KAUNAS UNIVERSITY OF TECHNOLOGY

ERIKA ZALESKIENĖ

RESEARCH AND INTEGRATED MANAGEMENT OF RURAL-URBAN INTERFACE LANDSCAPES (CASE OF LITHUANIA)

Doctoral dissertation
Humanities, History and Theory of Arts (H 003)

2019, Kaunas

This doctoral dissertation was prepared at Kaunas University of Technology, Faculty of Architecture and Civil Engineering, Institute of Architecture and Construction during the period of 2012–2018.

Scientific Supervisor:

Assoc. Prof. dr. Indrė GRAŽULEVIČIŪTĖ-VILENIŠKĖ (Kaunas University of Technology, Humanities, History and Theory of Arts, H 003).

Scientific Advisor:

Prof. dr. Jūratė KAMIČAITYTĖ-VIRBAŠIENĖ (Kaunas University of Technology, Technological sciences, Environmental Engineering, T 004).

Doctoral dissertation has been published in:
http://ktu.edu

Editor:

Armandas Rumšas (Publishing Office “Technologija”)

ISBN 978-609-02-1634-7

The bibliographic information about the publication is available in the National Bibliographic Data Bank (NBDB) of Martynas Mažvydas National Library of Lithuania.

KAUNO TECHNOLOGIJOS UNIVERSITETAS

ERIKA ZALESKIENĖ

MIESTO IR KAIMO SĄVEIKOS KRAŠTOVAIZDŽIŲ TYRIMAS IR INTEGRALAUS VALDYMO MODELIS (LIETUVOS PAVYZDŽIU)

Daktaro disertacija
Humanitariniai mokslai, menotyra (H 003)

2019, Kaunas

Disertacija rengta 2012-2018 metais Kauno technologijos universiteto Statybos ir architektūros fakultete, Statybos ir architektūros kompetencijų centre.

Mokslinis vadovas:

Doc. dr. Indrė GRAŽULEVIČIŪTĖ-VILENIŠKĖ (Kauno technologijos universitetas, humanitariniai mokslai, menotyra, H 003).

Mokslinis konsultantas:

Prof. dr. Jūratė KAMIČAITYTĖ-VIRBAŠIENĖ (Kauno technologijos universitetas, technologijos mokslai, aplinkos inžinerija, T 004).

Interneto svetainės, kurioje skelbiama disertacija, adresas:
http://ktu.edu

Redagavo:

Armandas Rumšas (KTU leidykla “Technologija”)

ISBN

Leidinio bibliografinė informacija pateikiama Lietuvos nacionalinės Martyno Mažvydo bibliotekos Nacionalinės bibliografijos duomenų banke (NBDB).

CONTENTS

INTRODUCTION

Relevance of research

In the era of massive urbanization and suburbanization, the urban fringe is no longer the clear line separating urban and rural or natural landscapes, but often the continuous fragmented mix of rural and urban features. These territories of rural-urban interface – *rurban landscapes* – have become the everyday living and working environment of the increasing numbers of people around the world including Lithuania. Those who have a possibility to choose whether to live in rurban areas usually expect a combination of benefits of residing in the city and in the countryside. However, what they commonly get is ether visual complication or suburban uniformity. This encourages looking at these rurban landscapes more carefully.

The *European Landscape Convention* urges landscape researchers and practitioners to analyze very different types of landscapes; however, recent literature on landscape development and research trends demonstrates that not all of the categories of landscape and not all of the areas of landscape research have been receiving the attention they deserve. One of such interesting, however, frequently overlooked, areas is the above mentioned rurban landscapes emerging as a consequence of urban pressure on the countryside or as a part of rural-urban continuum. These landscapes can be characterized with such peculiar features as dynamism, diversity, complexity, a mix of rural and urban features, fragmentation, and interdependence with the city. There is no doubt that such landscapes reflect the major challenges of landscape research including landscape aesthetics, which, in fact, presents new challenges in the context of the contemporarily prevailing mechanistic view of the landscape and the predominant ecological concerns.

Moreover, the areas of rural-urban interface are a fairly new spatial and social phenomenon strongly related with such contemporary socio-geographic processes as globalization and metropolization. This issue results in general or global problematics of the rural urban interface – i.e., features and management challenges of rurban areas which are similar around the world, not only in developed but also in developing countries. However, such newly emerging areas inevitably have a historical dimension and local features caused not only by the specific geographical, natural conditions of the area under analysis, but also by the rural history of land use largely influenced by agricultural politics (Palang, Spek and Stenseke, 2011) of the area into which the urban area expands. The patterns of urban expansion and their changes may also affect the local peculiarities of rurban problematics. Considering this, it is possible to conclude that the links between the *global* and the *local* in rurban studies should constitute an important sphere of research, whereas the understanding of these links should influence the management of these territories.

Considering this, the focus of this research – *understanding the areas of rural-urban interface, their global features, local peculiarities and the related aesthetic concerns and management possibilities* – is relevant and timely.

Aim and tasks of the research

The *Aim of the research* is the development of understanding of global and local aspects of rural-urban interface landscapes and the formulation of the management guidelines for the areas of rural-urban interface while devoting major attention to rurban aesthetics research and modeling.

Tasks of the research:

- literature review in order to understand the present situation of rurban research and to formulate the research approach;
- definition and characterization of rural-urban interface landscapes;
- analysis of local peculiarities of rural-urban interface landscapes by using the example of Lithuania;
- classification of rural-urban interface landscapes;
- review of landscape analysis methodologies suitable for rural-urban interface areas with the major focus on landscape aesthetic research;
- formulation of methodology for ecoaesthetic assessment of rural-urban interface landscapes;
- formulation of rurban landscape management guidelines including the modeling of the image of these areas.

Object of research

The general object of this research is *rural-urban interface* or *rurban landscapes* which emerge as a consequence of the urban pressure on the countryside or as a part of rural-urban continuum. The particular object of this research is the rural-urban interface areas surrounding the largest Lithuanian cities with the population over 100,000 and best reflecting the rurban dynamics of the country.

Methodology of research

The research methodology includes:

- a review and analysis of foreign and Lithuanian literature on the subjects of rural-urban interface, urban development, rural and urban landscapes, landscape classification, valuation and planning, aesthetics and ecology, etc.
- analysis of sites (concept and description, local features and peculiarities, classification, study and evaluation of rurban landscapes), recording in photographs, mainly focusing on the four largest Lithuanian cities with the population above 100,000 residents (Vilnius, Kaunas, Klaipėda, Šiauliai);
- comparative analysis of experience and ideas, synthesis, generalizations;
- methodologies of *visual landscape characterization* and *ecoaesthetic assessment* by Tveit, Ode and Fry (2006), Ode, Tveit and Fry (2008) and Jankevica (2012) were also used in the research (in terms of using concepts of landscape visual (complexity, coherence, disturbance, stewardship, imageability, visual scale, naturalness, historicity and ephemera) and ecological (biodiversity, accordance with the landscape type, predominance of native species and natural elements, carelessness and presence of unaffected nature processes) characterization);

- expert opinion survey was conducted in which respondents helped to reveal the peculiarities of the Lithuanian rurban landscapes and to clarify the hypothetical provisions of this dissertation (research approach for rurban landscapes, general characterization, local peculiarities, importance of the relicts of historic rural landscape types, classification, assessment and regulation of changes and sustainable development). The statistical percentage ratios, the average, and the methods of the determining factors of importance were applied.

- the distinguishing of strengths, weaknesses, opportunities, and threats, i.e., the SWOT analysis for the regulation and modeling of changes of rurban landscapes (development scenarios).

Scientific novelty of the research

The scientific novelty of the research is determined by the following aspects:

- The research provides a comprehensive look at the areas of rural urban interface in the general context of landscape research trends distinguishing global features and local peculiarities of these areas while using the example of Lithuania;

- the focus of the research is on rurban landscape aesthetics; analysis of landscape aesthetics theories and assessment methodologies is conducted;

- the research presents a concept of rural and urban interface landscapes, the methodological background for the eco-aesthetic quality research and assessment of these landscapes including expert opinion survey;

- preliminary study of an expert-oriented approach to rural-urban interface landscapes in order to integrate expert opinion into the process of research and assessment of these landscapes;

- descriptions and assessments of aesthetic trends in the development of rurban landscapes are proposed;

- focus on rurban areas and the development of management guidelines for rurban landscapes integrating the modeling or rurban aesthetics into the overall sustainable development of these areas is offered.

The proposed methodological background of eco-aesthetic research, assessment and regulation of rurban landscapes can serve as a basis for studying and improving the aesthetic and ecological quality of this landscape type, extending the monitoring of landscape structure changes as well as improving the legal foundations of spatial planning for a qualitative aesthetic environment and for the sustainable development of defined territorial development.

Scientific and practical value of the research

The findings of this research can be widely applied:

- the theoretical findings (definition and characterization of rurban landscapes, their classification, distinguished peculiarities of Lithuanian rurban landscapes, the methodology for ecoaesthetic assessment of rural-urban interface landscapes, etc.) can be applied in the future research and stimulate other findings; for example, the peculiarities of rurban landscapes of other countries or regions can be distinguished,

comparative analyses can be performed while using different methodologies including the one formulated in this research;

- the research approach and outcomes can be useful for the field of landscape management from several points of view: it can be applied in monitoring and modeling of landscape processes in the rurban areas, in rurban landscape protection and sustainable development with better understanding of the local context and improving the aesthetic, functional, and ecological quality of the outdoor environment, while developing new competences in this field, etc.

Objects of defense

- characterization of rurban landscapes;
- classification of Lithuanian rurban landscapes;
- ecoaesthetic assessment methodology adapted for rurban landscapes;
- rurban landscapes management guidelines;
- guidelines for modeling the image of rurban landscapes.

Key terms

Landscape – an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors (European..., 2000).

Environment – the complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival (Merriam-Webster, 2019).

Cultural landscape (both rural and urban) – is a quality result of a harmonious coexistence between man and the environment (Bučas, 2001). It is a targeted formation of landscape which satisfies biological, psychological (informational, aesthetic), social, ergonomic (fitness for action), economic needs of life, work and recreation environment (Lietuvos Respublikos Vyriausybė, 2004).

Anthropogenic landscape – the second phase of cultured landscape in which the effects of human activity are predominantly quantitative and visual, natural elements do not play a compensatory role, their naturalization without special measures is almost impossible. Commonly, this is a new landscape close to the urban or industrial landscape (Bučas, 2001)

Landscape analysis – a systematic process of describing landscape attributes, their spatial pattern and their importance to people (Ode *et al*., 2008).

Rural-urban interface (rurban) landscape – landscape emerging because of urban pressure on countryside, or which is as a part of rural-urban continuum (Zaleskienė and Gražulevičiūtė-Vileniškė, 2013).

Landscape description – identification of the landscape components. Components of a landscape range from landform, geology, soil, vegetation cover, drainage patterns, built development, land uses, infrastructure, and heritage sites to cultural meaning (Landscape description, 1997).

Landscape visual character – the visual expression of the spatial elements, structure and pattern in the landscape (Ode *et al*., 2008).

Landscape aesthetics – the landscape quality perceived by using all human senses (including sight); as far as the subject perceives 85 percent of environment – object – by using sight and gets specific spiritual-aesthetic, emotional-aesthetic experience, it can be stated that the visual quality constitutes the basis of the aesthetic quality of landscape. The aesthetic experience of landscape is determined both by the personal qualities of the perceiver and by his or her cultural background – cultural context (Kamičaitytė-Virbašienė, 2003).

Landscape assessment – comprehensive, detailed studies of the landscape and environment (Landscape and sustainable development…, 2006).

Visual landscape assessment – a process that aims at analyzing the visual landscape character (Ode *et al*., 2008).

Landscape character – a distinct, recognizable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse (Laukaitytė-Malžinskienė, 2008).

Landscape type – a common concept indicating the nature of the spatial structure of the landscape according to criteria of basic or applied knowledge (Kavaliauskas, 2011).

Landscape identity – the entirety of features by which one can identify the identity of the spatial structure of the landscape, to recognize its unique traits (Kavaliauskas, 2011).

Scenario of landscape development – prediction of the visible, material changes in the landscape that can be done after the study of the perceivable, non-material features and underlying processes influencing landscape change (Palang, Alumae and Mander, 2000).

Sustainability – the quality of not being harmful to the environment or depleting natural resources, and thereby supporting long-term ecological balance (Dictionary.com, 2019).

Sustainable development of landscape – the development of the landscape ensuring better quality of the landscape, both for the present and future generations (Darnaus vystymosi tikslų..., 2018).

Volume and structure of the research

The research consists of four major parts – (1) notion, development and relevance of research of rural-urban interface landscapes; (2) analysis of rural-urban interface landscapes; (3) assessment of rural-urban interface landscapes; (4) management of rural-urban interface landscapes. The volume of the main text is 177 pages, including 63 figures and 18 tables. The first part of the research is devoted to the first glance at the areas of rural-urban interface landscapes – a definition and concise description of development of these areas, the literature review setting the rurban problematics in the general context of landscape research and demonstrating its relevance – and the formulation of the hypothesis of the research. The second part includes more detailed characterization of rurban landscapes while distinguishing their global features and local peculiarities by using the example of Lithuania, and the classification of rural-urban interface landscapes based on the example of Lithuania. The third part is devoted to the review of landscape analysis

methodologies that can be applied to rurban landscapes and the development of ecoaesthetic assessment methodology for these landscapes based on the research of Tveit *et al*. (2006), Ode *et al*. (2008) and Jankevica (2012). This part also includes a review of Lithuanian landscape assessment methodologies in the context of rural-urban interface landscapes and their integration in the rurban research. The fourth part is devoted to the management guidelines for rural-urban interface landscapes including the general guidelines, regulation aspects, and the aesthetic issues. Aesthetic modeling proposals for rurban areas integrate the aesthetic perceptual categories under sustainable landscape conditions by Nohl (2001) and the system of visual landscape characterization concepts by Tveit *et al*. (2006), Ode *et al*. (2008). The appendixes of the text consist of 2 parts demonstrating the formulation and application of the methodology for ecoaesthetic assessment of rural-urban interface landscapes.

The research material which the author published with her co-authors in a series of scientific publications on the topic of the dissertation was used in the text of the dissertation (see *Appendix 4*).

1. NOTION, DEVELOPMENT AND RELEVANCE OF RESEARCH OF RURAL-URBAN INTERFACE LANDSCAPES

1.1. Notion of rural-urban interface landscapes

The development and changes of landscape are influenced by various anthropogenic and natural factors. Geographers and researchers working in the field of land management state that contemporarily hardly any natural landscapes uninfluenced by human activity exist at all, and thus culturized and cultural (with reference to Bučas (2001)) landscapes influenced and reshaped by intensive human activities are prevailing. These anthropogenic culturized and cultural landscapes of various types receive increasing attention of researchers of various disciplines. Traditionally, based on the type of anthropogenic activities, culturized and cultural landscapes are subdivided into *rural* and *urban* ones. However, the urban sprawl into suburban areas is the most significant process of land use changes around the world.

Historic rural landscapes had distinct, clearly distinguishable aesthetics, and mostly they, together with natural areas (in opposition to the urban areas) shaped the image of countries and regions. The present situation is largely different in the fields of landscape aesthetics and country or region image formation as well as in the field of interactions between urbanized, rural, and natural areas. Industrialization and globalization radically altered the situation in these areas. For example, Jacobs and Mann (2000) note that growing populations seeking increasingly centralized markets and employment opportunities generate the spread of urbanization across the globe; thus landscapes are subject to enormous forces of centralization and to increasing uniformity. The traditional urban-rural dichotomy could not be maintained in such conditions, and the rural-urban continuum emerged where the mobile middle classes built a highly dispersed pattern of activities developing not in a place, but in a region (Adell, 1999). These processes rapidly changing the world's landscapes seem unidirectional, and there is no reason to believe that these pressures on the traditional rural and natural landscapes will diminish. The urban expansion rapidly changing the face of the countryside is evident even in those countries where the general number of inhabitants is decreasing (Lithuania) (Bardauskiene, Pakalnis, 2012). Due to the global travel and rapid communication, cities and their zones of influence nowadays not only play a prominent role in the global economics, but also shape the image of countries and regions more than the countryside which is increasingly transformed into the areas devoted to large scale agricultural production. It is not surprising that these changes in landscapes and landscape perception have engendered new terms and even fields of research.

The term *urban fringe* expressing the changes in the urban form and lifestyles was for the first time used by American geographers during the 1940s and 1950s (Adell, 1999). Contemporary landscape researchers use a variety of terms and neologisms characterizing suburban, urban and rural interaction, areas located in the urban influence zone and their internal structure. Numerous new terms – *rural-urban fringe, metropolitan fringe, peri-urban, edge-cities, near-urban, pre-urban, exurban, post-suburban landscapes, extended metropolitan region, rurban,*

ruralurban, pseudo-suburbs, urban satellites, and *pseudo-satellites, inner* and *outer urban fringe, rural non-farm areas, rurban periphery, urban hinterland* (Adell, 1999; Low Choy *et al*., 2008) – and the entire area of rurban or peri-urban studies have emerged (*Fig. 1.1*).

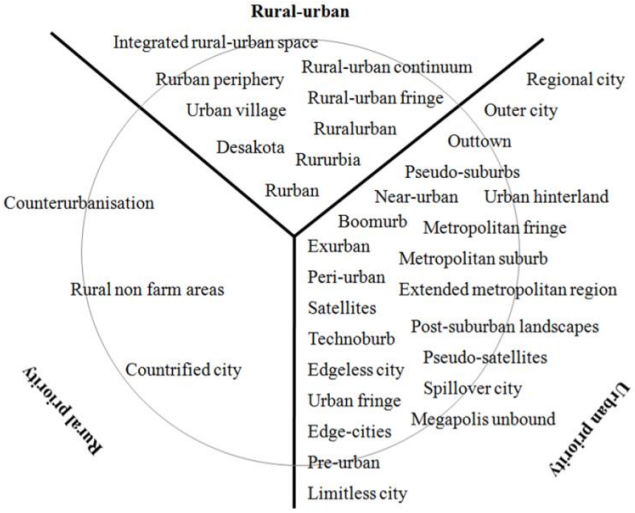


Fig. 1.1. Terms used to describe new processes in landscapes (Adell, 1999; Taylor and Lang, 2004; Low Choy *et al*., 2008) and their distribution according to the connotations of meaning. Scheme by the author

Some terms, such as *urban fringe* or *peri-urban*, imply the dualism and antagonism between the rural and urban realms, and, according to Low Choy *et al*. (2008), depict the peri-urban zone as invaded countryside threatened by the urban fabric expansion and a new population invading the traditional local communities. The understanding of the complexity of links between the city and the countryside is evolving rapidly and shifting towards new conceptions of landscapes where rural-urban links are being redefined. The views had emerged that the transitional landscapes between city and the countryside were not necessarily the result of solely urban-driven processes, thus it resulted in such terms as *rurban* or *ruralurban* getting coined (Adell, 1999).

The terms *rural-urban interface, rurban, ruralurban* attempt to transcend the traditional urban-rural dichotomy and the view that urbanization is always the only factor shaping the identity of these areas. Thus these terms are used in this research.

The plethora of new terms *(Fig. 1.1.)* implies that these new types of landscapes are being extensively studied and analyzed while taking into account the increased interest in landscape caused by the emergence of the European Landscape Convention. Actually, natural, rural, urban and peri-urban areas all belong to the concern of the *Convention*. However, as Conrad, Christie and Fazey (2011) note, the landscape knowledge and technical capacities for landscape protection, planning and management are unevenly distributed across the landscape types. They note that one

of the types of landscapes, which – to date – has not been well-studied and still needs to be better addressed is the rural-urban interface areas.

1.2. Development of rural-urban interface landscapes

The human history reveals the links between and the mutual impact of one on the other of urban settlements and the countryside throughout the centuries. As Antrop (2000) notes, historically, the agrarian cultural landscape was created in parallel to the creation of the urbanized society. Meanwhile, urban theorist Lefebvre (2003) in his analysis of the ongoing 'urban revolution' presents the notion of the 'political city' and notes that in the ancient times in many instances agriculture was formalized through the pressure from the urban centers. Lefebvre (2003) locates the 'political city' managing large-scale agricultural projects, shaping and transforming the countryside at the point of the origin on the space-time axis demonstrating the development of the urban society *(Fig. 1.2)*; this form of urban-rural relations is followed by the 'mercantile city' and the 'industrial city' together with the increasing importance of the 'urban reality'. The contemporary situation is described as the 'critical zone' where the effects of 'implosion – explosion' are mostly felt. The term 'implosion – explosion', borrowed from the nuclear physics by Lefebvre (2003), adequately explains the contemporary reality and the causes of the urban – rural dynamics: the enormous concentration of the 'urban reality' (of people, activities, wealth, goods, objects, instruments, means, and thought) and the immense 'explosion' of urbanization into space (peripheries, suburbs, vacation homes, satellite towns), the 'rural exodus', and the final subordination of the agrarian to the urban. The 'implosion – explosion' means both the urban growth and sprawl, and the increasing industrialization and rationalization of agriculture. Lefebvre (2003) believes that the 'urban reality' shapes the socioeconomic and sociocultural processes.

Meanwhile, the geographer and anthropologist Harvey (2008) speaks of 'the production of space and the built environment'. This notion reflects the ability of contemporary humanity to transform the environment with industrial pace and in the global scale. According to Harvey (2008), the urban expansion is only one of the aspects of the 'production of space', the driver of which is the industrial capitalism; the industry erases the urban – rural differences, the agriculture is mechanized and specialized, the agricultural land is strictly subdivided, and the production is regulated by national and global demand, prices, and profits, the residents of the farms and remote rural areas are economically, culturally, socially and politically linked with the rest of societies, and their lifestyles become increasingly urbanized (Giddens, 2001). The pace and scale of landscape changes and rurban problematics are strongly interlinked. The emergence of the rural-urban interface and the related challenges was caused by the massive urbanization and urban expansion as a consequence of industrial and agricultural revolutions *(Fig. 1.3)*. According to Antrop (2008), one landscape experienced through many generations was replaced with many landscapes experienced in one generation, and the rurban landscape is one of these experienced varieties. Whether driven by the 'urban reality' or by the industrial capitalism, the transformation of the countryside and natural areas caused

by the 'urban implosion – explosion' process presents numerous challenges to landscape researchers and practitioners from the points of view of structure, ecology, aesthetics, functions, etc.

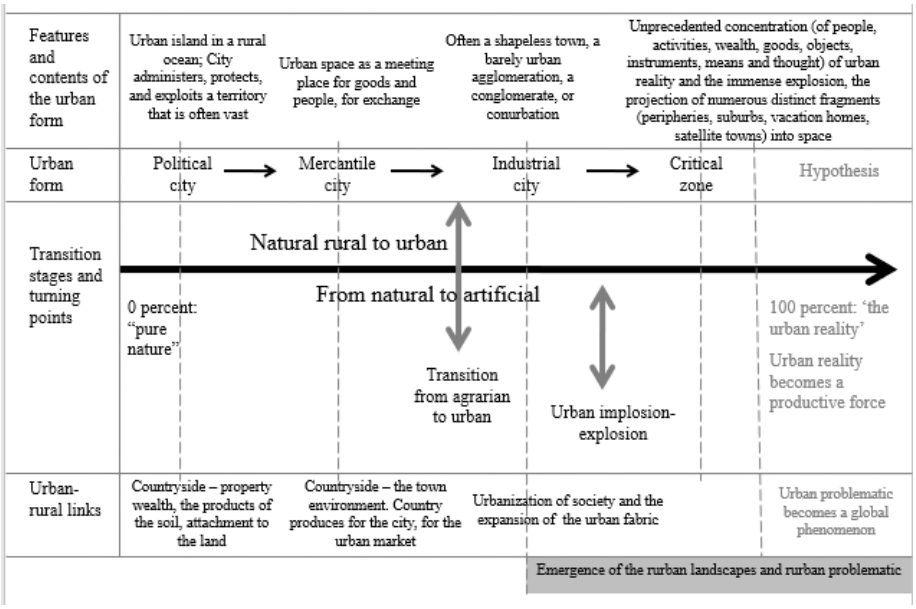


Fig. 1.2. Scheme demonstrating Lefebvre's (2003) 'urban revolution' concept and the place of rurban landscapes in it. Scheme by the author

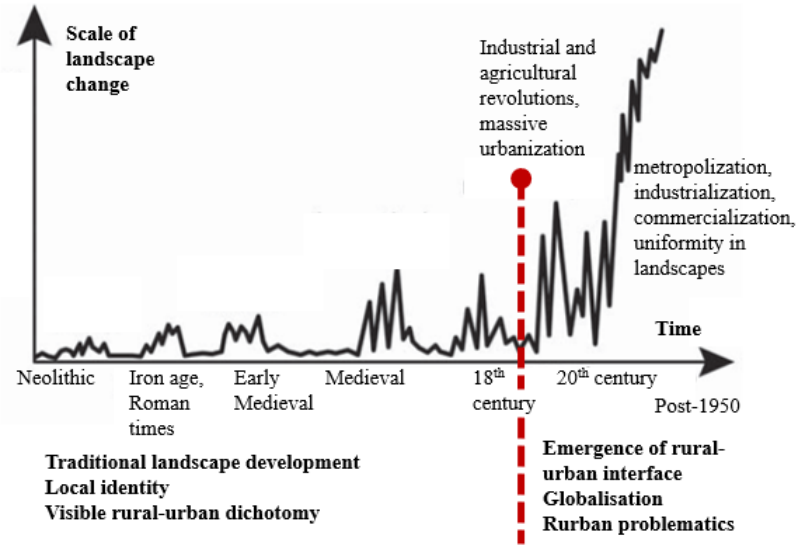


Fig. 1.3. The emergence of rurban problematics in the European landscapes with reference to Antrop (2008). Scheme by the author

1.3. Research of rural-urban interface landscapes and its significance

Literature review. The focus of this research is relatively narrow – the areas of rural-urban interface – and very wide at the same time as this issue is interlinked with such questions as contemporary and historic landscapes, 'working landscapes' or agricultural landscapes, wastelands and greenfield/brownfield development, peri-urban and suburban developments, post-Communist developments (bearing in mind the example of Lithuania), building conversions, landscape aesthetics, landscape sustainability, etc. All these topics and subtopics can be linked by the concepts of anthropogenic and cultural landscapes – the consequences of the complex miscellaneous interactions of nature and humankind – the underlying forces of landscape (Bučas 2001; Palang *et al*., 2006; Kavaliauskas, 2011; UNESCO…, 2013). Considering this, the key issues relevant to this research that could help framing the case in relation to the wider context of Lithuanian and foreign literature were distinguished:

Development, changes and significance of the European and other cultural landscapes, human-nature interactions were addressed by numerous researchers including Phillips (1998), Bučas (2001), Antrop (2004, 2005, 2008), Favry and Pfefferkorn (2005), Matthews and Selman (2006) and many others. The dynamics of cultural landscapes in the contemporary post-Communist countries deserves separate attention. Palang *et al*. (2006) argues that the Central and Eastern European landscapes are much more diverse in time layers than the Western European ones and this creates specific perception and management problems. There is a considerable set of literature that analyzes the changes of landscapes in the Central and Eastern European countries that took place during the Soviet period and their emergent transformations after the collapse of the Soviet bloc. For example, Bučas (1988, 2001) analyzed the characteristic features and changes of the Lithuanian landscape; Rasa and Nikodemus (2008) analyzed the structural and related changes in the landscape of Gauja National Park in Latvia throughout the 20th century; Bell, Peneze, Nikodemus and Montarzino (2008) addressed the Latvian landscape and its perceptions during the social and economic transformations; Vanwambeke, Meyfroidt and Nikodemus (2012) analyzed the changes of the Latvian landscape in the transition from the USSR to the EU; Kuemmerle *et al*. (2011) analyzed post-Soviet landscape transformations in the western Ukraine; Prishchepov, Muller, Dubinin, Baumann and Radeloff (2013) studied the post-Soviet land abandonment issues in the European part of Russia.

Understanding, planning and managing the areas of rural-urban interface in the context of urban transformations is also of considerable relevance for this research. As recently as ten years before the present investigation, research on the rural-urban interface – rurban studies – was a new area of scientific interest. The pace and extent of the contemporary urban expansion urges research in this area; thus this sphere of research is continuously expanding; it focuses not only on the protection of nature, but also on the effects that urban expansion, urban lifestyles and values impose on rural areas. A significant number of research papers and several monographs including general considerations (for example, Antrop and Eetvelde (2000); Allen (2003); Jerpasen and Swensen 2008; Low Choy *et al*.

(2008); Marshall, Waldman, MacGregor, Mehta and Randhawa (2009) and case studies (for example, Olmo and Munoz (2004); Dupont (2005); Overbeek and Terluin (2006); Swensen and Jerpasen (2008)) and several major literature reviews, including Rakodi (1999), Phillips *et al*. (1999), Adell (1999), Buxton *et al*. (2006), focus on different aspects of the rural-urban interface. A part of the reviews is concentrated on specific issues, such as poverty (Rakodi 1999), natural resources (Phillips *et al*., 1999), whereas others are more general and comprehensive (Adell, 1999; Buxton *et al*., 2006). Some other analyzed aspects are: peri-urban landscape typology and classification (Antrop 2000; Iaqiunta and Drescher, 2000), urban growth and peri-urban landscape change, which is influenced by drivers of change (Powell and Roberts, 2007; Piorr, 2011; Low Choy *et al*., 2007; Buxton *et al*., 2006), typology of peri-urban land-use conflicts (von der Dunk, Gret-Regamey, Dalang and Hersperger, 2011; Buxton *et al*., 2006), and so on.

A review of these sources demonstrates that the research material regarding the rural-urban interface, even if extensive, still lacks contextualization – i.e., setting the rurban problematic into the wider context of landscape research trends and in this way demonstrating its importance and contemporary relevance. In the post-Communist space, including Lithuania, this research area is still fairly new; however, it currently is expanding considerably. For example, Sykora and Bouzarovski (2012) addressed the issue of the post-Communist urban transition; Cirtautas (2012) discussed the peculiarities of extensive development of cities in the Baltic States; Čereškevičius (2012) analyzed the characteristic phenomenon of the shrinking cities of the region. Researchers also analyzed the phenomenon of the urban sprawl affecting the countryside (Bučas, 2010; Bardauskienė and Pakalnis, 2012), studied the general peculiarities of peri-urban or suburban landscapes (Laukaitytė-Malžinskienė, 2005, 2008; Neniškis, 2009; Cirtautas, 2010, 2012), issues of the rural heritage under pressure of urbanization (Jurevičienė, 2005; Vitkuvienė, 2005); they also analyzed the examples of particular cities from the point of view of suburban and peri-urban development (Daujotaitė, 1967; Daunora, 1996; Jakaitis, 2001; Dijokienė, 2006). In the editorial of a special issue of *Cities*, Gentile, Tammaru and Van Kempen (2012) discussed the social and spatial change in Central and East European cities and identified the phenomenon of heteropolitanization – a transition towards the socially, economically, culturally and spatially heterogeneous and complex environment as the prevailing trend in the ongoing processes of transformation. Although, as the review demonstrates, the urban dimension has been receiving more attention in the analysis of the rural-urban interface in the post-Communist context, the focus on rural issues under urban pressures is present as well. The study by Česnulevičius (1999) or the analysis by Aleknavičius and Valčiukienė (2011) of the features of the rural landscape development in Vilnius City influence zone may serve as excellent examples of this case. A review of Lithuanian literature directly and indirectly related with the rural-urban interface demonstrates another important issue – i.e., lack of synthesis of rural and urban studies. When analyzing the urban development and expansion, the rural dimension is insufficiently considered, and vice versa.

The problems of abandoned buildings and areas, 'brownfields' and adaptive re-use are dealt with both in the post-Communist countries and the rest of the world in scientific research articles (Bullen and Love, 2011), studies and reports (Leading..., 2010), guidelines (Practice..., 2012). etc. Several important studies can be distinguished in the Lithuanian context. For example, Pakalnis and Bardauskienė (2012) analyze the question of the re-use of buildings and territories in the broader context of the so-called 'green' and 'brown' urbanism in Lithuania. Antuchevičienė (2005) carried out a research on the modeling of re-use of abandoned buildings in Lithuania in the context of sustainability. The State Protected Areas Service under the Ministry of the Environment of the Republic of Lithuania commissioned a comprehensive *Program of Liquidation of Abandoned Buildings* (2008).

Ecology and aesthetics and their links, especially in the areas of rural-urban interface, is another urgent issue in the light of the contemporary developments. Even if the philosophical interest in the discipline intensified as early as in the 18th century with the advent of the concept of the *sublime* (Slater, 2014). This concept is applicable to landscape, reviews reveal that the greatest interest in landscape aesthetics as a scientific discipline and its scientific measurement was demonstrated in the second half of the 20th century both in the world and specifically in Lithuania. The contemporary research tries to integrate aesthetics as one of the dimensions of landscape sustainability. It is important to reconcile ecology and aesthetics, while concentrating on ecological and economic, or on the social questions, on the application of new technologies in the landscape research thus leaving landscape aesthetics in the background. The experience in this field ranges from the widely known studies by Appleton (1975), Kaplan and Kaplan (1989), Nassauer (1988) and others expressing a variety of attitudes towards landscape preferences to more recent approaches trying to reconcile ecology and aesthetics or aesthetics and environmental sustainability including Nassauer (1988), Gobster, Nassauer, Daniel and Fry (2007), Steinitz (1990), Nohl (2001), Musacchio (2009) and many others. Some thematically relevant research should be mentioned:

- Kamičaitytė-Virbašienė (2003) and Ode *et al*. (2008) published extensive literature reviews on approaches towards aesthetic assessment of landscape.

- Jorgensen (2011) reviewed the trends of landscape aesthetics research and provided outlines for the future directions in the landscape aesthetics research.

- Ewald (2001), Nohl (2001) expressed regret regarding the currently deteriorating aesthetic conditions of landscapes.

- The research trying to combine and/or integrate aesthetics and ecological aspects is worth noting in the context of this research includes: Nassauer (1995) on combining the 'spontaneous' and the 'orderly' in the landscape architecture "Messy ecosystems, orderly frames," the manifesto of Ecoaesthetics by Araeen (2009), the comparative analysis of methodologies for landscape ecological aesthetics in urban planning by Jankevica (2012), Gandy (2013) on aesthetics, ecology, and urban wastelands with such concepts as 'urban nature' and 'urban biodiversity' relevant for the analysis of the rural-urban interface.

- The contribution of Nohl (2001) is of particular interest. His holistic approach towards aesthetics in the context of landscape sustainability and the look at

the future landscapes as an aesthetical object and his four aesthetic perceptual categories under sustainable landscape conditions can be successfully applied in the development of rurban landscapes.

It is paradoxical that, according to Kamičaitytė-Virbašienė, in Lithuania the major work in the field of landscape aesthetic assessment was carried out during the Soviet period by Ėringis and Budriūnas (1966; 1970), Palys (1979), Stauskas (1966), Kavaliauskas (1975), Daniulaitis (1970–1980), Bučas (1980; 1983) (Kamičaitytė-Virbašienė, 2003). Meanwhile, in later works after the restoration of the country's independence, Budriūnas and Ėringis (2000), Daniulaitis and Kamičaitytė-Virbašienė (2002), Kamičaitytė-Virbašienė (2001; 2003) also addressed the questions of landscape visual quality and, more generally, aesthetics. They presented a number of theoretical approaches and methodologies towards landscape valuation (see ***Appendix 1***).

Relevance of rurban problematic in the context of general landscape research. The above-mentioned lack of synthesis and contextualization justifies the need to show the rurban problematic in the light of general landscape research. The literature review helped to distinguish several challenges of landscape research relevant to rurban studies: *the increasing pace and scale of landscape change, the increasing complexity of landscapes, proliferation and fragmentation of knowledge, handling the subjective dimension in landscape valuation, landscape aesthetics challenges*. A presumption was made that the rurban landscapes around the world constitute a concentrated manifestation, a microcosm of the contradictory and complicated processes affecting today's landscapes and can serve as the indispensable objects for integrated landscape research: these landscapes can function as laboratories for landscape research.

Increasing pace and scale of landscape change. Landscape researchers devote considerable attention to landscape dynamics. According to Antrop (2000), the nature of the composing elements changes, as do their connecting relationships. Ewald (2001) notes that the energy and material flows over time are the major driving forces of landscape dynamics. It is clear that landscape dynamics includes both spatial and temporal dimensions of landscape changes. Since the advent of human settlements in the Neolithic era, the natural and human-created or modified components interact in landscapes with differing dominance. Since that time, the human role in the landscape dynamics has been gradually increasing. The process to create the cultural landscapes which we value today has been the slow development with a few periods of change and long periods of consolidation (Antrop 2000). Thus the landscape change is not new, but what is new and poses concern is the scale, the pace, and the results of the contemporary landscape change: stages of the major reform are followed by very short periods of compensation or even by another abrupt change. With technological advancement and predominant economic thinking, these processes have taken on a global character. One of the definitions of rurban or peri-urban areas is that these are the areas outside the existing urban agglomeration(s) where extensive changes are taking place over space and time (Dupont, 2005). Therefore, we can say that the dynamism of the suburban landscape characterizes this landscape type very well, thus several aspects regarding the pace

and scale of change in the rurban areas are distinguished below.

Transitional character and multidirectional change. The rurban landscapes as we know them today emerged in a very short period of time. Today, these areas are not stable and still clearly exhibit the rapid continuous restructuring of space driven by the socioeconomic processes and the institutional policies: the rural landscape with some urban features can be rapidly replaced by urbanized landscape with fragments of rural environment, which, in turn, can become increasingly urbanized. A question can even be posed: is the rurban landscape a place or a process of transition from rural to more urbanized settings? Are these landscapes in constant flux? Rurban landscapes can significantly change even in the course of the analysis. Low Choy *et al*. (2008) notes that the peri-urban zone is either diminished if it is finite, or its inner and outer boundaries move further outward from the dominant urban center. This author refers to these areas as the 'zone of impermanence'. This causes monitoring and forecasting difficulties. The changes in the land use (and landscape) occur very fast, so census statistics do not 'catch up' (Antrop, 2000). The transitional character is often visible in the spatial dimension as well: the proportion and distribution of urban and rural features, their effect on the identity of the place change moving from the outskirts of the city to the rural areas. However, the human and natural processes that take place in these transitional landscapes are multidirectional: decay of heritage buildings, renaturalization of abandoned agricultural lots, intensification of industrial and household agriculture in the proximity of urban areas due to the larger densities of residents, construction of new buildings and infrastructure due to urbanization pressures, etc. For example, the urban pressure is often considered to cause the decline of agricultural practices, however, the experience from the developing countries demonstrates that agricultural activities can be more intensive when moving closer to the city's edge (Marshall *et al*., 2009).

Time depth. Despite the rapid change, one of the basic features distinguishing rurban landscapes from urban areas or suburbs is the presence of the rural dimension is the residues of rural environment, i.e., the rural heritage. Thus these landscapes transformed by urbanization or social pressures can often be characterized as remnant or having a historical dimension, significant landscape memory or time depth (Dobson, 2008) *(Fig. 1.4)*. The legibility of the historical dimension can be different in different rurban landscapes. In some areas, as Antrop (2000) notes, these remnants of the traditional landscape structures become just isolated patches in a large-scale uniform space and are more and more difficult to recognize. He argues that the understanding of the historical development – the time dimension – of the rurban landscape allows the assessment of these traditional landscape elements and structures that can become the anchor places in the management and reorganization of the changing surrounding landscape.

The urbanity as the driver of change. Antrop (2000) underlines that, historically, the rural hinterland was vital for the subsistence of the city; meanwhile, now cities are vital for the subsistence of the rural hinterland or the rurban areas. In other words, the urban explosion and the social urbanization perform the role of a driver in the landscape change and in the development of rurban areas *(Fig. 1.5)*.

The fact that the urbanity is perceived as the main driver of development of the rural-urban interface is well reflected in the bulk of terms implying the urban priority that recently emerged to describe new processes and landscapes. Meanwhile, the rural component as one of the factors shaping the rurban identity is frequently omitted.

Increasing complexity of landscapes. Complexity is a major result of the rapid landscape change. Certain complexity, diversity and multifunctionality were characteristic valuable features of many cultural landscapes. This desirable stimulating landscape diversity is the goal of sustainable development of cultural landscapes. However, the contemporary pace and scale of the landscape change often results in psychologically and socially unacceptable forms of diversity – visual, structural, and functional confusion, visual and social landscape fragmentation, management problems, conflicts and tensions. The changes and decline in ecosystems and ecosystem fragmentation pose major concerns as well. It is paradoxical that the hardly understandable landscape diversity goes hand in hand with the global landscape uniformity: suburban, industrial, agricultural-industrial, logistics areas replace the traditional landscapes and become increasingly similar around the world. Rurban areas best exemplify the landscape complexity; several aspects of this problem are discussed below.

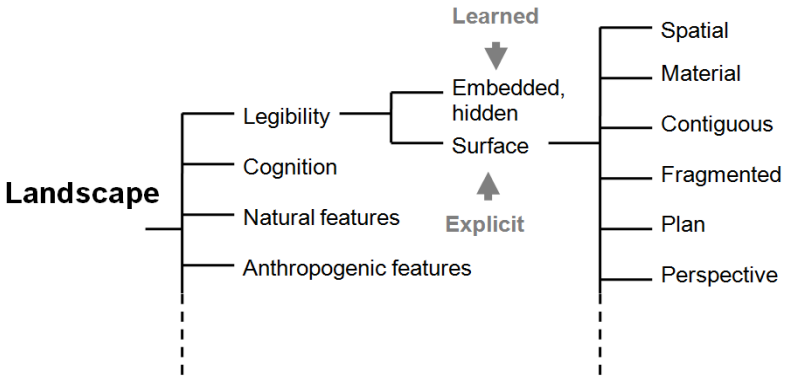


Fig. 1.4. Time-depth of landscape and its present legibility with reference to Dobson (2008) and Stephenson (2008). Scheme by the author

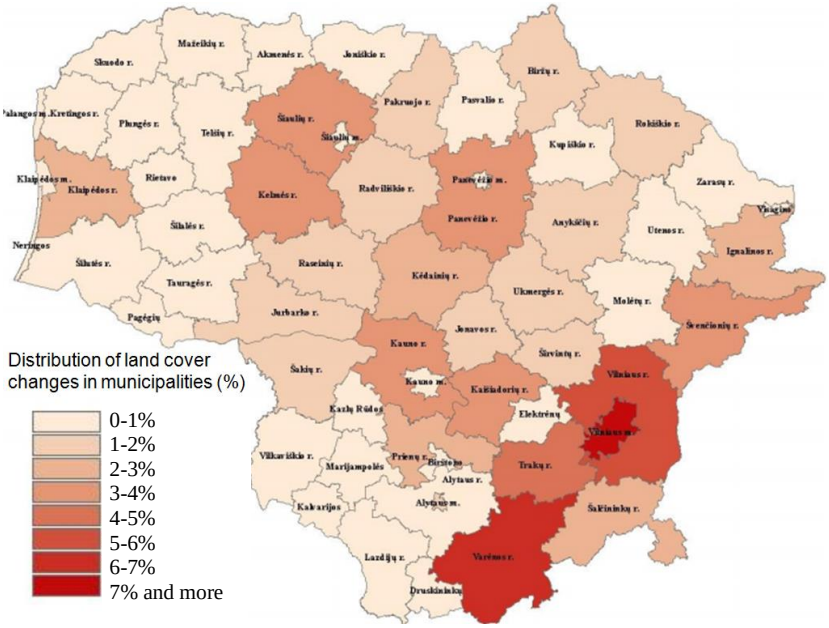


Fig. 1.5. Land cover changes 2006–2013 (Žemės..., 2014) in Lithuania demonstrating the constant landscape change and the urbanity as a driver in it (we should note the intensity of landscape change in the municipalities of Vilnius and Vilnius District).

New types of landscapes. The rural-urban interface areas are often considered just as a transitional area from urbanized to rural and natural setting (Marshall *et al*., 2009) and are attributed to the competence of urban or rural studies, depending on the proportion and intensity of the corresponding features. Another view towards rurban areas sees them as generated largely by the activities within the urban zone (Philips *et al*., 1999; Adell, 1999). However, the reality of rurban areas is not that simple, and they often resist the usual subdivision between the urban and rural competence spheres. Researchers list various functions and uses which coexist in the areas of the rural-urban interface: pockets of suburban housing, large residential and rural residential lots, a range of farming activities including intensive agriculture and shed-based agriculture, resource extraction activities, utility installations and major urban infrastructure and services facilities, such as airfields, landfills, schools, churches, retail and commercial premises, and tourist and recreational uses (Low Choy *et al*., 2008). New hybrid rural-urban uses are also emerging. These complex areas are sometimes referred to as the 'fuzzy zones' (Marshall *et al*., 2009). These 'fuzzy zones' further attract various rural, urban, and hybrid activities resulting in the unusual mixtures of functions and forms and in unusual experience which is neither rural, nor urban. The complexity of suburban landscapes sometimes has a negative meaning as landscapes become too complex, difficult to understand, not aesthetic, unlike the city center. Thus, out of the interface or collision of the supposedly antagonistic rural and urban features, new qualities can emerge. Rurban areas can take many shapes depending on the natural character of the area and the combinations and conflicts of different rural and urban-driven human activities.

Some types of rurban landscapes remain still beyond the definition up to date thus presenting a field of research for landscape studies.

Landscapes of new complexity. The complexity of rurban landscapes involves not only the heterogeneity of land uses. Spatial complexity, complex ecological problematics, and social complexity can be distinguished. These emerging landscapes can be referred to as the landscapes of new complexity. Marshall *et al*. (2009) distinguishes the following aspects of socioeconomic complexity: the 'mosaic' of land-use patterns, the accessibility of this area to the city, the diversification of household incomes, the proximity of markets, the availability of farm labor, and the possibilities of off-farm employment. According to the authors, the rural-urban interface areas can be characterized both by rural values and 'tradition' and by high, and often increasing, population density compared to the countryside, small landholdings, rich countryside homes, poor slums, diverse sources of income, lack of regulation, contested land tenure rights, changing agricultural practices, uncoordinated conversion of farmland to housing, commercialization, economic dynamism including industrial developments, severe lack of service provision, as well as urban 'vices'. Some of these aspects in turn cause complex ecologic problems including pollution, intensive resource exploitation, and ecosystem fragmentation. Such complexity and dynamism often results in management and classification challenges. Antrop (2000) notes that significant differences exist between the official land use statistics and the reality in the rurban areas: many land uses cannot be categorized easily in the statistical classification schemes, and many uses are not legally reported, either.

Global and local interface. In order to understand the complexities of rurban areas, not only the local and regional links should be addressed. The influence of the global economic flows, markets, political processes and cultural trends on the urban form encourages looking at the relationships between the global, national and regional drivers of the rural-urban interface. Marshall *et al.* (2009) identifies globalization as the most pervasive of these broader structural processes shaping the rurban; with reference to these authors, several aspects of this influence can be distinguished: (1) influence on urban and peri-urban centrality (development of new economic centers and high technology islands in the areas of rural-urban interface, peripherization of the parts of the urban core); (2) influence on the urban and peri-urban economy (increased demand for services, new criteria for selecting and evaluating economic activities); and (3) influence on the rural-urban dichotomy and identities (mobility, 'contraction of space', globalization-related economic growth and the related socioeconomic polarization, suburban uniform lifestyle in rurban areas).

