eastern Lithuania.

Agro landscape optimization - is a constructive system of measures directed to productive use in the territory, while addressing the ecological, aesthetic, social and economic problems. Rational use of arable land and natural resources, agro landscape should not only be protected, but aesthetically enriched and decorated with natural elements, stabilizing water and wind erosion, air and water pollution, providing shelter for fauna and flora that increase diversity.

Implementation of the protective agro greenery spatial system in the current landscape is the main agro land - use improvement instrument for guiding rural landscape ecological stability, national diversity, regional identity, aesthetic appeal and psychological acceptability. After the restoration of Lithuanian citizens ownership rights to land, forest and water bodies, a new economic phase of the land reform (the

base of which - environmental protection), land use restructuring and consolidation began. Land consolidation main objective is to transform small and competitive economy unfavorable land use to larger and more efficient, better suited to a viable agriculture development, as well as to replace the existing land use inconvenient limits to more convenient, better suited to farming.

While transforming land use and performing land consolidation, most favorable conditions are developing in the transition from agro landscape antropogenic conflict situations, which developed in Soviet era, to their neutralization - to carry out environmental reclamation, to develop organic farming, performing the restoration of the agrarian environmental and ecological stability, historical continuity and ethno-cultural singularity. To achieve these objectives, it is necessary to draw up a national ecological reclamation strategy based on farming, ethnic culture, Lithuanian rural landscape management traditions and practical experiences of other countries.

CONCLUSIONS

1. The reconstruction of Lithuanian rural landscape ecological balance, aesthetic quality, national and regional identity in current conditions is strongly influenced by protective agro greenery spatial system formation perception and evolution of its structural components, change patterns, knowledge and creative application.
2. Protective agro greenery vitality and adaption of historical formation traditions are influenced by 1) natural conditions: undulating terrain, shapes of natural water bodies, wooded and non-agricultural land survival, 2) farmers' ability to adapt to the surrounding natural features and use them for their own use.
3. Following hydrotechnical, culture-technical, chemical and agro-technical land reclamation, reducing the amount of natural agroplantings, amalgamation of cultivated fields and without taking into account the ecological benefits of land reclamation, agro landscape experienced negative meteorological factors, which caused harmful anthropogenic processes: soil water erosion and deflation, soil and water pollution dispersion, silting up and shallowing up of water bodies.
4. In Kolkhoz period created fragmented major component protective greenery spatial system does not ensure agrarian landscape ecological stability, aesthetic appeal and singularity. While solving the problems of rural landscape restoration, exclusively important is the restoration of field protective greenery spatial system, minding the principles of plantation traditions continuity and deterministic landscaping.
5. In order to restore the national singularity of Lithuanian rural landscape, supported by long-lived experiences of farmers, it is necessary to revive the forming the traditions of protective greenery spatial system and its structural components, which should become the ecological land reclamation ideological basis. For its part, protective greenery should become the primary measures of agrarian landscape quality restoration, environmental sustainability support and the optimization of rural landscape spatial structure.

REFERENCES

Antrop M. 1997. The concept of traditional landscapes as a base for landscape evaluation and planning. The example of Flanders Region, *Landscape and Urban Planning 38*, pp. 105–117.

Antrop M. 2000. Beckground concepts for integrated landscape analysis, *Agriculture, Ecosystems and Environment 77* (1/2), p. 17 – 28.

Basalykas A. 1977. *Lietuvos TSR kraštovaizdis.* Vilnius, pp. 174.

Bučas J. 1988. *Lietuvos kaimo kraštovaizdžio raida ir istorinės vertybės.* Vilnius, pp. 82-85.

Bučas J. 2001. *Kraštotvarkos pagrindai.* Kaunas, pp. 151-177.

Bučas J. 2005. Lietuvos kraštovaizdžio vizijos koncepcija. Konferencijos "*Lietuvos kraštovaizdžio vizija*" pranešimų medžiaga, Technologija, Kaunas, pp. 11–21.

Bučas J. 2010. Miesto drieka kaime: socialinis ir aplinkosauginis aspektai. *Urbanistinė drieka: miesto ir kaimo sandūra*. Mokslo straipsnių rinkinys. IV Lietuvos urbanistinis forumas. KTU Kaunas, pp. 5–11.

Daukantas S. 1955. *Rinktiniai raštai*. Vilnius, pp. 168, 242 – 243, 422 - 425.

EKVPĮ 1999. *Lietuvis Respublikos Etninės kultūros valstybinės globos pagrindų įstatymas*. Valstybės žinios Nr. VIII-1328, Vilnius.