Diversity and uniformity. Diversity, instability and rapid change characterize the contemporary rurban areas. However, the results of these changes can be different: positive, stimulating diversity, spatial, social, and ecological fragmentation, total change of identity and, very commonly, the uncontrolled diversity of rural, urban, industrial, infrastructural elements may result in uniformity. Low Choy *et al*. (2008) points out the blurring of uses and characteristics of a significant share of the peri-urban areas, the undifferentiated sameness and regional

facelessness. Moreover, uniformity is characteristic both to suburban sprawl and industrial agriculture. Thus, without ingenious and sensible planning, agricultural uniformity can be replaced with suburban uniformity.

Proliferation and fragmentation of knowledge. It is peculiar that the physical fragmentation of landscapes that raises concerns to the contemporary researchers and planners corresponds with the fragmentation in the field of landscape knowledge and the methods applied. Landscape as an entity or concept has unifying features. According to Antrop (2000), as an abstract notion, landscape has no borders and refers to such concepts as scenery, system and structure. Such a landscape characteristic calls for unified, holistic approaches. However, the strict modernist subdivision of the areas of competence and the proliferation of various scientific disciplines and study areas creates exactly the opposite. Several aspects of this problem relevant to any landscape, but especially to rurban areas, can be distinguished.

Miscommunication between research disciplines. Ecology, archeology, architectural history, social sciences, psychology, agriculture and many other disciplines share their interest in landscapes. Different disciplines variously interpret landscapes as an ecological entity, an artifact of material culture, a visual resource, a metaphor, an artistic depiction, an ideology, an agent of power relations, etc. (Stephenson, 2008). These interests and views generate large quantities of research material (for example, the sociological research on the peri-urban poor, the research on ecosystem fragmentation in rurban areas, the research on the rural heritage under urban pressure, etc.), however, the problems of lack of common language between these areas and the overlapping knowledge when two disciplines research the same area and do not exchange their knowledge adequately are evident. The excellent example of knowledge fragmentation and overlapping competences are the rural studies and the urban studies which both address the rural-urban interface looking from different perspectives. Stephenson (2008) notes that landscape evaluations are commonly set up to provide a series of parallel assessments by different disciplinary experts, and what is perceived to be of value will depend on the particular interest of the discipline.

Conflicting policies. Landscape research in many instances is applied research, and many findings become translated into policies which affect our immediate living environment. Differing research results provided by different disciplines may result in differing, uncoordinated and even conflicting/incompatible management strategies. This is particularly relevant to the rurban areas where agricultural, industrial, forestry, recreational, transportation, heritage preservation and many other interests represented and coordinated by different institutions and organizations overlap. According to Ewald (2001), farmers tend to view landscapes as the places of production and daily work, and they hardly consider, for example, the recreational concept of landscape, the interests of the city in the rurban landscape, or landscape as a whole. Thus, conflicts arise as soon as planners treat agricultural land as a part of the general landscape. Meanwhile, foresters do not perceive their forests in the landscape context and still see forests primarily as an area of timber production. Beside the overlapping interests, the ‘horizontal’

'institutional fragmentation' (Marshall *et al*., 2009) and knowledge fragmentation develops. For example, some part of rurban areas is often comprised of the administrative boundaries of the city; meanwhile, another part of the same area constitutes the wider metropolitan region. Development of these areas thus is administered by different entities and may result in different characteristics and visual features.

Rise of the subjective dimension in landscape valuation. The subjective dimension of landscape receives increasing attention as it is clearly reflected in the definition of landscape as "an area, as perceived by people" in the *European Landscape Convention* (ECL, 2000). Researchers agree both regarding the relevance of the subjective dimension in the landscape analysis and management and on the complexities it brings to the field. Researchers also uphold the idea that landscape qualities are inseparable from the observer (Antrop, 2000; Stephenson, 2007); thus, theoretically, as many landscapes can simultaneously exist at the same time at the same spot as many observers exist, and the differences and qualities of these landscapes would depend on the backgrounds and/or priorities of the observers. Consequently, landscape research directs more and more attention to symbols, narratives, mental images embedded in landscapes, different landscape identities, spiritual and social values (for example, Stephenson (2007; 2008)). Hermeneutics is being increasingly applied to landscapes, and interpretation is encouraged. In this context rurban landscapes present particular difficulties and challenges which are discussed below.

Conflicting interests. The so-called rurban community is now comprised of a far greater diversity of residents and stakeholders than hitherto (Low Choy *et al.*, 2008). Low Choy *et al.* (2008) even distinguished four groups of stakeholders in the peri-urban context: the *seekers*, the *survivors*, the *speculators*, and the *strugglers*. In the rurban areas, the variety of forms how landscapes are used and inhabited is closely intertwined. In this way, the development of rurban landscapes produces an array of conflicting interests: production vs. recreation, hobby vs. profit, rural uses vs. urban uses, rural lifestyles vs. urban lifestyles, rural aesthetics vs. urban aesthetics, local visual character vs. uniform global character of urban and suburban areas as well as many others. For example, the new residents of the changing urban areas are oriented towards the city and linked to the city, their interests are concentrated in the city; meanwhile, the old residents are tied to the place, whereas their activities are much more locally concentrated. Moreover, the same landscape functions, for example, agricultural, can be perceived and treated differently by different people and social groups, as Ewald (2001) notes.

Lack of stable identity and common narratives. Researchers underline the informational function of landscape (Jacobs 2011; Nohl 2001). The informational capacity makes landscape a vehicle to transfer various forms of heritage to the future generations. Nohl (2001) argues that the positive stimulating and enriching functions of landscape are inseparable from its informational capacity and legibility: the more a beholder is successful at 'reading the landscape', the greater is his/her emotional and expressive benefit. Nohl presents a few remarks on the contemporary state of the European landscapes which are particularly clearly visible in the rurban areas:

landscape is unable to tell anything to the beholder, neither perceptually nor symbolically; landscape has lost its narrative aspects as well as its poetic aspects (expressiveness); landscapes are not able to deliver stimulating orientation patterns. The decline of the informational capacity of rurban landscapes is closely related with the above-discussed rapid structural, functional and social change, the hardly understandable diversity (mix of visually, functionally, and cognitively contrasting landscape features), and the uniformity of the rurban space. Jacobs (2011) notes that due to the impact of urbanization, our perceptions, uses, and management of the landscape are in serious flux. This flux affects the landscape identities and narratives. The rapidly and continuously changing rurban landscapes not only lack historically formed identities and images in the consciousness of the society; it is even difficult to formulate stable images of rurban areas for the residents with either rural or urban background. In such landscapes, neither urban nor rural narratives are valid any more. Changes in the narratives and legibility may be different: due to the arrival of new residents and users with the urban background, the meanings and narratives connected with the rurban area may change more rapidly than the landscape itself; different meanings are constructed by different groups of people – rural residents, newcomers from the urban areas, international migrants settling in the peri-urban zone sharing the rurban landscape; in some cases, being under pressure of urbanization, the landscape changes so rapidly that the old narratives become disconnected from it and lose their primary meaning. Due to changes of landscape and landscape meanings, common points of reference may be entirely lost.

Challenges of landscape aesthetics. The subjective dimension in the landscape research and the search for common points of reference discussed above are closely related with the aesthetic perception and the aesthetics of landscape. A model developed by Gobster, Nassauer, Daniel and Fry (2007) (*Fig. 1.6*) suggests how the aesthetic experience of landscapes may drive actions and change to people and the landscape. According to the authors, different landscape types feature particular perceptible characteristics that evoke related human perceptions and expectations. *Fig. 1.6 (B)* schematically shows how both landscape context and situational context may influence the aesthetic experience.

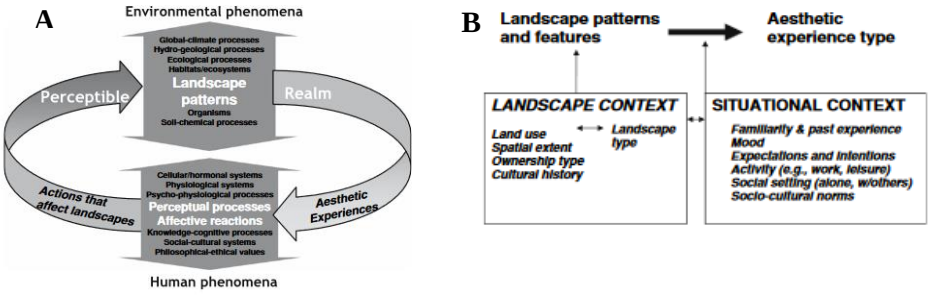


Fig. 1.6. A – Model of human-environmental interactions in the landscape and demonstration of the potential for aesthetics to motivate and direct landscape; B – Context component to Model A of human-environmental interactions in the landscape (Gobster *et al*., 2007)

However, researchers note that the role of aesthetics in the field of contemporary landscape research has notably diminished (Jacobs, 2011). The field of and the means available for landscape research have considerably expanded; however, the same cannot be stated about the research of landscape aesthetics. Several reasons explaining this phenomenon can be outlined. For example, Conrad *et al.* (2011) sees a transition from the aristocratic, elitist to the democratic treatment of landscape. This suggests a transition from aesthetic concerns which became viewed as elitist towards the functional, economic, equity and ecological concerns, from qualitative towards quantitative, from artistic towards technical. Landscape today is seldom viewed as an object of enjoyment, delight, or art criticism. According to Jacobs (2011), the idea of landscape implied by the majority of the contemporary research has narrowed to a predominately mechanistic view. Another aspect that can be linked with the democratization of approaches towards landscape is the above mentioned emphasis on subjectivity in the landscape research. According to Nohl (2001), "people will more and more supply each of the different landscape types with their own aesthetic understanding and appreciation as the individualization and atomization of society grows." Shifts in attitudes and approaches towards individual, subjective, equity, utility, and functionality have strongly affected not only the landscape aesthetics research but also the aesthetic quality of the landscape itself. According to Nohl (2001), contemporary land management requires large economically effective uniform plots, thus landscape changes are often very insensitive, and these changes cover huge areas; as a result, the number of aesthetically effective elements in the cultural landscape is getting dramatically reduced; moreover, radical ecological thinking often brings about uncontrolled vegetation growth.

New rurban aesthetics and aesthetic fragmentation. It can be stated that rurban areas present an unfamiliar and disorientating mixture of familiar landscape features. Considering the holistic approach to landscapes (Antrop and Van Etvelde, 2000) where the whole is more than the sum of the composite parts, in the areas of the rural-urban interface, new landscape aesthetics may emerge out of the mixture of familiar features. This raises the challenges of new definitions and of understanding of the new aesthetic trends. Even if negative views towards the features evolving in – both hardly understandable and uniform – landscape prevail among the contemporary experts (Marshall *et al*., 2009), questions may still be asked whether the rurban landscape can be a place for consolation, an object of delight, interest, whether it may still embody the classical aesthetic notions of beautiful, sublime, or picturesque. As Antrop (2000) notes, the sense for beauty is universal, but the expression of beauty may differ between regions, cultures and historic periods.

According to Nohl (2001), new aesthetic orientations occur when significant changes in landscape take place. Jorgensen (2011) notes that even if some researchers consider preferences of the scenic beauty of the society to be relatively permanent, shifts in these aesthetic preferences and tastes are possible, including not only long-term historical and cultural shifts in the aesthetic appreciation for particular types of landscape, but also relatively rapid changes in aesthetic preferences associated with environmental awareness and education. However,

several threats should be discussed. For example, Marshall *et al.* (2009) notes the flows-based understanding of the peri-urban, which emphasizes the flows of produce, finance, labor and services, and the influence of the processes of rapid economic, sociological, institutional, and environmental change. Such an approach not only shows the distance between the rurban research and the landscape aesthetics research but also reflects the rapid changes of the physical structure and visual features of rurban areas. Rapid and constant changes make it difficult to grasp the stable aesthetic categories of rurban areas. It is even possible to speak about the aesthetics of change.

Another issue relevant to rurban areas is the extreme aesthetic fragmentation both at physical, structural, and at subjective perceptional levels. With reference to Nohl (2001), it could be stated that today's landscapes in the areas of the rural-urban interface can be characterized by a multiplicity of functions which are scarcely compatible with each other, and, therefore, build separate landscape aesthetic worlds of their own. This increasingly fragmented mosaic of disconnected aesthetic worlds creates a disorientating pattern in the space in the human living and working environment about which the proponents of postmodernity like to speak. The spatial confusion and aesthetic fragmentation in rurban areas are complemented by the increasing perception diversity in the individualized and atomized society. This phenomenon adequately reflects the previously mentioned diversity of interests and tastes as well as the polarization of inhabitants and users of peri-urban areas and other stakeholders. Thus the complicated structure of the peri-urban context is viewed through many prisms including the urban middle class tastes, the tastes and preferences of rural communities, the preferences of developers and designers, etc. Further preference fragmentation may arise in multicultural societies where different people from different backgrounds and with different landscape preferences have to share the same environment. These issues clearly illustrate the complexity of creating aesthetic rurban landscapes as an aesthetically mature and viable cultural living landscape most often develops in an evolutionary way and exhibits strong links between the land and the population that inhabits it.

Aesthetics and ecology in rurban landscapes. The aesthetics and ecological concerns are of considerable importance and are closely interrelated in the areas of the rural-urban interface. This becomes especially relevant when human aesthetic preferences and ecological goals are not aligned – when whatever is seen as beautiful is deemed to be ecologically unhealthy, or whatever is deemed to be ecologically healthy is seen as undistinguished or ugly (Kučinskienė, 2009; Gobster *et al*., 2007). Jorgensen (2011) maintains that changes in perception of the landscape ecological values can shift perceptions of how we experience and appreciate the beauty of landscapes and implies that the climate change signals an end to the perceived biological *status quo* and the advent of the 'aesthetics of necessity'. Thus this landscape 'aesthetics of necessity' would become a driver of the landscape change on the basis of a diverse range of values, including social as well as environmental equity. However, the perspective of merging the aesthetics with ethics is multifaceted and ambiguous, as the lessons of modernist architecture imply. Aesthetics cannot be measured solely with equity or biodiversity, and this is

particularly important in rurban areas where rural history, nature and ecology, agriculture, and intensive urbanization are interacting. Ecological, equity, and aesthetic concerns need to be reconciled with the historic dimension which is one of the distinguishing features of the rurban areas.

1.4. Hypothesis of analysis and management of rural-urban interface landscapes

Rurban landscape research directions. The emergence of the rurban landscapes as *landscapes of new complexity* raises new complicated planning and management tasks. With reference to Phillips *et al*. (1999) and Adell (1999), it can be stated that an amorphous and mobile environment must be managed in order to provide a framework for the interaction of various social, economic and cultural processes, to establish sustainable links between the rural and the urban and simultaneously to maintain the historical dimension creating a viable living and working environment with a distinctive identity.

The research shows *the importance of integration of time and space in the rurban landscape research*. The pace of change tends to turn the rurban from a landscape to a process. In such circumstances, the analysis of the present state and identification of the trends of changes and their possible outcomes are increasingly interconnected and overlapping. The prediction of trends, the setting of the desirable objectives, and the development of landscape quality models for the rurban space must be carried out under uncertainty generated by the multitude of interacting factors.

The importance of legibility in the rurban landscape development cannot be underestimated. These landscapes would remain distinctively rurban only if the legibility of their rural dimension would be maintained. However, it becomes increasingly difficult to maintain the time depth in the ever changing landscapes. The legibility of the historical dimension may be different in different rurban landscapes, thus the types of landscapes can be analyzed and classified accordingly. Legibility should be an/the object of the planning process.

The relationships between aesthetics, ecology, and equity in rurban landscapes should be of considerable importance. Legibility is inseparable from the aesthetic perception of landscape, and the need for beauty and delight is universal. This need should be reconciled with the ecological and social aspects in the rurban space while simultaneously preserving characteristic the rural and natural features important for the local identity.

Considering the present individualization of the society and the multiplicity of stakeholders and social groups with their social needs and aesthetic preferences in the rurban areas, it is possible to agree with Conrad *et al.* (2011) that there is need for innovation in terms of developing new participatory techniques for landscape protection, planning and management. On the other hand, the expert approach would be irreplaceable when determining common points of reference in the complex and ever changing rurban areas. *The need to integrate participatory and expert approaches* is relevant in the rurban research.

The problems listed above imply the need to integrate different outlooks (for example, rural and urban studies), *the need for more inclusive, holistic* (Antrop and Van Eetvelde, 2000), *integrative, systematic, comprehensive approaches to rurban landscapes*. Not only rural-urban dichotomy, but also the continuums (time-space continuum, rural-urban continuum) should be emphasized. However, all-encompassing holistic approaches may appear too heavily generalized, and the contradictions of holism and the quantitative research, holism and detail, holism and individualism and subjectivism should be resolved.

Our research has revealed general issues related with rurban landscapes in the light of the contemporary landscape research. This could serve as a starting point for the *comprehensive analysis of local (national, regional) peculiarities of rurban landscapes* including the rural-urban interface in Lithuania. The analysis of the global and local aspects of Lithuanian rurban landscapes is one of the goals of this research.

Hypothesis of the research. The main hypothetical statements deriving from the analysis of literature and documents and observations on sites are presented below:

1. Research approach. Comprehensive approach to rurban landscapes as relatively unknown and scarcely researched landscapes is needed.

2. General characterization. General characterization of rurban landscapes must include their main development trends and general features; the key terms for describing them may be developed.

3. Local peculiarities. Rurban landscapes in different regions and countries have their peculiarities determined by the character of landscape, climate, and history of the place, its socioeconomic situation, cultural character and traditions, trends of urban development, etc. These peculiarities must be taken into account in the rurban studies from the early stage of the research.

4. Importance of the relicts of historic rural landscape types. Historic types of rural landscapes constitute an important and always less acknowledged part determining the local peculiarities of rurban landscapes which can determine their identity.

5. Classification. Classifications of rurban landscapes among other things must take into account the local landscape and classification tradition, the existing land use typology, the historic rural landscape types, etc.

6. Assessment. Assessment techniques applied to rurban landscapes should consider both morphological and visual aspects as well as ecological aspects. Assessment techniques should be flexible in order to analyze and predict landscape changes and to adapt to the local peculiarities.

7. Regulation of changes and sustainable development. Approaches towards regulation of changes of rurban landscapes are essential. The regulation of changes must integrate sustainable functions, environmental sustainability and landscape aesthetics.

1.5. Generalization

Definition and development. Landscape variety, structure and composition may change dramatically over time. The cities and towns had shaped the surrounding countryside for centuries, however, prior to the epoch of industrialization and massive scale urbanization, differences between rural and urban areas were evident, and their identities were distinct. Over the last hundred years, the intensive urbanization has led to the development of the areas of rural-urban interface: the areas surrounding the largest cities and even moderate settlements have been radically transformed. Urban sprawl causes changes of both urban and rural landscapes. The landscapes emerging in the areas affected by rural and urban interface can be characterized as dynamic and complex landscapes possessing both rural and urban features. The traditional development of landscapes takes on a new direction, and a new *rurban* (rural-urban) landscape type emerges.

Research context. These unseen and problematic types of landscape not only require more profound understanding, new terms and categorizations, but also represent concentrated manifestation of the contradictory and complicated processes affecting today's landscapes and the field of landscape research. Our analysis has demonstrated that rurban landscapes present challenges in the most significant spheres of landscape perception and analysis ranging from ecology to landscape-related narratives. The problem area of the landscape research and rurban landscapes is outlined in *Table 1.1*.

Table 1.1. Rural-urban interface problem area in the context of general challenges of landscape research. Table by the author

Landscape research trends	**Peculiarities of rurban landscape research and planning**
Increasing pace and scale of landscape change	*Transitional character and multidirectional change* *Time depth* *The urbanity as the driver of change*
Increasing complexity of landscapes	*New types of landscapes* *Landscapes of new complexity* *Global and local interface* *Diversity, complication, and uniformity*
Fragmentation of knowledge regarding landscapes	*Miscommunication between research disciplines studying rurban problematic* *Conflicting policies regarding rurban areas*
Rise of subjective dimension in landscape valuation	*Conflicting interests in rurban space* *Lack of stable identity and common narratives in rurban space* *The need to establish the links between the subjective and the objective*
Challenges of landscape aesthetics	*New rurban aesthetics* *Aesthetic fragmentation in rurban areas* *'Aesthetics of change'* *The need to reconcile ecology, equity, aesthetics, and rural and urban dimensions in rurban areas*

Hypothesis. The hypothetical statements regarding the characterization, assessment, and regulation of changes of the rurban landscape formulated in the research encompass the selection of the research strategies, the general description of rurban landscapes, the significance of the local characteristics and historical relics of the rural environment for these landscapes, the classification and valuation of rurban landscapes, the prediction of changes and the possibilities of sustainable development of rurban landscapes *(Table 1.2)*.

Table 1.2. Summary of the hypothetical provisions regarding rurban landscapes characterization, assessment, and the regulation of changes. Table by the author

Rurban landscapes	
Research approach	Comprehensive, interdisciplinary
General characterization	Rural-urban continuum, time-space continuum
Local peculiarities	Geographic peculiarities, size of cities, character, pace and scale of urban expansion, characteristics of rural landscape
Importance of the relicts of historic rural landscape types	Important factor determining the identity and value of rurban landscapes
Classification	General, conventional classifications Integration of local aspects into classifications: local landscape morphotypes, landscape classification and land use classification from local legislations, types of historic rural landscape, etc.
Assessment	Flexible methodologies Need to address both morphological, heritage, aesthetic features and ecological aspects Necessity to provide the possibility to evaluate the changes of the rurban landscapes
Regulation of changes and sustainable development	Development of scenarios under different conditions of implementation Analysis of the strengths, weaknesses, opportunities, and threats of scenarios Determining the aesthetic development trends for these scenarios Application of assessment methodologies for comparison of different scenarios and the present condition

2. ANALYSIS OF RURAL-URBAN INTERFACE LANDSCAPES

2.1. Research approach

The rurban landscapes possessing a variety of new ecological, aesthetic, and functional features raise new challenges of landscape understanding, definition, analysis, and policy making. Even if these rurban landscapes constitute our everyday working and living environment, they are *relatively unexplored and virtually unknown* to the general society and even to a large part of experts. According to Antrop (2000), integrated landscape analysis considers landscape as a perceivable and dynamic holistic entity. In order to test the hypothesis of the research, it was necessary to develop an approach to the analysis of rurban landscapes as relatively unknown landscapes, thus it has to serve cases when researchers are faced with the

lack of knowledge, or when only separate unrelated data sets exist, whereas the common picture has to be created, and the knowledge gaps have to be identified.

This kind of approach should emphasize the research processes and be based on the universal model of learning not only to provide the parallel shelves to sort out the existing data and the methods to obtain it. In such a framework, one set of data could affect the other and encourage new research: the framework should be suitable for the integration of subjective and objective data starting from literature and philosophy to environmental research in a way that the interaction of the information sets could be possible. Considering that the object of analysis is the rurban landscapes – relatively unknown landscapes – their understanding, valuation, and management, thus the perceptible dimension, the view towards landscapes as cultural phenomena is compulsory to this approach; the cultural approach should be maintained even when handling objective, quantitative, graphical data.

To coordinate and integrate the subjective and objective aspects of the research, the culture and nature, the viewing of landscape from different human perspectives (individual, cultural, social) and the understanding of the place of humans (individuals, groups, societies) in the landscape, the approach of cultural ecology might be useful. The association of environmental sciences and the human culture in the concept of cultural ecology is allowed by the two-sided view of the human nature and environment as explained by von Bertalanffly: the material side is the one in which each human being lives with a physical, biological body; in the other side, according to von Bertalanffly, each person creates, uses, dominates, and is dominated by a universe of symbols (De Bustos, 2009). Landscape is not only a set of natural forms, ecosystems, sites, buildings, etc., it also refers to the spiritual legacy, beliefs, and traditions. According to Stephenson (2008), landscape is a visible expression of the humanized environment perceived through sensory and cognitive processes, and simultaneously a medium for human action. *Figure 2.1* adapted from Endo (1996) shows the culture affecting the remaining variables (international relationships and politics, science and technology, economy, industry, employment, life and society) and vice versa, i.e., it highlights that these variables affect culture; many of these interactions can be traced as surface or embedded (hidden) aspects in landscape. According to De Bustos (2009), a specific problem in one area would generate dysfunctions in the others. Concepts of sustainable development and sustainability also imply links between culture and ecology. According to De Bustos (2009), the idea of development has changed: if it is considered that development is supposed to be humane and sustainable, then culture becomes relevant; there cannot be sustainable development without cultural sustainability. Bearing in mind the concept of cultural ecology and the need for an adaptive model allowing gradual learning for landscape analysis, the hermeneutic circle as a basis for the rurban landscape analysis approach was selected. In hermeneutics, the grasping of the idea that whatever is new in the present depends on what was already understood in the past serves as the focal point; the historicity of human understanding is represented by the hermeneutic circle in which the continuous flow of information prevents it from becoming a vicious circle (Bontekoe, 1996). *Figure 2.2* shows the hermeneutic circle.

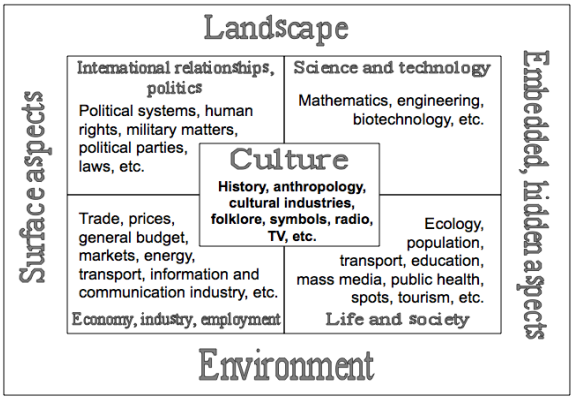


Fig. 2.1. Systems of culture and their links with environment and landscape with reference to Endo (1996) and Stephenson (2008). Scheme by the author

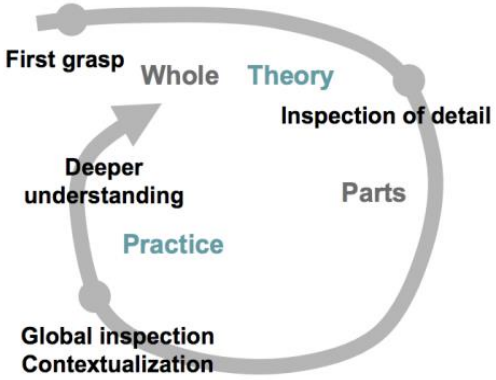


Fig. 2.2. The process of understanding – hermeneutic circle adapted from Hermeneutics (2013), Research… (2013)

A simplified scheme of the proposed framework for understanding and analysis of rurban landscapes as relatively unknown landscapes is presented in *Figure 2.3* and shows how the understanding of landscape can be thought of and treated as a circular reinforcing movement: understanding is a development of what is already understood, with the more developed understanding returning to illuminate and enlarge one's starting point (Hermeneutics, 2013); thus one set of data can affect another. Four stages in the process of analysis are distinguished: the first grasp, inspection of details, contextualization (implying both physical and social contexts), and deeper understanding. *Table 2.1* below presents a short review of landscape analysis methods that can be applied in each of the stages of rurban landscape analysis according to the selected approach.

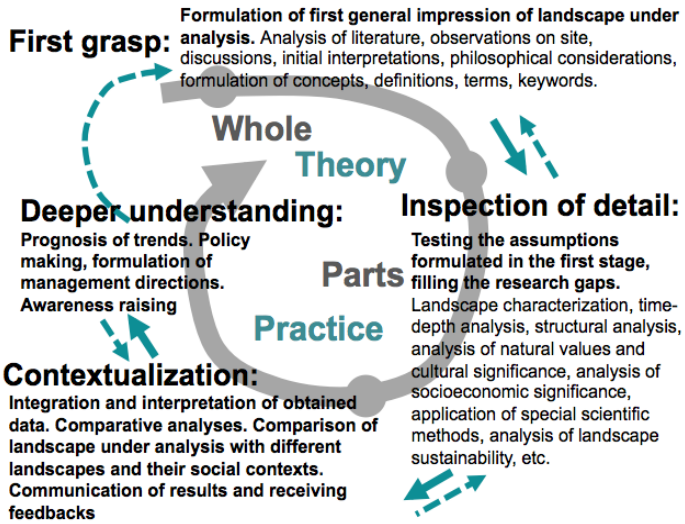


Fig. 2.3. Scheme of the proposed framework for understanding and analysis of rurban landscapes as relatively unknown landscapes demonstrating the process of research and its principal stages and the possible links between different sets of data, adapted from Hermeneutics (2013), Research… (2013), Bargiela-Chiappini (2010) and Zaleskienė, Kamičaitytė-Virbašienė and Gražulevičiūtė-Vileniškė (2013). Scheme by the author

Table 2.1. Summary of tools, methods and approaches that can be applied in each stage of landscape analysis. The most important ones which were used in this work are marked in grey. Table by the author

Approach	Methods	Data sources	Type of results
Stage 1: First grasp: formulating the first general impression of landscape under analysis			
Initial interpretation, philosophical considerations	Analysis of scientific literature, iconographic material, initial discussions with professionals and locals, a review of existing artistic work regarding the landscapes under analysis, etc.	Publications, documents, artistic work, professionals, local communities, visitors, etc.	Qualitative
Method of overall impression	Exploring landscapes on site	Experiences, impressions on site	Qualitative
Stage 2: Inspection of details			
Visual characterization of landscapes	Landscape description based on predefined criteria, application of the concept of preferred landscape	Experiences, impressions on site, historical maps and documents, professionals, local communities, visitors, etc.	Qualitative, quantitative
Time-depth analysis	*Historic Landscape Characterization* methodology or similar approaches	Experiences, impressions on site, historical maps and documents, professionals, local communities, etc.	Qualitative, quantitative
Structural analysis of landscape	Distinguishing structural landscape components, such as nodes, networks, spaces, etc., elements, analyzing the links between them	Experiences, impressions on site, maps and other documents, professionals, local communities, visitors, etc.	Qualitative, quantitative

Continuation of Table 2.1

Analysis of natural values in landscape	Environmental valuation techniques	Data obtained during analysis on site, aerial photographs, maps, databases, etc.	Qualitative, quantitative
Analysis of cultural significance	Analysis of aspects of cultural significance, such as aesthetic, historic, scientific, social or spiritual values	Experiences, impressions on site, maps and other documents, professionals, local communities, visitors, etc.	Qualitative
Analysis of socioeconomic significance	Application of market and non-market valuation techniques	Professionals, communities, visitors, available market data, documents, etc.	Quantitative, qualitative
Application of special scientific methods	Fractal analysis, video-ecological method, Salingaros method	Experiences, impressions on site, maps, photographs, drawings	Quantitative, qualitative
Analysis of landscape sustainability	Analyzing landscape sustainability in different dimensions: social, cultural, economic, environmental. Sustainability indicators can be applied, SWOT analysis	Data obtained during analysis on site, aerial photographs, maps, documents, databases, professionals, communities, visitors, etc.	Qualitative, quantitative
Stage 3: Contextualization: integration, interpretation of obtained data, its spatial and social contextualization			
Integration and interpretation of obtained data	Dynamic-spatial-temporal landscape models	Data obtained in previous research stages, interpretation	Quantitative
Comparison	Comparative analysis	Data obtained in previous research stages and similar data on other landscapes with which the landscape under analysis is compared	Qualitative, quantitative
Communication of results	Lectures, discussions, **publications**, films, exhibitions, internet sites, etc.	Data obtained in previous research, interpretation	Qualitative, quantitative
Receiving feedback from society	Discussions, sociological surveys	Society, local communities, visitors, etc.	Qualitative
Stage 4: Deeper understanding			
Prognosis of trends	Dynamic-spatial-temporal landscape models, analysis, systematization	Obtained in previous research and constantly renewed data, interpretation	Qualitative, quantitative
Policy making	Strategies, plans, projects	Obtained in previous research and constantly renewed data, interpretation	Qualitative, quantitative
Awareness raising	Lectures, discussions, publications, films, exhibitions, internet sites, etc.	Obtained in previous research and constantly renewed data, interpretation	Qualitative
Rethinking research focus	Discussions, analysis, systematization	Obtained in previous research and constantly renewed data, interpretation	Qualitative

2.2. General characteristics and local structure and development peculiarities of rural-urban interface landscapes

General characteristics. Following the formulated research approach towards rurban landscapes as relatively unknown landscapes, first of all it is necessary to distinguish the main characteristics of such landscapes. Researchers analyzing this phenomenon present numerous definitions and characterizations:

- According to Dutta (2012), the landscapes emerging in the areas affected by rural and urban interface can be characterized as undefined structures, dynamic and constantly changing areas, which are often described as a transit zone between the expanding periphery of the city and the nearby rural environment. Delimitation between the urban and the rural becomes a fluid, relatively indistinct transition from what people would characterize as the city proper and the surrounding countryside (Antrop, 2004a; Swensen and Jerpasen, 2008). Land zoning borders in these dynamic landscapes do not remain stable delineation even for a short time (Antrop, 2004a).

- According to Berentsen, Roosaare and Samara (2000), "rurban areas are defined as places where there are many people who live urban lifestyles (including commuting to urban or suburban areas), but in a setting that otherwise appears rather rural (e.g., much of such an area may still be dominated by field and forest)." The meaning of these areas is unclear: whether they are urban or rural, a platform for dynamics or the assets to be preserved, a production or a consumption landscape (Westerink, Lagendijk, Duhr, Van der Jagt and Kempenaar, 2013).

- Rapid changes in land use extensively affect the character of natural and cultural historic landscapes (Swensen and Jerpasen, 2008). According to Wanempten (2009), such landscapes spatially "materialize in a fragmented and dispersed way, creating a diffuse heterogeneous tissue that is often neither urban nor rural but simultaneously both." Landscape diversity, heterogeneity and fragmentation result in more complex forms of multifunctional land use (Antrop, 2004b).

- Low Choy and Harding (2010), Buxton and Low Choy (2011) also present a series of characteristics of such landscapes which can be seen in *Table 2.2*.

According to Adell (1999), the prevailing morphological and functional approach to rurban areas is based on the analysis of such features as density, morphology and land uses changing in an efferent pattern from the urbanized towards agricultural and natural areas. In this case, the object of research is the *rural-urban continuum* (*Fig. 1.1*). However, the pace at which these new landscapes have emerged – and at which they are constantly changing – calls for approaches addressing the temporal dimension: seeing the rurban areas as *space-time continuum* (*Fig. 1.1*). For example, according to Marshall *et al*. (2009), the rural-urban interface can be defined as a *place*, *concept* or *process*, and the recognition of the dynamism inherent in rurban spaces is evident in the use of the terms, such as 'space', 'zone' or 'interface'. Antrop (2000) notes that landscape should be considered as *holistic*, *relativistic* and *dynamic*. Considering these approaches, after the analysis of literature and numerous definitions of rurban landscapes, five key terms defining rurban landscapes around the world – their general characteristics – were distinguished:

1. *Remnant*. One of the basic features distinguishing rurban landscapes form urban areas or suburbs is the presence of the rural dimension. Thus these landscapes can be characterized as *remnant:* these are landscapes transformed by urbanization or social pressures, however, retaining the relevant historic dimension or landscape memory. Legibility of the rural features can be different in different landscapes, thus

they can be analyzed and classified accordingly. It is very important to note that such rurban areas have a rural history of land use largely influenced by agricultural politics (Palang *et al*., 2011), and this circumstance together with distinctive urban expansion patterns, geographical conditions, etc., reflects the local peculiarities of the rural-urban interface.

2. *Transient*. Another important characteristic of rurban landscapes is their *transitional* character. This type of landscapes has emerged very rapidly – during the last century; thus it changes very rapidly: the rural landscape with some urban features can be rapidly replaced with the rurban landscape featuring fragments of rural environment which, in turn, can become increasingly urbanized *(Fig. 2.4)*. This shows the dynamism of rurban landscapes and the relevance of the dimension of time. If the dimension of time of the rurban landscape is analyzed, the aspects of stability and dynamism, the frequency of change of elements, and the extent of the territorial development can be identified (Antrop, 2000; Ahern, 1995). The transient character is also visible in the spatial dimension: the landscape acquires more rural landscape features when moving away from the city (Antrop, 2000).

3. *Contested*. The processes of formation of rurban landscapes induced by the territorial and social urbanization inevitably produce an array of *conflicts*: between urban and rural uses, between urban and rural lifestyles, between urban and rural aesthetics, etc. Thus these landscapes in some aspects can be seen as *contested* areas, especially in the initial stages of their development.

4. *Complex*. Antrop (2000) notes that once cities formed a center in a rural hinterland; meanwhile, nowadays, rural areas are scattered and fragmented by the urban network into relict zones of the original hinterland. Rurban landscapes have both urban and rural features, and in the interface or collision of the supposedly antagonistic features, new qualities, characteristic solely to these landscapes, can emerge; thus these landscapes can be described as *diverse*, *complex*, or in some cases as *fragmented*. Marshall *et al*. (2009) notes that peri-urban is still conceptualized as a *heterogeneous* mix of urban and rural features. However, a mix of well-known features can result in a new quality. Rurban landscapes can be seen as *landscapes of new complexity (Fig. 2.5)*.

5. *Interdependent*. Another characteristic of rurban areas is their links to and dependence from the urban area. Antrop (2000) underlines that, historically, the rural hinterland was vital for the subsistence of the city; meanwhile, nowadays, cities are vital for the subsistence of the rural hinterland or rurban areas. In other words, the urban area is a crucial component in the development of rurban areas; it performs the role of a driver.

Table 2.2 presents the general characteristics of rurban landscapes formulated in this research compared to the characteristics of the rural-urban interface distinguished by Buxton and Low Choy (2011). This table shows that the remnant rural dimension – the potential source of distinctiveness and identity of such areas – is often overlooked.

Fig. 2.4. Transformation of the rurban space at the fringe of Kaunas City (Lithuania): traditional rural landscapes (A) were suddenly transformed by the advent of industrial agriculture, and in turn are altered again by the urban expansion (B, C) (Maps4u..., 2012; Maps..., 2014)

Local peculiarities. Scholarly literature demonstrates that in the Central and Eastern European region in general, and in Lithuania in particular, the rural landscapes and the marks of different transformations in them play an important part in the local identity and distinctiveness (Bučas, 1988; 2001; Palang *et al*., 2006) including the rural-urban interface zones. For example, today, rural landscapes of different qualities embodying different historical transformations constitute the largest part of the territory of Lithuania (Bukantis *et al*., 2008). As a contrast to landscapes shaped by coherent evolution, these landscapes still bear significant marks of countryside transformations caused by the subsequent land reforms and collective efforts of the population. According to the researchers, this type of landscape character causes landscape perception difficulties and creates specific management and planning challenges. For example, Palang *et al*. (2006) in their research on the "forgotten rural landscapes of Central and Eastern Europe" conclude that "quickly changing socioeconomic formations have encouraged alienation, as people are not able to identify themselves with too-rapidly-changing postmodern landscapes. The time barriers between the formations are so thick that people do not understand the context of the former formations; meanwhile, the time layers are also so thin that new landscapes (both material and mental) have had no time to become traditional." This is particularly true with the Lithuanian rural landscapes, especially those that are the object of this research – currently experiencing the pressure of urbanization and rapid change.

A.

Major urban infrastructure Intensive agriculture Utility installations
Tourist and recreational uses Services facilities Suburban housing
Retail and commercial uses Green areas

B.

Abandoned agricultural lots Suburban housing Shed based agriculture
Utility installations Green areas

Fig. 2.5. Rurban landscapes with multiple visible and hidden uses (Poland – A, Lithuania – B). Photographs by Indrė Gražulevičiūtė-Vileniškė

In order to highlight comprehensively the characteristics and peculiarities of the rural-urban interface landscapes in Lithuania, three dimensions of analysis were distinguished:

1) *global aspects* of rural-urban interface in Lithuania – in order to set this phenomenon into the wider context and to demonstrate what these landscapes have in common around the world;

2) *local peculiarities* – in order to show the peculiar aspects of Lithuanian rurban areas determined by local history, social, economic, cultural, and other factors that should be paid special attention in landscape management;

3) *identity* – in order to distinguish unique and valuable features of the rurban space of the country that should be preserved, maintained or creatively employed in order to maintain the distinctive Lithuanian landscapes and to avoid homogenization, uniformity and 'placelessness' or the areas of rural-urban interface.

Each country, region or place has its own unique history; however, no area develops and cannot be analyzed in complete isolation from the others. Sometimes, in the fields of cultural landscape research or heritage preservation, such an isolationist research leads to the miscommunication between different disciplines and between the academic peers dealing with similar issues in different contexts.

Urbanization and development of the rural-urban interface in Lithuania has many aspects in common both with the countries within the Central and Eastern European region, and, to some extent, with other countries of the world. Even if agrarian economics and the rural culture had been predominant in Lithuania until World War II, massive urbanization took place only in the second half of the 20th century and was mainly driven by the industrialization policies of the Soviet regime (for example, in 1940, the urban population constituted 23 percent of Lithuanian inhabitants, whereas in 1977 it already reached 52 percent) (Vanagas, 1996; 2003), and the market economy was re-introduced only after the restoration of the independence in 1990; currently, very similar areas containing modernist blocks of flats, territories of strict functional zoning and vast areas devoted to industrial agriculture as well as visual complication and uniformity of the suburban areas generated by virtually unrestricted real estate development coexist in the country similarly as in those countries which were not affected by the Communist regimes. Thus it is possible to trace general or global trends of the rural-urban interface in the Lithuanian context.

Table 2.2. Rurban landscape characterization. Table by the author

General features of rurban areas	**Features of rurban areas by Buxton and Low Choy (2011)**
Remnant (presence of rural, natural landscape dimension)	- natural resource values at threat
Transient (rapid changes, transition from rural to urban)	- a dynamic area undergoing constant and rapid change - displaying attributes of a transition area dominated by the temporary nature of land uses - low to ultra low housing densities
Contested (conflicts between urban and rural uses, between urban and rural lifestyles, between urban and rural aesthetics, etc.)	- a heterogeneous population - an increasing diverse range of heterogeneous conflicting rural and urban land uses - highly contested activities and values - disjoined planning and policy approaches
Complex (featuring both urban and rural features and new qualities characteristic solely to these landscapes)	- an increasingly fragmented landscape - an increasingly illegible landscape character - questionable landscape management skills of newer residents - lack of planning and subdivision guidance - a poorly planned and managed landscape
Interdependent (links to and dependence from the urban area)	- lying within the sphere of influence of adjacent metropolitan or urban areas, its growing population dependent on these centers for employment, cultural, social, and recreational needs - its growth is related to the growth of nearby metropolitan or urban centers

One of such trends visible around the world is *the shift of social, economic, and cultural importance from the rural to the urban*. This process has been taking place for centuries; however, its last stage that started with the Industrial Revolution is the most radical and all-encompassing. This shift is even more evident in Lithuania where it happened virtually only in the second half of the 20th century. In

this context, it is possible to speak not only about the mutual interdependence of the rural-urban interface zone and the city; actually, the rurban tends to be subordinated to the urban. For example, rurban areas in Lithuania and around the world accommodate infrastructural and industrial objects that meet urban demands but often take up too much land to be easily accommodated in the built-up area; these areas also increasingly provide markets for the city's goods and services (Phillips, 1998). Rurban areas are dependent on their nearby urban centers for a range of economic, employment, social and cultural purposes as Low Choy *et al*. (2008) observes.

Of course, the surrounding rural and rurban areas supply food and fuel to the city (Phillips, 1998); however, contemporary forces of *globalization* and *internationalization* of economy make both large urban areas and industrial agriculture less and less locally oriented, and the lifestyle in the areas of the rural-urban interface is becoming less and less place-specific. Thus the picture would be incomplete without currently the most often referred process of globalization and the ongoing policies of globalism that in one way or another affect countries and regions everywhere. A decrease of distances, or the so-called 'shrinking of the world' due to the advances in transportation, communication, and information exchange technologies thus promoting elimination of any barriers or limitations for international trade and foreign investment, activities of multinational enterprises and supranational entities, growing interdependence of countries and regions accompanied by polarization, weakening power and influence of sovereign nation-states and emerging forms of global culture (Kamičaitytė-Virbašienė and Gražulevičiūtė-Vileniškė, 2008) create several phenomena – *metropolization, industrialization, commercialization, uniformity or internationalization* – affecting the areas of rural-urban interface on the global scale including Lithuania (*Fig. 2.6*).

The geographical and societal process of *metropolization* has been globally transforming the structures of territories, population lifestyles, planning, urbanism, and economies since the 1970s. The metropolized territories are most often spatially multi-polarized urban discontinuities, segregated socially and functionally. This type of territorial structure is covering large spaces at the regional scales; they are the geographic face of globalization and of the transformation of human lifestyle (Gadal, 2011). The uncontrolled urban sprawl that rapidly emerged after the restoration of Lithuanian independence and transformed the zones of influence of the larger cities and the spreading of the suburban lifestyle in the country enabled by automobilization and information technologies are a few of the faces of metropolization. The post-Communist period in Lithuania is characterized by similar suburban globalized dynamics as in Western Europe, America, Africa or Asia (Gadal, 2011).

Fig. 2.6. Global face of the urban fringe (Vilnius). Engineering infrastructure objects are rurban landscape elements that affect the aesthetic quality of the landscape. Photograph by the author

The trends of *commercialization, internationalization*, and *uniformity* are also reflected in the suburban housing clusters in the areas of rural-urban interface in Lithuania. The international character and uniformity of these areas is mainly conditioned by the anonymous standard architecture and industrially produced materials of individual housing as well as by the landscape arrangement in individual lots and suburban lifestyles influenced by global cultural trends. The aspect of commercialization is also evident in the suburban housing, as one of the main drivers in this process is the real estate developers encouraged by land speculation and the recent real estate boom (Bardauskienė and Pakalnis, 2012). The narrow economic outlook towards the quality of life in the rurban areas is also highlighted by the fact that the majority of these areas lack public spaces, facilities and infrastructure; they actually tend to resemble small scattered islands of suburbia in the natural or rural landscape (*Fig. 2.7*). Large commercial objects including shopping malls, logistics infrastructure and buildings, offices and retail centers of international companies are increasingly common in the zones of influence of large Lithuanian cities. They embody the global trends of industrialization, commercialization, uniformity or internationalization as well.

Fig. 2.7. Uniformity of suburban housing (example of Kaunas) and disharmony of sudden landscape change. Lack of public spaces, facilities and infrastructure. Photograph by Indrė Gražulevičiūtė-Vileniškė

Each global phenomenon has its local roots, modifications and adaptations (Giddens, 2001), thus radical universalism and internationalism in the landscape

research and management is no better than the above mentioned isolationism. In this research, the local peculiarities of rural-urban interface in Lithuania represent the specific modifications and adaptations of the above mentioned global phenomena.

Lithuanian landscape development and urbanization has a peculiar history which could be described not as even and continuous but rather as *dynamic, from time to time interrupted and restructured by major changes* in the form of land reforms and other significant historical events, such as occupations. Antrop (2008) and Bučas (2001) distinguish among a set of dynamic landscape development models *(Fig. 2.8)*.

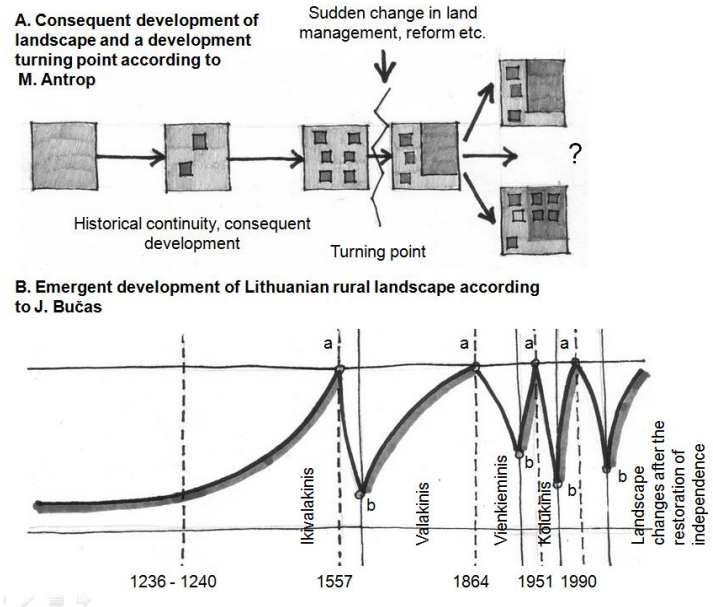


Fig. 2.8. A – Continuous landscape development and landscape development with interruptions and direction changes: generalized landscape development model by Antrop (2008) and B – model of development of Lithuanian rural landscape by Bučas (2001). Adapted by the author

Bučas (2001) characterized the Lithuanian landscape as shaped by the factors of evolutionary change, major reforms, and compensation periods and described it as 'emergent'. This is evident in the development of both rural and urban landscapes of the country. The emergent historical development of the rural landscape with its heritage is discussed in the following subsection regarding identity; here, major attention is devoted to the patterns of urbanization recognizable around the world and their local peculiarities. Low Choy *et al*. (2008) notes that areas under urban pressure can either be changed rapidly from rural to urban activities, or else they can change through a transitional period of land use change, population increases and settlement intensification. Based on literature (Miškinis, 1991; Vanagas, 2003; Burinskienė, 2003; Cirtautas, 2012; Pakalnis and Bardauskienė, 2012; Bardauskienė and Pakalnis, 2012; 2010), three important stages in the history of Lithuanian urbanization and rural-urban interface may be distinguished *(Fig. 2.9)*:

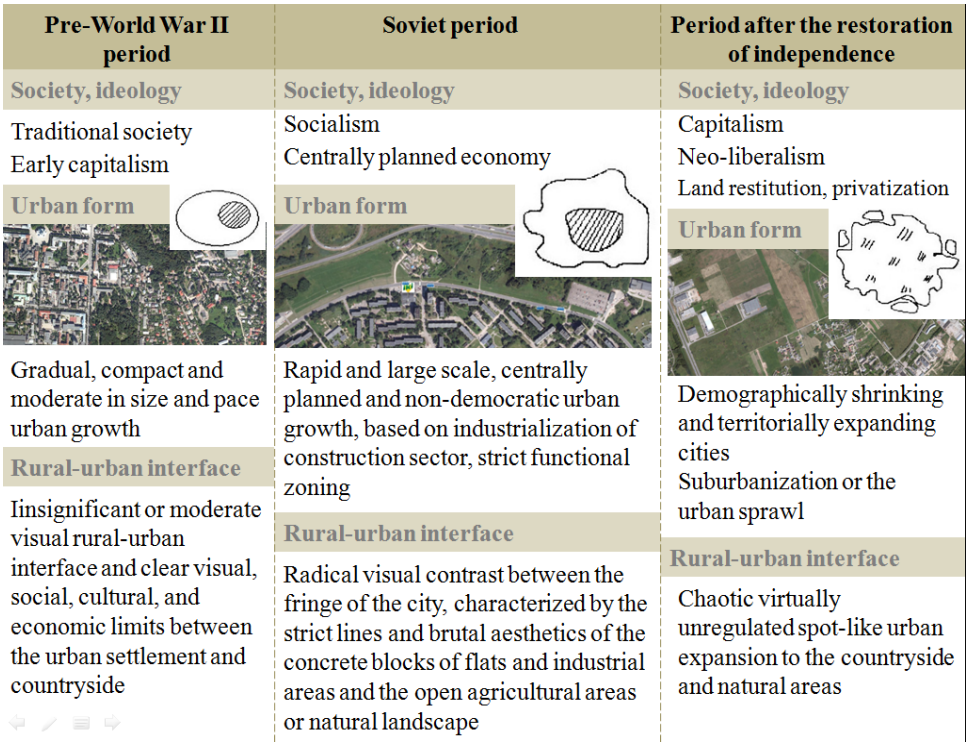


Fig. 2.9. Changes of urban development in Lithuania and their effects on rural-urban interface. With reference to Bučas (2007), Gražulevičiūtė-Vileniškė, Gadal and Zaleskienė (2014), Maps... (2014). Scheme by the author

1. The first stage of gradual and moderate in size and pace urban growth which started with the emergence of the first settlements which could be referred to as cities in the Middle Ages and intensified in the 19th and the first half of the 20th century with the advancement of industry and railway lines, this stage can be characterized with insignificant or moderate visual rural-urban interface. The limits between the urban settlements and the countryside started to blur only in the 19th century and onwards, when the infrastructure and industrial buildings started to emerge in what was earlier considered countryside, and the models of suburban living, such as villas or small manors, benefiting both from life in the proximity of the city and from countryside and natural surroundings, started to appear.

2. The second stage in the development of the rural-urban interface of the country which started after the Soviet occupation was far more radical and can be characterized as being rapid and of large scale, centrally planned and non-democratic, based on industrialization both of agriculture and the construction sector, strict functional zoning and insensitive towards any kind of rural heritage and historic countryside elements which appeared in the way of urbanization and industrialization. In this massive effort to change the face of the country, many traditional landscape features perished, and lifestyle both in the city and in the countryside radically changed. Lithuania was rapidly and brutally re-oriented from

the agricultural to the industrial state. In this stage, in large and even smaller settlements, the modernist urban quarters with industrially constructed blocks of flats appeared, and in the case of large cities, such as Vilnius, Kaunas or Klaipėda, rings of industrial and residential districts swept away even the traces of former rural or natural landscapes; hence the former existence of villages can only be traced from the toponyms. During this stage, the immediate radical visual contrast between the fringe of the city, characterized by the strict lines and brutal aesthetics of the concrete blocks of flats and industrial areas and the open agricultural areas or natural landscape, emerged in the country for the first time on such a large scale *(Fig. 2.10)*.

Fig. 2.10. Radical contrast between the rural and the urban (Kaunas). Relicts of historic rural landscape and natural landscape are included into the rurban landscape. Photograph by Indrė Gražulevičiūtė-Vileniškė

3. The third stage in the development of the rural-urban interface in Lithuania started after the restoration of independence. This time, it was driven not by the centrally planned economy, but rather by the restoration of historical justice (land restitution), privatization, and the free market. The specificity of the Lithuanian territorial changes during the first decade after the restoration of independence concerns the rebuilding of individual farms destroyed by collectivization (Gadal, 2011). Together with the changes in the countryside and in the agricultural sector, a phenomenon, known worldwide as *suburbanization* or *urban sprawl*, came to Lithuania (Cirtautas, 2012). It is true that cities most rapidly expanded in the Soviet era and that the suburban areas built-up with individual houses and often incorporating former rural settlements emerged in this period. However, the recent market economy-driven urban sprawl is radically different. Rather compact and strictly planned urban expansion of the Soviet period was replaced by the virtually unregulated spot-like expansion to the countryside and natural areas (Bardauskienė and Pakalnis, 2012). Research on the structure and development of Lithuanian cities from 1990 till 2007 carried out by Gadal and Lekavičiūtė (2009) also confirmed this trend. The recent real estate boom and the eagerness of developers to benefit from this situation, the master plans of the cities designed to fit their interests (Pakalnis and Bardauskienė, 2012), the legal conversion of agricultural land into land for

housing construction and other purposes resulted in the rapid expansion of the zones of influence of the largest Lithuanian cities resulting in a plethora of negative consequences of unsustainable urban development including the decline in landscape quality and legibility, consumption of valuable agricultural and natural land, additional expenses on infrastructure, the increasing dependence on the private car as a means of transportation, urban shrinkage, etc. According to Čereškevičius (2012), the trend of city shrinking can be observed in many European cities, and especially in the countries of Eastern Europe after 1990; he identifies suburbanization as one of the reasons of urban shrinkage. Thus it is peculiar that the urban sprawl is taking place even in the countries where the general and urban populations are decreasing; let us take the example of Eastern Europe, and Lithuania in particular (Bardauskienė and Pakalnis, 2012). The total number of inhabitants of the country has been decreasing due to lower birth rates and emigration both in the cities (in 2006, Lithuanian cities had 2,190,656 inhabitants, meanwhile, at the beginning of 2013, they had 1,989,268 inhabitants), meanwhile, the rural areas shrank as well (in 2006 – 1,099,179 inhabitants and in 2013 – 982,637). The ageing of the population also threatens the country's viability (Pakalnis and Bardauskienė, 2012, Oficialiosios..., 2014).

However, even with the decline of the population, the rate of expansion of the built-up areas and the transport infrastructure is growing (Pakalnis and Bardauskienė, 2012). Moreover, the official statistics and research demonstrates, that the population in the zones of influence of the largest cities of the country is increasing (Zagorskas, 2009; Oficialiosios..., 2014). This also evidences the urban sprawl and the priority towards suburban lifestyles. For example, from 2006 till 2013, the population of Kaunas District slightly increased from 83,091 to 86,419 inhabitants; meanwhile, in the city itself, during the same timespan, a decrease was observed from 348,506 in 2006 to 306,888. The situation of the capital city Vilnius is also remarkable: from 2006 until 2013, the population of the municipality of the city decreased from 542,525 to 537,152, meanwhile, in Vilnius District, it slightly increased from 93,324 to 95,035 inhabitants (Oficialiosios..., 2014). In this case, the inner urban areas may lose their social viability, which results in the decline of the built fabric; meanwhile, the outer urban fringe is constantly and uncontrollably expanding as the country still lacks methods to control efficiently the urban development under conditions of market economy (Pakalnis and Bardauskienė, 2012). Thus it can be noted that one of the peculiarities of the rural-urban interface and the urban development in general in Lithuania and in other Central and Eastern European countries is the demographically shrinking and territorially expanding cities.

The overall regional development of the country is also denoted by its historical (temporal) and spatial peculiarities. For example, it can be noted that the Lithuanian urban framework – the spatial distribution of urban settlements – is largely different from its closest neighbors Latvia and Estonia where large capital cities and ports dominate in the spatial structure and life of the country. The basic Lithuanian urban framework (65.8 percent of all of the country's urban settlements) was formed as early as in the middle of the 16th century, and the process of

founding, growth and establishment of new urban settlements continued until 1940; thus the adequately dense historic urban framework was almost sufficient for the economy of the Soviet period, and only 6 new cities were instituted after 1940; almost all of them were based near large-scale industrial enterprises (Miškinis, 1991). The Lithuanian regional planning scheme – the official document prepared in 1964 – was based on the even, balanced, and dispersed regional development of the country's settlement system stimulating the growth of regional centers – small and middle sized cities – at the expense of Kaunas and Vilnius. This scheme, actually based on the historic urban framework, allowed the dispersed location of the industry in the country, stimulated the growth and viability of smaller urban settlements, and allowed avoiding hypertrophied growth of the largest urban centers, thus limiting their impact on natural and agricultural areas and avoiding the massive migration of qualified workforce from the East (Vanagas, 2003; Burinskienė, 2003; Cirtautas, 2012). Hence the territorial structure of the country – fundamentally, a result of the historic development of the urban framework and the Soviet space organization with a high interconnectivity level between the medium urban centers and the largest cities – Vilnius and Kaunas (Gadal, 2011) – allowed small-scale and moderate rural-urban interface throughout the country without emergence of large urban regions with vast zones of influence as a result of rapid and massive industrialization.

This situation started to change after the restoration of country's independence and the subsequent integration into the European Union. Currently, the regional and spatial planning more and more transgresses the national boundaries with different international and European level projects and programs; territorial integration and cohesion of the European space is presently being sought. For example, Lithuania currently participates in the *European Spatial Planning Observation Network* (ESPON) (Lazauskaitė, 2012). International program *Visions and Strategies Around the Baltic Sea* (VASAB) views the Baltic Sea region comprising 11 countries as an integral region with four levels of cities – European, Baltic, National, and Regional levels (Vanagas, 2003). In this situation, the absence of a large capital city with a population exceeding one million is seen as a shortcoming, and the ideas of merging Kaunas and Vilnius into the so-called Dipolis (Vanagas, 2006) is regularly getting presented. Even if the ideas of polycentrism and decentralized concentration of the urban development in the policy of integrated regional development of the European Union are paradoxically similar to the policies of the Soviet Union, the actual implementation of these ideas in the spirit of the free market and globalization becomes increasingly problematic; thus the growth or decline of the cities in the Baltic Sea region including Lithuania is mainly affected by the economic and market factors and people's personal choices. Hence the largest Lithuanian cities adopt the growth patterns characteristic to the Western countries (Cirtautas, 2012). Consequently, the general picture of Lithuanian regions and the trends of the rural-urban interface started to change.

The prevailing economic and migration trends and the current ideas and strategies of the country's regional development demonstrate that, in the future, the major urban pressure will continue to affect the zones of influence of the largest

urban centers, mainly Vilnius, Kaunas, and Klaipėda; meanwhile, other regions will experience urban shrinkage and depopulation. In the regions of Southern and Eastern Lithuania, the current situation is already unfavorable for any kind of growth as, during the period of last two generations, the population declined by half (Pakalnis and Bardauskienė, 2012). Nilsson *et al.* (2013) distinguished among 10 Lithuanian RUR regions (RUR = the urban area + peri-urban area + rural hinterland) *(Fig. 2.11)* including one monocentric very large (Vilnius region), one monocentric large (Kaunas region), five monocentric medium (Klaipėda, Šiauliai, Panevėžys, Marijampolė, Alytus regions), and three rural (Telšiai, Tauragė, Utena regions), which is a precise reflection of the present uneven regional development and the related problems and challenges of the rural-urban interface.

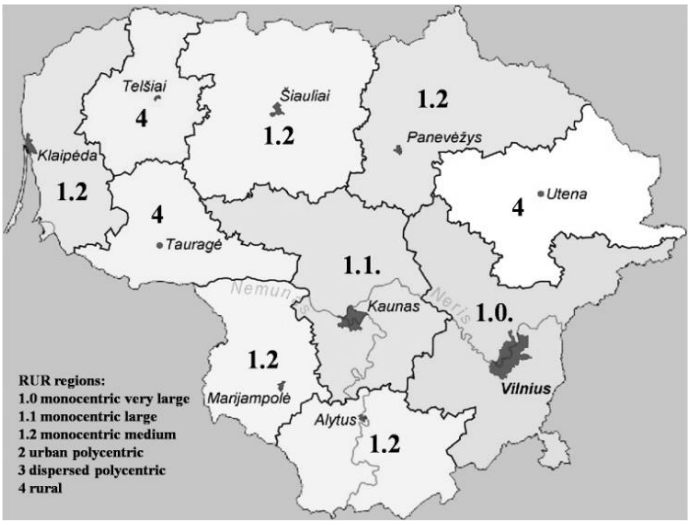


Fig. 2.11. RUR delineation and morphology classification for Lithuania (Nilsson *et al.*, 2013) demonstrates the peculiarities of the rural-urban interface in Lithuania. Map by the author

According to Antrop (2000), urbanization acts differently in space and forms different spheres of influence around the main cities. Thus, looking at the peculiarities of the Lithuanian rural-urban interface, the spatial aspects related to the structure and scale should also be mentioned. Compared to large developed Western and Asian countries and the developing world (Mexico, India, China, etc.) and even to the closest neighbors, such as Poland, the zones of influence of large Lithuanian cities characterized by a higher density of inhabitants and more elevated real estate prices than other areas seem moderate. For example, the research by Aleknavičius and Valčiukienė (2011) demonstrated that the radius of influence of the capital city Vilnius is limited to 25 kilometers. Moreover, despite the uniformity of suburban housing and lifestyles around the world, the small scale of the Lithuanian suburban residential development, its scattered point-like character and the lack of even the basic public infrastructure, such as sidewalks (not even mentioning parks or

kindergartens) make these areas very different from, for example, the endless suburbia of the United States.

In the era of globalization, the landscape identity and distinctiveness are becoming increasingly important, and the areas of rural-urban interface should not be an exception. However, according to Bardauskienė ir Pakalnis (2012), contemporary rurban landscapes surrounding large Lithuanian cities are characterized by degrading natural elements, continuously growing consumption of natural resources and energy, lack of infrastructure, of public and maintained green spaces, and by environmental pollution. Neniškis (2009) indicates that the country's areas of the rural-urban interface are losing their identity and community spirit due to specific developmental conditions. In order to demonstrate the alternative possibilities of development of these newly emerging landscapes, in this subsection, the features of the Lithuanian landscape that could be employed in the development of identity of the emerging rurban areas of the country were distinguished. Here, it is maintained that the natural and rural dimensions should be considered no less important than the urban influence. The society needs the sustainable development of the rurban areas as the character and identity of the future rurban landscape depends not only on the trends of the urban expansion discussed above, the character of a particular expanding city, the location of transport routes, etc., but also on the peculiarities, values, historic features and typology of the rural and natural areas surrounding the city *(Fig. 2.12)*.

Fig. 2.12. Relict of historic rural landscape as a potential determinant of identity of rurban landscape which enriches landscape diversity, historical informativeness and visual identity (Žaliūkiai windmill in Šiauliai. The windmill is protected as architectural heritage, an example of wooden architecture). Photograph by the author

The features of local geography constitute the basis for the development of both rural and urban landscapes and their interface and are the primary determinants of the local identity. Moreover, until the present day, natural relief forms dominate in the territory of Lithuania (Kavaliauskas, 2011). According to Kavaliauskas (2011), the clayey plains extend across the largest part of the contemporary territory of Lithuania (36 percent) and mainly occupy the central part of the country, whereas territories of clayey undulating plateaus and moraine hilly terrain cover almost 17

percent of the country. In addition, sandy plains, valleys, moraine hills, and lake landscape types also occupy a substantial part of the Lithuanian territory (4–8 percent each). Sandy hills (dunes), lake troughs, littoral plains, lagoon and old valley landscapes occupy even smaller parts of the country's territory, and such landscape types as seaside plains, deltas, a spit, and erosive gully landscapes constitute only 0.1 percent of the country's territory. Bučas (2001) notes that, in different natural landscapes, historical rural landscapes also acquired distinctive features. The natural sandy plains were just slightly altered even prior to the middle of the 20th century, here, only 30 percent of the lands were cultivated, and the small agricultural lots were chaotically scattered; meanwhile, in the fertile areas, before the Soviet period, 50–75 percent of the lands (by area) were cultivated. The Lithuanian landscape with its characteristic flatlands and river valleys certainly influenced and still influences the urban development and expansion as well. The natural landscape types in the zones of influence of the largest Lithuanian cities – Vilnius, Kaunas, Klaipėda – clayey plains, the moraine hilly terrain, and the seaside plain as well as river valley landscapes – should be particularly noted when analyzing and determining the identity of the areas of the rural-urban interface.

Cities, their historic centers and business districts today are seen as the major determinants of the international image of the country as these are the areas that tourists and visitors see first and foremost. However, the image and character of the Lithuanian landscape was less determined by its urban framework, the evolution of which was historically late compared to other European countries, and more by the natural landscape and the processes and factors related to the development of agriculture – agricultural traditions and techniques, agriculture-related businesses and crafts, traditions of ethnic architecture, major historical agricultural reforms, territorial administrative dependence, land cultivation and melioration, specialization of agriculture, industrialization, recreation, etc. (Bučas, 2001; Pašakarnis and Malienė, 2010; Baležentis, 2011). As it was mentioned above, the historical development of the Lithuanian landscape can be referred to as dynamic, interrupted or 'emergent' (Bučas, 2001). With reference to Bučas (2001), six major stages in the development of the country's rural landscape and four historic rural landscape types (the relicts of which are extant until this day) which strongly determine the identity and uniqueness of the Lithuanian rural landscape can be identified. Six development stages include:

1) the early stage prior to the formation of a centralized feudal state, starting with the primitive land cultivation using the slash-and-burn technique and cattle rearing, later passing to the arable farming. During this stage, the first rural settlements emerged. The first fragments of the rural landscape – scattered settlements, pastures, cultivated and abandoned lots – were chaotically located in the predominantly natural territory. No urban settlements and, consequently, no rural-urban interconnections existed;

2) the stage of landscape development prior to the land reform of the 16th century (the Volok (lt. *Valakų*) Reform) is the stage of further spontaneous cultivation of the forested territory by the means of the emerging early feudal organization starting with the 9th century. At this stage, castles and the surrounding

settlements as well as the first urban settlements emerge. This stage marks the start of rural-urban interconnections;

3) the stage of landscape development after the Volok (*Valakų*) Reform encompassed the historical period from the middle of the 16th till the middle of the 19th century and is characterized by the intensive cultivation of the territory and planned development of land and settlements on the basis of serfdom economy. The characteristic linear villages and land cultivation based on three fields or the so-called fallow system emerged at that time. The location and regular composition of linear villages and fields was less in harmony with the natural landscape; however, the manors – another important element of this era – maintained closer links with the environment. The urban framework of the country also continued to grow;

4) the formation of landscape of individual homesteads encompassed the period from the middle of the 19th century till 1940 and was a result of planned restructuring and management of the agricultural landscape based on individual farming. The lands of one farmer were consolidated into one lot, the lands of manors and villages were subdivided, individual homesteads emerged in the landscape. The formation of an evenly dispersed system of settlements was completed; the first steps towards a more intensive rural-urban interface were taken;

5) the stage of landscape development that started with the Soviet collective farm reform was shaped by the radical measures of property nationalization, collectivization, land consolidation, industrialization of agriculture, large scale melioration projects, reconstruction of already existing and construction of new settlements and large farming complexes, expansion of the infrastructure and the above mentioned rapid urbanization with its impact on the countryside;

6) the land reform after the restoration of the country's independence and the subsequent landscape development has been based on the return to private agricultural economy. The outcomes of this stage are still unclear as many different and contradictory processes are taking place. Similar changes occurred in many countries that were a part of the former Soviet bloc: Socialism with its relative equality and centrally planned economy was rapidly replaced with Capitalism, the ideology of Neo-liberalism and the subsequent social stratification (Gentile *et al*., 2012). The influence of these changes on the landscape was not envisaged or even considered (Bučas, 2001). Some effects of this shift on the rural areas can be mentioned: the return of the land to owners, privatization of property, the abandonment of surplus farmland, expansion of forests, the migration of the young generation to the cities, the ageing of population, the collapse of the rural infrastructure and the decay of old houses and rural buildings *(Figs. 2.13, 2.14)* (Bell *et al*., 2008; Kuemmerle *et al*., 2011). For example, in Lithuania, during the initial years of independence from 1990 to 2004, the proportion of cultivated agricultural land decreased by 10–12 percent (Lygis, 2000). The research carried out by the Institute of Geology and Geography (Kraštovaizdžio..., 2008) identified landscape changes in the territory of the country based on the selected landscape monitoring areas at the local level throughout the period between 1974–1993 and 2006. The results of the research reflect the above mentioned trends *(Fig. 2.15)*: the decline of the agrarian areas, the processes of landscape renaturalization reflected in the

increase of scrubby areas across almost all the territory of the country, and the intensification of construction activities. The landscape change trends remain similar during the period of 2006–2013 as the analysis of land cover (Žemės..., 2014) demonstrates: the decrease of pastures, mainly due to renaturalization and the expansion of construction activities at the expense of agricultural areas *(Fig. 2.16)*.

In the course of the above mentioned landscape changes, one landscape type replaced another or was strongly modified; the extant relicts of the historical types of the country's rural landscape – the results of this process – important for the identity of rurban areas are: *ikivalakinis* (pre-Volok: relicts of landscape formed before the land reform of the 16th century, mainly natural with the remains of primitive settlements), *valakinis* (Volok: relicts of landscape that emerged after the land reform of the 16th century characterized by more geometrized composition, linear settlements, and manor residencies), *vienkieminis* (Farmstead: relicts of dispersed landscapes based on individual homesteads mainly of the inter-war period), *kolūkinis* (Kolkhoz: relicts of the landscape of the Soviet period characterized by large scale agricultural lots, concentrated settlements and production complexes) (Bučas, 2001). Bučas (2001) also identified ethnic regions of Lithuania with the traditional ethnic architecture and land management traditions as one of the determinants of the country's landscape identity strongly related with the historic types of rural landscape. The relicts of rural landscape embodying different historic land management and agricultural practices and regional ethnic traditions, as well as fragments of different types of natural landscape are very important and often overlooked in the sustainable development of the areas of rural-urban interface with a distinctive identity.

Fig. 2.13. Remains of abandoned agricultural buildings of the Soviet era at the fringe of Kaunas. Abandoned buildings visually pollute the landscape and reduce its aesthetic quality. Photograph by Indrė Gražulevičiūtė-Vileniškė

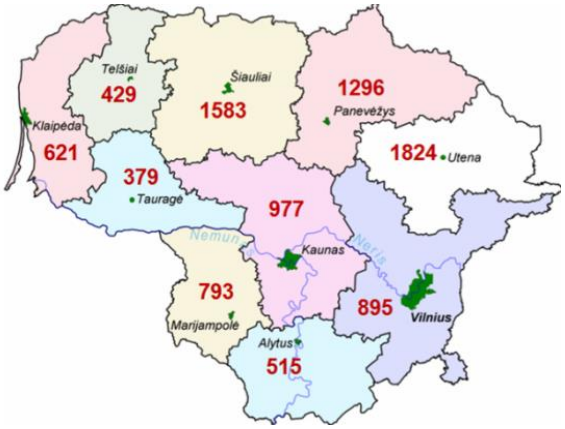


Fig. 2.14. Distribution of abandoned buildings in the territory of Lithuania as distributed by county (State..., 2008; Apskritis..., 2015): according to the data of the Informational System of Derelict Buildings, 9,312 units of such buildings exist in the territory of the country, although this number is neither exact nor final. The majority of these abandoned buildings are non-residential buildings of the Soviet period mainly related with the former collective farms

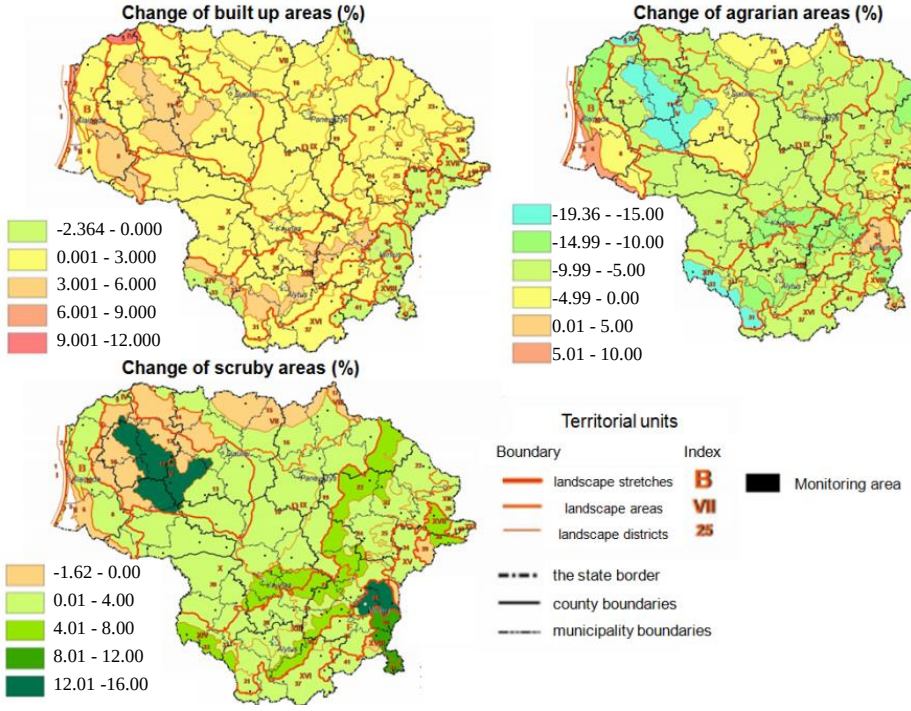


Fig. 2.15. Changes in the Lithuanian landscape in the period of post-Communist transformation (from 1974–1993 to 2006) according to the data of *Institute of Geology and Geography* from landscape monitoring (local level) areas. A negative percentage value indicates decrease, a positive value denotes increase of the areas under consideration. Adapted by the author from Kraštovaizdžio..., 2008

Fig. 2.16. Relicts of rural landscape of the Soviet period and contemporary suburban housing (Kaunas). The compact volumes of large production objects in the countryside of the collective farm gave a distinctive and new aesthetic quality. The remaining objects reduce the monotony of landscape and improve the composition of the landscape. Photograph by the author

2.3. Relevant legal documents for rural-urban interface landscapes

The field of territorial planning with its multiple interconnected levels and types of planning documents is a way to develop territories and landscapes, including the rurban ones, in a more sustainable way. The analysis of the existing territorial planning documents of a particular country or region was performed regarding the following issues: feasibility of development of rurban areas; presence of rural-urban influence in the country or its region; the character of rurban landscape (including natural conditions, functions, structure, development problems and identity); the potential of rurban areas; the state of management of rurban areas as reflected in the territorial planning documents. The selected valid Lithuanian territorial planning documents were analyzed at national, municipality, and local levels (Table 2.3). Development peculiarities and possibilities of the rural-urban interface areas according to the above listed issues in the Lithuanian context were also identified. While analyzing the planning documents of the district municipality and lower levels, emphasis was made on three major cities with their zones of influence – Vilnius, the capital city, Kaunas, the second largest city situated in the central part of the country, and Klaipėda, the port city. The three cities can be characterized by active rural-urban interaction processes as well as by the diverse and distinctive features of the surrounding landscape. The research is limited to the territory of the country as only here the above mentioned documents are valid; they do not pertain to the supranational level.

The Lithuanian territorial planning system is concisely described by Ramanauskas and Dringelis (2013). The *Law on Territorial Planning of the Republic of Lithuania* identifies territorial planning as a process directed towards sustainable development of the country's territory and distinguishes complex (general/master and detailed plans) and special territorial planning documents. Complex territorial planning theoretically aims at determining the trends of spatial development, the priorities of preservation and the use of the territories under

consideration. Special territorial planning documents are aimed at determining the means of use, management, and preservation of the areas intended for specific purpose according to the level of territorial planning. The Law distinguishes among three levels of territorial planning – national (territory of the country or its parts), municipal and local (territories of urban settlements and their parts, etc.) (Lietuvos Respublikos teritorijų planavimo įstatymas, 1995). The emphasis on the complexity of the approach and the planning of the spatial structure of the territories embodied in the Law and the array of the possible types of planning documents such as general plans of the territory of the country and its parts, general plans of municipalities or their parts, detailed plans, various special plans – land management documents, special plans of protected areas, plans concerning the protection of immovable cultural heritage, plans for the development of engineering infrastructure, etc. theoretically allow the sustainable development of rurban areas by means of territorial planning.

Influence. The zones of direct influence of the largest Lithuanian cities can be characterized by a higher density of inhabitants, relatively larger built-up areas, and higher real estate prices than in other areas, and more favorable conditions for the land use conversions, as demonstrated in the case of Vilnius, the capital city (Aleknavičius and Valčiukienė, 2011). The concept of the influence of the urban settlement on the surrounding areas can be further expanded and subdivided into visual, aesthetic, social, economic, as well as the influence on the image of the territory, etc.; the comparably large urban center defines the image of a substantially large surrounding territory. For example, the county – the territorial unit in Lithuania – usually takes the name of its major city where the influence on the territory's image and the economy can, presumably, be mostly felt; the district municipality surrounding the territory of the municipality of the city also has the city's name, and the influence of the city on the image and the economy, the population and the landscape can be identified. Aleknavičius and Valčiukienė identified the radius of 25 km of influence of Vilnius City on the surrounding territory (Aleknavičius and Valčiukienė, 2011). Their analysis demonstrated that the appreciable influence of the city approximately coincides with the territory of the district municipality, and major attention should be paid to the territories of the elderships bordering with the territory of the municipality of the central city.

Two major territorial planning documents of the national scale reflecting the influence of urban areas on the countryside can be distinguished – the *General Plan of the Territory of the Republic of Lithuania* and the *National Landscape Management Plan of the Republic of Lithuania*. For example, the main drawing of the *General Plan of the Territory of the Republic of Lithuania* shows the zones of the present and perspective agglomeration interests surrounding Lithuanian cities (Fig. 2.17) (Lietuvos Respublikos teritorijos bendrasis planas, 2000). In the *National Landscape Management Plan*, the general character of the landscape is marked with different colors and reflects the existence of mixed or transitory character areas surrounding the cities under analysis (Nacionalinis kraštovaizdžio tvarkymo planas, 2015).

The municipality level planning documents reflect the rural-urban influence as well. For example, the drawings in the *General Plan of Kaunas District Municipality* and the *Special Landscape Plan of Vilnius District Municipality* demonstrate the continuity of densely built-up structures outside the official boundaries of city municipalities (Nacionalinis kraštovaizdžio tvarkymo planas, 2015; Vilniaus rajono savivaldybės teritorijos kraštovaizdžio…, 2014). The territorial extent of the planning documents of the municipality level reflects the presence of the rural-urban interface as well. For example, Vilnius District Municipality has a separate planning document (the general plan) for its more intensely urbanized part called *the U zone* according to its configuration encompassing the territories of seven more intensely urbanized elderships (circa 10,000 ha) which border the territory of the municipality of Vilnius City (Vilniaus rajono savivaldybės teritorijos dallies…, 2017).

Most of the local level planning documents, such as detailed plans for the territories and lots at the urban fringe or in the zone of urban influence, are the reflection and tools of urbanization of the countryside as one of the main purposes of these plans is the land use change from agricultural to residential.

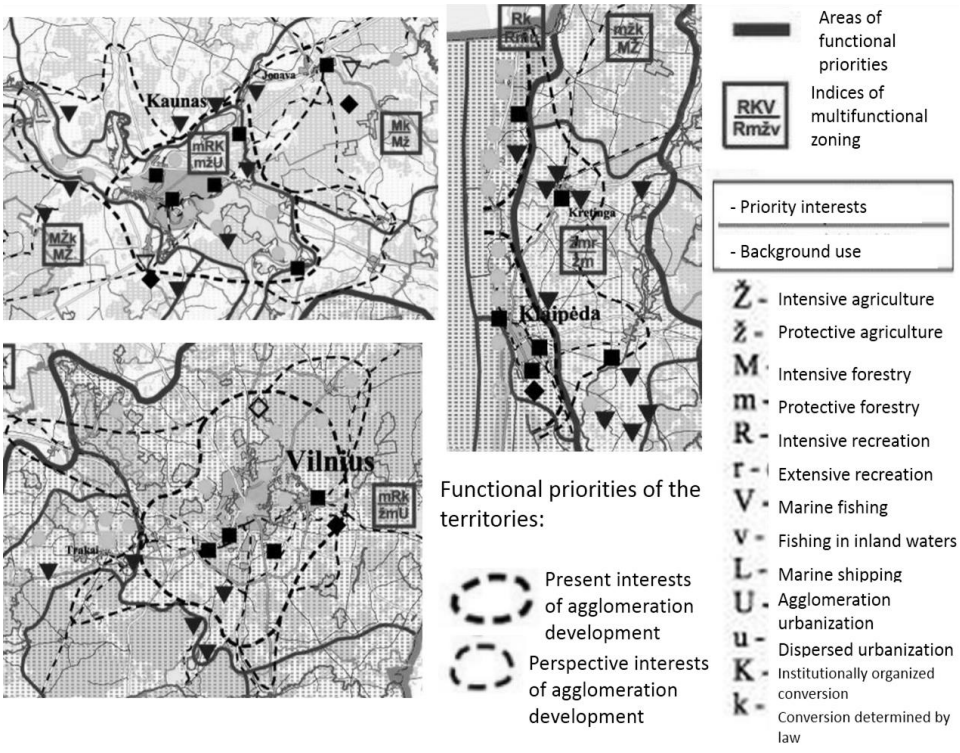


Fig. 2.17. The presence of rural-urban interface in territorial planning documents of the national level: a fragment of the main drawing of the Master Plan of the Territory of the Republic of Lithuania (2000) showing the zones of influence of Vilnius, Kaunas and Klaipėda. Scheme by the author

Landscape Character. The natural conditions in the territories where the rural-urban interface is observed are an important feature of their character and identity. Analysis of the *National Landscape Management Plan* demonstrates that the diverse, expressive, picturesque landscapes extend in the zones of influence of the large Lithuanian cities. Fig. 2.18 shows the peculiarities of visual expression of the country's landscape by distinguishing among the fundamental types of the visual structure of landscape determined by a combination of the degree of expression of the horizontal and vertical division of landscape, the type of their visual predominance and some areas and places of highly recommended conservation due to their visual and aesthetic potential. It can be seen in *Fig. 2.18* that the territories surrounding Vilnius, Kaunas and Klaipėda (extending in the district municipalities of these cities) encompass the areas of a strongly protected aesthetic potential determined by this document; this also concerns a part of the recommended seashore zone of visual protection which extends in the territory of Klaipėda District Municipality. The mosaic of landscapes of different degrees of vertical division and of openness of spaces including landscapes of a strongly expressed vertical division and with the visual predominance in landscape of expressed complex horizontal and vertical, expressed horizontal, and expressed vertical landmarks is characteristic in the zones of influence of Vilnius and Kaunas. The zone of influence of Klaipėda City is characteristic for its seashore landscape with the mosaic of horizontal, vertical, and complex landmarks (Nacionalinio kraštovaizdžio tvarkymo planas, 2015). Heritage and cultural landscape aspects are discussed in the following section regarding the potential of rurban areas. The diverse landscape character, the mosaic of green, open, and built-up areas, is visible in the municipality level planning documents as well.

The main drawing of the General Plan of the Territory of the Republic of Lithuania shows indices of multifunctional zoning indicating that forestry and agriculture – the traditional land use in the countryside – are very important in rurban zones along with urban-driven interests of recreation, urbanization, and conversion of territories (Lietuvos Respublikos teritorijos bendrasis planas, 2000). Other planning documents, while using different classifications, show the presence of functionally transitory zones. For example, the *National Landscape Management Plan* shows zones of interaction of urban and natural or rural environment as a rigid junction of urbanized and agrarian or natural landscapes or as transitory zones of the agrarian urbanized, the agrarian slightly urbanized, etc. landscapes. More intense fragmentation of functional zones is also visible in the zones of influence of large cities (Nacionalinio kraštovaizdžio tvarkymo planas, 2015). According to the *Special Landscape Management Plan of Klaipėda District Municipality*, in the territory of this municipality, the cultured landscape consists of agrarian forested (28.48 percent), agrarian (26.78 percent), agrarian slightly urbanized (19.29 percent) and agrarian urbanized (17.97 percent) types of landscape (Klaipėdos rajono savivaldybės teritorijos…, 2013). The detailed plans of rurban zones also reflect the functional character – the residential function, mainly suburban individual housing, of these areas.

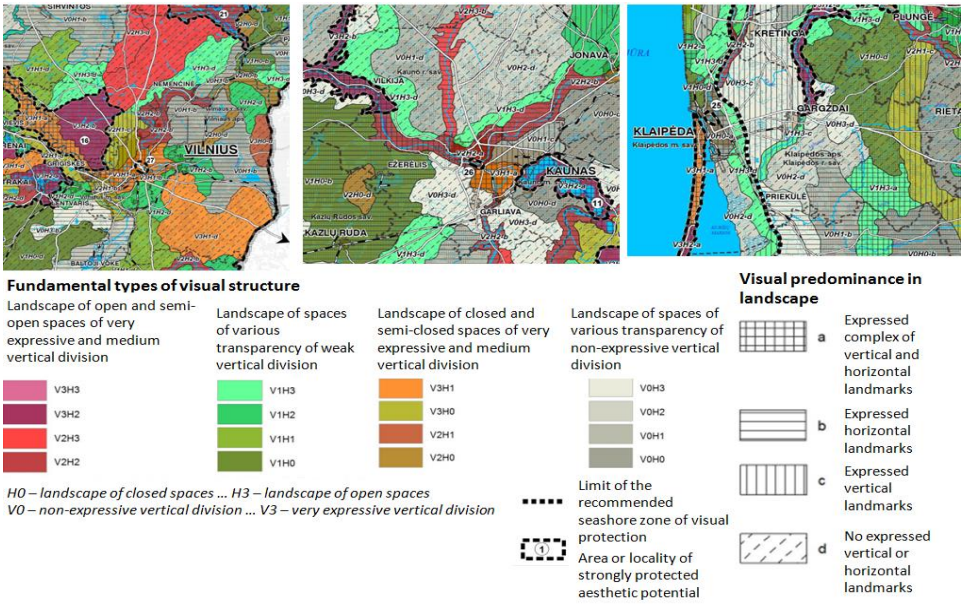


Fig. 2.18. Fragments of the 3rd drawing of the *National Landscape Management Plan of the Republic of Lithuania* (2015) showing the expressive picturesque landscapes extending in the zones of influence of the large Lithuanian cities. Scheme by the author

The layout and the spatial structure of rurban areas can be easily analyzed by using the drawings of general and special plans of district municipalities. The drawing of the General Plan of Kaunas District Municipality showing the land use demonstrates the continuity of intensive urbanization outside and alongside the official boundaries of the city municipality, the fragmentation of landscape structure in the zone of influence of the city, and the transition from urban to rural (Kauno rajono savivaldybės bendrasis planas, 2009). The character of peripheral territories of the city territory is also important from this point of view. For example, the drawing showing the planning outcomes of the *Master Plan of Kaunas* reflects the character of the city's fringe areas – the residential areas of the built-up structure of low intensity; although the document indicates that these territories should be provided with necessary social and commercial infrastructure, services, etc. (Kauno miesto bendrasis planas, 2013), the commonly known fact is that there is scarce infrastructure in the low density urban periphery and in the farther extending rurban areas. According to the analyses of Gaudesius (2013), detailed plans of rurban zones also reflect the structure (low density point-like or patch like) of rurban areas.

Problems related with rurban areas are reflected both in the drawings and in the explanatory material of the planning documents. The drawings and the explanatory text of the concept stage of the *Special Landscape Management Plan of Klaipėda District Municipality* demonstrate and describe the so-called problem areas in the municipality's territory. The majority of the identified problems is linked with the pressure for the development and increased anthropogenic activities related with the vicinity of the active urban center. The document distinguishes among a few

types of areas which are denoted by the following characteristics: 1) conflicts of intensive recreation, urban expansion, bio-production and interest in conservation; 2) deforestation, erosion, intensive bio-production, and urbanization; 3) conflicts of nature and cultural heritage preservation, and difficulties in implementing the regulations covering protected areas; 4) unorganized and intensive urban expansion resulting in uncontrolled urbanization and the emergence of the suburban architecture diminishing the aesthetic value of the landscape; 5) conflicts between the intensive use of mineral deposits and other uses, such as environmental preservation and recreation. However, the authors of the document mention not only the pressure for the development and problems of coordination of the regulations of different planning documents regulating the rurban zones, but also the processes related with the abandonment of land, cultural heritage objects, agricultural buildings, and the re-naturalization of territories (Klaipėdos rajono savivaldybės teritorijos…, 2013). The above reviewed problems of Klaipėda District can be seen in the zones of influence of other large Lithuanian cities as well; they are clearly visible in the drawings of the General plans of Vilnius and Kaunas district municipalities, the *Special Landscape Plan of Vilnius District Municipality*, etc. and can be partially deduced from the planning documents of the national level.

The zones of influence of large Lithuanian cities can be seen as the accumulation and representation of the country's heritage and landscape. The natural conditions that determine the exceptional character of the rurban areas under analysis were introduced in the Subsection on Problems and identity. These expressive landscapes with water bodies are characteristic for the concentration of the cultural heritage of different types. The *National Landscape Management Plan* shows that the zones of influence of the three cities under analysis overlap with the zones of accumulation of the areas of heritage of national significance. The areas of heritage significant to the state history, the areas of archaeological architectural ethno-cultural and urban heritage, etc. overlap in the zones of influence of Vilnius, Kaunas, and Klaipėda (Nacionalinio kraštovaizdžio tvarkymo planas, 2015).

The rich cultural landscape in the zones of influence of the largest Lithuanian cities requires not only the awareness of urban pressure and preservation, but also has a potential for the representation, revival, and the sustainable use of the country's heritage as well as the development of tourism and cultural routes due to the good accessibility from the central cities and the developed communications linking Vilnius, Kaunas, and Klaipėda.

As it was mentioned above, the central city influences the image of the substantially large surrounding territory, for example, its county. However, it is necessary to note that rurban areas, especially the ones extending at the fringe of the city and possessing characteristic natural and rural heritage features, can influence the image of the central city as well. The analyzed planning documents demonstrate the untapped potential of the urban fringe in the development of the image of the city; for example, the solutions of the *Master Plan of Kaunas* demonstrate that the built heritage and the objects and areas determining the identity of the city identified by the planners are mainly concentrated in the city's central part (Kauno miesto bendrasis planas, 2013); meanwhile, the features characteristic to the rurban

environment (including the cultural heritage of the rural origin) are not identified as shaping the city's identity. The heritage and landscape values identified above and the new interventions that occur due to the urban pressure and territorial expansion of the urbanized areas create peculiar landscape aesthetics or visual quality at the urban fringe which must be regulated and enhanced as a constituent of the image of the urban area.

Theoretically, the territorial planning documents of all levels can serve as an effective tool for the development and management of rurban areas. Analysis of the already existing planning documents revealed some attempts directed towards this objective. For example, the national level planning document *General Plan of the Territory of the Republic of Lithuania* shows the functional priorities, the spatial development concept, and the urban framework of the territory of the country thus identifying the zones of future development and the influence of agglomeration of urban centers (*Fig. 2.19*) (Lietuvos Respublikos teritorijos bendrasis planas, 2000). Drawing 2 in *Fig. 2.19* of the *National Landscape Management Plan* demonstrates the distribution of the landscape management regulation strategies and trends in the cities of Vilnius, Kaunas, Klaipėda and their surrounding district municipalities. The regulations of extensive urbanization are mainly identified for the territories at the fringe of the cities under this analysis.