Girininkas A. 2005. *Neolitas* // Lietuvos istorija. T. 1. Baltos lankos, Kaunas pp. 170

Januškevičius L. 2004. *Lietuvos parkai*. Kaunas, pp. 448-476.

Juknevičienė G.and Prakapaitė G. 2006. *Augalų kvapai – vaistai*. Kaunas, pp. 8-27, 64

Kaplan R and Kaplan S. 1989. *The experience of nature: A psychological perspective*. Cambridge University Press, New York.

КАВАЛЯУСКАС П and БУЧАС Ю. 1982. *Формирование сельского ландшафта Литовской ССР.* Вильнюс,. pp. 3-4 p.

КОНСТАНТИНОВ АР and СТРУЗЕР ЛР. 1965. *Лесные полосы и урожай.* Ленинград, pp. 176.

KPKA 2004, *Lietuvos respublikos Vyriausybės nutarimas* Nr. 1526 „Dėl kraštovaizdžio politikos krypčių aprašo patvirtinimo". Valstybės žinios Nr. 64-2302, Vilnius.

Kreutz W. 1975. Wplyw ochrony przed wiatrem na klimat siedliskowy//*Kesztaltowanie krajobrazu a ochrona przyrody.* Warszawa, pp. 348-374.

LAC 2002. Landscape Assessment of Country Leitrim. *Technical Report*, p. 38–40.

Latvijas statistikas gadagramata. 1999. Latvijas respublikas centrala statistikas parvalde. Riga.

LCAI 2006. Landscape Character Assessment in Ireland. *Audit and Evaluation*.

LCA 2002. Landscape Character Assessment. Guidance for England and Scotland. *The Country side Agency and Scottish Natural Heritag,* pp. 35–41.

LIS 2001. The Landmap Information System. *Countryside Council for Wales*.

Lothian A. 2000. Landscape Quality Assessment of South Australia. *Dissertation for Doctorate of Philosophy*. Department of Geographical and Environmental Studies. University of Adelaide, pp. 17–30.

Meyer EK. 2000. The Post – Earth Day Conundrum: Translating Environmental Values into Landscape Design, in *Environmentalism in Landscape Architecture*. Edited by Michael Conan. Published by Dumbarton Oaks Research Library and Collection Washington, pp. 48.

Misius R. 2006. Melioracija kaip agrokraštotvarkos priemonė. *Vagos. Mokslo darbai* 73 (26). Akademija, pp. 78.

Misius R. and Bučas J. 2009. Kaimo kraštovaizdžio apsauginių želdynų erdvinės sistemos formavimosi istoriniai aspektai // *Vagos. Mokslo darbai.* Nr.82(35) Akademija. ISSN 1648 – 116X. [CAB Abstracts, VINITI], p.p. 108-112.

Misius R. 2012. Želdinimo tradicijos Lietuvos valstiečių vienkieminėse sodybose: veiklos paveldas menotyriniu aspektu. *Daktaro disertacija, humanitariniai mokslai, menotyra (03H)*. Kaunas, ISBN 978-609-02-0743-7.

Misius R. 2015. Etnokultūrinio savitumo problema Lietuvos kaimiškajame kraštovaizdyje // *Kraštovaizdžio architektūra – profesijos horizontai ir sinergija.* Kraštovaizdžio architektūros forumas

2015. Mokslo darbai. Vilnius, 2015 m. spalio 29 d. ISBN 978-609-95567-3-4), ISBN 978-609-95567-4-1 (online) p.p. 27–36.

NDVS 2003. *Lietuvos respublikos Vyriausybės nutarimas* Nr. 1160 dėl nacionalinės darnos vystymosi strategijos patvirtinimo ir įgyvendinimo. Valstybės žinios Nr. 89-4029, Vilnius.

OMED 1992. *The Oxford Modern English Dictionary for Everyday Use*. Oxford University Press, New York.

Owen OS. 1971. *Natural Resource Conservation. An Ecological Approch.* New York, pp. 69-80.

Palmer J. 2003. Research Agenda for Landscape Perception, in Buhmann E., Ervin S. M. *Trends in Landscape Modelling, Proceedings at Anhalt University of Applied Siences*.

Šimkūnaitė E. 2001. *Gyvenimo receptai*. Iš žiniuonės palikimo. Vilnius, P. 113, 318, 353 – 376

Tloczek I. 1966. *Ksztaltowanie zieleni w krajobrazie wiejskim.* Warsawa, pp. 40-70.

Vasinauskas P. 1969. *Žemių kultūrinimas*. Vilnius, pp. 202.