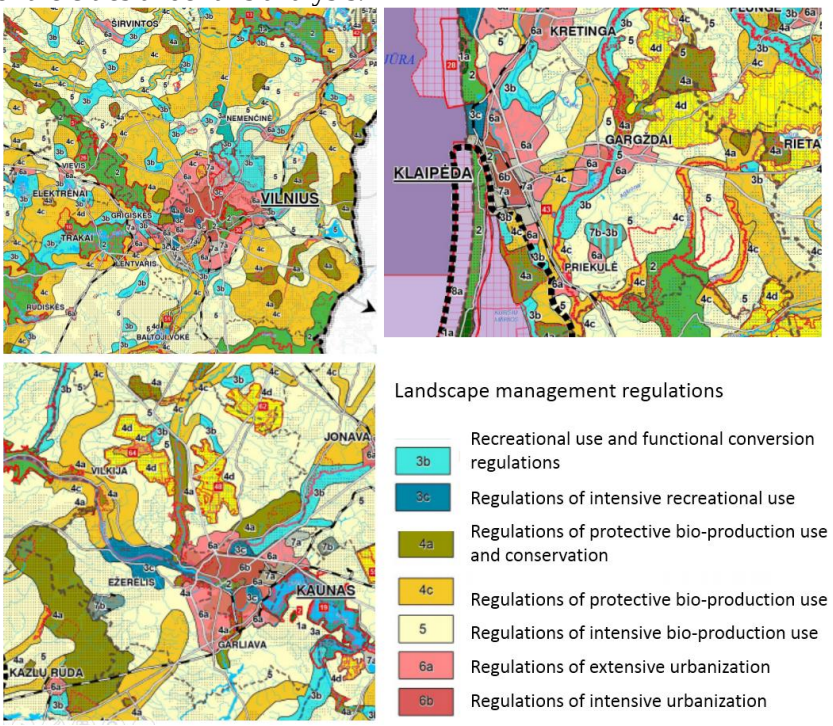


Fig. 2.19. Fragments of the 2nd drawing of the *National Landscape Management Plan* of the Republic of Lithuania showing the landscape management regulations in the zones of influence of Vilnius, Kaunas, and Klaipėda (Nacionalinio kraštovaizdžio tvarkymo planas, 2015). Scheme by the author

These regulations of extensive urbanization are vaguely defined in the explanatory text of the document; thus it is difficult to envision the character and the features of landscape that should be developed in the rurban areas (Nacionalinio kraštovaizdžio tvarkymo planas, 2015). District municipality level planning documents – general and special landscape plans – can be analyzed from this point of view as well. The Special Landscape Plan of Vilnius District Municipality in its concept drawing envisions a diverse mix of valuable cultural and natural features and territories in the zone of influence of Vilnius City. A closer look at the development solutions reveals extensive urbanization patterns with the majority of urban expansion concentrated alongside the transport routes, and some dispersion of urbanization into the countryside mainly based on the expansion of the existing settlements (Vilniaus rajono savivaldybės teritorijos kraštovaizdžio…, 2014). The *General Plan of Kaunas District Municipality* envisions a more concentrated pattern of rurban development with the priority areas for residential development mainly bordering with the limit of the territory of the city. Meanwhile, the priority territories for the industry, logistics, and commerce are concentrated alongside the transport routes. Cultural heritage objects with the envisioned protection zones are concentrated alongside the historic routes (Kauno rajono savivaldybės bendrasis planas, 2009). Thus the planning documents reveal a different character of development of these two district municipalities and the attempts to maintain it by means of territorial planning (*Table 2.3*).

Table 2.3. Summary of analyzed Lithuanian territorial planning documents. Table by the author

Level according to the Law on Territorial Planning	**Types of documents/analyzed documents**	**Aspects related to rurban areas**
National level	General Plan of the Territory of the Republic of Lithuania National Landscape Management Plan of the Republic of Lithuania	*Rural-urban influence* • zones of present and perspective agglomeration interests; • existence of mixed character or transitory landscape areas in the zones of influence of cities
		Rurban landscape characteristics • presence of diverse, expressive, picturesque landscape in rurban zones; • indices of multifunctional zoning; • presence of functionally transitory zones in rurban areas
		Potential of rurban areas • expressive landscape with water bodies characteristic for concentration of cultural heritage of different types; • Vilnius, Kaunas and Klaipėda as important parts of the spatial framework, where heritage

		representing the Lithuanian state is predominant; • developed communication linking Vilnius, Kaunas, and Klaipėda
		Management of rurban areas • functional priorities, spatial development concept, and urban framework of the territory of the country; • zones of future development and the agglomeration influence of urban centres; • distribution of landscape management regulation strategies and trends; • regulations of extensive urbanization
Municipality level	General Plan of Kaunas General Plan of Kaunas District Municipality Special Landscape Plan of Vilnius District Municipality Special Landscape Management Plan of Klaipėda District Municipality (concept stage)	*Rural-urban influence* • continuity of the densely built-up structures outside the official boundary of the city municipalities
		Rurban landscape characteristics • diverse landscape character, mosaic of green, open, and built up areas in rurban zones; • intense fragmentation of functional zones in rurban areas; • fragmentation of landscape structure; • transition from urban to rural; • residential areas of built-up structure of low intensity; • pressure for development and increased anthropogenic activities; • processes related with the abandonment of land, of cultural heritage objects, agricultural buildings, and re-naturalization of territories
		Potential of rurban areas • good accessibility to rurban areas from central cities
		Management of rurban areas • diverse mix of valuable cultural and natural features and territories; • extensive urbanization patterns with the majority of urban expansion concentrated alongside the transport routes and some dispersion of urbanization into the countryside mainly based on the expansion of the existing settlements; • development mainly within the borders of the city territory; • priority territories for industry, logistics, and commerce are concentrated alongside the transport routes

Continuation of Table 2.3

Locality level	Detailed plans of Kaunas City Municipality	*Rural-urban influence* • reflection and tools of urbanization of the countryside; • land use change from agricultural to residential
	Detailed plans of Vilnius District Municipality	*Rurban landscape characteristics* • residential function, mainly suburban individual housing in rurban areas; • low density point-like or patch-like structure of rurban areas
	Detailed plans of Klaipėda District municipality	*Management of rurban areas* • tool for land conversion

However, the solutions of the municipality level territorial planning documents and their impact on the landscape attain much criticism from researchers who usually conclude that the extent of territorial expansion of urbanization into the countryside and the natural areas and its character are often driven by commercial interests; meanwhile, the local planning documents (the detailed plans) often serve as a mere tool of land conversion (Ramanauskas and Dringelis, 2013; Gaudėšius, 2013). Aleknavičius and Valčiukienė (2011) note the pressure of urban expansion on the valuable agricultural land and the failure of the contemporary territorial planning to sustainably coordinate the arrangement of the built-up and natural areas, to evaluate the aesthetic impact and the impact on the agriculture of the proposed landscape transformations (Lietuvos Respublikos teritorijos bendrasis planas, 2000).

2.4. Classification of rural-urban interface landscapes

Numerous landscape researchers addressed the issue of classification of landscape types in the areas of the rural-urban interface (Antrop, 2000; Iaquinta and Drescher, 2000; Buxton *et al*., 2006; Low Choy *et al*., 2007; Low Choy *et al*., 2008; Piorr, 2011, and many others). According to Adell (1999), rural-urban regions are seen as the overall territorial units with a functional urban area (the zone of daily commuting) and the surrounding rural hinterland; the inner and outer edges of the city are often identified in theory and practice; the inner fringe is characterized by the higher building density, faster population growth, more dynamic functional conversion processes, and a complex transport system compared to the outer fringe. Several examples of the rurban typology are presented below:

- Antrop (2000) distinguishes the inner (which functions as the urban core but has a complex morphology of urban and rural elements) and the outer (which looks like the 'normal' rural landscape, but contains a lot of non-rural functioning) urban fringe, generally referred to as the *rurban fringe*.

- Low Choy *et al*. (2007; 2008) distinguishes among the inner perimetropolitan areas, outer perimetropolitan areas, peri-urban centers in the commuting zone, peri-urban centers in the rural zone, inner peri-regional centers, outer peri-regional centers, and linear peri-urban settlements (transit, amenity-coastal, amenity-aquatic, amenity-terrestrial) *(Fig. 2.20)*.

- Buxton *et al*. (2006) distinguishes among the urban fringe, rural fringe, coastal areas, inland areas, amenity areas, recreation areas, consumption sites, and production sites, protected and un-protected sites.

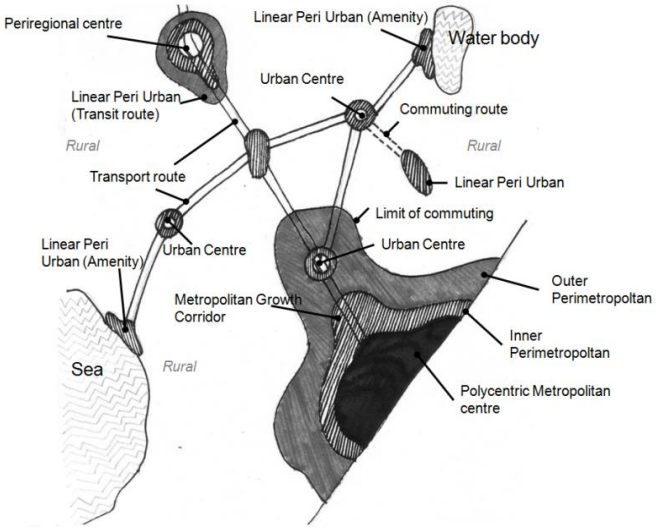


Fig. 2.20. Peri-urban typology by Low Choy *et al*. (2008)

- Iaquinta and Drescher (2000) distinguish village peri-urban, diffuse peri-urban, chain peri-urban, in-place peri-urban, and absorbed peri-urban categories.

- Piorr (2011) distinguishes urban areas and peri-urban areas; the urban area is further subdivided into the city center, inner urban territories, and suburban territories; the peri-urban area is subdivided into urban fringe, urban periphery, and rural hinterland *(Fig. 2.21)*.

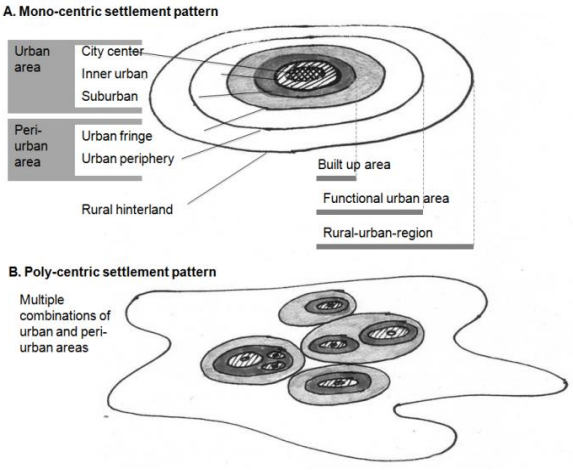


Fig. 2.21. Abstract model of rural-urban interface formulated implementing the PLUREL (Piorr, 2011) project of research of peri-urbanization in Europe

- Cirtautas (2012) distinguishes the central city (with the urban core and historical suburbs) and the non-central city (with modern and self-sufficient suburbs) *(Fig. 2.22)*.

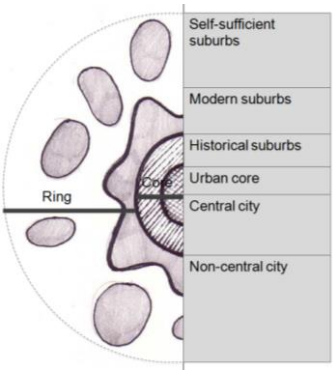


Fig. 2.22. Model of concentric urban structure by Cirtautas (2012)

Van Dijk and van der Valk (2007) noted that "patterns of urbanization are very specific in different world regions and so are relations between urban and rural areas" which form a new kind of space. Thus the classifications of landscape types and rural-urban interface areas may be case-sensitive and vary from country to country, from region to region, and even from one urban area to another depending on the geographical factors, agricultural traditions and policies, and urban expansion patterns. Official legislation may even ignore the presence of rurban areas and see them as rural or urban depending on the intensity of urbanization.

Let us take as an example the Lithuanian landscape classification and the place of rurban areas in it. The official Lithuanian landscape classification (Lietuvos Respublikos Vyriausybė, 2004) is based on the natural and anthropogenic factors shaping the landscapes and their interactions. Depending on the degree and type of the human impact, solely *natural*, *rural*, and *urban* landscapes are distinguished:

- *natural* is a landscape which is shaped by the natural processes and develop this way up to now, human activities have minimal impact on the landscape development (relatively few natural forests, wetlands and water bodies remain);

- rural (agrarian) is a landscape that was formed by natural processes and human activities and which preserved the main structural features of natural areas (agricultural land, extensive development of villages);

- urban is a landscape which is strongly altered, maintained, and developed by human activities (cities, towns, densely built-up villages, and areas of large engineering technical complexes).

Meanwhile, Kavaliauskas (2011) distinguished among the following Lithuanian landscape morphotypes: marshy, wooded, wooded-agrarian, wooded-slightly urbanized, agrarian, agrarian-slightly urbanized, agrarian-urbanized, and urbanized. The relicts of the historical types of the Lithuanian rural landscape (*ikivalakinis* (pre-Volok), *valakinis* (Volok), *vienkieminis* (Farmstead), *kolūkinis*

(Kolkhoz)) can also be distinguished (Bučas, 2001) *(Fig. 2.23)*, whereas the urban pressures on these types of historic landscapes may produce very different aesthetic results *(Fig. 2.24)*.

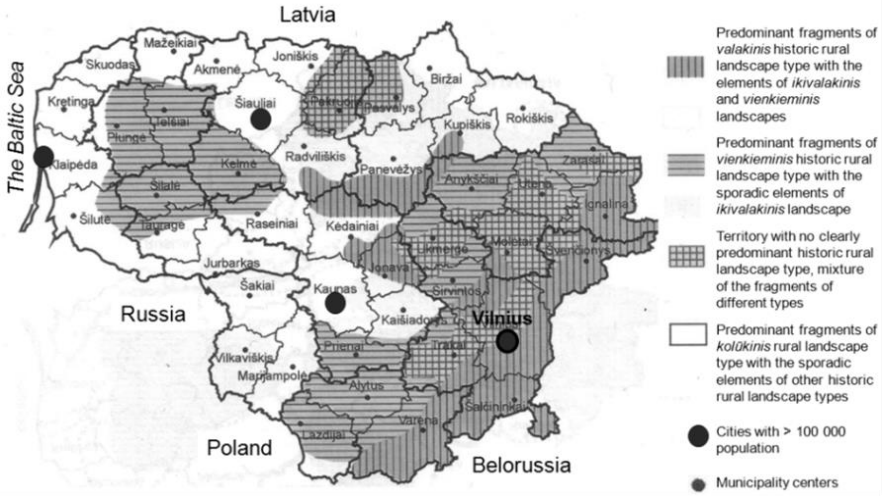


Fig. 2.23. Territorial fragments of historic types of rural landscapes in the contemporary territory of Lithuania. Adapted from Bučas (2001) by the author

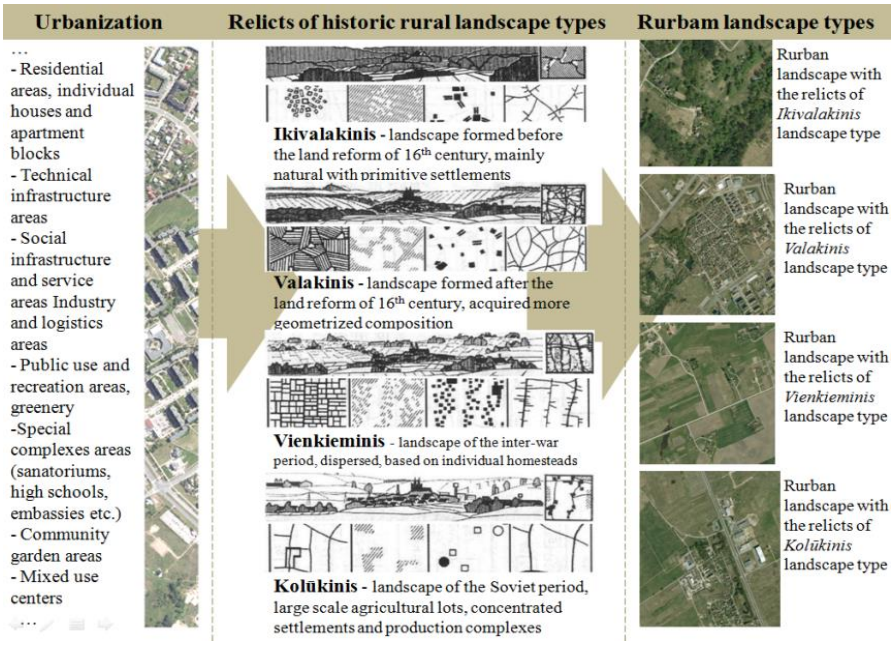


Fig. 2.24. The relicts of historic types of rural landscape of different quality and identity influence rurban development in Lithuania. With reference to Bučas (2001), Maps... (2014), Miestų... (2009), Zaleskienė and Gražulevičiūtė-Vileniškė (2013). Scheme by the author

Table 2.4 shows classifications of Lithuanian landscape types and the place or rurban areas in this context and the general classification of rurban areas according to the presence and intensity of the features of the rural and urban environment and lifestyles formulated in this research and applicable to Lithuanian landscapes:

- rural or natural landscape with slight manifestations of features of urban environment;
- rural landscape with clear features of urban environment;
- landscape where the features of rural and urban environment are equally present;
- urban landscape with clear features of rural environment;
- urban landscape with slight manifestations of rural environment.

Figure 2.25 demonstrates some of the types of rural-urban interface landscapes at the fringe of Šiauliai City.

Table 2.4. Classifications of Lithuanian landscape types and the place or rurban landscapes in this context. Table by the author

<table>
<tr><th colspan="8">Classification of Lithuanian landscape types</th></tr>
<tr><th colspan="3">Natural</th><th colspan="3">Rural</th><th colspan="2">Urban</th></tr>
<tr><th colspan="8">Lithuanian landscape morphotypes (Kavaliauskas, 2011)</th></tr>
<tr><th>Marshy</th><th>Wooded</th><th>Wooded-agrarian</th><th>Wooded-slightly urbanized</th><th>Agrarian</th><th>Agrarian-slightly urbanized</th><th>Agrarian-urbanized</th><th>Urbanized</th></tr>
<tr><th colspan="8">Classification of landscapes in the areas or rural-urban interface</th></tr>
<tr><td colspan="3">Natural, rural</td><td>Rural or natural landscape with slight manifestations of features of urban environment and / or of urban lifestyle

Referred to as:
Outer fringe
Outer boundary
Rural hinterland
City hinterland</td><td colspan="2">Rural landscape with clear features of urban environment and urban lifestyle

Referred to as:
Exurbia / exurban</td><td>Landscape where the features of rural and urban environment and rural and urban lifestyles are equally present

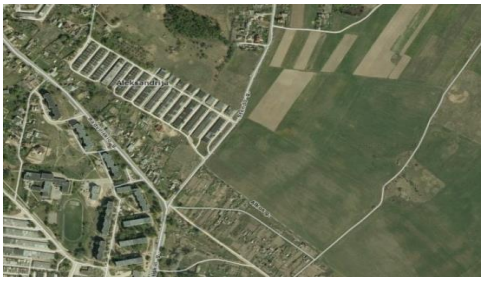
Referred to as:
Rurban
Ruralurban
Peri-urban
Rural-urban fringe
Rural-urban interface</td><td>Urban landscape with clear features of rural environment

Referred to as:
Boomburb
Edge city
Urban fringe
Urban periphery
Inland</td><td>Urban landscape with slight manifestations of rural environment

Referred to as:
Historical suburb
Suburb
Suburban area</td><td>Urban</td></tr>
</table>

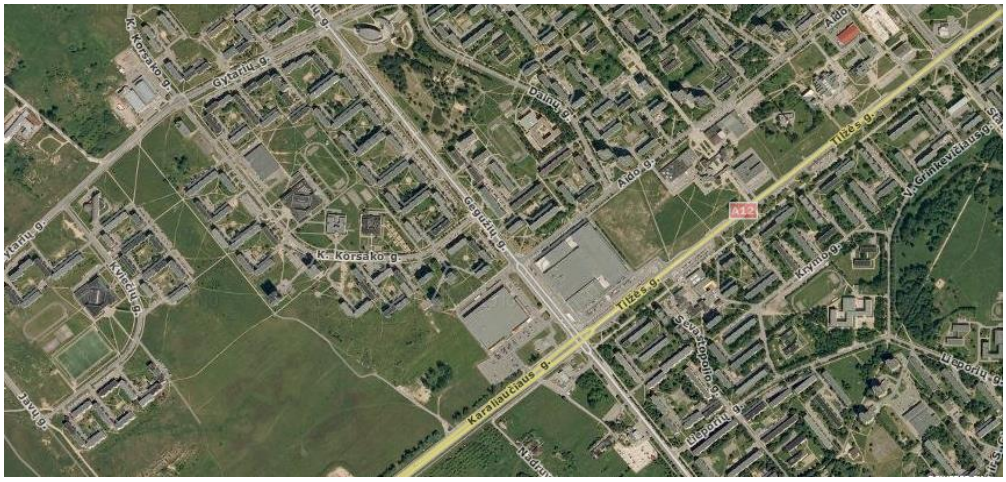
*Rural landscape with **slight** manifestations of features of urban environment. Location: Rekyva settlement*

*Rural landscape with **clear** features of urban environment. Location: Verduliai settlement*



*Landscape where the features of rural and urban environment and rural and urban lifestyles are **equally** present. Location: Aleksandrija settlement*

*Urban landscape with **clear** features of rural environment. Location: Ginkūnai settlement*



*Urban landscape with **slight** manifestations of rural environment. Location: Dainiai*

Fig. 2.25. Examples of the rural-urban interface landscape types in Šiauliai (Maps..., 2014)

Considering the above analyzed peculiarities of Lithuanian rural landscapes, trends of urbanization and the rural-urban interface, a matrix for classification of Lithuanian rurban landscapes was proposed *(Table 2.5)*.

Table 2.5. Classification of Lithuanian rurban landscapes with reference to Bučas (2001), Antrop (2000). Table by the author

Intensity of urbanization	Natural → Artificial																																						
Links with the city	Outer urban fringe				Inner urban fringe																																				
General impression	Natural slightly urbanized				Rural					Rural-urban									Urban																						
Classification of landscapes in the areas or rural-urban interface	Rural or natural landscape with **slight** manifestations of features of urban environment and / or of urban lifestyle (**RN**)				Rural landscape with **clear** features of urban environment and urban lifestyle (**R**)					Landscape where the features of rural and urban environment and rural and urban lifestyles are **equally** present (**RU**)									Urban landscape with **clear** features of rural environment (**UR**)									Urban landscape with **slight** manifestations of rural environment (**U**)								
Land use*	F	A	R	W	A	R	T	S	I	W	R	B	P	T	I	C	S	A	G	W	R	B	P	M	T	I	C	S	A	W	B	R	M	P	C	S	T	I	W
Rural landscape types	**Rurban landscape subtypes**																																						
Contemporary productive agricultural landscapes																																							
Landscape with relicts of historical rural landscape types	RNI, RNVA, RNVI, RNK				RI, RVA, RVI, RK					RUI, RUVA, RUVI, RUK									URI, URVA, URVI, URK									UI, UVA, UVI, UK								
With relicts of landscape before the land reform of 16th century (*Ikivalakinis*) (**I**)																																							
With relicts of landscape after the land reform of 16th century (*Valakinis*) (**VA**)																																							
With relicts of landscape of the inter-war period (*Vienkieminis*) (**VI**)																																							
With relicts of landscape of the Soviet period (*Kolūkinis*) (**K**)																																							
Mixed rural landscape types	RNIK, RNVAK, RNVIK				RIK, RVAK, RVIK					RUIK, RUVAK, RUVIK									URIK, URVAK, URVIK									UIK, UVAK, UVIK								
With relicts of *Ikivalakinis* and *Kolūkinis* landscapes (**IK**)																																							
With relicts of *Valakinis* and *Kolūkinis* landscapes (**VAK**)																																							
With relicts of *Vienkieminis* and *Kolūkinis* landscapes (**VIK**)																																							
...																																							

**Forests and forested areas (F); Agricultural areas (A); Residential areas, individual houses (R); Water bodies (W); Technical infrastructure areas (T); Social infrastructure and service areas (areas designated to objects that meet the social needs of the local residents including culture, education, community centers, health care) (S); Industry and logistics areas (I); Residential areas, apartment blocks (B); Public use and recreation areas, greenery (P); Special complexes areas (areas designated to special complexes, such as hospitals, sanatoriums, high(er) schools, embassies, defense objects) (C); Community garden areas (G); Mixed use centers (M).*

The matrix encompasses:
- the intensity of urbanization of the area;
- links with the city or the rurban area;
- general impression created by landscape;

- general classification of landscapes in the areas of the rural-urban interface into five types;

- further subdivisions of these general types based on the prevailing land uses and the extant historical features of Lithuanian rural landscapes.

The matrix demonstrates the land uses which are the most characteristic to each of the five rurban landscape types. The categories of land uses were distinguished by using two documents: *Specification of Regimes and Sub-Regimes of Main Uses of Land Lots* (Žemės..., 2014) and the project of *Planning Norms of Cities, Small Towns and Villages* (Residential Areas) (Miestų..., 2009). For example, such land uses as residential areas including individual houses and apartment blocks, public use and recreation areas, technical infrastructure areas, industry and logistics areas, special complexes areas, agricultural areas, community garden areas, and water bodies could be found in landscapes where the features of the rural and urban environment and rural and urban lifestyles are equally present. The matrix displays the characteristic land uses according to their predominance and significance in each rurban landscape type. The historical peculiarities and heritage values of the Lithuanian rural landscape are reflected in the matrix as well. The subtypes of rurban landscapes in which the relics of various historical rural landscape types have been preserved were distinguished; for example, the rural landscape with clear features of the urban environment with the relicts of the historical rural landscape shaped after the land reform of the 16th century, the landscape where the features of the rural and urban environment are equally present with the relicts of the historic rural landscape shaped during the inter-war period, etc. Mixed rurban landscape types in which the relicts of several historic rural landscape types are closely intertwined can be also distinguished. Several of such different types are shown in the matrix, though other combinations may also exist. This landscape classification which shows the importance of historic rural landscape relicts in the analyzed landscapes is used in the further stages of the research, where the possible realization of new types of sustainable landscape by Nohl (2001) is proposed (Table 4.4).

2.5. Generalization

Research approach. The rurban landscapes possessing a variety of new ecological, aesthetic, and functional features raise new challenges of landscape understanding, definition, analysis, and policy making. Even if these rurban landscapes constitute our everyday working and living environment, they are *relatively unexplored and virtually unknown* to the general society and even to a large part of experts. Thus the emerging variety of rurban landscapes requires a *comprehensive* research approach which encompasses all the stages from the first grasp (understanding) to a definition, detailed analysis, setting the landscapes into the physical and social context (a comparison with other landscapes, understanding of the society's views towards these landscapes) to the policy making and development strategies. Any analysis of such landscapes must be *interdisciplinary*

as well, as the functional, ecological, aesthetic, historical, social, economic and other interrelated issues must be analyzed.

Characterization. Following the research approach, the rurban landscapes after the analysis of different definitions and characterizations in literature were characterized as: *remnant* (landscapes transformed by urbanization still retaining historic dimension, landscape memory, and time depth), *dynamic* (the transitional character and the relevance of the dimension of time), *complex* (a heterogeneous mix of rural and urban features, landscape fragmentation, emerging new landscape types), *emergent* (a rapid change of the landscape quality), *contested* (conflicts between rural and urban uses, lifestyles, different aesthetics), *interdependent* (links to and dependence from the urban area).

Local peculiarities. Even if the rurban landscapes possessing the features of both urban and rural environment are a global phenomenon, local national, regional, local, etc. peculiarities can also be distinguished. Our research has demonstrated not only global trends – metropolization, industrialization, commercialization, uniformity or internationalization – but also local distinctive aspects related with the character of natural landscape, urbanization patterns, and the history of the rural landscape in the rural-urban interface in Lithuania. The dynamic, 'emergent' development of the country's rural landscape has left relicts of the historic types of the rural landscape of various quality and identity, meanwhile, the radical changes of urban development have conditioned that today's landscapes in the areas of the rural-urban interface are mainly shaped not by the sharply contrasting densely built-up urban and slightly urbanized rural and natural areas, but by the scattered emergence of point-like urban insertions in the surrounding rural and natural environment. *Figure 2.26* demonstrates the features of Lithuanian rurban landscapes.

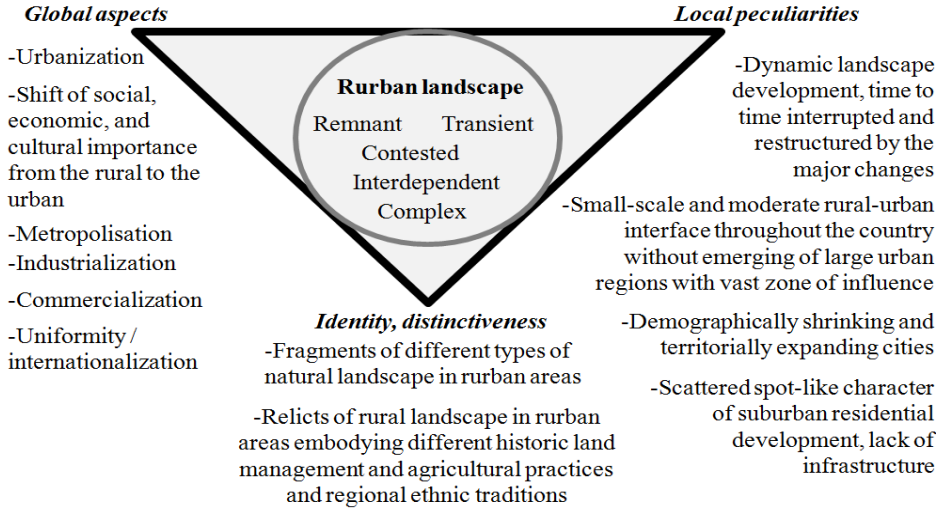


Fig. 2.26. Features of Lithuanian rurban landscapes. Scheme by the author

Analysis of territorial planning documents. Our analysis of the selected territorial planning documents of different levels which are currently in the territory

of Lithuania demonstrates the presence of the rural-urban interface and the related problematics in the zones of influence of the large cities of the country. The natural conditions, the functions, the structure, and the management problematics of the rurban areas as reflected in the territorial planning documents allow concluding on their identity: the transitory nature of the layout, spatial structure and uses, changing dynamic character with the present processes of rapid urbanization and abandonment, the decline of heritage and agricultural buildings and renaturalization of territories, the increasing functional, layout, spatial and resulting aesthetic and ecological fragmentation and increasing complexity. Our analysis shows that the potential of the rurban areas lies in their understanding as accumulations and representatives of the country's heritage and diverse and expressive landscape, in the favorable possibilities for communication, and in the integration of these landscapes in the formation of the image of the urban area. The emphasis on the complexity of the approach and the planning of the spatial structure of the territories embodied in the contemporary territorial planning legislation of the country as well as the array of the possible types of planning documents theoretically allow the sustainable development of the rurban areas by the means of territorial planning in Lithuania.

Classification. There are many ways to classify different types of landscapes in the zones of rural urban interface; however, the classification of rurban landscapes may meaningfully encompass local peculiarities as well. These peculiarities can be integrated into more general classifications. For example, a classification of Lithuanian rurban landscapes can integrate not only the degree of influence of urbanization on the rural and natural areas (rural or natural landscape with slight manifestations of features of the urban environment, rural landscape with clear features of the urban environment, a landscape where the features of the rural and urban environment are equally present, an urban landscape with clear features of the rural environment, an urban landscape with slight manifestations of the rural environment), but also 1) general Lithuanian landscape classification (Lietuvos..., 2004) (natural, rural, urban); 2) Lithuanian landscape morphotypes (marshy, wooded, wooded-agrarian, wooded-slightly urbanized, agrarian, agrarian-slightly urbanized, agrarian-urbanized, and urbanized (Kavaliauskas, 2011); 3) legally determined categories of land use, 4) types of historic rural landscapes.

3. ASSESSMENT OF RURAL-URBAN INTERFACE LANDSCAPES

3.1. Questions of aesthetics and aesthetic assessment of rural-urban interface landscapes

Aesthetics may be defined narrowly as the theory of beauty (Slater, 2014). Aesthetics is broader in scope than the philosophy of art which constitutes one of its branches. It deals not only with arts but also with these responses to natural objects, including landscapes, which find expression in the language of the *beautiful* and the *ugly*. The contemporary discipline of aesthetics incorporates three approaches: the study of the aesthetic concepts, the study of certain states of mind – responses, attitudes, emotions – that are held to be involved in aesthetic experience, and the study of the aesthetic object (Murno, 2013). Considering these subjective and objective, abstract and concrete aspects of aesthetics, landscape aesthetics can be defined as the quality of landscape perceived by using all human senses (including sight); as far as the *subject* perceives 85 percent of the environment – *object* – by using sight and gets specific spiritual-aesthetic, emotional-aesthetic experience, it can be stated that the *visual quality constitutes the basis of the aesthetic quality of landscape*. Moreover, the aesthetic experience of landscape is determined both by the personal qualities of the perceiver and by his or her cultural background – the *cultural context* (Kamičaitytė-Virbašienė, 2003).

The protection of the landscape's beauty has long-lasting traditions in the United States and in Great Britain as well as in other European countries. The use and protection of the beauty of the landscape is strongly related with protected areas, which, if comparing landscapes of different counties, cover from 0.15 percent to 15 percent of the territory. Landscape aesthetics, however, is an *intangible resource of our living environment* (Kamičaitytė-Virbašienė, 2003), thus not only the natural and cultural landscapes of exceptional aesthetic quality, but also our everyday living and working environment should be an/the object of the landscape aesthetic research. Aesthetics is an important and frequently overlooked aspect of landscape sustainability. For example, Nohl (2001) revealed and analyzed the poor aesthetic reality of today's landscapes in Europe. According to him, the economic and technical rationalities of the modern age completely changed the traditional cultural landscapes: large uniform landscape areas were created, the number of aesthetically effective elements in the cultural landscape was dramatically reduced; moreover, radical ecological thinking often brings about uncontrolled vegetation growth. These landscape alterations result in four inadequacies of the human perceptual field: coarsening, impoverishment, destabilization, and alienation (Nohl, 2001). The negative structural and aesthetic changes of cultural landscapes identified by Nohl (2001) can be particularly seen in rurban areas. Rurban landscapes that, with the ongoing urbanization, become everyday reality of the increasing numbers of population around the world not only reflect the general challenges of landscape aesthetics but also present specific and yet unsolved problems. The importance of aesthetics cannot be underestimated in the areas of rural-urban interface that become the living and working environment of an increasing part of the world's population.

3.1.1. Landscape aesthetic theories and their application

Within the field of landscape aesthetics, several groups of theories for explaining landscape perception and preferences can be distinguished – the so-called evolutionary or biological theories (landscape preferences reflect landscape qualities satisfying human biological needs to survive and thrive as a species), cultural preference theories (the perception and experience of a landscape is predominantly dependent on the cultural background and personal attributes of the observer), and mixed theories (Tveit *et al*., 2006). Based on Tveit *et al*. (2006) and Ode *et al*. (2008) and other sources (Nassauer, 1995; Kamičaitytė-Virbašienė, 2003; Stedman and Ingalls, 2014), a short description of these theories is provided below.

- *The Prospect-refuge* theory – the evolutionary or biological landscape preference theory – as developed by Appleton in 1975 – underlines humans as both the predator and the prey who would prefer landscapes offering both prospect and refuge – the possibility of "seeing without being seen." According to this theory, this ability is an indicator of environmental conditions favorable to our biological survival, and the landscape providing such features is simultaneously a source of aesthetic pleasure. The *Human habitat theory* by Orians similarly links aesthetic pleasure with the fulfillment of human biological needs (Tveit *et al*., 2006).

- *The Information processing theory*, another evolutionary theory by Kaplan and Kaplan (1989), is based on the human need for information and the ability to process it in order to survive. Consequently, easily legible landscapes (this is a 'readable' landscape that a person can perceive, recognize what type of the landscape it is, and find one's way in it) would be favored by natural selection, and the genetic basis to appreciate such landscapes would still be inherent in people today (Tveit *et al*., 2006; Ode *et al*., 2008).

- *The Biophilia or Biophilia hypothesis* by Kellert and Wilson bases the aesthetic appreciation of landscape on the human biological need to affiliate with nature. This evolutionary landscape preference theory emphasizes the importance of the natural diversity of species and landscape types as well as the tendency naturally inherent in people through evolutionary history to appreciate and focus on life and lifelike processes (Tveit *et al*., 2006; Ode *et al*., 2008; Stedman and Ingalls, 2014).

- *The Theory of restorative landscapes* links cultural and biological bases for landscape appreciation and emphasizes the links between the ability of environments to enhance recovery of mental energies and landscape preferences. It underlines the relationships between the naturalness of a scene and human restoration or stress recovery; meanwhile, naturalness has also been found to enhance landscape preference (Ode *et al*., 2008).

- Another mixed biological-cultural *Ecological aesthetics theory* by Carlson and Gobster links preferences for landscape with ethics, suggesting a preference for ecologically sound landscapes (Tveit *et al*., 2006). Jorgensen (2011) also expressed a similar view. This theory sees landscape preferences from an ethical perspective: if a landscape is known to be ecologically healthy, then it will be preferred. According to Kamičaitytė-Virbašienė (2003), this approach dominates in the landscape valuation in Lithuania: the intensity of the human impact is seen as inversely

proportional to the landscape's aesthetic quality, and the most natural landscapes are seen as the most scenic. However, such an approach is applicable only to specific categories of landscape.

- The theory by Tuan called *Topophilia* – the love of the place – focuses on the cultural dimension of preference and is defined as the affective bond with one's environment – a person's mental, emotional, and cognitive ties to a place (Heimer, 2005). The *topophilia* hypothesis emphasizes the personal attributes – the age, gender, occupation, hobbies, academic background, familiarity, etc. – as important factors for landscape preference (Tveit *et al*., 2006).

- *The Formal aesthetics theory*, another cultural theory of landscape preference, is based on the design theories and attempts at describing landscape by using the concepts and terms of aesthetic philosophy and art criticism in order to provide a language to describe the aesthetic qualities of landscape mainly linked to design, planning and assessment. Here, an expert with formal education in aesthetics and art criticism qualified to evaluate the visual quality of landscape plays an important role (Tveit *et al*., 2006).

- *The Landscape heritage or historic landscapes approach* to landscape preferences presented by Lowenthal and Fairclough maintains that the historical dimension and historical elements are important for landscape perception and preference. Landscapes containing both past and present can provide their residents with a feeling of community integrity and quality. The historical continuity in landscape, landscape elements that, through their different form, material, wear and patina, differ from recently built structures, provide a depth of meaning, a sense of time as well as recreational resources; thus they contribute to landscape aesthetics (Tveit *et al*., 2006; Ode *et al*., 2008). Kamičaitytė-Virbašienė (2003) identifies a similar *cultural heritage protection concept* in the Lithuanian landscape valuation practice related to the historical-cultural approach towards the visual quality of landscape. Here, cultural landscapes are classified into organically developed, intentionally planned, and associative, the visual quality of which is determined by different factors – a specific combination of physical components and visual expression determined by different land use, compositional factors, or associative values.

- *The Spirit of place, genius loci, vividness, or imageability approach* presented by Lynch, Litton, Litton *et al*., and Bell links landscape preferences with such special landscape features as identifiable uniqueness, distinction, sometimes known as the *genius loci* or 'sense of place' or "the quality in a physical object which gives it a high probability of evoking a strong image in any given observer" (Tveit *et al*., 2006).

- *The aesthetics of care theory* is linked with the works of Nassauer and Sheppard; it focuses on signs of landscape maintenance – the visual 'cues of care' (mowing, tidy fences and footpaths, bright flowers and trimmed, straight edges) – which are used to explain a landscape preference (Nassauer, 1995; Tveit *et al*., 2006; Ode *et al*., 2008).

Our review of the variety of landscape aesthetics theories demonstrates that part of them are clearly oriented towards the natural landscape and human survival,

whereas the other part is oriented towards culturized environments transformed by man, while the third group tries to integrate or reconcile these opposite approaches. This transition from nature to culture (biological (nature oriented) – mixed – cultural) corresponds to the transitory nature of rurban landscapes (a rural or natural landscape with urban features – an urban landscape with rural features); moreover, each rurban landscape is a mix of rural, natural, and urban features. That is why it is not possible to limit the aesthetic analysis of rurban landscapes only with biological or cultural landscape aesthetics theories and criteria deriving from them. *Table 3.1* demonstrates the applicability and relevance of landscape aesthetics theories to rurban landscapes.

Table 3.1. Theories of landscape preference summarized by the author from Tveit *et al*. (2006) and Ode *et al*. (2008) and their applicability and relevance to the rurban landscape

Theory				**Relevance to rurban landscapes**	
Category	*Title*	*Authors, sources*	*Year*	*Aspects of relevance*	*Degree of relevance*
Evolutionary, biological	Prospect-refuge theory	Appleton	1975	Spatial structure of various types of rurban landscapes (both with predominant natural and rural and urban features) can provide the possibility of "seeing without being seen"	High
	Information processing theory	Kaplan and Kaplan	1982–1989	Some features of rurban landscapes, for example, the relicts of historic rural landscapes, could be easily readable	Medium
	Biophilia, Biophilia hypothesis	Kellert and Wilson	1993	Diversity of landscape types and their fragments in rurban areas, presence of fragments of natural environment and processes of abandonment and renaturalization in rurban landscapes	High
Mixed	Restorative landscapes	Kaplan and Kaplan, Ulrich, Hartig *et al*., Herzog *et al*., Real *et al*., Hagerhall *et al*.	1989–2004	Presence of fragments of natural environment in rurban landscapes and possibilities to use them for recreation	High
	Ecological aesthetics	Gobster, Carlson	1999–2001	Presence of fragments of natural environment in rurban landscapes, importance of ecology in the zones under pressure of urbanization	Medium

Continuation of Table 3.1

	Topophilia	Tuan	1974	The relicts of rural environment in rurban landscapes may be an object of topophilia; topophilia is also important in the developing communities in the rurban areas	High
Cultural	Formal aesthetics	Bell	1999	Formal landscape aesthetics can be a useful tool for describing cultural picturesque landscapes in the rurban areas; however, the complexity of rurban landscapes limits the application possibilities of this theory	Low
	Landscape heritage / historic landscapes	Lowenthal, Fairclough *et al*.	1979–1999	Presence of relicts of historic rural landscapes in rurban areas	High
	Spirit of place / genius loci / vividness	Lynch, Litton, Litton *et al*., Bell	1960–1999	Presence of distinctive relicts of historic rural and natural landscapes in rurban areas, the need to develop a distinctive image of rurban areas	High
	Aesthetics of care	Nassauer, Sheppard	1995–2001	Aesthetics of care is important preserving the relicts of historic rural landscapes and developing high quality living environment with local centers and public spaces in rurban areas	Medium

3.1.2. Methods of aesthetic assessment

In order to understand the peculiarities of the aesthetic analysis of rurban areas, it is necessary to review the methods of aesthetic landscape analysis and their classifications. This section focuses on the main trends of landscape aesthetic assessment and their applicability to rural-urban interface areas.

Various classifications of landscape aesthetic assessment approaches exist. The most common classification subdivides all the methods into (Zaleskienė *et al*., 2013):

- *expert/design approaches* – the approaches based on expert valuation. Experts are involved in the selection of characteristics of the landscapes to be valuated and the rules and guidelines which are used to rank landscapes in terms of landscape quality (Burgess, Patton, Georgiou and Matthews, 2009; Daniel, 2001).

- *perception-based approaches* – the approaches analyzing the perception of landscapes by the observers. Both landscape as whole and separate factors of

landscape and their influence on the visual quality can be analyzed (Daniel and Vining, 1983);

- *integrated approaches* encompass methodical aspects of descriptive (expert) and perception-based methods. These methods can integrate landscape evaluation as a whole and split it into objective landscape indicators as well (Daniel and Vining, 1983). Statistical techniques are used to determine the mathematical relationships that exist between landscape components and the scenic preferences of observers (Arriaza *et al*., 2004; 2005).

Considering the main features of rural-urban interface areas, it would also be appropriate to use another classification of landscape visual quality evaluation methods. Rurban landscapes are complex, fragmented, dynamic and mixed, considering natural, rural and urban features, and at the same time all the above mentioned characteristics are interconnected. Accordingly, it is necessary to comprehend landscape as a whole or as a system and also as particular factors of the visual quality of landscape at once while evaluating its aesthetic potential. Taking this into account, another classification of landscape aesthetic analysis methods is possible (Kamičaitytė-Virbašienė, 2003; Review of Existing..., 2010; Zaleskienė *et al*., 2013):

- *Methods of overall impression.* Methods of overall impression constitute a non-structural way of landscape research related with the undividedness of the landscape's visual impact where not the landscape itself but the impressions made by it are analyzed; these methods are employed in order to understand how various people perceive landscape (Zaleskienė *et al*., 2013).

- *Methods of structural analysis.* Analysis of the structure of a landscape and its components constitutes an important part in landscape understanding. Such an approach stresses the importance of separate factors that determine the landscape's visual character. Here, the landscape structure, its components and elements, their interrelations and factors conditioning them are analyzed. Landscape is evaluated according to indicators of its structure – their type, the quantity of the components and elements, and relations between them (Zaleskienė *et al*., 2013). Structural analysis, which is an expert-based approach, transforms landscapes into formal design parameters through the classification of biophysical features of landscapes (geomorphologic forms, vegetation, water, etc.) into characteristics which are considered to be important for landscape aesthetics, i.e., forms, lines, textures, colors, and the relationships between these features, e.g., variety, vividness, unity, harmony (Burgess *et al*., 2009; Daniel, 2001; Zaleskienė *et al*., 2013). As it can be seen in ***Appendix 1***, methods of structural analysis were developed and applied in Lithuania as well. For example, in 1968, Ėringis and Budriūnas developed the method of structural quantitative analysis and evaluated the aesthetical resources of the territory of Lithuania. In the same year, Daniulaitis and Kavaliauskas developed the method of structural comparative analysis and evaluated the landscape of South Lithuania region for the purposes of recreation and tourism (Kamičaitytė-Virbašienė, 2003).

- *Landscape visual characterization*. This type of research focuses on the visual character of landscape and its features. These methods concentrate on

whatever features of landscape and of observers influence judgment about the landscape quality: biophysical features of the landscape, informational and functional needs of humans (Daniel, 2001; Brown, Keane and Kaplan, 1986), people's needs to understand and explore natural landscapes (Kaplan, Kaplan, 1989) which are closely linked with landscape aesthetic theories discussed above. Different concepts for landscape characterization were distinguished: naturalness, diversity, functionality, identity, and compositional perfection (Ardzijauskas, 1979; Daniulaitis and Kavaliauskas, 1973); coherence, complexity, legibility, mystery (Kaplan, Kaplan, 1989; Burgess *et al*., 2009); coziness, interestingness, mystery, coherence, impressiveness, originality, neatness, and links with the past and culture of the nation (Kamičaitytė-Virbašienė, 2003). Tveit *et al*. (2006) adds more concepts to the above mentioned ones: naturalness (wilderness, vegetation health, etc.), stewardship (sense of order and care, upkeep), disturbance (intrusion, alteration, impact, lack of contextual fit, etc.), historicity (historic continuity and richness), visual scale (visibility, openness, enclosure, etc.), imageability (*genius loci*, sense of place, uniqueness, place identity, etc.), and ephemera (seasonal, weather changes). The overall approach to landscape characterization by Tveit *et al*. (2006) is discussed in greater detail in Section 3.3. These sets of criteria can be used for landscape description by experts or for a sociological survey of observers.

- *Complex methods.* These methods integrate aspects of the above mentioned analyses in order to consider landscape characteristics and public preferences. For example, landscape can be analyzed structurally (in terms of components and elements of landscape, their indicators, characteristics, relations), and then public opinion about that landscape is analyzed (Zaleskienė *et al*., 2013). Such a method was developed by Purvinas in 1982 in Lithuania as well (Kamičaitytė-Virbašienė, 2003). The approach towards landscape characterization by Ode *et al*. (2008) can be attributed to this category as well, and it is analyzed in greater detail in Section 3.3.

In order to solve the questions of planning and management of rurban areas properly and to consider the subjective and objective aspect considering preferences towards these landscapes and their features, the most suitable approach would be to integrate the aspects of the above mentioned approaches and to design or adapt to rurban landscapes *complex* or *integrated methods* which are more advanced and precise, and also consider the subjective and objective aspect of landscape evaluation (Arthur, Daniel and Boster, 1977; Daniel, Vining, 1983; Review of..., 1997; Zaleskienė *et al*., 2013).

3.1.3. Challenges of aesthetic assessment

Bearing in mind the general features of rurban areas and the methods of aesthetic landscape analysis discussed above, it is possible to distinguish the main challenges in the aesthetic analysis of rural-urban interface areas. *Table 3.2* demonstrates the general challenges of landscape aesthetics in addition to particular landscape aesthetics challenges concerning landscapes in the areas of the rural-urban interface.

Some challenges of aesthetic assessment of rurban landscapes are discussed below in greater detail:

1. Challenges of defining new landscapes and their aesthetics. In the areas of the rural-urban interface, new types of landscapes emerge; this raises the challenges of new definitions and understanding of novel aesthetic trends which may arise in the process of the rural-urban interface. Application of the methods based on the expert/design approach and perception-based methods and their combinations may be difficult because landscape experts and the society may not be aware of the peculiarities of rurban landscapes. According to Antrop (2000), perception determines the valuation in an important manner. Difficulties may arise in grasping the aesthetics of new landscapes, in fitting these new landscapes into predefined concepts, or in relating them to these concepts. Rurban landscapes can be viewed as totally aesthetically unacceptable by the society and by some experts regarding the conflicting rural and urban features resulting in dissonance. Such concerns certainly would not be without foundation as visual disorder in the zones of the rural-urban interface may have an adverse effect on the image of entire regions and countries. However, a possibility cannot be rejected that these areas may bring new aesthetic contribution to the human habitat.

2. The diversity of landscape types, and the complexity and fragmentation of landscapes in the rural-urban interface zones may cause difficulties of formulating and expressing the general impression. Many sub-zones and sub-types or rurban landscapes can be distinguished. Distinguishing, understanding and describing these new landscape types in aesthetic terms and their further classification requires comprehensive expertise.

Table 3.2. Some challenges related to landscape aesthetics. Table by the author

General	**Specific to rurban landscapes**
- Landscape aesthetics as component of quality of life (psychological, emotional, spiritual meaning); - Aesthetics as one of landscape sustainability dimensions; - Importance of landscape aesthetics as economic category - Insufficient interest in landscape aesthetics in recent decades; - Turn from qualitative to quantitative in landscape research; - Predominant rationalistic, economic, productive interests in landscape formation; - Predominance of ecological thought in landscape research; - Problems of reconciling ecology and aesthetics, aesthetics and ethics in landscape research; - Challenges of integrating subjective assessment and objective landscape characteristics in landscape aesthetics.	- Rapid changes and instability of rurban landscape, lack of stable aesthetic categories; - Lack of stable and positive image and distinctive aesthetics of rurban landscapes; - Lack of historical identity of rurban areas; - Difficulties of 'reading' complex rurban landscapes; - Problems of visual chaos and uniformity of rurban landscapes; - Aesthetic fragmentation in rurban landscapes; - Rurban landscapes are not viewed as an aesthetic resource; - Challenge of new rurban aesthetics; - Strong contradictions and conflicts between the aesthetics and ecology in rurban landscapes; - Contradictions and conflicts between rural and urban aesthetics in rurban landscapes; - Contradictions and conflicts between local visual character and global suburban aesthetics in rurban landscapes; - Lack of experience of rurban landscape aesthetic assessment and systematic formation.

3. Challenges of landscapes aesthetics assessment caused by the mutability and dynamics of landscapes in rural-urban interface zones. The rapidly developing rurban landscapes not only lack stable, historically formed identities and images in the consciousness of the society. Rurban areas clearly exhibit rapid continuous restructuring of space driven by the social processes, markets, and institutional policies. Thus it is even difficult to grasp stable aesthetic categories of rurban areas. It is even possible to speak about the aesthetics of change. The processes of changes are multidirectional: decay of heritage buildings, renaturalization of abandoned agricultural lots, development of industrial agriculture, construction of new buildings and infrastructure due to urbanization pressures, etc. The aesthetic valuation must be aimed not only at evaluating the present state, but also at identifying the trends of changes and their possible outcomes.

4. Difficulties of defining the aesthetics of contested areas. Rurban landscapes may be viewed by the society and by some experts solely as the area which will be completely urbanized in the future, as the land reserve for urban expansion or solely as the manifestation of negative processes making threats to the cultural and natural heritage and agricultural land. In this case, difficulties may be mostly related to the so-called direct esthetic assessment methods involving the society. The remnant rural dimension can be perceived with difficulties by the new urban or suburban population; meanwhile, the landscape changes driven by urbanization can be perceived with hostility by the population of rural areas subjected to urban pressures.

5. Challenges of harmony of ecology and aesthetics in rurban areas. Landscape aesthetics and ecology are equally important in the rurban landscape development. However, the interconnection between the aesthetics and ecology in these areas is ambiguous and cannot be easily defined. This issue, deserving a separate consideration and briefly touched in Section 1.3, will be further discussed in Subsection 3.2.4.

3.1.4. Problems of ecoaesthetics

Aesthetics and ecology are strongly interlined in landscapes and should not be dealt with separately. Interdisciplinary attempts to analyze the links between/among ecology, aesthetics, and even artistic creation engendered the discipline of ecoaesthetics (Araeen, 2009).

At the first glance, the ecological and aesthetic states of rurban landscapes directly correlate. The most important aspects or rurban areas are: the built-up landscape (including urban fabric contour, suburban settlements, and road network) and the open landscape (including suburban natural areas, green recreational and agricultural areas) (Laukaitytė-Malžinskienė, 2005). Urban pressures and the expansion of the urban fabric (the built-up landscape) into the rural hinterland mean the increasing intensity and density of the human physical impact. As a result of this impact, usually, non-attractive, uniform, dissonant landscapes which become a stereotype of rurban landscape emerge (Antrop, 2000; Walmsley, 1995; Neniškis, 2009; Bardauskienė, Pakalnis, 2012). In such a case, both ecological and aesthetic aspects of natural and rural landscapes affected by urbanization are in decline. A ‘vice versa’ phenomenon is also observed: for example, maintaining valuable plants

would have high aesthetical potential, not only ecological one (Jankevica, 2012) for rurban areas, etc. Many practical examples of direct links between ecology and aesthetics can be seen in the Lithuanian landscape. For example, when analyzing the aesthetic potential of the Lithuanian landscape, Kavaliauskas (2011) indicates that agricultural plains which constitute more than a half (51.3 percent) of the country's landscape and constitute an important part of rurban areas were acknowledged by Lithuanian landscape researchers Budriūnas and Ėringis as having the lowest aesthetic value.

The harmony between the high aesthetic quality of environment and its ecological health is desirable for cultural landscapes. Nevertheless, the ecological health is not always associated with the high aesthetic quality: ecologically healthy landscapes may not be aesthetically pleasing, and vice versa (Kučinskienė, 2009). The close interrelations in landscapes between the anthropogenic elements, such as architecture and the urban structure (the built-up landscape), which require constant maintenance, and the natural elements (the open landscape) which flourish undisturbed by human activities create ecoaesthetic complexities. In the areas of the rural-urban interface, links between aesthetics and ecology become even more complicated: these landscapes are affected by such contradictory trends as new development and renaturalization *(Fig. 3.1)* and the advent of urban aesthetics.

Some common ecological-aesthetic congruencies and contradictions in the rurban areas are described below:

Renaturalization. As the nature reclaims the abandoned agricultural land, thus ecological viability and diversity increase. Natural ecosystems in the urbanized, densely inhabited environment though are desirable from the point of view of environmental sustainability (Jorgensen, 2011), however, according to the opinion of some researchers (Nassauer, 1995), they create the sense of abandonment and unsafety. According to Nassauer (1995), many natural ecosystems do not correspond to the aesthetic norms prevalent in the society. In the case of agricultural landscapes at the urban fringe, this abandonment often happens on the large scale *(Fig. 3.1)*. Derelict farm buildings also contribute to the negative image of these areas in the vicinity of the city. However, as the contemporary research on the links of ecology and aesthetics demonstrates, these abandoned succession landscapes at the urban fringe or even in the inner urban areas may have a specific aesthetic value, and sometimes may even be desirable elements of environment, sites of discovery and experimentation (Nohl, 2001; Gandy, 2013).

Intensive cultivation. Intensively cultivated productive agricultural landscapes are denoted by certain aesthetics (Nohl, 2001), although land cultivation and especially monoculture in the rurban areas cause ecological decline and contrasts of the features of urban, suburban and agricultural aesthetics in the areas of rural-urban interface *(Fig. 3.2)*.

Fig. 3.1. Renaturalization and abandonment at the fringe of Kaunas City. Photograph by Indrė Gražulevičiūtė-Vileniškė

Fig. 3.2. Contemporary large-scale agricultural practices in the agricultural landscape of the Soviet period at the fringe of Kaunas City. Photograph by Indrė Gražulevičiūtė-Vileniškė

Aesthetic fragmentation and diversity. Due to the economic pressures and intensive development, the features of natural and agricultural landscape are being increasingly erased in the areas where the urban influence is mostly felt *(Fig. 3.3)*. The large regular open areas in rural landscapes provide possibilities for unrestrained development of residential, commercial, logistical structures and the necessary relevant infrastructure. The intensive development of rurban areas suggests ecological decline; simultaneously, with the lack of coordination of the development process, dissonant, fragmented landscapes having both rural and urban features that became a stereotype of the suburban landscape are emerging. Here, many processes happen in close proximity and create aesthetic confusion.

Fig. 3.3. Urbanization in the former rural landscape at the fringe of Kaunas City. Engineering equipment like a boundary separates the living area from the natural environment thus creating aesthetic fragmentation of the landscape. Photograph by Indrė Gražulevičiūtė-Vileniškė

3.2. Methodology for ecoaesthetic assessment of rural-urban interface landscapes

Antrop (2008) in his landscape research priorities for the future indicates that "landscape is a basic theme in the strategic environmental and policy assessment. There is no such thing as a non-landscape, so all landscapes should be considered in all policy domains," and *rurban landscapes are not an exception*. He also underlines the need to encourage practical applications for policy making of scientific landscape research, the need for efficient monitoring of landscape changes, the need to focus more on forecast and possible scenarios, and the need to develop and test indicators of landscape change.

Another important theme in landscape, and rurban landscape in particular, research is the above-discussed landscape aesthetics and its changes. Even if landscape researchers agree that landscape aesthetics and scenery evaluation should be an essential part of any comprehensive understanding of landscape (Ewald, 2001) and optimistically suggest that contemporary landscape aesthetics is becoming increasingly interdisciplinary with contributions from arts, philosophy, and social sciences (Jorgensen, 2011), however, analysis of landscape research trends shows that 'aesthetic' is often replaced by 'visual', and 'place' is replaced by 'picture'. An example of such an approach is landscape aesthetics research using photographs and other visual media to represent real world environments that started in the 1960s (Jorgensen, 2011). However, given the importance of the informational content for aesthetic perception (Nohl, 2001), the need to expand the vision of landscape from a 'picture' to a 'place' (Jacobs, 2011) with its past and present is evident.

All the above mentioned landscape research challenges are relevant in monitoring and assessing the aesthetic transformations of rurban landscapes and directing them towards a more sustainable way – developing and maintaining a specific landscape character (a distinct, recognizable and consistent pattern of

elements in the landscape that makes one landscape different from another, rather than better or worse (Swanwick, 2002), regulating the landscape's visual quality (Kamičaitytė-Virbašienė, 2003), or modeling and developing a specific aesthetic image of specific rurban area).

As it was mentioned above in the review of landscape valuation methods, different sets of criteria for aesthetic analysis of landscape exist. Tveit *et al*. (2006) and Ode *et al*. (2008) performed a comprehensive analysis of different landscape characterization systems and theoretical considerations underlying them and distinguished nine concepts – *coherence, complexity, disturbance, stewardship, imageability, visual scale, naturalness, historicity, and ephemera* – as well as indicators related to each one of them and determined their characterization possibilities *(Table 3.2)*. It can be noted that this methodology responds to the basic challenges and needs of rurban landscape aesthetic assessment and the assessment of rurban landscape changes and is thus suitable for its assessment:

- the methodology is flexible, and different sets of indicators can be selected for different landscapes depending on their characteristics; new indicators can be incorporated as well. Consequently, it allows evaluating natural, historic, contemporary man-made structures in landscapes relevant to heterogeneous rurban landscapes.

- it allows using different sources of information (landscape photos, orthophotos, land cover data, and field observations) and avoiding the replacement of 'place' with 'picture' and 'aesthetic' with 'visual' *(Table 3.3)*;

- it allows integrating general preferences and abstract judgments (for example, whether a landscape is natural or coherent, or not) with concrete quantitative and qualitative features of landscape aesthetic resources – objective indicators (Kamičaitytė-Virbašienė, 2003): to integrate the *subjective* and the *objective* in landscape valuation *(Table 3.3)*;

- it links landscape aesthetics theories with the landscape assessment methodology which can be successfully applied in practice (for example, the concept of complexity derives from theories of Information processing and Biophilia, both underlining landscape diversity) *(Table 3.4)*;

- it provides the possibility of involvement of experts and the general society in landscape assessment: landscape preferences expressed by the public and experts – i.e., the general impression – can be compared with expert assessment while using this methodology. According to Ode *et al*. (2008), "landscape indicators provide possibilities for a more objective basis for identifying landscape character through dividing the totality of our visual perception of the physical landscape into quantifiable characteristics." A good example of such an attempt is the research by Burgess *et al*. (2009) where the authors linked landscape preferences expressed by respondents with the qualitative and quantitative features of landscapes under valuation by using the concepts of complexity, coherence, legibility and mystery as developed by Kaplan and Kaplan (1989).

- the methodology is suitable for the assessment of landscape changes, landscape monitoring, making prognosis and modeling of landscape development

(for example, assessing different landscape development scenarios) that are important for dynamic rurban landscapes;

- it integrates historical dimension (historicity) and non-tangible, associative aspects (historicity, imageability), especially relevant for rurban landscapes with the relicts of historic rural landscapes;

- it is compatible with other landscape aesthetic/visual and even ecoaesthetic assessment methodologies including the integrated approach by Jankevica (2012) where the following criteria for aesthetic-ecological assessment of landscapes were distinguished: order (regularity), quality of man-made elements, visible human intention, particularity, use of outlandish species, use of natural forms, accordance of landscape and architecture, biodiversity, accordance (of the ecological situation) with the landscape type, native species, natural elements, carelessness, wildlife, and unaffected natural processes.

Table 3.3. Some indicators of coherence of landscape, and possibility to determine them by using different data sources (Ode *et al*., 2008)

Concept	**Data source**			
Coherence - enhances people's ability to orient themselves, both in time and space, which is dependent on the readability of the landscape	***Landscape photos*** 	***Orthophotos*** 	***Land cover data*** 	***Field observations*** 
1. Spatial arrangement of water				
Presence of water	% of water cover *Percent*	% of water cover *Percent*	% of water cover *Percent*	Proportion of water cover *(1-4) (1- absent; 2 - moderate; 3 - average; 4 - high)*
Correspondence of land form and water location	% of area in correspondence *Percent*	% of area in correspondence *Percent*	% of area in correspondence *Percent*	Proportion of area in correspondence *(1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)*
2. Spatial arrangement of vegetation				
Correspondence with natural conditions	% of area in correspondence *Percent*	% of area in correspondence *Percent*	% of area in correspondence *Percent*	Proportion of area in correspondence *(1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)*

Continuation of Table 3.3

Fragmentation		Fragmentation indices (FRAGSTAT) *Absolute value*	Fragmentation indices (FRAGSTAT) *Absolute value*	
Repetition of pattern across the landscape	Presence of repeated patterns *(1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)*	Autocorrelation indices (GIS) *Absolute value*	Autocorrelation indices (GIS) *Absolute value*	Presence of repeated patterns *(1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)*

- The methodology is compatible with the local landscape assessment tradition. Lithuania has a long-lasting tradition of aesthetic landscape assessment and development of methodologies dating back to 1966 (Kamičaitytė-Virbašienė, 2003). It is possible to make a presumption that Lithuanian methodologies correspond to the peculiarities of the country's landscape and could be adapted for the assessment of rurban landscapes as well. In order to test this presumption and the compatibility of the approach by Tveit *et al*. (2006) and Ode *et al*. (2008) with other methodologies, Lithuanian landscape aesthetic assessment approaches were reviewed, and also the comprehensive review by Kamičaitytė-Virbašienė (2003) was used ***(see Appendix 1)***. This analysis demonstrated that the majority of criteria used in the Lithuanian landscape aesthetic assessment methodologies directly or partially correspond to the concepts of the comprehensive methodology of landscape characterization by Tveit *et al*. (2006) and Ode *et al*. (2008) *(Table 3.4)*. Moreover, Lithuanian landscape aesthetic assessment methodologies mainly focus on natural (Budriūnas, Ėringis, 2000) and rural (Bučas, 1980; 1983) landscapes, especially valuable picturesque landscapes suitable for recreation (Stauskas, 1966; Daniulaitis, 1980). This analysis demonstrates that the majority of the criteria used in the Lithuanian landscape aesthetic assessment methodologies correspond to the concepts of complexity, coherence, imageability, and naturalness from Tveit *et al*. (2006) and Ode *et al*. (2008) developed methodology. This is important, although insufficient for rurban landscape assessment – in which, the urban dimension is equally important. Here, the concepts, such as disturbance, stewardship, and historicity, are no less relevant. The concept of ephemera (meaning *seasonal change*) is of high relevance to Lithuanian landscapes in general. Some approaches used in the Lithuanian landscape aesthetic assessment methodologies can be successfully integrated into the methodology by Tveit *et al*. (2006) and Ode *et al*. (2008). For example, distinction of the visual spaces as used in Kavaliauskas (1975) and Purvinas (1983) can be applied while determining the visual scale; the assessment of the visual character and compositional aspects of the spatial structure of the rural landscape by Bučas (1980; 1983) can be used in determining the coherence, imageability and historicity of rurban landscapes.

Considering the aspects of the approach of Tveit *et al*. (2006) and Ode *et al*. (2008) and its suitability for aesthetic rurban landscape valuation and the importance of ecology-aesthetic links in the areas of rural-urban interface, the methodology for rurban landscape ecoaesthetic assessment was developed based on the approaches of

Tveit *et al*. (2006), Ode *et al*. (2008) and Jankevica (2012) *(Table 3.5)*. The methodology includes the aesthetic and ecological sections consisting of concepts, their indicators and their quantitative characterization. The more detailed development and content of the methodology are presented in ***Appendix 2*** including:

- concepts and indicators for landscape visual character analysis summarized from Tveit *et al*. (2006) and Ode *et al*. (2008) with introduced additional indicators relevant for rurban landscapes;
- preliminary and detailed characterization of indicators for landscape visual character analysis by Tveit *et al*. (2006) and Ode *et al*. (2008) demonstrating the possibility to use different data sources;
- ecoaesthetic landscape assessment methodology by Jankevica (2012) and feasibility of its application to rurban landscapes;
- ecological indicators for landscape analysis by Jankevica (2012) and their preliminary characterization developed in the framework of this research.

Table 3.4. Correspondence of landscape assessment methodologies and landscape aesthetics theories. Data from Kamičaitytė-Virbašienė (2003), Tveit *et al*. (2006) and Ode *et al*. (2008). Compiled by the author

Landscape aesthetics theory	**Methodology by Ode *et al*. (2008) and Tveit *et al*. (2006)**		**Lithuanian landscape aesthetic assessment methodologies**
	Concept	*Short description*	*Corresponding criteria*
Biophilia, Information processing theory	*Complexity*	Diversity, variation, richness, complexity of patterns and shapes, spatial pattern / combination	**expressiveness** of relief, spatial **diversity** of vegetation, **diversity** of man-made objects (Ėringis and Budriūnas), **diversity** (Purvinas), relief height, **diversity**, colorfulness, importance of man-made elements (Stauskas), **expressiveness** of structure, character of built-up areas (Kavaliauskas), **diversity** (Daniulaitis), **diversity** (Palys), **diversity** of visual spaces (Šešelgis), ***complexity***, hierarchy (Bučas), **diversity**, ***complexity***, **expressiveness** (Kamičaitytė-Virbašienė)
Information processing theory	*Coherence*	Correspondence with the ideal situation, harmony, unity, holistic, land-use suitability, balance and proportion, intactness	presence of **water** bodies, suitability for recreation, appropriateness of man-made objects (Ėringis and Budriūnas), general psychological-aesthetic potential (Purvinas) , size and character of **water** bodies, links between relief, **water** bodies and vegetation, general impression (Stauskas), compositional **harmony**, **water** bodies (Kavaliauskas), purposefulness, compositional **harmony** (Daniulaitis), clarity, technological optimality (Palys), optimal location of

			visual landmarks and accents and their exposition in landscapes, compositional **harmony** of buildings and natural components (Šešelgis), proportion, hierarchy, integrity of compositional structure (Bučas), **harmony**, functionality (Kamičaitytė-Virbašienė)
Biophilia	*Disturbance*	Intrusion, alteration, impact, lack of contextual fit, lack of coherence	minimization of landscape visual pollution (Šešelgis)
Aesthetics of care	*Stewardship*	Sense of order, sense of care, upkeep	purposefulness (Daniulaitis), technological optimality (Palys), functionality (Kamičaitytė-Virbašienė)
Spirit of place / *genius loci*, Vividness, Topophilia	*Imageability*	Sense of place, *genius loci*, place identity, uniqueness, distinctivenes, vividness	suitability for recreation (Ėringis and Budriūnas), general psychological-aesthetic potential (Purvinas), general impression, **uniqueness**, associative elements (Stauskas), **individuality** of structure, **meaningfulness** of expression (Kavaliauskas), **uniqueness** (Daniulaitis), **individuality**, cultural-historic significance (Palys), regional identity (Šešelgis), expressiveness, **uniqueness**, **meaningfulness** (Kamičaitytė-Virbašienė)
Prospect-refuge theory, Information processing theory	*Visual scale*	Landscape room, visibility, openness, enclosure, spaciousnes, grain size	type of landscape **spatial structure** (Purvinas), character and **spatial structure** of vegetation and land surface, **spatial structure** of man-made elements, visibility (Stauskas), orographic subdivision (Kavaliauskas), compactness (Bučas)
Restorative landscapes, Biophilia, Ecological aesthetics	*Naturalness*	Intactness, wilderness, natural, ecologically robust, vegetation health	presence of forests (Ėringis and Budriūnas), ***naturalness*** (Purvinas), **viability** of environment, degree of culturization, type of vegetation (Kavaliauskas), landscape health (Daniulaitis), ***naturalness***, natural diversity (Palys), protection of picturesque natural landscape (Šešelgis), **viability** (Kamičaitytė-Virbašienė)
Topophilia, Landscape heritage / historic landscapes	*Historicity*	Historical continuity, historical richness	associative elements (Stauskas), character of built-up areas (Kavaliauskas), cultural-historic significance (Palys), **meaningfulness** of expression (Kavaliauskas),

			meaningfulness (Kamičaitytė-Virbašienė)
Restorative landscapes	*Ephemera*	Seasonal change (human imposed and natural), weather changes	colorfulness (Stauskas)

Table 3.5. Ecoaesthetic valuation methodology for rurban landscapes based on Tveit *et al*. (2006), Ode *et al*. (2008) and Jankevica (2012). Compiled by the author

Concept and indicators		**Characterization***
Visual character, aesthetics	Complexity	
	Distribution of landscape attributes	- Richness of landscape elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Diversity of land cover (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Spatial organization of landscape attributes	- Edge density (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Heterogeneity (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Aggregation of land cover/patches (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Variation and contrast between landscape elements	- Contrast (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Shape variation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Size variation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Coherence	
	Spatial arrangement of vegetation	- Correspondence with natural conditions (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Fragmentation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Repetition of pattern across the landscape (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Spatial arrangement of buildings and structures	- Correspondence of building arrangement with natural conditions (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Correspondence of building arrangement with landscape type (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Correspondence of area with a particular landscape type	- Correspondence of area with particular landscape type (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Disturbance	
	Presence of disturbing / disturbed elements	- Presence of landscape elements classified as disturbing (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
	Visual impact of disturbing elements	- Area visually affected by disturbance (1-4) (1-absent; 2-moderate; 3-average; 4-large)
	Stewardship	
	Level of management for vegetation	- Level of abandonment (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		- Presence of weed (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		- Management type (1-4) (1 - no maintenance; 2 - poorly maintained; 3 - partly maintained; 4 - highly maintained)
		-Management frequency (1-4) (1 - no management; 2 - random; 3 - satisfactory; 4 - systematic)
	Status and conditions of man-made structures in the landscape	- Condition / maintenance of structures such as fences, buildings (1-4) (1 - no maintenance; 2 - poorly maintained; 3 - partly maintained; 4 - highly maintained)
	Imageability	
	Spectacular, unique and iconic elements	- Density of spectacular, unique or iconic built features (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		- Density of landmarks (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		- Proportion of water (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		- Density of historical elements (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)

Continuation of Table 3.5

	Viewpoints	- Density of viewpoints (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Visual scale	
	Open area	- Proportion of open land (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		- Viewshed size (1-4) (1 - small; 2 - moderate; 3 - average; 4 - large)
		- Viewshed shape (1-3) (1 - patchy open area; 2 - split open area; 3 - large open area)
		- Depth / breadth of view (1-3) (1 - short; 2 - medium; 3 - long)
	Obstruction of the view	- Density of obstructing elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Degree of visual penetration of vegetation (1-4) (1 - blocked; 2 - dense; 3 - semi-open; 4 - open)
	Naturalness	
	Naturalness of vegetation	- Proportion of natural vegetation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Level of succession (the observed process of change in the species structure of an ecological community over time) (1-4) (1 - no succession; 2 - primary succession; 3 - intermediate succession; 4 - climax)
		- Shape of edges (1-3) (1 - geometrical; 2 - intermediate; 3 - complex)
	Pattern in the landscape, as perceived as natural or not	- Landscape visual fragmentation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Water bodies with natural appearance	- Proportion of water in landscape (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
	Historicity	
	Vegetation with continuity	- Proportion of landscape with continuity of land cover (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Proportion of landscape with traditional land use (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
	Organization of landscape attributes	- Traditional field shapes (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		-Traditional spatial arrangement of vegetation (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
	Landscape elements	- Density of cultural elements (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		- Cultural significance of landscape elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Presence of time layers (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Presence of traditional linear shapes (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
	Ephemera	
	Season-bound activities	- Presence of animals (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
		- Presence of cyclical farming activities (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
	Landscape attributes with seasonal change	- Seasonal variation in natural vegetation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
		- Seasonal variation on agricultural land (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Landscape attributes with weather characteristics	- Presence in landscape of water or other expressive attributes with weather characteristics (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)
Ecology	Biodiversity (*rich biodiversity characteristic for geographic area under analysis, vegetation health*)	(1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
	Accordance with landscape type (*ecological situation corresponds to the particular landscape type*)	(1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)

Continuation of Table 3.5

Predominance of native species (*ecosystems dominated by native species*)	(1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
Predominance of natural elements (*unaltered and undisturbed natural elements prevail*)	(1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
Carelessness (*landscapes in succession*)	(1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)
Presence of unaffected nature processes (*wilderness, natural landscape development without significant human intervention prevails*)	(1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)

* The four-point scale is used for the ecoaesthetic characterization of the determined parameters in Table 3.5 above: 1 point is usually given when the feature is completely absent; 2 points are given when the feature is partially visible; 3 points are issued when the feature is clearly visible; 4 points are assigned when the feature is particularly prominent.

For example, for the concept *Complexity*, different forms of visual elements that coexist in the same environment are important, therefore, high scores should be given if these differences are considered to be excessive; for the concept *Coherence*, visual elements create in such a way as to form the whole bit are best suited for high scores; for the concept *Imageability*, it is preferable to give a high score when such features as place identity or uniqueness are involved. For the concept *Stewardship*, if it is thought that the elements that make up the visual order are well-maintained, then, it should be given a high score; for the concept *Naturalness*, the higher scores are given if there are more natural scenery features visible (Keles, Atik and Bayrak (2018)).

Table 3.6 demonstrates the possibility to apply this methodology for the assessment of Lithuanian rurban landscapes by using the case of rurban landscapes with the relicts of the Soviet rural landscape (the *kolūkinis* (Kolkhoz) historic rural landscape type). The application considers three directions of change of rural landscapes under the influence of urbanization – 1) renaturalization of abandoned agricultural land, decline of buildings; 2) intensive processes of urbanization where features of agricultural landscape are gradually erased, agricultural complexes of the Soviet period are adapted to new functions, demolished or left to decline; 3) intensive agricultural use of land, reconstruction of buildings and the use for agricultural purposes – and presents their characterization and the assessment of quality change.

The results are presented in Table 3.6 which contains the obtained assessment of the generalized features of landscapes existing in the zones of influence of the largest Lithuanian cities (Vilnius, Kaunas and Klaipėda). The present situation of the selected type of landscapes – rural urban interface areas with the relicts of the Soviet rural landscape – undergoing various development trends was evaluated in the scale from 1 to 4 based on the methodology presented in the present dissertation. It can be

noted that, if compared with the situation of the Soviet period, the *Complexity* of landscapes undergoing the processes of renaturalization decreased except for the aggregation of land cover/patches. Meanwhile, in the landscapes undergoing intensive urbanization, the complexity is generally increasing if compared to the Soviet era situation. No significant changes in the areas where the agricultural function is continued were observed.

Table 3.6. Main directions of change of the relicts of the Soviet rural landscape in the areas of rural-urban interface and their assessment by using the methodology based on the approaches by Tveit *et al*. (2006), Ode *et al*. (2008) and Jankevica (2012)

Approach	**Concept and indicators**	**Preliminary characterization**	**Main directions of change of the relicts of the Soviet rural landscape in the areas of rural-urban interface**					
			Renaturalization		**Urbanization**		**Agricultural use**	
			Renaturalization of abandoned agricultural land, decline of buildings		Intensive processes of urbanization, features of agricultural landscape are gradually erased, agricultural complexes of the Soviet period are adapted to new functions, demolished or left to decline		Intensive agricultural use of land, reconstruction of buildings and use for agricultural purposes	
			Present	Change	Present	Change	Present	Change
Visual character, aesthetics	Complexity							
	Distribution of landscape attributes	- Richness of landscape elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	3	↑	2	-
		- Diversity of land cover (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2	↓	2	↓	3	-
	Spatial organization of landscape attributes	- Edge density (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	3	↑	2	-
		- Heterogeneity (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	3-4	↑	2	-
		- Aggregation of land cover/patches (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3	↑	1-2	↓	2	-

Continuation of Table 3.5

Variation and contrast between landscape elements	- Contrast (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	2-3	↑	2	-
	- Shape variation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	4	↑	3	-
	- Size variation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	4	↑	2	-
Coherence							
Spatial arrangement of vegetation	- Correspondence with natural conditions (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3	↑	1-2	↓	2-3	-
	- Fragmentation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	3-4	↑	2	-
	- Repetition of pattern across the landscape (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2	↓	2	↓	3	-
Spatial arrangement of buildings and structures	- Correspondence of building arrangement with natural conditions (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	-	-	1	↓	2	-
	- Correspondence of building arrangement with landscape type (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	-	-	2	↓	3	-
Correspondence of area with particular landscape type	- Correspondence of area with particular landscape type (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2	↑	1-2	↓	3-4	-
Disturbance							

Continuation of Table 3.6

Presence of disturbing / disturbed elements	- Presence of landscape elements classified as disturbing (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	3-4	↑	3-4	↑	3	-
Visual impact of disturbing elements	- Area visually affected by disturbance (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - large)	3-4	↑	3-4	↑	3	-
Stewardship							
Level of management for vegetation	- Level of abandonment (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	4	↑	2	↑	1	-
	- Presence of weed (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	4	↑	1-2	↑	1	-
	- Management type (1-4) (1 - no maintenance; 2 - poorly maintained; 3 - partly maintained; 4 - highly maintained)	1	↓	3	↓	4	-
	- Management frequency (1-4)(1 - no management; 2 - random; 3 - satisfactory; 4 - systematic)	1	↓	2-3	↓	3-4	-
Status and conditions of man-made structures in the landscape	- Condition / maintenance of structures such as fences, buildings (1-4) (1 - no maintenance; 2 - poorly maintained; 3 - partly maintained; 4 - highly maintained)	1	↓	2-3	↓	4	-
Imageability							
Spectacular, unique and iconic elements	- Density of spectacular, unique or iconic built features (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	↓	3	↑	2	-
	- Density of landmarks (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	↓	2-3	↑	2	-

Continuation of Table 3.6

		- Proportion of water (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	-	-	-	-	-	-
		- Density of historical elements (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	↓	1	↓	1-2	-
	Viewpoints	- Density of viewpoints (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	2-3	↑	1-2	-
	Visual scale							
	Open area	- Proportion of open land (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	3-4	↓	2	↓	4	-
		- Viewshed size (1-4) (1 - small; 2 - moderate; 3 - average; 4 - large)	3-4	↓	2	↓	4	-
		- Viewshed shape (1-3) (1 - patchy open area; 2 - split open area; 3 - large open area)	3	↓	2	↓	3	-
		- Depth / breadth of view (1-3) (1 - short; 2 - medium; 3 - long)	2	↓	1-2	↓	3	-
	Obstruction of the view	- Density of obstructing elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2	↓	3-4	↑	1-2	-
		- Degree of visual penetration of vegetation (1-4) (1 - blocked; 2 - dense; 3 - semi-open; 4 - open)	2	↓	3	↓	4	-
	Naturalness							
	Naturalness of vegetation	- Proportion of natural vegetation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	4	↑	2-3	↑	2	-

Continuation of Table 3.6

		- Level of succession (the observed process of change in the species structure of an ecological community over time) (1-4) (1 - no succession; 2 - primary succession; 3 - intermediate succession; 4 - climax)	3-4	↑	2	↑	1	-
		- Shape of edges (1-3) (1 - geometrical; 2 - intermediate; 3 - complex)	2-3	↑	2	↑	1	-
	Pattern in the landscape, as perceived as natural or not	- Landscape visual fragmentation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3	↑	3-4	↑	2	-
	Water bodies with natural appearance	- Proportion of water in landscape (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	-	-	-	-	-	-
	Historicity							
	Vegetation with continuity	- Proportion of landscape with continuity of land cover (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	1	↓	3-4	-
		- Proportion of landscape with traditional land use (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	↓	1	↓	3-4	-
	Organization of landscape attributes	- Traditional field shapes (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	-	1	-	1	-
		-Traditional spatial arrangement of vegetation (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	↓	1	↓	1-2	-

Continuation of Table 3.6

Landscape elements	- Density of cultural elements (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1-2	↓	2-3	↑	2	-
	- Cultural significance of landscape elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	↓	1-3	-	2	-
	- Presence of time layers (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2	↓	2	↓	2-3	-
	- Presence of traditional linear shapes (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1-2	↓	1	↓	1-2	-
Ephemera							
Season-bound activities	- Presence of animals (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	↓	1	↓	3	↓
	- Presence of cyclical farming activities (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	↓	1-2	↓	4	-
Landscape attributes with seasonal change	- Seasonal variation in natural vegetation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3	↑	2-3	↑	2	-
	- Seasonal variation on agricultural land (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	1-2	↓	4	-
Landscape attributes with weather characteristics	- Presence in landscape of water or other expressive attributes with weather characteristics (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	3	↑	1-2	-	1-2	-

Continuation of Table 3.6

Ecology	Biodiversity (*rich biodiversity characteristic for geographic area under analysis, vegetation health*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3-4	↑	1	↓	1-2	-
	Accordance with landscape type (*ecological situation corresponds to particular landscape type*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	↓	1	↓	3-4	-
	Predominance of native species (*ecosystems dominated by native species*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3-4	↑	1	↓	1-2	-
	Predominance of natural elements (*unaltered and undisturbed natural elements prevail*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2-3	↑	1	↓	1-2	-
	Carelessness (*landscapes in succession*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	4	↑	1-2	↑	1	-
	Presence of unaffected nature processes (*wilderness, natural landscape development without significant human intervention prevails*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3	↑	1-2	↑	1	-
↑ - increase compared to the Soviet period ↓ - decline compared to the Soviet period - no significant changes in quality, difficult to determine changes							

The assessment of *Coherence* of the landscapes undergoing renaturalization processes shows the intensification of expression of these characteristics: correspondence with the natural conditions, correspondence of an area with a particular landscape type, the presence of landscape elements classified as disturbing, and determination of the visual impact of disturbing elements. Meanwhile, the areas undergoing urbanization processes also undergo an increase in fragmentation, yet the presence of disturbing/disturbed elements and the visual impact of disturbing elements, and the expression of other indicators in these landscapes is declining. Changes in the quality of the areas of agricultural use were either insignificant or difficult to determine.

The presence of disturbing/disturbed elements and the visual impact of disturbing elements characteristic to the concept of *Disturbance* increased in the landscapes undergoing renaturalization and urbanization directions and were assessed as ‘high’ (from 3 to 4 points). Changes in the quality of areas of agricultural use were not significant or were difficult to determine.

The level of abandonment and the presence of weed (concept *Stewardship*) also increased in the landscapes undergoing renaturalization and urbanization directions; at the same time, we are observing the decline of the management type,

management frequency and status and conditions of man-made structures in these landscapes.

In the assessment of the landscapes of the renaturalization trend of the concept *Imageability*, all the indicators declined compared to the situation of the Soviet era; meanwhile, in the landscapes undergoing urbanization, all the processes increased except for the density of historical elements. Changes in the quality of landscapes of agricultural use were either insignificant or difficult to determine.

Almost all the *Visual scale* indicators declined in the landscapes undergoing the processes of urbanization and renaturalization if compared to the Soviet situation. The density of obstructing elements in the present situation was evaluated by 3 to 4 points in the landscapes under intensive urbanization.

The assessment of *Naturalness* shows that all the indicators increased in cases of change of renaturalization and urbanization directions. Vice versa, the assessment of *Historicity* shows that all the indicators declined, except the density of cultural elements meanwhile, the landscapes representing the change of renaturalization and urbanization directions are not significant or were difficult to determine. As well as cultural significance of landscape elements undergoing urbanization direction.

In the assessment of the concept *Ephemera*, season-bound activities and seasonal variation on the agricultural land were found to be in decline in the landscapes undergoing renaturalization and in urbanization landscapes while other indicators increased. It was found that the presence of animals declined in the landscape used for agricultural activities. Other changes of agricultural use were difficult to determine, or significant changes were not observed at all.

From the point of view of ecology, the assessment shows an increase in almost all the aspects (except for the indicator of accordance with the landscape type) in the landscapes undergoing renaturalization; herewith, in the landscapes under urbanization, indicators declined if compared to the Soviet period, except for carelessness and presence of unaffected nature processes which were rated 1 to 2 points.

3.3. Sociological research of assessment and management of rural-urban interface landscapes

Landscapes emerging in the areas of rural-urban interface are a particularly topical issue of spatial planning not only at the global level but are increasingly becoming more relevant in Lithuania; therefore, a survey of Lithuanian experts working in various fields of research and formation of the environment was carried out. The purpose of this investigation was to reveal the peculiarities of the case of Lithuania and to clarify the hypothetical provisions formulated during the preparation of this dissertation. A total of 301 experts were selected (scientists, municipal specialists, specialists of territorial planning and design companies), a list of their contacts was drafted. The list of specialists of territorial planning and design companies was compiled through searches in the online catalogue of Lithuanian companies. The questionnaire (*see Appendix 3*) consisted of five parts: conception and description of urban and rural interface landscapes, local features, classification,

study and evaluation, regulation and modeling, and data on respondents. The questionnaire was distributed electronically through the www.apklausa.lt online page.

The survey was conducted in 2017 from April 4 to September 24. The link to the online questionnaire was sent to the selected experts for the first time via e-mail on April 4–6, 2017, and a repeated call was sent via e-mail on April 27, 2017, however, due to the low activity of respondents, the survey was only completed in September 2017. 27 expert responses were received during the entire period of the survey. Such a number of respondents is sufficient for the pilot survey.

For the analysis of the obtained results, the statistical percentage ratio, the average, and the methods of determining the factors of importance were applied. The results and the discussion of findings are presented below.

Concept and features of rural-urban interface landscapes. The expert evaluation contained six different photographs illustrating rural-urban interface landscapes *(Fig. 3.4)* and the experts were asked to provide keywords or word combinations that would be appropriate to describe the landscapes presented in the photographs.

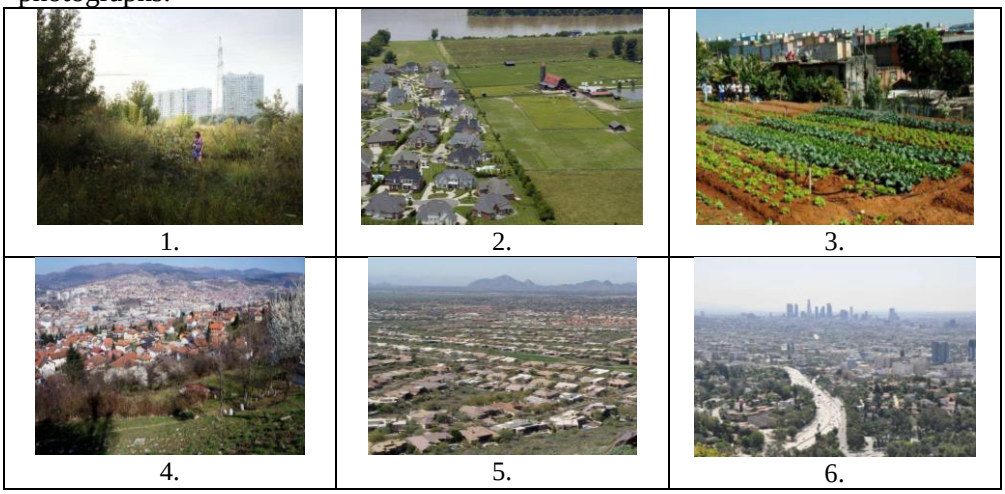


Fig. 3.4. The images of rural-urban interface presented to experts for description with keywords

The received expert responses were grouped and compared with the most important features of rural-urban interface landscapes, such as remnant, transient, contested, complex and interdependent (*Fig. 3.5*). In the cases it was not possible to classify the keywords provided by experts to any one of the landscape features, they were classified in the category ‘Other’.

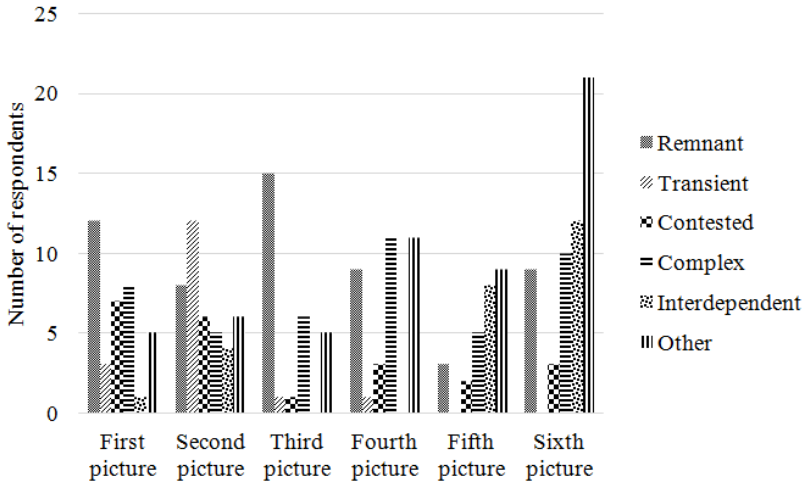


Fig. 3.5. Assessment of the most important features of urban-rural interface landscapes. Figure by the author

When analyzing the assessment of the first photo which contained a sufficiently natural landscape with apartment block buildings visible in the background, the landscape could be described as remnant, complex, and contested. By giving the keywords, the experts accentuated the natural character of the landscape, but there were also negative assessments of unhandled and abandoned green areas.

When assessing the second landscape, it could be described as remnant and transient. The emphasis is on the small-scale buildings, agrarian and natural environment, the influence of urbanization; a threat not only to the agro-landscape but also to the landscape biodiversity was identified.

The third landscape in the opinion of the majority of experts could be described as remnant. In this case, the emphasis was placed on the rural landscape or its occurrence in the urban environment. However, a small part of the respondents presented landscape descriptions which also correspond to the characteristics of complexity. This is evidenced by the provided descriptions of landscapes such as: "urbanized with rural elements landscape; cultural landscape in an urbanized area; landscape with the view of the urban and rural landscape interface; multifunctionality."

In the fourth case, the landscape was assessed in two ways: the keyword 'complexity' was dominant along with the descriptions that were attributed to the group 'other' since it was difficult to attribute them to any of the features of the landscape from the provided keywords. Also, a significant part of the expert responses was classified as the category of remnant. When presenting their keywords, the experts emphasized the urban landscape and its relation with the surrounding natural landscape.

The fifth photo contained a picture of the landscape of a hilly type with small-scale residential buildings. According to the descriptions of the landscape, it was difficult to assign this image to one of the five features of the urban-rural interface

landscape since the experts accentuated the way in which the site was built and urbanized, therefore, the answers were attributed to the group 'other'. However, a similar part of the most common responses was attributed to the characteristic of 'interdependent'. In this case, such landscape descriptions as 'urban sprawl' and 'suburban' were mostly mentioned.

In the context of the analysis of the sixth landscape, the exceptionally large part of the expert responses assessed the view as 'other', whereas they could not be attributed to any of the features of the urban-rural interface landscape. 'City', 'highway', 'urbanization' are the dominant key words among the answers provided. However, the other part of the predominant responses can be attributed even to three characteristics of the rural-urban interface landscape: interdependent, complex and remnant. In this case, the green areas of the city were accentuated.

The evaluation of all the six photos shows that it is easiest to evaluate and analyze those urban-rural interface landscapes which have a significant proportion of natural or semi-natural features. Therefore, the more the landscape is urbanized and complex, due to its complexity, the more difficult it is to identify and determine its characteristics.

What concerns the question "Which terms, in your opinion, would be most appropriate for describing landscapes in urban and rural interface zones (both in the world and in Lithuania in general)?", the respondents gave 51 responses as they were allowed to choose several answer options. The most frequently repeated terms are: *chaotic character* (21%), *dependence on the city* (20%), *sudden, emergent change* (19%), and *dynamism* (constant change) (18%) *(Fig. 3.6)*. Thus we can observe that the experts did not distinguish the landscapes of the urban-rural interface with one of the dominant terms, but chose several of them. However, 'chaotic character' was mentioned most commonly, which, as the keyword, was also mentioned in the assessment of the second and fourth photos in the analysis of the most important characteristics of the rural-urban interface landscapes.

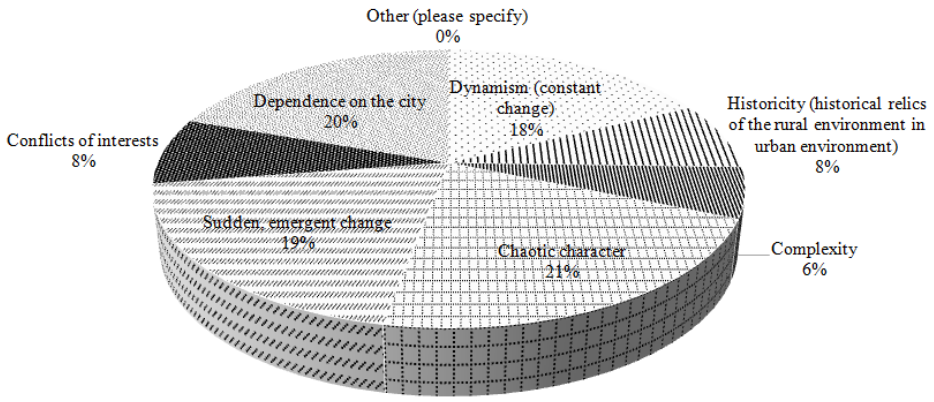


Fig. 3.6. Terms that are most appropriate for describing landscapes in urban and rural interface zones (both in the world and in Lithuania in general) according to the surveyed experts. Figure by the author

In response to the question "How would you describe landscapes emerging in urban and rural interface areas (both globally and in Lithuania)?", experts from several possible responses could choose one of their preferred choices or record their answer. There was no clearly dominant version of the reply, as experts' opinions were distributed roughly evenly. Nevertheless, 28% of the respondents indicated that the emerging landscapes of urban-rural interface zones create new quality landscapes which interact with the characteristics of rural and urban environments, while 24% of the experts pointed out that these are chaotic, constantly changing transit territories that are characteristic to the territorial development of the city. One respondent who selected the answer 'Other (record)' stated that "These are chaotically urbanized territories without infrastructure characteristic to the city." It is therefore possible to link these two responses to each other *(Fig. 3.7)*.

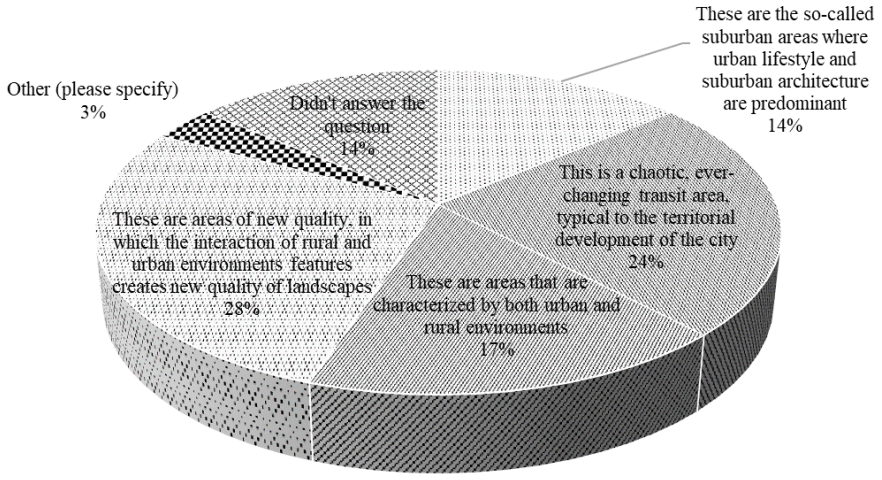


Fig. 3.7. Description of emerging landscapes in urban and rural interface zones (both in the world and in Lithuania in general) according to surveyed experts. Figure by the author

Responding to the question regarding the factors that play a decisive role in shaping landscapes in urban and rural interface areas (both globally and in Lithuania), respondents stated rather unanimously that this is the urban factor – the territorial development of the city and the real estate market (63%). As a secondary factor, 18% of the respondents indicated that this is an equivalent interface of urban and rural factors (*Fig. 3.8*).

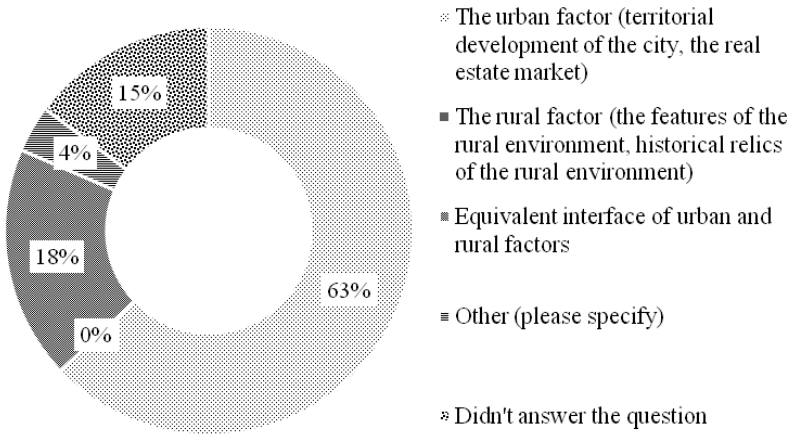


Fig. 3.8. Factors that play a decisive role in shaping landscapes in urban and rural interface zones (both in the world and in Lithuania in general) according to surveyed experts. Figure by the author

To sum up, it can be argued that experts treat the landscapes of urban and rural interface as new quality landscapes whose formation is most influenced by the interaction between urban and rural factors, but the role of the city is crucial here. Meanwhile, the rural factor is not considered to be the dominant factor.

Case of Lithuania in the international context. Six different pictures were presented to the experts illustrating the landscape of the urban-rural interface zones of Lithuania, and the experts were asked to enter the key words that they would use to describe them (*Fig. 3.9*). When analyzing the responses, they were divided into three groups: positive, negative or neutral/ambiguous evaluations (*Fig. 3.10*). The majority of assessments are neutral/ambiguous evaluations. However, there were negative assessments that dominated the landscapes presented in the first and the fifth photos. Interestingly, there were very few positive assessments. The first and the fifth photos were positively evaluated once, while the sixth photo – twice. Meanwhile, other landscapes presented in the photos did not receive positive assessments.


1.


2.


3.

Fig. 3.9. Images of Lithuanian rural-urban interface landscapes presented for evaluation to surveyed experts

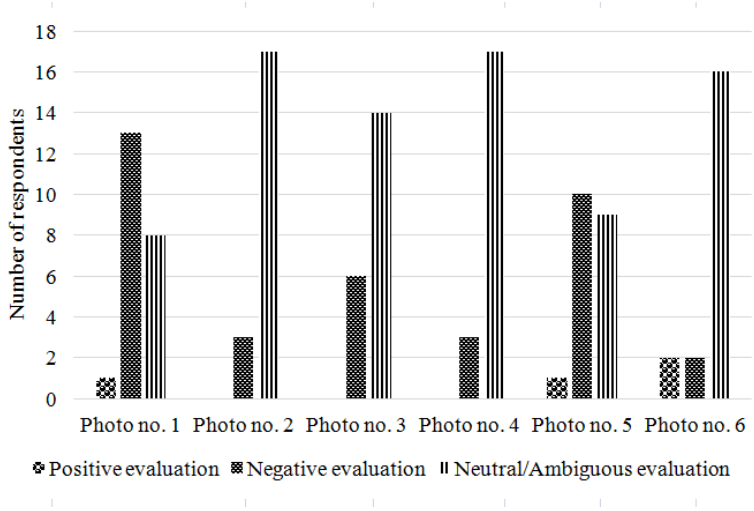


Fig. 3.10. Assessment of the landscape of the Lithuanian rural-urban interface zones. Figure by the author

When answering to the question "What, according to your opinion, determines the characteristics of landscapes in the urban and rural interface zones in different regions or countries?", the experts were offered to choose one or several acceptable answers, or to write their own answer. A clearly dominant answer is 'difficult to distinguish', although 29% of the experts pointed out that rural-urban interface areas were primarily influenced by urbanization trends and the city size (*Fig. 3.11*). On the secondary basis, 21% of the respondents indicated the geographical characteristics of the local landscape, climate, relief, etc. A similar share of the experts (20%) opined for the third answer option – national economic development.

The surveyed experts also provided other answers which highlighted land management issues (the land management policy, the land reform and the so-called land transfer practice) and the economic aspect (more convenient housing for lower costs can be procured in peri-urban areas).

To summarize, it can be noted that the opinion expressed by the experts coincides with the worldwide prevailing trends in the urban development, and the fact was highlighted that national, regional, local, etc. peculiarities are relevant for rural-urban interface landscapes.

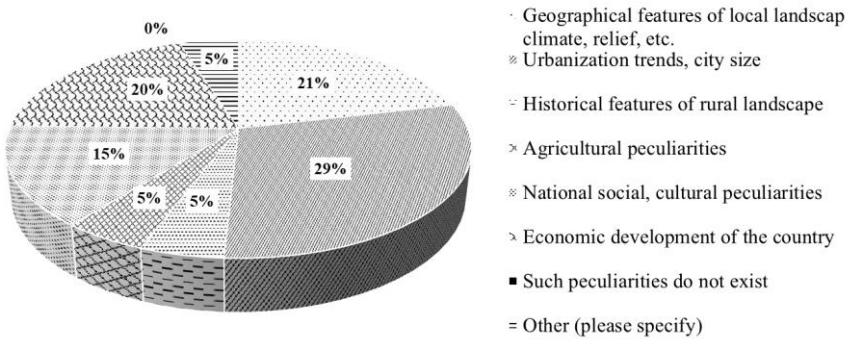


Fig. 3.11. Features that determine the characteristics of landscapes in rural-urban interface zones in different regions or countries according to surveyed experts. Figure by the author

In order to determine the peculiarities of the case in Lithuania, the experts were asked to answer the question "Do the landscapes emerging in the rural-urban interface areas of Lithuania have any peculiarities?" A significant share of the respondents (37%) confirmed that the distinctive characteristics of such landscapes are obvious (*Fig. 3.12*). However, another part of the respondents (22%) did not decide, and, without further investigation, could not answer the question precisely or did not respond at all (22%). There were also other respondents (8%) who claimed that such features simply do not exist or are dependent on the communities, their needs, activity and lifestyles.

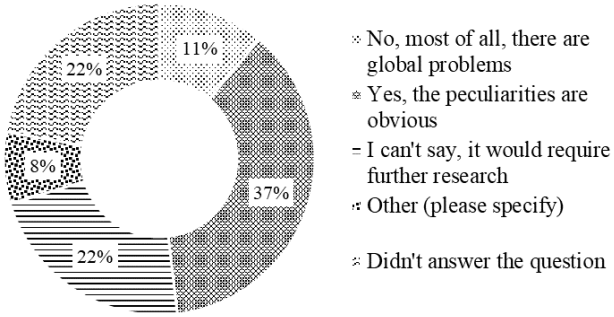


Fig. 3.12. Characteristics of landscapes emerging in rural-urban interface areas in Lithuania according to the surveyed experts. Figure by the author

As a result of this assessment, it can be noted that the emerging landscapes and their peculiarities in the zones of the rural-urban interface are not clearly perceived by the surveyed experts, since this type of landscape in Lithuania is not yet clearly identifiable, nor is there a sufficiently developed methodology for the research and assessment of the suburban areas, whereas research in this field has only started recently.

When comparing the rural-urban interface territories in Lithuania and the world, experts pointed out that such landscapes are most closely linked to the territorial development of cities (the so-called urban sprawl or suburbanization) (38%) and similar functions in the areas of rural-urban influence, such as infrastructure, logistics, individual dwellings, etc. (33%). The experts opined as well that such areas are denoted by similar suburban lifestyles (19% of respondents) (*Fig. 3.13*).

The number of people, geographical similarities, political decisions in the field of business development, and history were mentioned among other features.

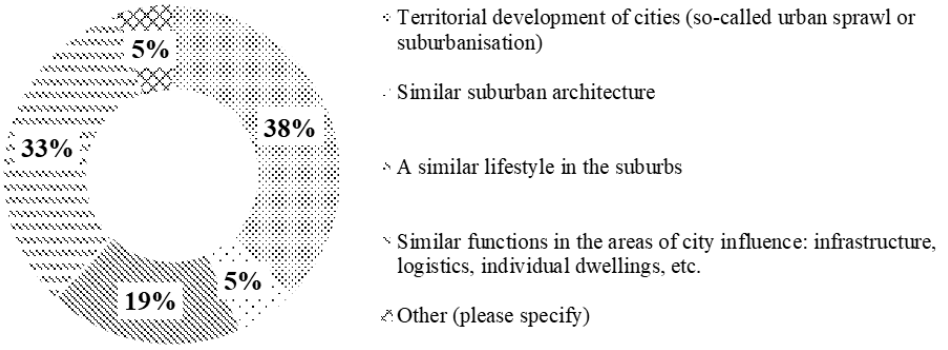


Fig. 3.13. Landscape features of Lithuanian rural-urban interface zones linking them to similar territories in the world according to the surveyed experts. Figure by the author

When answering the question "What features, in your opinion, of the landscape of the rural-urban interface in Lithuania determine their distinctiveness?" the experts could choose one or several answer options, or insert their own answer. A total of 59 responses were submitted. Most often (27%), it was pointed out that the current uneven development of the regions is precisely the factor that influences the landscapes of urban-rural areas. Somewhat less often (24%) the peculiarities of the development of urbanization, for example, sudden urbanization during the Soviet period and irregular urban sprawl after Lithuania regained its independence were mentioned. Other options of responses were chosen just a few times (*Fig. 3.14*).

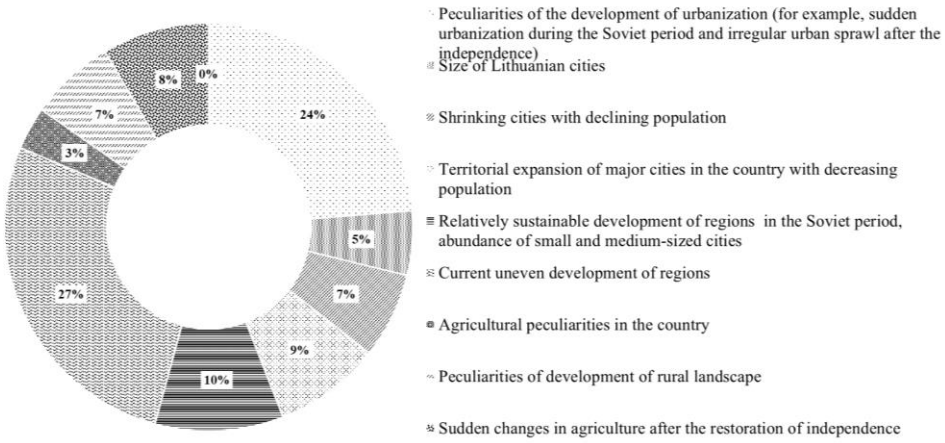


Fig. 3.14. Characteristics that determine the distinctive features of rural-urban interface landscapes in Lithuania according to surveyed experts. Figure by the author

Experts were able to identify the features that determine the peculiarities of the Lithuanian rural-urban interface landscape when choosing from the list of answers provided to them. 38 replies were received because one or more answer options could be selected. The characteristics of the country's natural landscape (32%) and the natural environment of Lithuanian cities (26%) were most commonly indicated (*Fig. 3.15*). However, the other two features that determine the specificity of suburban landscapes were also frequently mentioned: rural landscape as a formant of the national identity (21%), and relics of the historical rural environment in areas of rural-urban influence (18%). It should also be mentioned that one expert expressed the opinion that the features of the Lithuanian suburban landscape are not unique.

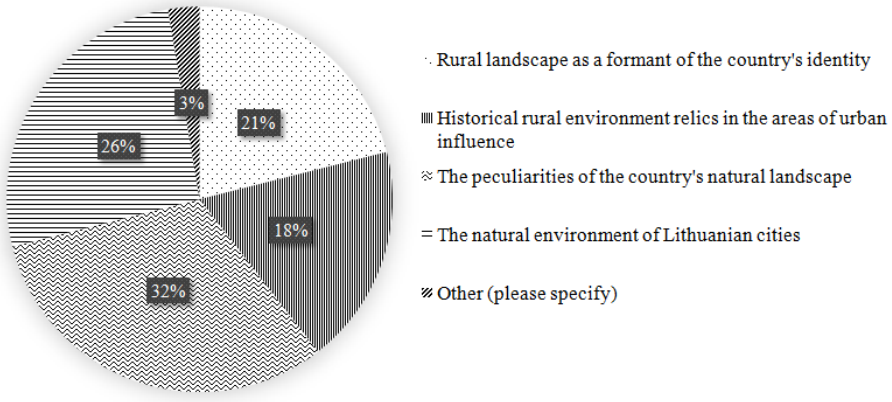


Fig. 3.15. Features determining the specificity of landscapes emerging in rural-urban interface areas in Lithuania according to surveyed experts. Figure by the author

When summarizing the received answers, it can be noted that there is no dominant answer since the responses are distributed quite evenly. Rural-urban

interface areas are characterized by complexity and interaction between different elements, which makes it fairly complicated to distinguish one of the dominant features. However, it can be noted that, in the opinion of the experts, the natural landscape and the natural environment are the determinants of the peculiarities of the rural-urban interface landscape; yet, insufficient attention is paid to the relicts of the historical rural environment.

Landscapes emerging in urban-rural areas create new quality landscapes whose sustainable development management requires a classification of such landscapes. For this purpose, the experts were asked to answer the question "What approach, in your opinion, is the best when classifying landscapes of rural-urban interface areas in Lithuania?" They were asked to choose one of the most acceptable responses to the question. Interestingly, the experts did not have a firm opinion on this issue, as 26% of the respondents did not answer this question at all (*Fig. 3.16*). However, a considerable share of experts (37%) pointed out that the most appropriate way to classify landscapes of urban and rural interface areas is to use universal international classifications and adapt them according to the peculiarities of Lithuania. A smaller proportion of respondents (15%) maintained the view that a new classification should be made which should be created according to the currently applicable legislation of the Republic of Lithuania and the presently existing landscape classifications.

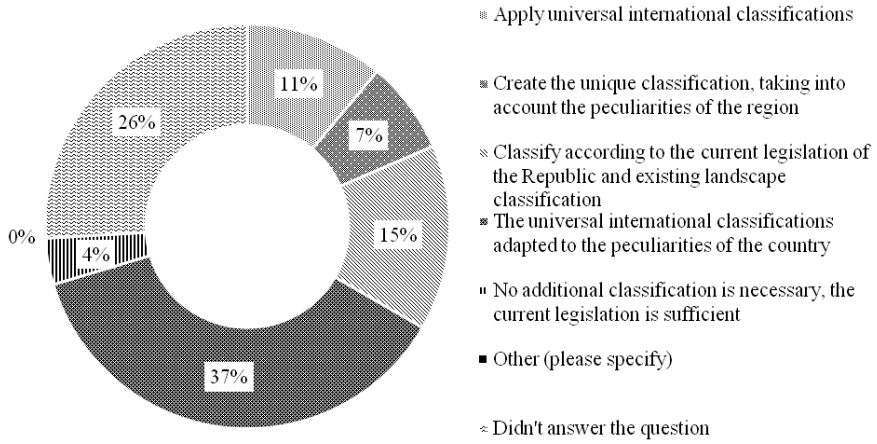


Fig. 3.16. The best way to classify landscapes in rural-urban interface zones in Lithuania according to surveyed experts. Figure by the author

Possibilities for research and evaluation of urban and rural interface landscapes. The question "What kind of features do you think should be featured in the research methodology used in the studies of landscapes in rural-urban interface areas?" was aimed at finding out the experts' views on the possibilities and methods of analysis of rural-urban interface landscapes. The experts indicated when choosing from the survey methodologies from the list submitted to them that the methodology

of analysis of such landscapes should involve such features as flexibility (34%), as well as interdisciplinarity (24%). Much less commonly, the respondents indicated that such methodologies should be universal (15%), comprehensive (12%) and specific (12%), or mentioned other traits, such as innovation (3%) (*Fig. 3.17*).

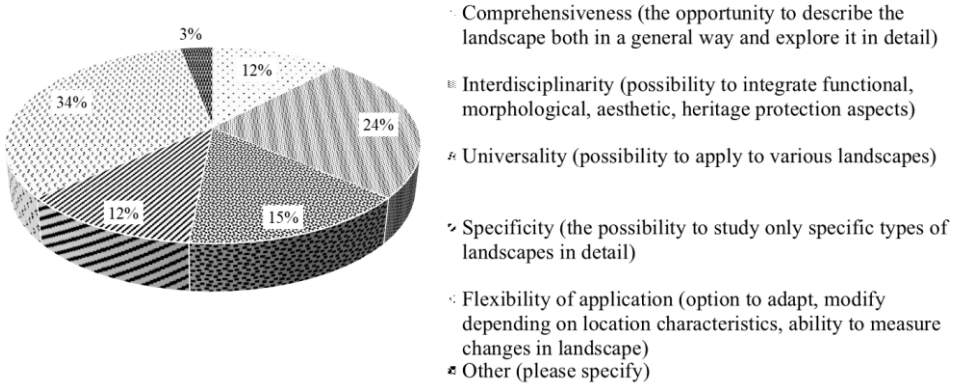


Fig. 3.17. Preferred features of research methods applied in the analysis of rural-urban interface landscapes according to surveyed experts. Figure by the author

In order to investigate the suitability of different landscape assessment methods for rural-urban interface landscapes, five evaluation methodologies were presented to the experts with the possibility to indicate their own option. The most appropriate assessment methodology according to the surveyed experts is the structural comparative analysis (10 answers), as well as the complex approach (7 answers) (*Fig. 3.18*). Other evaluation methods (visual characterization of the landscape, structural estimation analysis, and the method of general impression) were listed in the third place and selected five times. First of all, three methodologies were specified as appropriate methodologies: a method of visual characterization of the landscape, structural estimation analysis, and the general impression method were chosen 10 times each. After assessing and summing up all the positive responses, it becomes clear that the method of visual characterization of landscapes in the opinion of experts is the most appropriate for the analysis of rural-urban interface landscapes, although the three other methods were evaluated similarly.

The respondents also mentioned some other methods: “mathematically summed by using a score system” and “Clear identification of the elements of the rural and urban landscape: differences and similarities,” but they can be attributed to the methods already listed above. Another expert proposal is the “study of the social environment influencing the landscape.”

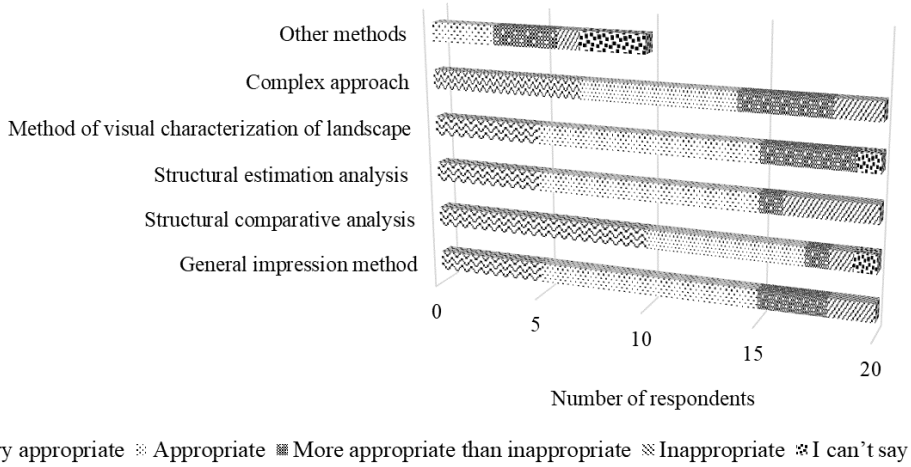


Fig. 3.18. Appropriateness of various landscape assessment methods for the analysis of rural-urban landscapes according to surveyed experts. Figure by the author

Nine concepts that are used in the selected assessment methodology of Tveit *et al*. (2006) and Ode *et al*. (2006) were presented to the respondents (*Fig. 3.19*). The experts were asked to assess the suitability of these concepts to describe landscapes in rural-urban interface areas. The concept of complexity is identified as 'very appropriate' in the opinion of ten experts. Concepts of historicity (9 experts), coherence, stewardship and imageability (8 experts) were assessed positively as well. The following concepts were used as the most appropriate for assessment: visual scale (13 times), naturalness (10 times), coherence, disturbance (9 times), historicity, ephemera (8 times). These concepts are more appropriate than those seen as unsuitable for most of the participants: disturbance (6 times), stewardship and ephemera (5 times), imageability and visual scale (4 times). However, some concepts were assessed not only positively but also negatively: mostly, disturbance and ephemera (3 times) were mentioned as inappropriate concepts; meanwhile, other concepts were identified as inappropriate only once.

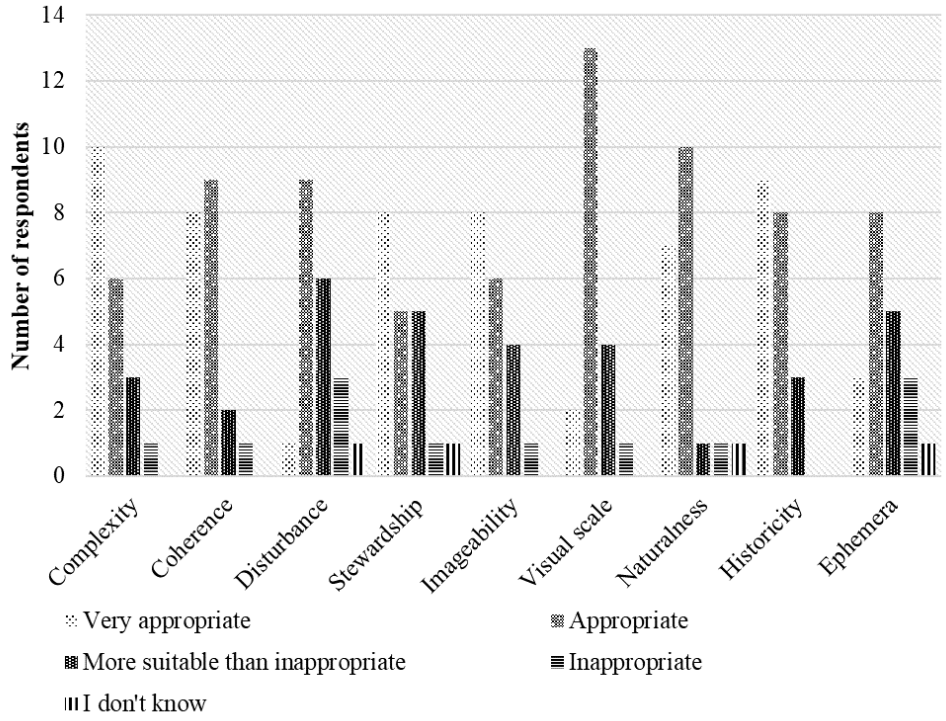


Fig. 3.19. Assessment of the eligibility of the concepts for the description of rural-urban interface landscapes according to surveyed experts. Figure by the author

When summing up all the positive assessments (very appropriate, appropriate, more appropriate than inappropriate), it can be pointed out that the most appropriate concept for the assessment of landscapes according to the surveyed experts is historicity. Concepts of complexity, coherence and visual scale are also very similarly appreciated by the experts.

In order to determine the suitability of the concepts suggested by Tveit *et al*. (2006), Ode *et al*. (2006) and Nohl (2001) for evaluating rural-urban interface landscapes, 10 photographs of rural-urban interface landscapes were presented to the surveyed experts (*Fig. 3.20*).

The assessment of the first picture in a four-point scale by the experts shows that, according to them, the concepts of imageability, stewardship and complexity are not completely present there. Meanwhile, the concepts of disturbance, ephemera, historicity, and visual scale are particularly evident. Most of the experts described this landscape as *plain* (*Fig. 3.21*).

The results of the assessment of the second picture show that the concept of historicity, complexity and naturalness were not identified by the experts in the analyzed landscape; meanwhile, the disturbance concept is the most pronounced. Most commonly, this landscape was described as *plain* and *interesting* (*Fig. 3.21*).

Fig. 3.20. Images presented for the assessment by the surveyed experts in order to test the suitability of the concepts by Tveit *et al*. (2006), Ode *et al*. (2006) and Nohl (2001) for evaluating rural-urban interface landscapes

According to the results of the third photo expert evaluation, the features of historicity, imageability and stewardship are not completely reflected there, whilst ephemera, visual scale and naturalness are particularly pronounced. Most of the experts described this landscape as *plain* (*Fig. 3.21*).

The results of the fourth picture expert assessment show that there are no signs of stewardship, imageability, ephemera and complexity, but the disturbance feature is particularly pronounced. According to a large part of experts, this landscape is describable as *plain* (*Fig. 3.21*).

After analyzing the results of the fifth image expert assessment, it can be seen that, according to the experts, there are absolutely no signs of imageability and historicity, nor any features of ephemera and naturalness, but the visual scale and

complexity are particularly pronounced. This landscape was described as *plain* as well (*Fig. 3.21*).

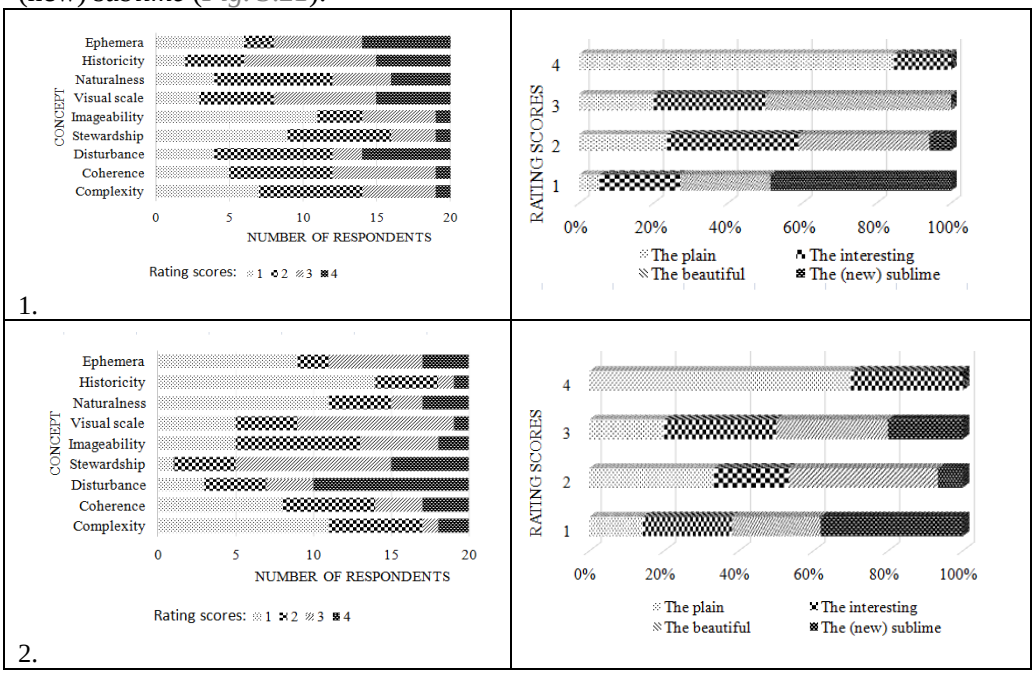
When summarizing the assessment results of the sixth image, it can be stated that, according to the experts, the features of historicity, disturbance and stewardship are completely absent, and, in particular, the features of ephemera, complexity and naturalness can be observed. When assessing aesthetics, most respondents state that the landscape could be described as *beautiful* (*Fig. 3.21*).

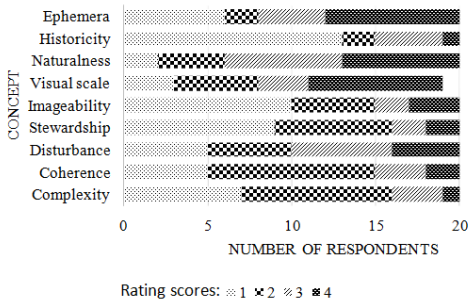
The results of the seventh photo description show completely absent features of historicity, naturalness and disturbance, and, in particular, visual scale, complexity and coherence were identified by the experts. The landscape was described as *plain* (*Fig. 3.21*).

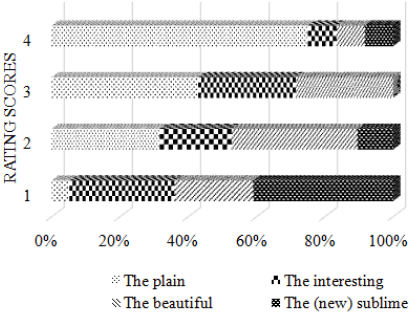
After analyzing the results of the expert assessment of the eighth image, it can be stated that historicity, naturalness and imageability are completely non-existent. Meanwhile, stewardship was seen by the experts as the most meaningful feature. The landscape was described as *plain* (*Fig. 3.21*).

According to the assessment results of the ninth image, there is absolutely no sign of imageability, historicity or coherence according to experts; meanwhile, the disturbance and ephemera features are particularly pronounced. According to the major share of experts, this landscape is describable as *plain* (*Fig. 3.21*).

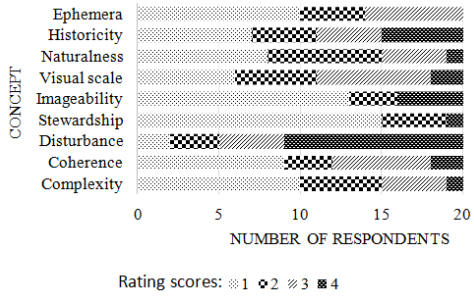
When summarizing the results of the assessment of the tenth image, it can be stated that historicity, ephemera, naturalness and imageability are completely absent according to the experts, and the features of stewardship, disturbance and coherence were identified in the image. The dominant aesthetic category is difficult to distinguish because the landscape was assessed both as *plain*, as *beautiful*, and as (new) *sublime* (*Fig. 3.21*).

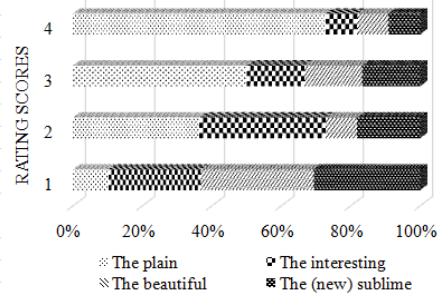



Ephemera
Historicity
Naturalness
Visual scale
Imageability
Stewardship
Disturbance
Coherence
Complexity
CONCEPT
0
5
10
15
20
NUMBER OF RESPONDENTS
Rating scores: 1 2 3 4

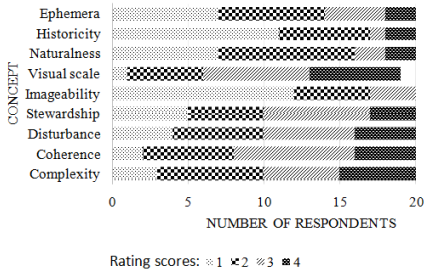

RATING SCORES
4
3
2
1
0%
20%
40%
60%
80%
100%
The plain
The interesting
The beautiful
The (new) sublime

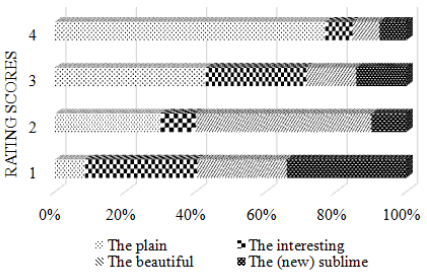
3.


Ephemera
Historicity
Naturalness
Visual scale
Imageability
Stewardship
Disturbance
Coherence
Complexity
CONCEPT
0
5
10
15
20
NUMBER OF RESPONDENTS
Rating scores: 1 2 3 4

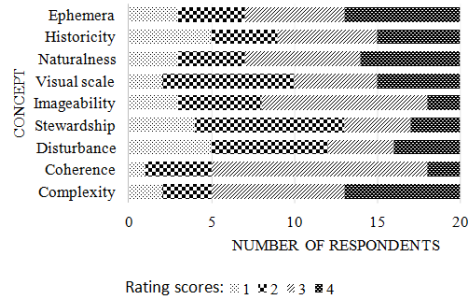

RATING SCORES
4
3
2
1
0%
20%
40%
60%
80%
100%
The plain
The interesting
The beautiful
The (new) sublime

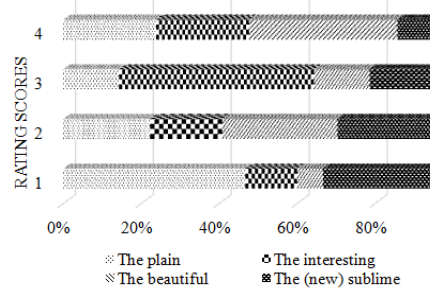
4.


Ephemera
Historicity
Naturalness
Visual scale
Imageability
Stewardship
Disturbance
Coherence
Complexity
CONCEPT
0
5
10
15
20
NUMBER OF RESPONDENTS
Rating scores: 1 2 3 4


RATING SCORES
4
3
2
1
0%
20%
40%
60%
80%
100%
The plain
The interesting
The beautiful
The (new) sublime

5.


Ephemera
Historicity
Naturalness
Visual scale
Imageability
Stewardship
Disturbance
Coherence
Complexity
CONCEPT
0
5
10
15
20
NUMBER OF RESPONDENTS
Rating scores: 1 2 3 4


RATING SCORES
4
3
2
1
0%
20%
40%
60%
80%
100%
The plain
The interesting
The beautiful
The (new) sublime

6.

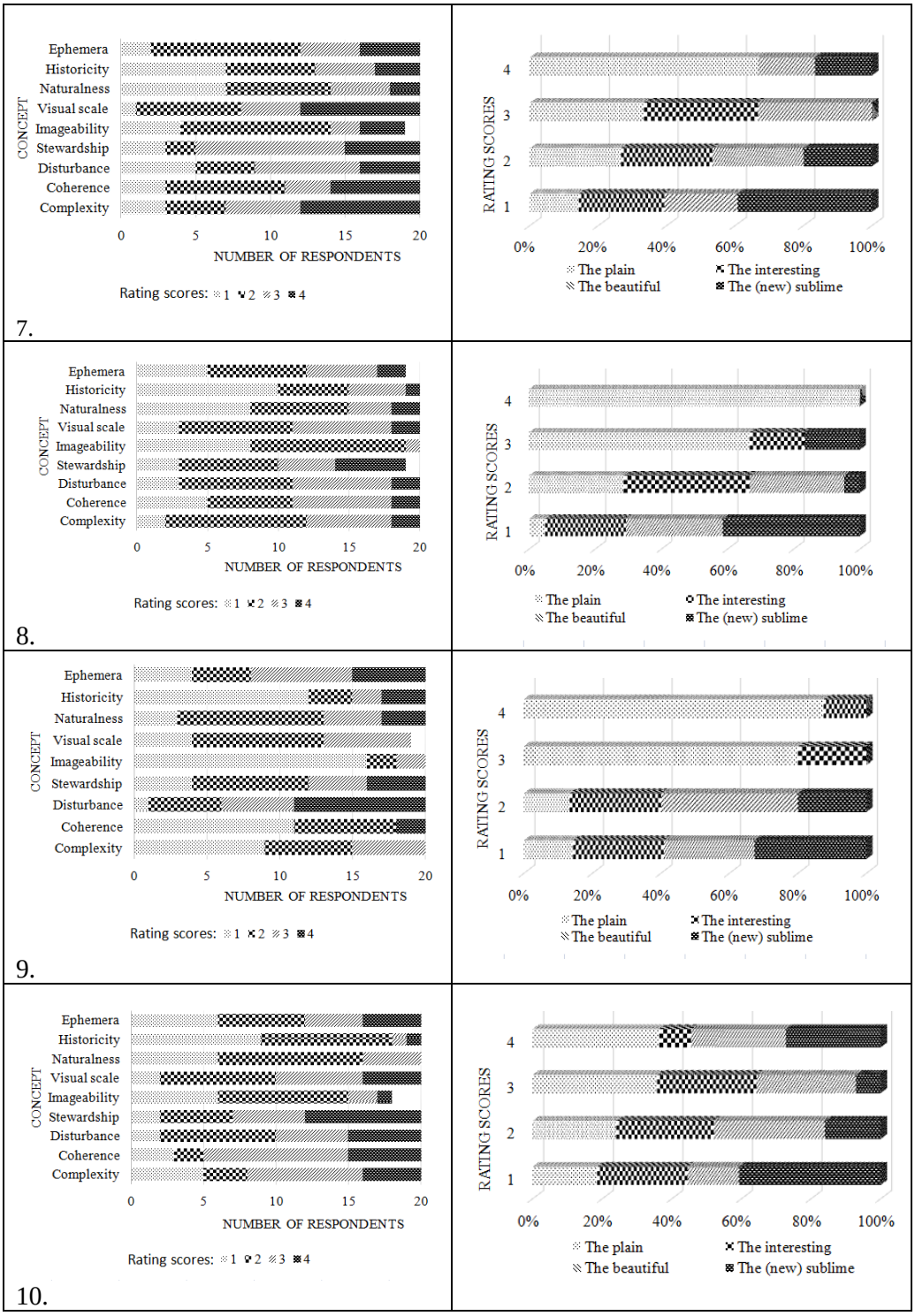


Fig. 3.21. Rating of the images by the surveyed experts. Figures by the author

In order to specify the main objectives of the development of rural-urban interface areas, the experts had the possibility to choose one or more of the answer options acceptable to them from the list of possible responses or to insert their response option (*Fig. 3.22*). Most commonly (17 times), two answer options were chosen: the experts stated that, in particular, valuable features of the natural environment and valuable historical relics of the countryside should be preserved. Slightly less frequent (13 times) were two options of responses: to strive for the specific aesthetics of rurban landscapes and to use natural areas in the formation of urban green areas. Fewer times (12 times), the answers to seek optimal landscape visual diversity, as well as natural territories and historical relics of the rural environment to be adapted for recreation or to search specific architectural and urban solutions that correspond to specifics of urban and rural interface areas were selected.

In addition to these most frequently selected answer options, one expert noted that the development of urban and rural interface zones "is an unregulated thing. This provision is specified in the legal acts of the Republic of Lithuania (Law on Planning, Construction Law, STR', etc.)."

To sum up the answers given by the respondents, it can be noted that the experts tend to consider both natural and anthropogenic landscape elements for the same purpose, but, at the same time, it is desirable to find a solution for achieving the optimal quality of the landscape.

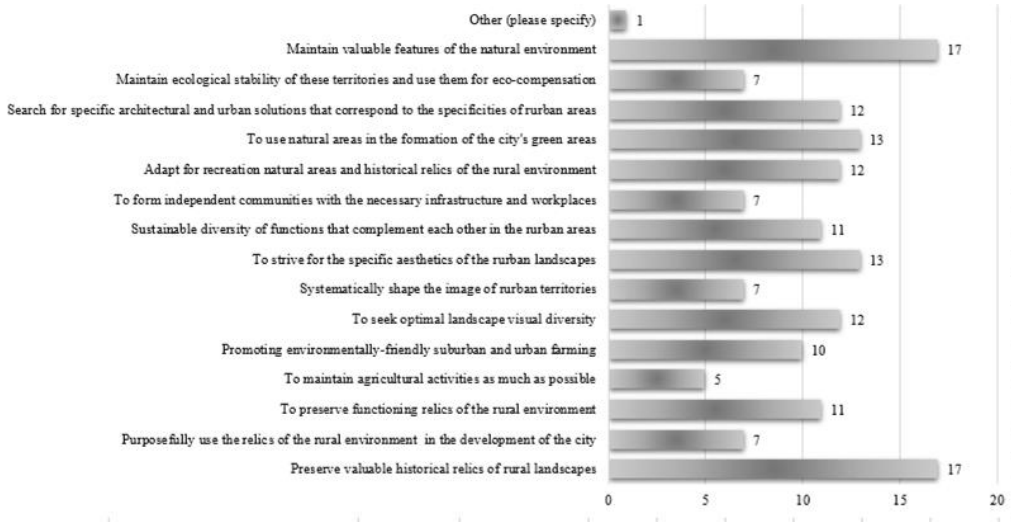


Fig. 3.22. The most important goals of regulating the development of rural-urban interface zones according to surveyed experts. Figure by the author

The experts were also asked to indicate the most important levels of sustainable development of urban and rural interface areas (*Fig. 3.23*). According to the experts, the most important level of development of such areas is regional, within the boundaries of the state territory (in the opinion of 14 experts). However, no less important are the municipalities (in the opinion of 11 experts) and the local

(part of the municipality) development (in the opinion of 11 experts). This shows that the development of rurban landscapes is a local issue and should be addressed first of all within the country.

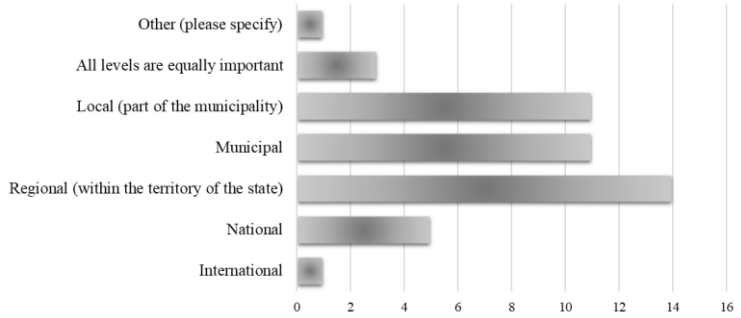


Fig. 3.23. The most important levels of sustainable development of rural-urban areas according to surveyed experts. Figure by the author

To assess the necessity of the presented measures for the regulation and modeling of the development of rural-urban interface areas, the experts fully appreciated three measures: analysis of the current state, analysis of the historical development, and heritage analysis and evaluation (*Fig. 3.24*). It can be noted here that most experts consider the analysis of the *status quo* to be a top necessity tool.

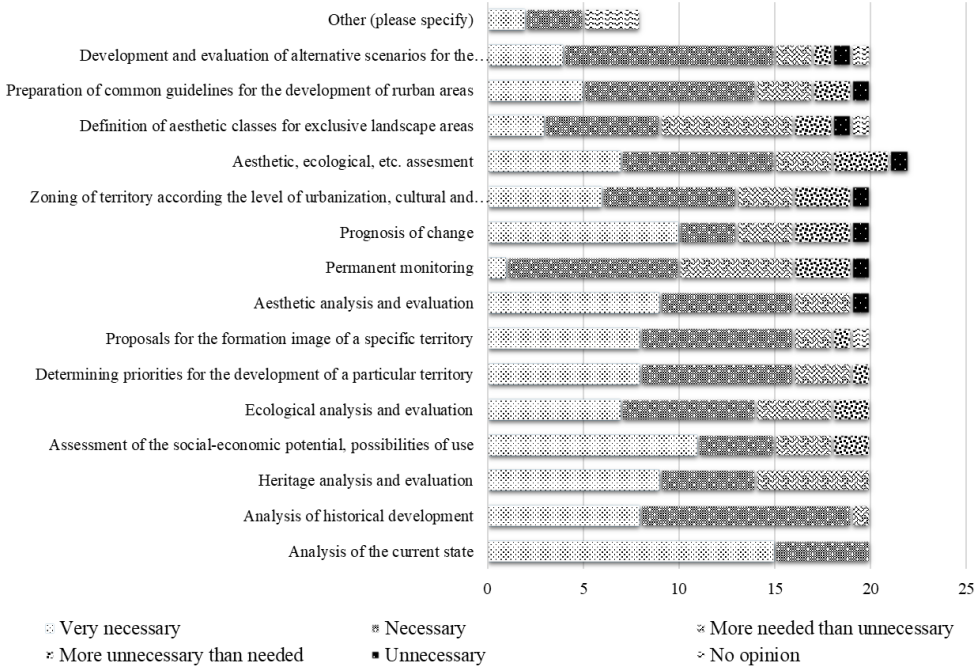


Fig. 3.24. The need for regulation and modeling of development of rural-urban interface zones according to surveyed experts. Figure by the author

Other measures were also identified, such as analysis and adaptation of good practices, improvement of the visual environment of suburban areas, regulation of urbanization, involvement of communities in defining the priorities and guidelines for the development of specific areas, public education, preservation of natural habitats, and proper allocation of the state budget funds.

In response to the question "What do you think should be the role of the National Landscape Management Plan for the sustainable development of urban and rural interface territories?", 45% of the experts agreed with the statement that the solutions of the *National Landscape Management Plan* should determine the most important guidelines for the sustainable development of rurban areas (*Fig. 3.25*). However, a considerably smaller percentage of the experts (22%) indicated that the solutions of the *National Landscape Management Plan* should regulate in detail the management of rural and urban interface areas. Meanwhile, even 26% of the respondents did not answer this question.

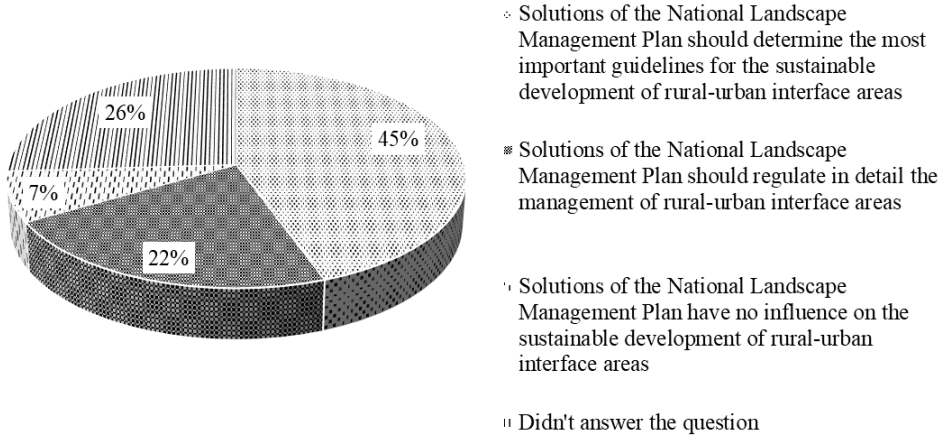


Fig. 3.25. The role of the National Landscape Management Plan in achieving sustainable development of rural-urban according to surveyed experts. Figure by the author

To sum up, it can be argued that the *National Landscape Management Plan* should become a more or less important document regulating not only the development of urban and rural interface areas, but also analysis of such areas indicating the priority directions of development of this landscape.

3.4. Generalization

Landscape aesthetics in rurban areas. Landscape aesthetics is an important component of the quality of life, landscape identity and landscape sustainability. That is why it is important not only to protect valuable aesthetic resources – natural and cultural picturesque landscapes or historic cityscapes – but also to take care of the aesthetic dimension of our everyday environment including the constantly expanding areas of the rural-urban interface.

Landscape aesthetics theories. The currently existing landscape aesthetics theories can be subdivided into evolutionary or biological (Prospect-refuge theory,

Information processing theory, Human habitat theory, Biophilia hypothesis), cultural (Landscape heritage, Spirit of place, Aesthetics of care), and mixed (Restorative landscapes, Ecological aesthetics, Topophilia) (Ode *et al*., 2008; Tveit *et al*., 2006). After the analysis whether and how they can be applicable to rurban landscapes, a conclusion was made that all the theories are potentially applicable to these landscapes due to their heterogeneous character encompassing rural, natural and urban features, and combining heritage and innovations.

Methods of landscape aesthetic research. It is possible to classify landscape aesthetics research methods into expert/design approaches, perception-based approaches, and integrated approaches. Another classification includes the methods of the overall impression, methods of structural analysis, and complex methods. The complex methods that take into account both the subjective and objective aspects of landscape must be the most appropriate for valuation of complex and hardly definable rurban landscapes. Composite rurban landscape research methodologies that include the above-mentioned approaches can be formulated.

Challenges of aesthetic analysis of rurban landscapes. Challenges of landscape aesthetics research in rural-urban interface areas include: the challenges of defining new rurban landscapes and their aesthetics; the diversity of landscape types, the complexity and fragmentation of landscapes in the rural-urban interface zones causing difficulties in formulating and expressing the general impression; the challenges of landscape aesthetic assessment caused by the mutability and dynamics of landscapes in the rural-urban interface zones; the difficulties of defining the aesthetics of contested areas; the challenges of harmony of ecology and aesthetics in rurban areas, and the need for ecoaesthetic analysis approaches.

Ecoaesthetic valuation methodology for rurban landscapes. Characteristics of rurban landscapes imply that assessment techniques applicable to the landscapes in the areas of rural-urban interface should: 1) be flexible enough in order to be applicable to a variety of types of these landscapes encompassing various features of rural, natural and urban landscapes, and ranging from the rural or natural landscape with slight manifestations of features of the urban environment to the urban landscape with slight manifestations of the rural environment; 2) address both morphological, heritage, and aesthetic features and ecological aspects; 3) address not only the rural-urban continuum but also the space-time continuum, in other words, they should provide the possibility to evaluate the changes of the rurban landscapes. The applicability of landscape aesthetics theories to rurban landscapes allows concluding that the system of visual characterization concepts – complexity, coherence, disturbance, stewardship, imageability, visual scale, naturalness, historicity, ephemera – their indicators and detailed characterization as developed Tveit *et al*. (2006) and Ode *et al*. (2008) and based on these theories – can be applied to various categories of rurban landscapes. Thus, both the present state and the envisioned landscape changes can be evaluated by using this approach. The ecoaesthetic valuation methodology for rurban landscapes developed in this research was based on the approach of Tveit *et al*. (2006) and Ode *et al*. (2008), and it integrates the ecoesthetic approach by Jankevica (2012) as well in order to emphasize the ecological aspect.

Sociological survey results. Rural-urban interface landscapes create new quality landscapes which are in practice not sufficiently known not only to the general public, but also to the vast majority of the surveyed experts. This suggests that it is necessary to conduct and develop surveys of this type of landscape in order to achieve the optimal quality of the living and working environment. According to the experts, the natural landscape and the natural environment determine the peculiarities of the landscape of the urban-rural interface, but insufficient attention is paid to the historical relics of the rural environment of different periods that directly affect and shape the unique landscape of the rurban areas in Lithuania. Therefore, for the study and evaluation of these rurban landscapes, flexible and universal assessment methods should be applied, adapted to the peculiarities of the country's landscape and integrated with the required assessment methodologies. It was found that the most important key measures of regulation of the rural-urban interface landscapes are considered in the analysis of the present state, the analysis of historical developments and heritage analysis. It shows that the development of rural-urban interface landscapes is local by nature and should be addressed first of all within the territory of the specific country. Attention is also drawn to the relics of the historic rural environment forming the specific landscape of Lithuania.

4. GUIDELINES FOR AESTHETIC DEVELOPMENT OF RURAL-URBAN INTERFACE LANDSCAPES

4.1. General premises for sustainable development of rural-urban interface landscapes

General management challenges of rural-urban interface areas. In this research, the rurban problematics is considered to be a universal phenomenon with local manifestations and peculiarities. The already existing research in this area (Gadal, 2010; 2011; Bardauskienė and Pakalnis, 2012; Gražulevičiūtė-Vileniškė *et al*., 2014) demonstrates such global trends as *metropolization* (spatially multi-polarized urban discontinuities, segregated socially and functionally (Gadal, 2011)), *industrialization* (industrially produced materials, rapid industrialized construction process, industrialized agriculture), *commercialization* (real estate developers as the main drivers of suburban construction, narrow economic outlook towards the quality of life manifested in the lack of public spaces and infrastructure in these areas), *internationalization* (global cultural trends in architecture and landscape management), and *environmental shifts* in Lithuanian rurban landscape.

Low Choy and Harding (2010), Buxton and Low Choy (2011) underline that these rural-urban, rurban landscapes and related complex social and environmental issues call for the rethinking of traditional landscape planning and management approaches. The above mentioned general trends pose general challenges. With reference to Low Choy and Harding (2010) and Buxton and Low Choy (2011), general *or global environmental and social challenges* of management of rural-urban interface areas can be distinguished. These challenges can be identified in a broad range of countries and regions around the world and in Lithuania as well. With reference to them, the general environmental and social challenges of the

management of rural-urban interface areas can be distinguished. *The environmental challenges* include: weed infestation, pest animals (abandonment and renaturalization, invasive species), loss of biodiversity, changes of hydrological regime, water quality decline, intensification of agriculture and other human activities, ecosystem fragmentation etc. (*Fig. 4.1*) *The social challenges* are: limited landscape management capacity of the new residents, social conflicts (between the new residents and the local farmers), social disadvantage, an increasing social and economic divide, a skewed population (loss of young adults, an ageing population), loss of sense of community, intensification or decline of agriculture, and the emergence of new local and regional economies, which, according to Low Choy and Harding (2010), Buxton and Low Choy (2011), may also possess many positive aspects. These challenges can be viewed as global or universal and can be identified in a broad range of countries and regions around the world.

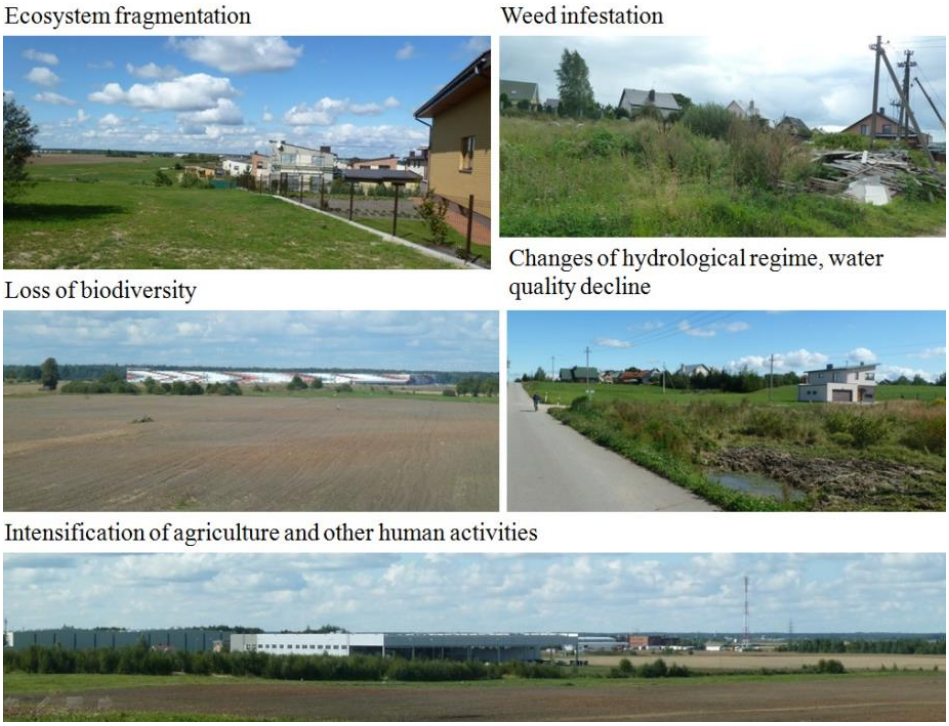


Fig. 4.1. Rurban environmental challenges in the Lithuanian landscape. Scheme by the author

Moreover, another category of rurban landscape management *challenges dealing with identity, locality, sense of place* also exists, including: the loss of scenic amenity (visual quality, beauty of a particular place), rural heritage and cultural landscape preservation problems, decline of the traditional rural lifestyles, change of the landscape identity, landscape uniformity, etc. According to Bučas and Mlinkauskienė (2002), Kamičaitytė-Virbašienė (2003), the principles of new cultural policy of the 21st century encourage paying major attention to the

preservation of cultural landscapes, cultural identity, and distinctiveness of small countries and regions. They note that small countries, while becoming members of supranational organizations and unions, can expect very rapid landscape transformations and consequently lose their distinctive national landscape features and character; thus they suggest integrated land management and heritage preservation approaches to this problem. Rurban landscapes are of particular interest in the context of this problem as concentrated manifestation of landscape change involving both urbanization and local rural and natural landscapes. Considering this, it is important to *formulate general guidelines for landscape management in the areas of rural-urban interface integrating ecological, social and identity, global and local aspects*.

The basis for management of rurban landscapes. *Understanding of rurban landscapes* is one of the basic premises for their appropriate management. Rurban landscapes here are seen as having particular features, such as the landscape type, influenced or determined both by global and local aspects. According to our research presented in the previous sections, rurban landscapes can be characterized as: remnant, transient, contested, complex, interdependent. Rurban landscapes can be analyzed from three points of view: global, local, and identity, as it was shown above. According to Musacchio (2009), the global scale is needed to understand how non-local phenomena, such as globalization and urbanization, affect landscapes and people's links with the environment, and how adaption to non-local phenomena occurs at the local and regional scales of landscapes. Consequently, management solutions for rurban landscapes must be based on their particular features and global (international, supra-national, regional), local (national, urban settlement level), and identity (national, urban settlement level) aspects of these landscapes.

Holistic approach. The understanding of the features and dimensions of the rurban landscape implies the holistic approach; by *holistic* we mean that the landscape as a whole is more than a sum of its parts (biophysical, ecological, cultural, historic, economic, political, aesthetic, etc.). One of the ways to address landscape as a whole is the contemporary notion of landscape sustainability. According to Musacchio (2009), in the landscape research and practice, scientists reinterpreted the definition of *sustainable development* so that to include the holistic basis of landscapes; in this context, she presents landscape sustainability model 'six E's of landscape sustainability' integrating environment, economics, equity, aesthetics, experience, and ethics, and argues that one of the great challenges will be how to operationalize the environmental, economic, equity, aesthetic, experiential, and ethical performance of designed landscapes as sustainable landscapes in an urbanizing world. *Figure 4.2* shows the six dimensions by Musacchio (2009) of the rurban landscape, in which, sustainability should be achieved, and the corresponding contemporary features of these landscapes should be mitigated, transformed or creatively employed thus developing sustainable rurban landscapes as a new type of landscapes.

When looking at rurban landscapes as a new landscape type and at the prospect of their sustainable development, another holistic concept – resilience of socio-ecological systems (Resilience..., 2002; Buxton, Low Choy, 2011) or coupled

human and natural systems (Musacchio, 2009) – should be integrated in this research. The resilience of socio-ecological systems is a basis for their sustainability and is defined as the capacity of such a system to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes: a resilient socio-ecological system can withstand shocks and rebuild itself when necessary (Resilience..., 2002). From the resilience point of view, the landscapes that can be defined as rurban have already lost the above-described capacity to resist changes and are undergoing qualitative transformations from rural or natural into urbanized areas. Resilience... (2002) and Buxton, Low Choy (2011) single out the following biophysical and social factors that can decrease resilience: loss of biodiversity, pollution, lack of functional redundancy, changing disturbance regimes, climate change, inflexible, closed institutions, unsustainable resource use, increased inefficiency, lack of social capital, lack of social memory, poor social learning outcomes, narrow world views, lack of public participation and involvement. These analyses demonstrate that the majority of these factors are affecting contemporary rurban territories *(Fig. 4.2)*. Consequently, the sustainable development of rurban landscapes requires:

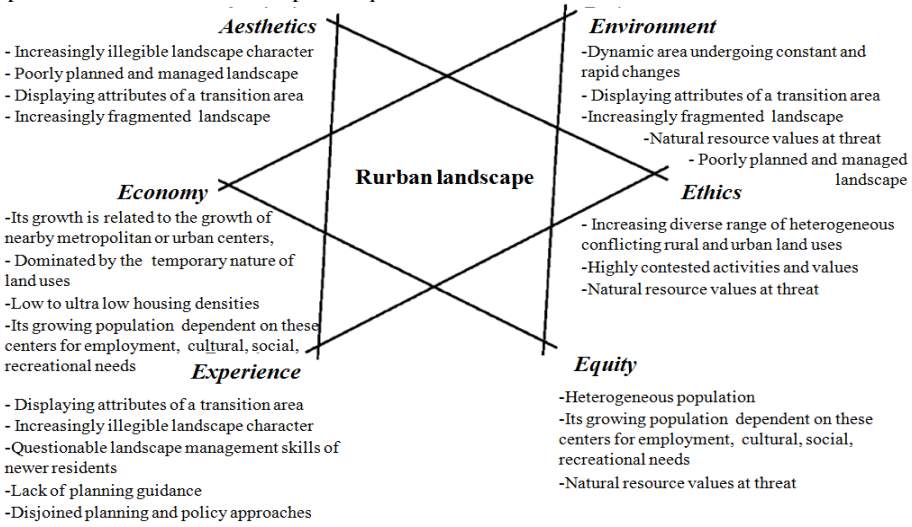


Fig. 4.2. Six dimensions of rurban landscape sustainability (Musacchio, 2009) and related features of contemporary rurban landscapes (Buxton, Low Choy, 2011). Scheme by the author

1) regulated qualitative transformations into sustainable rurban landscapes as a distinctive landscape type;

2) maintenance of resilience once this transformation has been achieved.

General management guidelines. The above-presented basis for the management of rurban landscapes – understanding and holistic approach – requires establishing rurban landscape management goals (directions) in order to develop a new category of sustainable landscapes and increase their resilience across all six sustainability dimensions.

Environment. Traditionally, environment is perceived as encompassing all the living and non-living things occurring naturally on Earth or in some region, and their interaction as a contrast to the constructed world. Presently, the term is treated in the broader sense, and environment is seen as encompassing both human and natural components and their interactions at different scales; for example, regional and local (the urban settlement and its zone of influence). Considering this, the goals of sustainable development of the rurban environment are presented below:

- Multiscale planning of development, or a systematic approach considering different territorial levels, which is a more adequate approach to face and manage complex systems (Berte, Panagopoulos and Zanon, 2013), such as rurban landscapes.

- Integrated planning and management at different scales in order to avoid institutional fragmentation and conflicts.

- The issue of rural-urban interface from the start should be viewed in the context of the overall country (or a broader region, for example, the Baltic Sea region) regional development. According to Musacchio (2009), "the regional scale is an intermediate spatial scale that connects to global and local scales and represents a nexus of distinctive attributes among landscapes, regional identity, human settlement patterns, and governance." The strategic documents of regional development and land use should guide the decision(s) concerning the development of rurban areas.

- Balanced regional development of the rural-urban interface. In the Lithuanian context, it is clear that, in the future, the urban expansion and development of the rural-urban interface will be the most relevant to the large urban centers due to the rapid territorial expansion and importance of these cities in the contemporary strategies and plans; however, the regulation of the development of the rurban areas should also be paid special attention in the attractive resort towns and valuable picturesque territories. In order to avoid the situation when large cities grow and expand at the expense of declining regions, the goal of more even regional development, while placing emphasis on small and medium-sized cities and towns, should be paid special attention.

- Development of the areas of rural-urban interface should be considered at the city/urban settlement level – i.e., integrated into the development strategy of a particular urban area.

- Reserved attitude towards further territorial urban expansion ('brown urbanism' according to Pakalnis and Bardauskienė (2012) aimed at avoiding the imbalance when vast new construction projects and urban expansion are taking place, and simultaneously many buildings and areas lay abandoned) thus developing rurban areas corresponding to the general sociodemographic trends of the country and the city which are beneficial from the ecological (energy savings, preservation of natural areas and habitats, etc.) and other points of view.

- Application of the concept of a sustainable socio-ecosystem at the local level – the idea that people and other living organisms can coexist in mutually supportive habitats (Musacchio, 2009), that people and nature can coexist in a sustainable world of designed ecosystems (Wu, 2008; Musacchio, 2009).

- Development of diverse and multifunctional socio-ecological systems and contemporary cultural landscapes in rurban areas, as the key to resilience in socio-ecological systems is diversity (Resilience..., 2002). According to Berte *et al*. (2013), cultural landscapes – integrated landscapes where natural and social processes are compatible – are characterized by multifunctionality which is determined by a variety of uses. They note that contemporary cultural landscapes originate from integrated goals when physical, ecosystem, and social elements are planned together. Antrop (2006) underlines the importance of the integration of design, space, and multifunctionality for sustainable landscapes, especially in the areas with the increasing uses, population density, and activities, such as the emerging rurban landscapes.

- Valuable natural areas, relicts of rural landscape, re-naturalized areas in the rurban zones should be preserved and simultaneously serve for the protection of biodiversity and eco-compensation, and for recreation and education. These green rurban areas should make an integral part of the natural framework of the city.

- Preservation of landscape heritage (Antrop, 2006) in rurban socio-ecosystems including the relicts of historic rural landscape types.

- Quality and sustainability of human living environment in the rural-urban interface zones including the beneficial ecological situation, the polycentric structure of the emerging rurban areas based on the ideas of a neighborhood unit (Patricios, 2002; Sustainable neighborhood..., 2004), new urbanism (New..., 2010), self-sufficient rurban settlements, relicts of historic rural landscape – buildings, ensembles/complexes – serving as centers or important nods of emerging neighborhoods.

- Ecological land use, sustainable agriculture.

Economics. The economic dimension in this research covers the production, distribution and consumption of goods and services in an exchange economy and the behavior of individuals, groups, and organizations when they manage or use scarce resources which have alternative uses to achieve the desired objectives. In this context, the goals of sustainable economic development of rurban areas are presented below:

- Self-sufficiency of communities in the rurban areas. Self-sufficiency would depend on the distance from the urban center – the larger is the distance from the urban area, the more self-sufficient communities should emerge. Self-sufficiency of rurban communities should include diversification of economic activities, creation and broadening of the employment base, provision of services and lessening of the need of commuting (Buxton, Low Choy, 2011). This would help to stabilize the changes and increase economic resilience in rurban areas.

- Self-sufficiency of communities in rurban areas is closely linked with the above mentioned multifunctionality. The multiplicity of complementary functions – residential, cultural, recreational, commercial, productive, agricultural, etc. – would contribute both to the quality of life, self-sufficiency and the links with the city of the rurban areas.

- Innovations are important both for the competitiveness and wellbeing of the community and for the continuous evolution of landscape. Such innovations may

include ecological peri-urban and suburban agriculture, non-traditional agriculture (lifestyle horticulture, mushroom growing, snail, earthworm farms, harvesting of solar energy on the rooftops, etc.). Relicts of historic rural landscape which lost its original functions can be adapted to the new needs without losing their identity; historic rural buildings, such as manor houses or homesteads, can be used for tourism or adapted to the needs of communities. A joint form of peri-urban farming and agricultural tourism can be developed.

- Mutually beneficial links between the city and the surrounding rurban areas through production-consumption, exchange of services, locally oriented agriculture, and recreation: rurban areas may accommodate self-sufficient communities with infrastructure and workplaces, and also provide recreational areas and agricultural production for the city. Specialization and changes in agricultural production and activities may be necessary in order to achieve this: to specialize farms for producing agricultural goods for the city including fruits, berries, vegetables, milk, and poultry (Aleknavičius and Valčiukienė, 2011), establishment of equine industry and other branches closely associated with the nearby growth of urban markets in the region (Low Choy, Harding, 2010; Buxton, Low Choy, 2011), etc.

- Rational use of resources, including the use of the already existing infrastructure and buildings, adaptation and re-use of abandoned buildings, preservation of agricultural land.

Equity. Equity in this research is viewed as the social dimension of rurban landscape sustainability, or as social justice. In the context of sustainability, both intra-generational and inter-generational equity (Throsby, 2002) is important. The social goals of rurban landscape development are presented below:

- Perceived quality of life, consisting of numerous above mentioned factors including self-sufficient communities, economic well-being, recreation possibilities, beneficial ecological situation, valuable natural and cultural landscapes for the present and future generations.

- Maintenance of social diversity, and diversity of lifestyles in rurban areas avoiding or mitigating segregation or conflicts between new and historically based local residents.

- Development of communities, formation of local institutions, organizations, and social links that help rurban areas and local communities to creatively adapt and to improve resilience and persistence (Musacchio, 2009).

- Involvement of rurban communities into decision making. According to Buxton and Low Choy (2011), "when the management of a resource is shared by a diverse group of stakeholders (e.g., local resource users, research scientists, community members with traditional knowledge, government representatives, etc.), decision-making is better informed and more options exist for testing policies."

Aesthetics. Rurban landscape aesthetics here is seen as the landscape quality perceived by using all human senses (including sight) (Kamičaitytė-Virbašienė, 2003), while also emphasizing the importance of the informational content and legibility of landscapes (Nohl, 2001). The main aesthetic goals of the development of rurban landscape are presented below:

- Aesthetic development must be seen as an integral part of the overall sustainable development of rurban landscapes and must be integrated in every stage of the general sequence of landscape development process from its beginning.

- Development of ecoaesthetic rurban landscapes – the socio-ecosystems that integrate the aesthetic quality and ecological health.

- The local identity (the identity of a particular country, region or settlement), legibility (identity of a particular landscape type), and the distinctive aesthetic image of rurban landscapes should be the integral parts of rurban landscape aesthetics.

- Preservation of landscape heritage (Antrop, 2006), both natural and cultural, should play an important part in the rurban landscape identity, legibility, and distinctiveness.

- Preservation of the rural dimension as one of the sources of the identity of rurban landscapes. The territories in the zone of influence of the city intended for the future urbanization will certainly have to accommodate some innovations. However, the preservation and maintenance of the rural, agricultural dimension is important both for local identity, visual diversity, and for the quality of life.

- Search for corresponding aesthetic images for rurban landscapes including landscape architecture, planning, and architectural innovations. The image and distinctive landscape aesthetics of the areas of rural-urban interface should be developed systematically, while harmoniously integrating both rural and urban elements and the emerging new suburban elements. This also includes the search for specific architecture and urbanism solutions reflecting the local identity and the specific identity of rurban areas.

- Humanization of the living and working environment, mitigation of visual pollution characteristic to rurban landscapes (abandoned farm buildings, aggressive infrastructure objects, etc.).

- Optimization of visual diversity. The historic relicts of rural landscape, fragments of natural landscape, functioning agricultural areas as recognizable and aesthetic objects should play an important role in maintaining the psychologically acceptable visual diversity in the rurban areas.

Experience. In this research, experience comprises the accumulation of knowledge or skills related to rurban landscapes and/or the apprehension of an object, thought, or emotion through the senses or mind (Free..., 2009). The main experience-related goals of rurban landscape management are presented below:

- Rurban landscapes can be experienced as a new and distinct form of settlement, a new type of landscape, not necessarily consumed by the expanding city – neither urban nor rural in a traditional sense. These landscapes should be functionally operating but also rich in identity and symbolic meanings (Berte *et al*., 2013). The concept of alternative landscapes by Musacchio (2009) can be used to describe the desirable goal of the rurban landscape development – such landscapes would introduce new types of nature (for example, renaturalized areas) and reinterpret the cultural meaning of human health, security, multifunctionality, and ecosystem services; such landscapes would provide distinctive places for people in the zones of the rural-urban interface that protect different types of biodiversity and

cultural diversity, facilitate stress reduction and mental fatigue, and enhance human-nature interactions.

- New experience and skills for the development and management of such alternative rurban landscapes are needed. For example, Musacchio (2009) identifies the need for a new generation of landscape sustainability professionals "who will be rolling out new types of alternative landscapes that will address a wide range of human health, security, ecosystem services, and resource management needs, such as new types of food, bioenergy, habitat, and stormwater systems."

- New experience and skills are needed for multiscale integrated planning and management of the rural-urban interface in order to avoid institutional fragmentation.

Ethics. Ethics in this research refers to the concepts of right and wrong conduct. The ethical goals related to sustainable development of rurban landscapes are presented below:

- The need to reconcile the ecological ethics, aesthetics, and functionality in rurban landscapes.

- The ecological education and ecological literacy (Buxton, Low Choy, 2011) of residents and users of rurban areas as people and other living organisms need to coexist in mutually supportive habitats (Musacchio, 2009).

- The necessity to coordinate and reconcile different, often contradictory, sets of values and lifestyles of rural and new urban residents in rurban areas. Two different attitudes towards the rurban areas – urban-centered and rural-centered – exist (Buxton, Low Choy, 2011). Urbanity as a driver of change must be acknowledged; however, the need to preserve the rural dimension cannot be neglected.

- The need for ethical innovations where previous values (both natural and social) are the basis for new coherent solutions (Berte *et al*., 2013) as a driver of change of rurban landscapes. According to Berte *et al*. (2013), innovation is one of the main driving forces for the development of contemporary landscapes, including rurban ones, where the dimension of time becomes increasingly important. The authors note that "the durability of a cultural landscape is connected to the ability to renovate, through appropriate actions, the interactions between society and nature."

- The need to develop place awareness, topophilia for rurban landscapes.

Table 4.1 shows rurban landscape management goals according to the dimensions of sustainability and their relevance to different aspects of these landscapes, and the biophysical and social features that can decrease resilience these goals are targeted at.

Table 4.1. Summary of general rurban landscape management guidelines with reference to Resilience... (2002), Musacchio (2009), Low Choy and Harding (2010), Buxton and Low Choy (2011), Zaleskienė *et al*. (2013). Table by the author

Sustainability dimensions	Biophysical and social features that can decrease resilience	Rurban landscape management guidelines	Relevant rurban landscape features	Relevant level, scale
Environment	Unsustainable resource use Climate change	Multiscale integrated planning	Interdependent; Complex; Transient; Contested	International, regional; National; Local
		Balanced regional development	Interdependent	International, regional; National
		'Brown urbanism'	Interdependent; Transient	Local
	Loss of biodiversity Pollution	Application of the concept of sustainable socio-ecosystem	Complex; Remnant; Contested	Local
		Diversity, multifunctionality of socio-ecosystems	Complex; Remnant; Contested	Local
		Protection of biodiversity and eco-compensation	Complex; Remnant; Contested; Transient	Local
	Changing disturbance regimes	Preservation of landscape heritage	Complex; Remnant; Contested; Transient	National; Local
		Quality and sustainability of human living environment	Complex; Remnant; Contested; Transient; Interdependent	Local
		Ecological land use, sustainable agriculture	Complex; Remnant; Interdependent	Local
Economics	Unsustainable resource use Increased inefficiency Narrow world views	Rational use of resources	Complex; Contested; Interdependent	International, regional; National; Local
		Innovations	Complex; Remnant; Contested; Interdependent	International, regional; National; Local
		Mult ifunctionality	Complex; Remnant; Contested; Interdependent	Local
	Lack of public participation and involvement Inflexible, closed institutions Lack of social capital	Self-sufficiency of communities	Complex; Remnant; Contested;	Local
		Mutually beneficial links with the city	Complex; Remnant; Transient; Interdependent	Local
		Innovations	Complex; Remnant; Contested; Transient; Interdependent	National; Local
Equity	Unsustainable resource use	Perceived quality of life	Complex; Remnant; Contested; Transient; Interdependent	National; Local
	Lack of public participation and involvement	Involvement of rurban communities into decision making	Complex; Contested	National; Local

Continuation of Table 4.1

	Lack of social memory Lack of social capital	Maintenance of social diversity and diversity of lifestyles	Complex; Remnant; Contested; Interdependent	Local
		Development of communities, formation of local institutions, organizations, and social links	Complex; Remnant; Contested; Interdependent	Local
Aesthetics	Unsustainable resource use Narrow world views	Aesthetic development as an integral part of the overall development	Complex; Remnant; Contested; Transient; Interdependent	Local
		Ecoaesthetics	Complex; Remnant; Contested;	Local
		Search for corresponding aesthetic images for rurban landscapes	Complex; Remnant; Contested; Transient; Interdependent	Local
		Optimization of visual diversity	Complex; Remnant; Contested;	Local
	Lack of social memory	Local identity, legibility, and distinctive aesthetic image	Complex; Remnant; Contested; Transient; Interdependent	Local
		Preservation of landscape heritage	Complex; Remnant; Contested;	National; Local
		Preservation of rural dimension	Complex; Remnant; Contested;	National; Local
	Lack of public participation and involvement	Humanization of living and working environment	Complex; Remnant; Contested;	Local
Experience	Narrow world views Lack of social memory	Alternative landscapes, new and distinct form of settlement, new type of landscape	Complex; Remnant; Contested; Transient; Interdependent	National; Local
	Inflexible, closed institutions Lack of social capital Lack of public participation and involvement	New experience and skills for development and management of such alternative rurban landscapes	Complex; Remnant; Contested; Transient; Interdependent	International, regional; National; Local
Ethics	Unsustainable resource use	Need to reconcile the ecological ethics, aesthetics, and functionality	Complex; Remnant; Contested; Transient; Interdependent	National; Local
	Lack of social memory Lack of public participation	Ecological education and ecological literacy	Complex; Remnant; Contested	Local
		Need to develop place awareness, topophilia	Complex; Remnant; Contested;	Local

Continuation of Table 4.1

	and involvement			
		Necessity to coordinate and reconcile different, often contradictory sets of values, lifestyles of rural and new urban residents	Complex; Remnant; Contested; Interdependent	Local
	Narrow world views	Need for ethical innovations, where previous values are the basis for new coherent solutions	Complex; Remnant; Contested; Interdependent	National; Local

4.2. Possibilities for regulation of rural-urban interface landscapes

Uncertainty as a condition for planning of rural-urban interface areas. Uncertainty – the state of being unsure of something, unpredictability, doubt – is an essential feature of contemporary life in many of its spheres, and, as Antrop (2004) notes, is characteristic to landscape change and planning – i.e., the objects of this research and this section. Landscape planning – a multidimensional process and a complex of activities which aim to steer the ongoing processes structuring our environment – deals with a hardly predictable future, lots of variables, is accessible for many parties, both governmental and non-governmental and, consequently, implies a lot of uncertainty (Antrop, 2004; Westerink *et al*., 2013). Moreover, the planning of rural-urban interface areas in particular means dealing with many sources and aspects of uncertainty simultaneously as these territories themselves are clear examples of uncertainty in and complexity of the contemporary landscape and may be seen as complex systems in the state far from equilibrium both with reference to the urban or rural territory model or as composites of contradictions (Antrop, 2004, Swensen and Jerpasen, 2008, Nilsson, Sick Nielsen and Pauleit, 2008). Many factors, both non-local (Musacchio, 2009) and local, affect rurban landscapes; their development is determined at different scales from global to local, and numerous research approaches and methods are needed in order to understand these landscapes. Many documents of international, national or local significance can actually or potentially influence their planning, and the lack of experience in planning and managing these emerging types of landscape is evident (Musacchio, 2009). The factor of uncertainty both in the field of landscape planning and the complexity and uncertainty embodied in the rurban landscapes themselves encourage to look for planning approaches.

Ideas relevant to the planning of rural-urban interface areas. According to Antrop (2004), uncertainty in landscape planning cannot be avoided, but appropriate methods must be applied to deal with it, and the precautionary principle is an adequate measure in this case. The precautionary principle states that action should be taken when a problem or a threat occurs, but not after harm has already been inflicted; it is an approach to decision-making which justifies preventive measures or policies despite scientific uncertainty about whether detrimental effects will occur (World..., 1998). The key elements of the precautionary principle include: the anticipatory action to prevent harm, the community's right to know complete and

accurate information on the potential impacts, examination of the full range of alternatives including no action, full cost accounting when evaluating potential alternatives, transparent, participatory decision making informed by the best available science and other relevant information (Wingspread..., 1998; Environmental..., 2014). Consequently, the precautionary principle in the rurban landscape planning under condition of uncertainty requires a multiscale scientific sustainability-based approach in planning and the related research ranging from the global to local level and from abstract to very specific and concrete place-based information.

The multiscale or multi-level principle is being extensively applied in landscape planning and research (Rozenblat, 2009, Berte *et al*., 2013, City..., 2014) and is implemented at the political and societal levels (Jeffery, 1997; Tasan-Kok and Vranken, 2011). The general term means 'pertaining to', or 'operating across' multiple scales solving physical problems which have important features at multiple scales, for example, spatial scales (Geiser, 2014). According to Berte *et al*. (2013), multiscale processes in landscapes underpin both the natural and the social systems which are based on multilevel relations. Thus rurban landscapes as socio-ecological systems (Resilience..., 2002, Buxton and Low Choy (2011) or coupled human and natural systems (Musacchio, 2009) are not an exception. With reference to Berte *et al*. (2013) and Antrop (2000), several important principles of multiscale systemic approach applicable to rurban landscapes can be distinguished:

- Rurban landscapes change continuously under the influence of 'internal' (those that may be controlled at the local level – the urban settlement and its zone of influence) and 'external' (influence on the local landscape conditions through upper level strategies and policies, for example, of national and supra-national levels) factors.

- Decisions directly or indirectly influencing rurban landscapes are made at different hierarchical levels of policy-making (for example, from the global or the EU (European Union) level to the municipality or local place level) and manifest themselves in terms of actions at different levels (from changes in ideas and paradigm shifts (sustainability, precautionary principle, etc.) to arrangements of lots in suburbs and infrastructure planning).

- Multiscale processes work through connections, junctions, and linkages between the dynamics at different levels (for example, rural-urban interface problematics should be recognized at the global, regional, national levels, and so forth).

According to Vanempten (2009), "rurbanity also challenges policy-making concerning these areas, requesting an integrated rather than a sectorial approach and a regional perspective and scale for their redevelopment. The rurban reality therefore challenges contemporary urbanism to go beyond its classical boundaries and methods, to incorporate other disciplines, to play out its integrating role." As the precautionary principle indicates, the actions at each scale (regional, national, local, etc.) must be guided by the adequate scientific research, regulatory documents, and other relevant information (Environmental..., 2014). Landscape research and its applications in planning use and combine very different scientific methods from

natural to social sciences (Antrop, 2004); numerous research approaches and methods can be successfully applied at different levels, in different scales, for analyzing spatial, temporal and other aspects of rurban landscapes: landscape monitoring and analysis based on remote sensing, GIS-based approaches, for example, historic map overlay and historic landscape characterization, visual landscape characterization, aesthetic and ecological assessment, cultural and economic valuation, analysis of social significance, etc. Numerous international, regional, national, local level strategic, political and legal documents, research and management guidelines, reports, reviews, plans, feasibility studies and other material can and should also be used in the planning and management of rurban landscapes. Thus it is important to carry out the appropriate researches and to apply the appropriate guiding documents at the appropriate scale.

In order to solve this question, the concepts of sustainability science – the research that produces useful knowledge and practical advice for highly complex problems (Clark, 2007; Musacchio, 2009) – and landscape sustainability were applied. According to Clark (2007), "sustainability science is a field defined by the problems it addresses rather than by the disciplines it employs"; it focuses on "understanding the complex dynamics that arise from interactions between human and environmental systems" and the "advancing understanding of coupled human-environment systems" in the "areas ranging from complex systems theory to cultural and political ecology." Musacchio (2009) noted that researchers and practitioners working in the field of landscape research "have reinterpreted the definition of sustainable development to include the holistic basis of landscapes" and distinguished environment, economics, equity, aesthetics, experience, and ethics as the dimensions of landscape sustainability.

Approach towards planning of rural-urban interface areas and related research. Considering the issues discussed above, the following aspects of our approach may be outlined:

1) uncertainty related with landscape planning and rurban landscape as a particular landscape type;

2) precautionary principle requiring anticipatory action, right to know, alternatives assessment, full cost accounting, and research-based participatory decision process (Environmental..., 2014);

3) multiscale approach to landscape research and planning;

4) the idea of sustainability science;

5) landscape sustainability in the interrelated dimensions of environment, economics, equity, aesthetics, experience, and ethics (Musacchio, 2009);

An approach towards rurban landscape planning and related research based on four major interrelated scales – global, regional, national, local – was developed. The outline of the approach is presented below and includes a short definition of each scale and the identification of the most important aspects regarding uncertainty, precautionary measures, sustainability science, landscape sustainability, and documents and measures at each of these scales:

1. Global scale – the worldwide scale, the whole of human civilization, experience, trends, ideas, non-local phenomena (Musacchio 2009). Uncertainty:

outcomes of globalization, economic, social, environmental, urban dynamics at the global scale, emerging ideas and technologies, paradigm shifts. Precautionary measures: anticipatory action, alternatives assessment, research-based decision process. Sustainability science: ideas and paradigms regarding human-nature interactions, globalization, global phenomena of urbanization, metropolization, urban sprawl, landscape and lifestyle changes, and climate change, etc. Landscape sustainability: the most relevant dimensions of landscape sustainability at this level are environment, economics, equity, experience, and ethics. Documents and measures: international documents – charters, conventions, documents reflecting the relevant experience of different regions and countries, feasibility studies and reports on social, demographic, economic, environmental, rural, urban, etc. dynamics at the global scale, landscape and geographic monitoring systems, spatial analysis systems, etc.

2. Regional scale – continental (for example, the European scale of planning), supra-national, regional level. Uncertainty: economic, environmental and related urban dynamics at the regional scale, changes in landscape identity across regions, unclear social, economic and ecological outcomes of strategies and plans, etc. Precautionary measures: anticipatory action, alternatives assessment, full cost accounting, research-based decision process. Sustainability science: urbanization dynamics, economic flows, even or uneven development, identity of regions, etc. Landscape sustainability: the most relevant dimensions of landscape sustainability at this level are environment, economics, equity, experience. Documents and measures: sustainability strategies and other strategic as well as political documents regarding urbanization, economic development, infrastructure, environment, etc., directives, feasibility studies, reports at continental or regional level, landscape and geographic monitoring systems, spatial analysis systems, etc.

3. National scale – territory of the country. Uncertainty: landscape transformations and urban dynamics at the national scale, changes in landscape identity, unclear social, economic and ecological outcomes of strategies and plans, etc. Precautionary measures: anticipatory action, alternatives assessment, full cost accounting, research-based decision process. Sustainability science: nature-human interactions at the national scale, urbanization dynamics at the national scale, even or uneven development of regions at the national scale, historic landscape character, national identity, etc. Landscape sustainability: the most relevant dimensions of landscape sustainability at this level are environment, economics, equity, experience. Documents and measures: national sustainability strategies, various strategic plans of national level, master (general) plans of the territory of the country, feasibility studies, reports concerning the national level, landscape and geographic monitoring systems, spatial analysis systems, etc.

4. Local scale encompasses different levels from the local place to the whole metropolitan area (City..., 2014), including urban settlement/city and its influence zone, rurban territory, etc. Uncertainty: landscape transformations at the local scale, multiplicity of stakeholders, conflicting interests, unclear aesthetic, social, economic and ecological outcomes of plans, etc. Precautionary measures: anticipatory action, right to know, alternatives assessment, full cost accounting, research-based

participatory decision process; particular attention should be paid to the right to know and to participation. Sustainability science: research on the interactions between the urban settlement and the surrounding natural and rural areas, between the society and the environment at the local level, issues of landscape fragmentation (ecological, aesthetic, social), multifunctionality, sustainability of communities, historic landscape character, local identity, environmental conditions, human health etc. Landscape sustainability: at this scale, all the dimensions of landscape sustainability – environment, economics, equity, aesthetics, experience, and ethics – become relevant, particular attention should be paid to the environment, aesthetics and social issues. Documents and measures: sustainability strategies, urban development strategies of the city and its zone of influence, feasibility studies, reports concerning the local level, master plans, special plans, detailed plans, place concepts (Westerink *et al*., 2013), landscape and geographic monitoring systems, spatial analysis systems, etc.

Application of the approach towards planning of rural-urban interface areas and related research in the Lithuanian context. Uncertainty is the particular feature of Lithuanian landscape development and planning including the rapidly emerging rurban areas both because of the shifts from the centralized Soviet urban planning to the present day situation and due to the non-control of the evolution according to the lifestyle changes and the liberalist economic trends. This encourages reviewing problems and challenges of landscape planning related to the rural-urban interface in Lithuania and illustrating the relevance and applicability of the above-presented approach with its case.

The appropriate regulation of the process of urbanization, landscape sustainability and perceived quality is the basic premise for the development of healthy, aesthetic and ergonomic living, work, and recreational environment. In different countries, these activities are developed at concept, legal, administrational, and territorial planning levels (Kamičaitytė, 2000; Kamičaitytė-Virbašienė, 2003). Kamičaitytė (2000), Kamičaitytė-Virbašienė (2003) carried out an extensive review how the process of urbanization and landscape visual quality, which are both very important for the development of metropolitan areas, is regulated in different countries including France, Italy and Spain. Lithuania also possesses a body of strategic, political, legal, and territorial planning documents directly and indirectly influencing urbanization, landscape quality, and the development of rurban landscapes produced by the National Strategy of Sustainable Development (Government of the Republic of Lithuania 2003, 2011) to master plans of urban settlements and detailed plans. Kamičaitytė (2000) presents a general scheme of the regulation of urbanization process encompassing six steps: provisions of regulation of urbanization, legal basis, administration and planning, urbanization, monitoring, and evaluation of results *(Fig. 4.3)*.

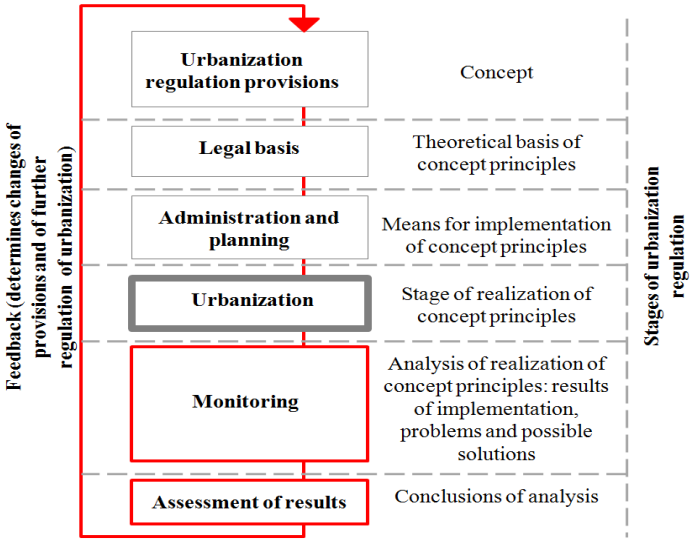


Fig. 4.3. General scheme of regulation or urbanization process demonstrating the importance of systematic monitoring and assessment of results redrawn and translated from Kamičaitytė (2000) by the author

The two final stages – systematic monitoring and assessment – are very important in order to demonstrate the reality of territorial planning in Lithuania in the context of the rural-urban interface and to develop adequate recommendations. However, no official systematic monitoring of urban dynamics is being carried out at the present day in Lithuania (Bardauskienė and Pakalnis, 2010). Consequently, the review of the present situation was based on the territorial planning documents, former and present scientific researches and reviews including Pakalnis (2010), Bardauskienė and Pakalnis (2010, 2012), Pakalnis and Bardauskienė (2012), Čereškevičius (2012), Cirtautas (2012), Gadal (2011; 2012), Ramanauskas and Dringelis (2011; 2013), Vanagas and Neniškis (2000), ongoing changes in the landscape and our own observations. Pertaining to the problems and challenges of landscape planning related to the rural-urban interface originating at different levels distinguished in the previous section – global, regional, national, local – the relevant documents and recommended actions for more sustainable development are presented below.

1. Global scale. Problems: different trends and ideas affect the contemporary landscape planning and management of the rural-urban interface and the related research around the world including the ideas presented above (socio-ecological systems and resilience of such systems (Resilience..., 2002, Buxton, Low Choy, 2011), the precautionary principle, the development of contemporary cultural landscapes (Berte *et al*., 2013), ecoaesthetics, a holistic, integrated approach towards landscapes, multiscale approach to planning) as the answers and reactions to the contemporary global environmental, aesthetic, economic and other challenges. Many of these ideas have originated as a part of the sustainability science and are linked

with the general idea of sustainable development. Even though Lithuania has developed the official National Strategy of Sustainable Development declaring that the strategic priorities and principles of the country's sustainable development reflect the interests of Lithuania and their peculiarities as well as the priorities of the *Renewed EU Sustainable Development Strategy* and other programmatic documents, and Lithuanian landscapes, including the areas of the rural-urban interface, are affected by such global trends as metropolization, industrialization, commercialization, uniformity, it is possible to state that the principles of sustainability are still not integrated into territorial planning (Ramanauskas and Dringelis, 2013) and are not visible in the actual development of the rurban areas. According to Bardauskienė and Pakalnis (2010), it is difficult to evaluate the correspondence of the contemporary landscape and urban dynamics of the country to the principles of the *National Strategy of Sustainable Development* as no systematic monitoring and evaluation of urban development is being carried out; however, the contemporary landscape reality demonstrates basic discrepancies. A more detailed analysis of these manifestations is presented below at the lower – regional, national, local – levels.

Documents: Paradigmatic documents: Our Common Future (World Commission on Environment and Development, 1987), Wingspread Statement on the Precautionary Principle (1998), Rio-Declaration, Agenda 21 (United Nations Conference on Environment and Development, 1992), Johannesburg Declaration on Sustainable Development and Johannesburg Plan of Implementation (World Summit on Sustainable Development, 2002), etc. Sectorial documents important to rurban areas: Charter of New Urbanism (The Congress for the New Urbanism, 1996) regarding polycentric multifunctional development of rurban areas, Burra Charter (Australia ICOMOS (International Council on Monuments and Sites) 1979; 2003), Charter on the Interpretation and Presentation of Cultural Heritage Sites (ICOMOS, 2008) regarding the cultural significance and interpretation of rurban landscapes, International Charter for the Conservation and Restoration of Monuments and Sites (2nd International Congress of Architects and Technicians of Historic Monuments 1964), Historic Gardens Charter (ICOMOS, 1981), Charter on the Built Vernacular Heritage (ICOMOS, 1999) regarding rural heritage in rurban areas, etc.

Actions: integration of the global experience, advances and paradigms corresponding to the country's interests, peculiarities, and identity into the territorial planning and their systematic application to rurban areas.

2. Regional scale. Problems: The competition of urban settlements in the continental, regional and even in the global context is the new reality that the Lithuanian urban development policy has to face (Cirtautas, 2012) together with the integration into the European, Baltic Sea region organizations; this affects rural-urban interface processes. Researchers analyzing the problematics of the country's spatial development in the regional scale (Vanagas and Neniškis, 2000; Vanagas, 2003; Gadal, 2011; 2012; Cirtautas, 2012) identify lack of contextualization and insufficient interest in the potential of spatial organization of the Lithuanian territory and cities in the international context (Vanagas and Neniškis, 2000), absence of integrated territorial politics linked to the economic development, and lack of real

development policy at the national and regional levels (Gadal, 2011; 2012). According to Vanagas and Neniškis (2000), the collapse of the planned urbanization system of the Soviet era, and the period of geopolitical reorientation resulted in ignoring the international context and the international territorial systems; hence, Lithuania is being seen solely as a transit country; the policy of even regional development of the Soviet period in this new reality is even seen as a shortcoming, and the possibility to increase the potential of Lithuanian cities by creating a bipolar structure – a tandem of two cities – is being discussed (Vanagas and Neniškis, 2000; Vanagas, 2003). The geopolitical reorientation and the emphasis on the large urban structures, as well as the process of metropolization are changing and will change in the future the problematics of the rural-urban interface in the country.

Documents: European level paradigmatic and sectorial documents: Renewed EU Sustainable Development Strategy and related documents, European Landscape Convention (Council of Europe, 2000), European Spatial Development Perspective (European Commission, 1999), The Cork Declaration (The European Conference on Rural Development, 1996), Urban Sprawl in Europe, the Ignored Challenge (European Environment Agency report, 2006), Leipzig Charter on Sustainable European Cities (Council of Ministers, 2007), Pan-European Biological and Landscape Diversity Strategy (3rd Ministerial Conference "An Environment for Europe" 1995), etc. EU directives: Environmental Impact Assessment Directive, Strategic Environmental Assessment Directive, Environmental Liability Directive, Habitats Directive, Urban Waste Water Directive, etc. Regional initiatives: Wismar Declaration on Transnational Spatial Planning and Development Policies for the Baltic Sea Region (Conference of Ministers Responsible for Spatial Planning and Development in the Countries of the Baltic Sea Region, 2001) and other initiatives by VASAB (Visions and Strategies around the Baltic Sea) – intergovernmental multilateral co-operation of 11 countries of the Baltic Sea Region in spatial planning and development guided by the Conference of Ministers responsible for spatial planning and development steered by the Committee on Spatial Planning and Development of the Baltic Sea Region composed of representatives of the respective ministries and regional authorities (Visions..., 2014).

Actions: integration of the continental and regional experience, advances, ideas and provisions of documents corresponding to the country's interests, peculiarities, and identity in the territorial planning and their systematic application to rurban areas, contextualization of territorial planning while taking into account the situation including the communication routes and the urban dynamics in the continent and in the Baltic Sea Region, the development of a more active territorial and spatial strategy in the regional context (Vanagas and Neniškis, 2000) while taking into account the contemporary socio-economic and geopolitical realities and the Lithuanian experience of even regional development, understanding the role and potential of Lithuanian urban settlements in the continental network of cities, examination of the full range of urban dynamics alternatives and full cost accounting when evaluating potential alternatives in the regional context.

3. National scale. Problems: Legal documents regulating urban dynamics, rural and regional development in the country are changing and are being constantly amended. The recently adopted new Law on Territorial Planning (2013; 2014) and the related documents integrate some advances of territorial development, including the notion of sustainability, complex (integrated) territorial and spatial development, multifunctionality, etc. However, the post-Soviet transition process, the legislation changes, and the lack of a consistent approach condition that, currently, the actual territorial and spatial development does not follow the strategies and plans including the goals of sustainability (Ramanauskas and Dringelis, 2013) – there is a dichotomy between the reality of urbanization and the urban development plans implemented by municipalities or the state (Gadal, 2011) – and this situation is clearly reflected in the areas of the rural-urban interface surrounding the largest cities of the country. The contemporary urbanization is guided by liberalism and the reality of spatial dynamics of metropolization and urbanization, and *de facto* existing urban metropolitan regions are not recognized by the state yet (Gadal, 2011; Cirtautas, 2012). The well-known case of *Vilnius-Kaunas Dipolis* (Vanagas and Neniškis, 2000; Vanagas, 2003) demonstrates the contradictions between the theoretical ideas and the actual processes, as both cities expand into the opposite directions (Gadal, 2011). Another example is land restitution and unregulated privatization of land after the collapse of the Soviet regime regardless of master plans (Ramanauskas and Dringelis, 2013), which became one of the reasons of the unregulated development of rural-urban interface areas. In fact, researches (Bardauskienė and Pakalnis, 2010; Pakalnis, 2010; Čereškevičius, 2012; Cirtautas, 2012; Ramanauskas and Dringelis, 2013) and the landscape reality demonstrate the paradoxical situation – territorial planning often follows the development and interests. According to Pakalnis (2010), in the public realm, the territorial planning is controversially perceived as a chain of procedures aimed at legalizing certain activities, as a means to realize of hinder certain development projects. The trends and scale of development of some urban settlements envisioned in the planning documents are not objectively determined by the logics of urban dynamics but adjusted to the needs of the politicians of local municipalities and the influential business interests standing behind them (Čereškevičius, 2012). This lack of competence and transparency determined the deregulation of urban expansion and the disproportionate influence of the market forces and private capital in the contemporary urban development (Cirtautas, 2012, Ramanauskas and Dringelis, 2013), especially in the rurban areas. Another aspect determining unregulated and ineffective urban planning, as identified by Pakalnis (2010), is the dominance of the sectorial influence (environmental protection, creation of favorable conditions for economic activities, heritage preservation, etc.) over the general integrated goals of master and detailed plans.

Documents: Strategic documents: Strategy of Long-term Development of the Country (Seimas of the Republic of Lithuania, 2002), Strategy of Lithuanian Regional Policy (Government of the Republic of Lithuania, 2005), National Strategy of Sustainable Development, Lithuanian Strategy of Environmental protection (Ministry of Environmental Protection of the Republic of Lithuania, 1996), National Strategy of Rural Development (Ministry of Agriculture of the Republic of

Lithuania, 2007), etc. Political and program documents: Landscape Policy of the Republic of Lithuania (Government of the Republic of Lithuania, 2004), Architecture Policy of the Republic of Lithuania (Government of the Republic of Lithuania, 2005), Program of Regional Development of the Republic of Lithuania (Government of the Republic of Lithuania, 2006), etc. Laws: Law on Land Reform (1991, 2013), Law on Regional Development (2002), Law on Territorial Planning and the related documents (1995, 2013, 2014), Law on Protected Areas (1993, 2001), Law on Immovable Cultural Heritage (1994, 2004), Law on the Land (1994, 2004), Law on Forests (1994, 2001), Law on Construction (1994, 2014), Law on Green areas (2007), etc. Territorial planning documents of the national scale, for example, the Master Plan of the Territory of the Republic of Lithuania. Research reports, feasibility studies, resolutions; for example, the resolutions of the Urban Forums annually organized by the Ministry of Environment and other institutions. The Urban Forum of 2010 was dedicated to the rural-urban interface.

Actions: Improvement of planning and landscape management competences. The development of a complex policy of urban, rural, and regional development and an overall vision of the country's spatial development (Bardauskienė and Pakalnis, 2010) integrating the anticipatory action, alternatives assessment, full cost accounting, and research-based decision-making process. Understanding of rurban problematics and incorporation of related concepts into legal documents. Sectorial interests must be integrated in and coordinated (Pakalnis, 2010) by the common vision of rural and urban development. Urban dynamics, rural-urban interface, rural development, development of the country's regions must be systematically monitored and evaluated at the national level. National level institutions should be actively involved in the development of master plans (Bardauskienė and Pakalnis, 2010).

4. Local scale. Problems: The prospects of urban development acquire the juridical basis through the solutions of master plans (Čereškevičius, 2012). The local level – the territory of a municipality, an urban settlement, segments of the rurban areas – clearly demonstrates the shortcomings of the territorial planning and of the development of rurban areas in Lithuania. According to Bardauskienė and Pakalnis (2010), cotemporary master plans of urban settlements fail to balance the socio-demographic trends and the desire of municipalities to create new territories for investment. In the context of the rural-urban interface, this means the development and expansion of urbanization into rural and natural areas being uncoordinated with the overall development of the city. Official statistics demonstrates that the overall number of inhabitants and the urban population in Lithuania have been constantly decreasing. According to Čereškevičius (2012), in almost all of the country's urban settlements with the population over 10,000, the number of inhabitants decreased in the period of 1989–2011, while, the future forecast is also threatening. Meanwhile, the master plans for the cities prepared during the years 2005–2010 envision the population increase from 1.5 to 15.4 percent in these urban settlements. This ungrounded theoretical increase in the urban population is reflected in the territorial planning solutions – the average increase of the territories of the cities in these plans is 44.7 percent (Čereškevičius, 2012); for example, the master plan of Vilnius City

adopted in 2007 envisions the territory of 3,000 hectares for new developments (Bardauskienė and Pakalnis, 2010; Rimkutė, 2011); the region of Kaunas is characterized by a prominent process of suburbanization and rurban dynamics in the demographic context of the population decline (Gadal, 2011). Such evident imbalance between the demographics and the new territories intended for urbanization in the master plans combined with the above mentioned dominance of market forces and business interests reflected in the development of the built fabric when detailed plans are prepared solely for the small lots of developers or builders without the wider context, inevitably creates scattered low density urban sprawl while posing difficulty to control the transforming agricultural territories into suburban residential areas without a clear and legible urban structure, public spaces, and the corresponding infrastructure (Bardauskienė and Pakalnis, 2010; Pakalnis, 2010; Ramanauskas and Dringelis, 2011; 2013; Cirtautas, 2012) with all the negative consequences affecting the landscape identity, environment, cultural heritage, agriculture, urban composition and aesthetics, etc. Moreover, the master plans of the municipality of the city and of the municipality of the surrounding district often are not coordinated as the research of Ramanauskas and Dringelis (2013) clearly demonstrates with the case of Kaunas City and Kaunas District master plans which envision more (newer) built up areas than the ones which currently exist.

Another important issue in the territorial planning in general and in the the development of rurban areas in particular is public participation. According to Jakaitis (2005), Pakalnis (2010), despite the numerous procedures of publicity and public participation in territorial planning guaranteed by the legislation of the country, the society, due to its passivity, or due to complicated planning procedures, is not aware of the decisions made by the institutions and their influence on the quality of life. Rural-urban interface areas with a low population density, characteristic social conflicts, and with conflicts of interests, constitute a particular challenge for participatory decision making. In fact, the scattered urbanized islands in the rural or natural landscape in the rurban areas are often planned solely based on the short-term economic efficiency criteria relevant to the developer.

Documents: Strategic documents: strategies of development of particular urban settlements or regions. Territorial planning documents: master plans of municipality territory and its parts, detailed plans, special plans of municipality territory and its parts (for example, land management schemes, rural development projects, plans for development of the engineering infrastructure, plans of protected areas, etc.). Projects: construction projects, projects of green areas, etc. Other documents: development programs, feasibility and scientific studies, reports concerning the local level.

Actions: In the multiscale planning of rurban development, the most important is the support of the local context under the multiscale perspective (Berte *et al*., 2013). In this local scale, where the character, identity, functionality and environmental sustainability of rurban areas is revealed, all the precautionary measures – anticipatory action, the right to know, alternatives assessment, full cost accounting, research-based participatory decision process – should be implemented.

Several important actions that can be implemented through the legislation and territorial planning documents should be mentioned: coordination of planning documents (for example, master plans of the municipality of the city and of the municipality of the surrounding district) in order to control the territorial urban expansion and the unnecessary development of the infrastructure - compact, 'brown' urbanism (Bardauskienė and Pakalnis, 2010; Pakalnis and Bardauskienė, 2012), priority of the integrated vision, the image of the rurban area over the sectorial interests (Pakalnis, 2010), the integration of rural vernacular settlements and relicts of the rural landscape in rurban areas (Costa, Batista, 2011), application of the functioning mechanisms of consolidation of properties and land acquisition to the public needs for the development of multifunctional, polycentric rurban areas with the necessary infrastructure, legible urban structure and public areas (Ramanauskas and Dringelis, 2011), and optimization of the qualitative and quantitative parameters of already existing and new structures (Čereškevičius, 2012) in the rurban areas (researches demonstrate that investments in infrastructure are ineffective if the density is lower than 30 residents per hectare (Bardauskienė and Pakalnis, 2010)). At this level, particular attention should be paid to the development of communities and their participation in decision making. The research by Jakaitis (2005) demonstrates that public participation is more effective when using not only compulsory but also informal means including forums, lectures and seminars and should start at the stages of visions and concepts. This is important in the rurban areas where numerous social conflicts and conflicts of interests emerge. Another of his findings – that the efficiency of public participation directly depends on the degree of polycentricism of the urban area and is inversely dependent on the level of abstractness of the territorial planning goals – also demonstrates the need for polycentric rurban development resulting not only in the qualitative and efficient urban structure but also in active communities and in the importance of participation at the local level, especially concerning the development of particular residential segments of rurban areas.

4.3. Modeling the image of rural-urban interface landscapes

According to Kamičaitytė-Virbašienė (2003), developed countries devote considerable attention to landscape visual resources as an important public good at theoretical, legal, administrative, and practical planning levels. According to her, the system of regulation of landscape visual resources may encompass landscape analysis and assessment while distinguishing territories of different visual quality with different concepts of the development of visual environment (visual landscape model), regulation of visual quality changes – the integration of visual quality goals into territorial planning documents, assessment of the visual impact on environment. After the analysis of literature, including works by Kamičaitytė-Virbašienė (2001; 2003) on the landscape visual quality regulation in land management, the practical experience of landscape valuation in the United States of America, in Great Britain, Poland, Spain, Portugal, analysis of peculiarities of rurban landscapes in general and

Lithuanian rurban landscapes in particular, theoretical proposals for the aesthetic development of rurban landscapes were formulated *(Fig. 4.4)*:

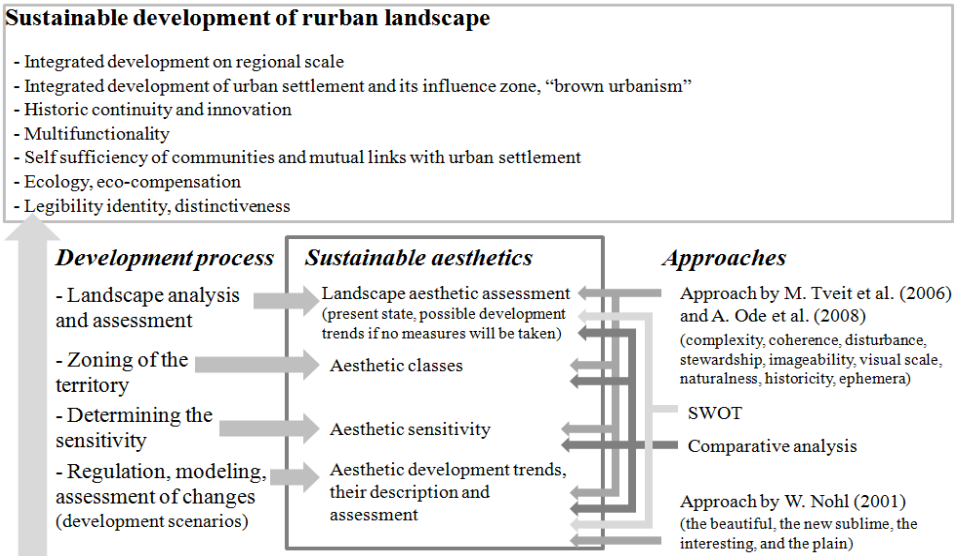


Fig. 4.4. Aesthetic development of rurban landscapes in the context of sustainability. Scheme by the author

- The development of the aesthetic image of rurban landscapes must be an *integral part of their overall sustainable development* but not an isolated goal in itself; it must be integrated in every stage of the general sequence of the landscape development process from its beginning. The landscape itself possesses a multi-functional character, it performs the ecological function, the aesthetic function, the cultural-historical function (heritage objects, land use structure, historical associations), functions of tourism and information (recreation, environmental education, interpretation), functions of resources and land use (habitat, agricultural or forestry production, water yield, etc.) (Rasa and Nikodemus, 2008); consequently, the planning and management of the rurban landscape integrate sustainable functions, environmental sustainability, heritage preservation, landscape identity and aesthetics. The approach by Nohl (2001) – *sustainable aesthetics* – integrates future scenarios of the sustainable development of landscapes and the possible trends of their aesthetic expression: the better or more sustainable landscape use modifies its aesthetic reality. Nohl (2001) argues that this may be a helpful tool in landscape planning.

- The stage of *landscape analysis and assessment* should integrate not only the functional, ecological, heritage preservation, socioeconomic and other aspects but also the landscape aesthetic assessment. The dynamic character of rurban landscapes requires not only the assessment of the present state, but also possible different trends of future development (urbanization, abandonment, re-naturalization, etc.) if no measures are taken. The above presented methodology based on the approaches

of Tveit *et al*. (2006), Ode *et al*. (2008) and Jankevica (2012) can be applied for the aesthetic assessment of the present state and possible development trends; the SWOT (strengths, weaknesses, opportunities and threats) analysis and comparative analysis of the present state and future hypothetical situations can be carried out.

- *Zoning of the territory* under analysis should integrate the typology of rurban landscapes according to the degree of urbanization, the presence of the relicts of the historic rurban landscape and the aesthetic quality. Four or more classes of aesthetic quality can be distinguished. When distinguishing the aesthetic classes, it should be noted that some concepts or sets of concepts are more important for different categories of landscape than others: for a predominantly natural landscape with urban insertions, the concepts of naturalness and ephemera are far more relevant than that of historicity, for a rurban landscape with valuable relicts of the historic rural landscape, the most important concepts would be those of historicity, coherence, stewardship, etc. *(Fig. 4.5)*.

- The *sensitivity* (from ecological, heritage preservation, visibility, aesthetics, social, economic and other points of view) of different zones towards landscape changes can be also determined. The higher is the aesthetic class, the more sensitive is the territory from the aesthetic point of view. The aesthetic sensitivity can also be influenced by the type of users (tourists, locals), the quantity of users, the social significance of the territory, the uses of the adjacent territories, the status of the protected territory (Kamičaitytė-Virbašienė, 2003).

- The *regulation and modeling of changes* of rurban landscapes should encompass the determining of priorities – ecological, agricultural, social (development of communities), urbanization (needs of the city), cultural, economic, industrial, heritage preservation etc. – based on the features and sensitivity of the territory and the needs of the urban settlement and the construction of *development scenarios* based on the determined priorities. Several alternative scenarios can be developed, evaluated and compared. These scenarios may include the functions and activities, plans and spatial structures, heritage preservation requirements, desirable ecological conditions, etc. and landscape aesthetics. In order to evaluate the alternative scenarios for the same area, SWOT analysis could be carried out. An example of the construction and evaluation of scenarios for the development of the rurban areas with the relicts of the Soviet rural landscape is presented in *Table 4.2*.

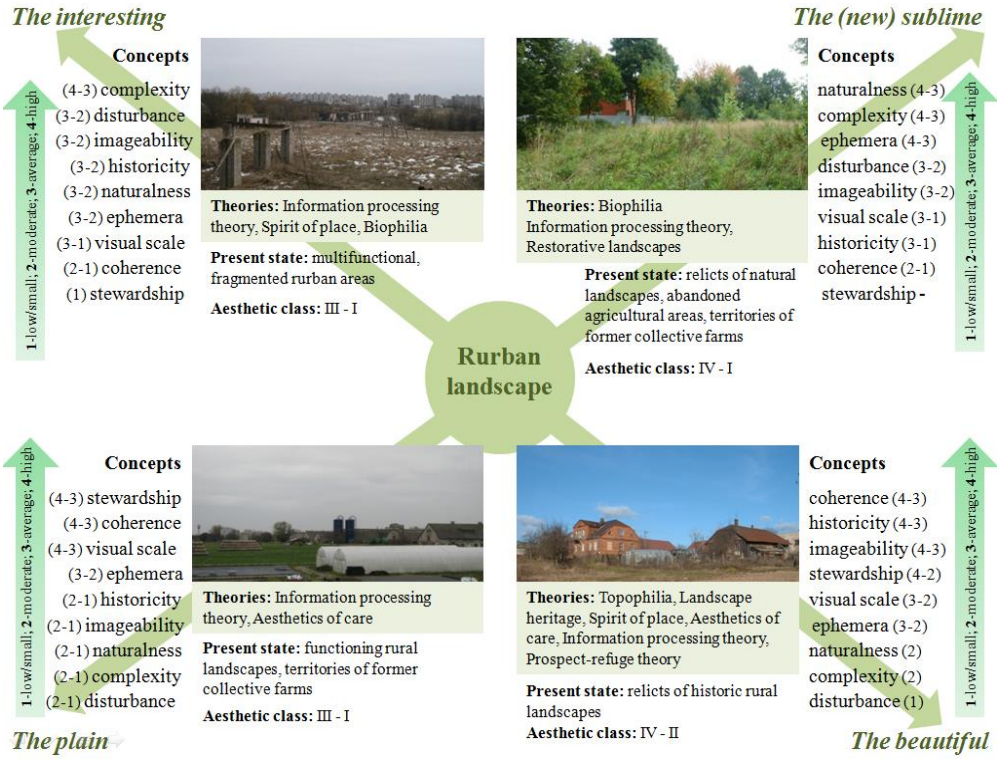


Fig. 4.5. Possible aesthetic development trends of different rurban landscapes: aesthetic categories by Nohl (2001) are used as landscape prototypes; concepts should by assessed by using indicators by Ode *et al*. (2008); aesthetic classes range from IV (highest) to I (lowest); landscape aesthetics theories potentially influencing preferences towards these landscapes are indicated as well. Scheme by the author

Table 4.2. Scenarios of development of the relicts of the Soviet rural landscape in the areas of rural-urban interface. Table by the author

Priorities						
Ecological		Agricultural		Peri-urban	Urban	
Scenarios						
1.	2.	3.	4.	5.	6.	7.
Renaturalized landscapes - re-creation of the image of natural landscape	**Succession landscapes** - leaving landscapes for spontaneous renaturalization while simultaneously maintaining some signs of their	**Unusual landscapes** - creating interesting, unusual, new types of landscape in the vicinity of the city	**Agricultural functional landscapes** - developing/maintaining agricultural landscapes in the vicinity of the city	**Recreational landscapes** - development of unusual recreational settings for urban population	**Peri-urban landscapes** - developing interesting and humane peri-urban environment with focal points for communities, specific character and the reminders of the place's	**Urban landscapes** - developing high quality urban environment

	previous use				history	
Conditions for implementation of scenarios						
- Considerable distance from the city and / or difficult accessibility - High ecological importance of the area due to intensive urbanization of surroundings or adjacent valuable natural areas - Derelict emergency state buildings and other structures of low cultural significance and economic value	- Considerable distance from the city and / or difficult accessibility - High ecological importance of the area due to intensive urbanization of surroundings or adjacent valuable natural areas - Derelict buildings and other structures of low cultural significance and economic value	- Considerable distance from the city - High ecological importance of the area or area is unsuitable for agriculture - Good or satisfactory state buildings	- Good accessibility - Area is suitable for agriculture - Good or satisfactory state buildings and infrastructure - Low or moderate ecological significance of territories	- Good accessibility - High social and ecological importance of the area due to intensive urbanization of surroundings (predominant residential use) - Good or average state buildings - Relicts of other types of historic rural landscape may be present in the territory	- Territories in close proximity to the city, good accessibility - High social and economic importance of the territory (residential and other uses) - Good or average state buildings	- Territories in close proximity to the city, good accessibility - High economic and social importance of the territory - Bad or emergency state buildings and other structures of low cultural significance and economic value
Strengths, weaknesses, opportunities, threats						
S: restoration of natural landscape, increase in biodiversity **W:** diminished possibilities of social and economic use **O:** ecological compensation, environmental education **T:** aesthetic unattractiveness of overgrown	**S:** restoration of more natural landscape, increase in biodiversity **W:** diminished possibilities of social and economic use **O:** ecological compensation,	**S:** restoration of more natural landscape, diversification of peri-urban economy, re-use of buildings **W:** limited array of activities to be developed **O:** ecological compensation, environmental and	**S:** continuity of use, local agricultural production for the city **W:** ecological degradation, diminished possibility of other uses **O:** economic viability, ecological production, agricultural education **T:** sharp contrasts	**S:** social use and environmental preservation **W:** diminished possibilities of economically profitable uses, required subsidies **O:** ecological compensation, environment	**S:** redevelopment of the area preserving the traces of the past **W:** ecological degradation of the area, loss of natural elements and possibilities of agricultural use **O:** living environment	**S:** redevelopment of the area, elimination of emergency state buildings and ruins **W:** ecological degradation of the area, loss of natural elements and possibilities of agricultural

areas	environmental education **T:** aesthetic unattractiveness of overgrown areas and ruins	agricultural education, increased social and economic viability **T:** unattractive contrast between overgrown areas and reconstructed buildings	between rural and urban aesthetics in the areas in closer proximity to the city	al education, strengthening of communities **T:** high pressures for urbanization, high maintenance costs	with distinctive identity **T:** sharp contrast between aesthetics of urbanized areas and former agricultural buildings, visual complication	use, radical change of landscape character **O:** development of high quality urban environment **T:** unregulated urban expansion, visual complication
New aesthetic perceptual categories under sustainable landscape conditions according to Nohl (2001)						
The (new) sublime (landscape prototype – natural landscape)	**The (new) sublime** (landscape prototype – succession landscape)	**The (new) sublime** (landscape prototype – succession landscape) **The interesting** (landscape prototype – urban-industrial landscape)	**The plain** (landscape prototype – rural functional landscape)	**The beautiful** (landscape prototype – traditional cultural landscape) **The interesting** (landscape prototype – urban-industrial landscape)	**The interesting** (landscape prototype – urban-industrial landscape) **The beautiful** (landscape prototype – traditional cultural landscape)	**The beautiful** (landscape prototype – traditional cultural landscape) **The interesting** (landscape prototype – urban-industrial landscape)

According to Antrop (2008), landscape research should focus more on forecasts and scenarios. He notes that much landscape research is descriptive; it contributes mainly to knowledge, but rarely serves as a basis for planning the future development. Thus the scenario approach was selected as a tool to coordinate all the above mentioned aspects and to strive for the desirable landscape quality and image. *Table 4.3* demonstrates seven scenarios of the treatment of the relicts of the Soviet rural landscape in the areas of rural-urban interface. The table includes:

- the identification of priorities (ecological – the image of natural landscape, agricultural – the image of functional agricultural landscape, peri-urban – the image of sustainable peri-urban development with strong emphasis on the social aspects and communities, urban – the image of high-quality urban environment) reflecting the traditional transition from natural and agricultural areas to the increasingly more densely urbanized environments;

- the title and short description of each scenario that reflect the desirable image of each envisioned landscape;

- the conditions for the implementation of these scenarios including the distance from the city, its accessibility, the surrounding environment, the ecological importance of the area, the state of buildings and other structures;

- the identification of the related strengths, weaknesses, opportunities, and threats of scenario implementations;

- the possibilities to develop types of sustainable landscape distinguished by Nohl (2001) – the beautiful, the new sublime, the interesting, and the plain – with the corresponding aesthetic character.

- the new sublime. Sustainable landscapes must contain areas where nature can develop freely and spontaneously, and such parts of landscape simultaneously can be very informative and aesthetically appealing, as Nohl (2001) observes. According to Nohl (2001) and Jorgensen (2011), strong ecological, environmental orientation stemming from the massive destruction of nature and from the threat of ecological disasters influences the aesthetic landscape perception. Nohl (2001) uses the old concept 'sublime' to describe the new aesthetic category generated by the self-dynamics, self-productivity and self-regulation power of nature while demonstrating that not everything on earth depends on the human will and human power. He characterizes these landscapes as *disharmonic, unordered, fragmented, unstable, not easy to read, mysterious*. *This aesthetic category can be easily applied in the rurban areas as a part of productive or recreational landscape*. Moreover, spontaneous re-naturalizing landscapes are important from the ecological and educational points of view. For example, the new sublime landscapes may emerge in the abandoned agricultural land and farming complexes in the areas of the rural-urban interface.

- the interesting. This aesthetic category, according to Nohl (2001), is related to the landscapes where a multiplicity of land uses generates confusing, incoherent, labyrinthine, hardly understandable environments and events; however, the interesting in the right place affects us positively even if it includes ugly things. This aesthetic category of landscape is full of contradictions – *designed and undesigned, beautiful and ugly, new and familiar, bizarre and usual, known and mysterious* (Nohl, 2001) – and very well corresponds to the nature of mutable, transitory rurban landscapes. *Rural landscapes with small isolated islands of suburban housing, abandoned farming buildings and equipment, unusual combinations of spontaneous nature and logistics, commercial, infrastructure buildings can embody this aesthetic category*. Of course, these confusing interesting landscapes must be structured by larger landscape areas, by natural elements and areas (Nohl, 2001).

- the plain. The aesthetic quality of the areas of ecologically sound intensive agricultural production – rural functional landscapes – embodies the aesthetic category 'the plain'. This aesthetic category, even if not so appealing and pleasing, shows how the nature and the man-made environment could be reconciled, generates the feelings of contentment and gratitude (Nohl, 2001). *The aesthetic category 'the plain' and the agricultural function it corresponds to can be successfully accommodated in the rurban areas (for example, in the territories of former collective farms) thus limiting the urban sprawl and providing agricultural products for the city*.

- It may be possible to use only one of these categories, but often several or all of them would be necessary for the characterization of the aesthetic state (Nohl, 2001) of the certain rurban landscape.

- In order to avoid uniformity or similarity of rurban landscapes, these aesthetic prototypes should be *differentiated by local regional variations* into the multiplicity of single, unique landscapes (Nohl, 2001). The factors that would work together with the aesthetic categories while creating the local identity and uniqueness of each rurban landscape are the local ethnographic traditions embodied in the historic rural architecture and landscape management, historic relicts of rural landscape, features of natural landscape, urban expansion trends, etc.

Table 4.3. Description of the proposed scenarios of development of the relicts of the Soviet rural landscape in the areas of rural-urban interface by using the methodology based on the approaches developed by Tveit *et al*. (2006), Ode *et al*. (2008) and Jankevica (2012). Table by the author

Approach	**Concept and indicators**	**Preliminary characterization**	1.	2.	3.	4.	5.	6.	7.
Visual character, aesthetics	Complexity								
	Distribution of landscape attributes	- Richness of landscape elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	2	3	2	4	3	3
		- Diversity of land cover (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2	2	2	2-3	4	2-3	2-3
	Spatial organization of landscape attributes	- Edge density (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	1-2	2-3	2-3	3	3-4	2-3
		- Heterogeneity (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	1-2	2-3	3	3	3	2-3
		- Aggregation of land cover/patches (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3	3	3	3	3	2	2-3
	Variation and contrast between landscape elements	- Contrast (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	1-2	3	3	3	3	2-3
		- Shape variation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	2	2-3	2	3	4	3-4
		- Size variation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	2	2-3	2-3	3	4	3-4
	Coherence								
	Spatial arrangement of vegetation	- Correspondence with natural conditions (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3-4	3	3	2-3	3	2-3	2
		- Fragmentation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	1-2	2	2-3	2	3	2
		- Repetition of pattern across the landscape (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	1-2	1-2	3-4	1-2	2	3
	Spatial arrangement of buildings and structures	- Correspondence of building arrangement with natural conditions (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	-	1	3	3	3	3	3

Continuation of Table 4.3

	- Correspondence of building arrangement with landscape type (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	-	1-2	3	3	3	3	3-4
Correspondence of area with particular landscape type	- Correspondence of area with particular landscape type (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3	3	3	4	3	3	4
Disturbance								
Presence of disturbing / disturbed elements	- Presence of landscape elements classified as disturbing (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1-2	3	2	2	2	2	2
Visual impact of disturbing elements	- Area visually affected by disturbance (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - large)	1	3	2	2	2	2	2
Stewardship								
Level of management for vegetation	- Level of abandonment (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	4	4	2-3	1	2	1-2	1
	- Presence of weed (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	4	4	3	1-2	2	1	1
	- Management type (1-4) (1 - no maintenance; 2 - poorly maintained; 3 - partly maintained; 4 - highly maintained)	3	3	3	4	3	4	4
	-Management frequency (1-4) (1 - no management; 2 - random; 3 - satisfactory; 4 - systematic)	2	2	3	4	4	4	4
Status and conditions of man-made structures in the landscape	- Condition / maintenance of structures such as fences, buildings (1-4) (1 - no maintenance; 2 - poorly maintained; 3 - partly maintained; 4 - highly maintained)	1	3	4	4	4	4	4
Imageability								
Spectacular, unique and iconic elements	- Density of spectacular, unique or iconic built features (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	2	2	2	2	3	3	3
	- Density of landmarks (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1-2	1-2	1-2	3	2-3	3
	- Proportion of water (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	2-3	2-3	2	2	3-4	2-3	2
	- Density of historical elements (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1-2	1-2	1-2	1-2	1-2	1
Viewpoints	- Density of viewpoints (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	1-2	2	2	3	3-4	3-4
Visual scale								

Continuation of Table 4.3

Open area	- Proportion of open land (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	2-3	2-3	2-3	4	3	2	1-2
	- Viewshed size (1-4) (1 - small; 2 - moderate; 3 - average; 4 - large)	2-3	2-3	3	3-4	3	1-2	1-2
	- Viewshed shape (1-3) (1 - patchy open area; 2 - split open area; 3 - large open area)	1-2	1-2	1-2	2-3	1	1	1
	- Depth / breadth of view (1-3) (1 - short; 2 - medium; 3 - long)	1-2	1-2	1-2	2-3	2	1	1
Obstruction of the view	- Density of obstructing elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1-2	2	2	2	2	3-4	3-4
	- Degree of visual penetration of vegetation (1-4) (1 - blocked; 2 - dense; 3 - semi-open; 4 - open)	2	2	2-3	3-4	3	3-4	3-4
Naturalness								
Naturalness of vegetation	- Proportion of natural vegetation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	4	4	3-4	1	3	2	2
	- Level of succession (the observed process of change in the species structure of an ecological community over time) (1-4) (1 - no succession; 2 - primary succession; 3 - intermediate succession; 4 - climax)	3-4	3-4	3-4	1	2-3	1-2	1
	- Shape of edges (1-3) (1 - geometrical; 2 - intermediate; 3 - complex)	2-3	2-3	2-3	1	3	1-2	1-2
Pattern in the landscape, as perceived as natural or not	- Landscape visual fragmentation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2-3	2-3	2-3	2	2	3-4	3-4
Water bodies with natural appearance	- Proportion of water in landscape (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	2-3	2-3	2-3	1-2	3	1-2	1-2
Historicity								
Vegetation with continuity	- Proportion of landscape with continuity of land cover (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	1	1	3	1	1	1
	- Proportion of landscape with traditional land use (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1	1	3	1	1	1
Organization of landscape attributes	- Traditional field shapes (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1	1	3	1	1	1
	-Traditional spatial arrangement of vegetation (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1	1	3	2	1	1
Landscape elements	- Density of cultural elements (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1-2	2	2	2-3	3	3

Continuation of Table 4.3

		- Cultural significance of landscape elements (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	1	1-2	1-2	3	3	3
		- Presence of time layers (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	2	2	2	2-3	2-3	3	1-2
		- Presence of traditional linear shapes (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1-2	2	2-3	2	1-2	1
	Ephemera								
	Season-bound activities	- Presence of animals (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1	1	3-4	1	1	1
		- Presence of cyclical farming activities (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	1	1	2	4	1-2	1-2	1
	Landscape attributes with seasonal change	- Seasonal variation in natural vegetation (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	3-4	3-4	3-4	3-4	3-4	2-3	2
		- Seasonal variation on agricultural land (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)	1	1	1	4	1	1	1
	Landscape attributes with weather characteristics	- Presence in landscape of water or other expressive attributes with weather characteristics (1-4) (1 - absent; 2 - moderate; 3 - average; 4 - high)	3	3	3	2	3	2-3	1-2
	Biodiversity (*rich biodiversity characteristic for geographic area under analysis, vegetation health*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)		3	3	3	1-2	2-3	2	1
Ecology	Accordance with landscape type (*ecological situation corresponds to particular landscape type*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)		4	4	4	4	3	3	4
	Predominance of native species (*ecosystems dominated by native species*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)		4	4	3	1-2	2-3	1-2	1-2
	Predominance of natural elements (*unaltered and undisturbed natural elements prevail*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)		3	3	3	1	3	2	1-2
	Carelessness (*landscapes in succession*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)		4	4	3	1	2	1-2	1
	Presence of unaffected nature processes (*wilderness, natural landscape development without significant human intervention prevails*) (1-4) (1 - low; 2 - moderate; 3 - average; 4 - high)		3-4	3-4	3	1	2-3	1-2	1

Table 4.4. Possible realization of new types of sustainable landscape by Nohl (2001) in Lithuanian rurban landscapes. Table by the author

New aesthetic perceptual categories under sustainable landscape conditions by Nohl (2001)	**Possibilities of realization of sustainable landscape by Nohl (2001) in the areas of rural-urban interface**			
	Description		**Realization possibilities**	
	Features	**Expressive and symbolic aspects**	**Types of rurban landscapes most appropriate for realization of new aesthetic perceptual categories**	**Subtypes of rurban landscapes most appropriate for the realization of new aesthetic perceptual categories***
The beautiful (landscape prototype – traditional cultural landscape)	**Culturally caused typical patterns of order, consisting of natural and man-made elements:** easily recognizable fragments of cultural rural landscape in urban environment recognizable urban patterns	Blissful feelings of harmony, identity, of being part of a whole Symbol of home, safety, and of being socially integrated	Rural landscape with **clear** features of urban environment and urban lifestyle; Urban landscape with **clear** features of rural environment ; Urban landscape with **slight** manifestations of rural environment.	RI, RVA, URI, URVA, UVA, UVI
The (new) sublime (landscape prototype – succession landscape)	**Unusual patterns of spontaneous, wild or overgrown nature, demonstrating self-dynamics, self organization and self-productivity of landscape:** spontaneous, wild, dynamic landscape in urbanized environment	Pleasant feelings towards 'disharmony', 'disorder', unsteadiness, and surprisingness, symbol of freedom, of the alien and the different	Rural or natural landscape with **slight** manifestations of features of urban environment and / or of urban lifestyle; Landscape where the features of rural and urban environment and rural and urban lifestyles are **equally** present; Urban landscape with **clear** features of rural environment.	RNI, RNIK, RUI, RUIK URI, URIK
The interesting (landscape prototype – urban-industrial landscape)	**Chaotic multiplicity of (apparently) disintegrated elements and structures mostly of technical origin:** interesting, hardly understandable landscape with elements of industrial rural landscape in urban environment industrial urban elements, urban infrastructure in rural landscape	Exiting feelings for risk and uncertainty symbol of necessary technical progress	Rural landscape with **clear** features of urban environment and urban lifestyle; Landscape where the features of rural and urban environment and rural and urban lifestyles are **equally** present; Urban landscape with **clear** features of rural environment.	RK, RVAK, RVIK RUK, RUVAK, RUVIK URK, URVAK, URVIK

Continuation of Table 4.4

The plain (landscape prototype – rural functional landscape)	**Simple, coarse-meshed pattern with repetitive, yet rich and natural (subdividing) structures:** fragments of agricultural areas in urbanized environment urban farming	Comfort feelings of contentment, of gratitude symbol of existential usefulness, of the reconciliation of the technical progress with nature	Rural or natural landscape with **slight** manifestations of features of urban environment and / or of urban lifestyle; Rural landscape with **clear** features of urban environment and urban lifestyle; Landscape where the features of rural and urban environment and rural and urban lifestyles are **equally** present.	RNVI, RNVIK RVI, RVIK RUVI, RUVIK

** Subtypes of Lithuanian rurban landscape as distinguished in the classification of Lithuanian rurban landscapes developed in this research and presented in Table 2.4*

4.4. Generalization

Management challenges. The management of landscapes emerging in the areas of the rural-urban interface raises environmental (abandonment and renaturalization, invasive species, loss of biodiversity, pollution, ecosystem fragmentation, etc.), social (social conflicts, lack of landscape management skills, loss of the sense of community, etc.) challenges and challenges related to the identity, locality, sense of place (heritage preservation problems, loss of the traditional rural lifestyles and landscape identity, decline of the landscape's visual quality, aesthetic fragmentation, etc.).

General management principles. The need to respond to the above mentioned challenges encourages formulating general guidelines for landscape management in the areas of the rural urban interface integrating ecological, social and identity, global and local aspects. After the analysis of literature and by using the experience of the Resilience Alliance (2002), Musacchio (2009), Buxton and Low Choy (2011), general guidelines for rurban landscape management consisting of two parts were formulated. The first part presents the basis for management – the guiding and integrating aspects: understanding of the global and local aspects and features of the rurban landscape and a holistic approach to it based on the concepts of sustainability and the resilience of socio-ecosystems. The second part presents the management goals (directions) of rurban landscapes in six interconnected areas – environment, economics, equity, aesthetics, experience, and ethics. It demonstrates the importance of both continuity and innovations for these dynamic landscapes. The summary of basic management recommendations is presented in *Table 4.5*.

Planning problemacy. Landscape planning as a future-oriented activity when targeted at such a complex entity as landscapes involves a lot of uncertainty. Rurban landscapes themselves being hardly definable and unstable, as well as their development which is affected by many non-local and local factors and is

determined at different scales from global to local can also be characterized with the term 'uncertainty'. The factor of uncertainty both in the field of landscape planning and complexity, and the uncertainty embodied in the rurban landscapes encourage to look for new comprehensive planning approaches for these landscapes.

Theoretical approach. Our research has demonstrated that the uncertainty related with landscape planning and embodied in the rurban landscape as a particular landscape type requires the precautionary principle and the application of the advances of the sustainability science in the interrelated dimensions of environment, economics, equity, aesthetics, experience, and ethics at the multiple interrelated scales. Thus the proposed approach to the rurban landscape planning and the related research can be identified as multiscale scientific sustainability-based research. Here, four major interrelated scales – global, regional, national, and local – are distinguished, and the aspects of uncertainty that should be evaluated and precautionary measures that can be taken, the research that should be carried out, the most relevant landscape sustainability dimensions, and the documents and measures that must or can be employed at each scale are analyzed.

Table 4.5. Rurban landscape management challenge – recommendation links. Table by the author

Challenge (Low Choy, Harding, 2010; Buxton, Low Choy, 2011)			**Recommendation**
General	*Environmental*	- weed infestation - pest animals - loss of biodiversity - changes of hydrological regime - water quality decline - intensification of agriculture and other human activities - ecosystem fragmentation	- View the problem at the regional scale - View the problem at the urban scale. Reserved attitude towards urban expansion - Protect biodiversity, implement eco-compensation, ecological education and recreation
	Social	- limited landscape management capacity of the new residents - social conflicts - social disadvantage - increasing social and economic divide - skewed population - loss of a sense of community - intensification or decline of agriculture - emergence of new local and regional economies	- View the problem at the regional scale - View the problem at the urban scale. Reserved attitude towards urban expansion - Maintain multifunctional use - Save historic continuity and innovation. Preserve the rural dimension
Local	*Identity*	- the loss of scenic amenity - rural heritage and cultural landscape preservation problems - decline of traditional rural lifestyles - change of landscape identity - landscape uniformity	- View the problem at the regional scale - View the problem at the urban scale. Reserved attitude towards urban expansion - Save historic continuity and innovation. Preserve the rural dimension - Keep distinctiveness, unique image and aesthetics - Optimize visual diversity

The case of Lithuania. The developed theoretical approach was applied to the case of Lithuania. Despite the absence of the systematic monitoring of rural-urban dynamics in Lithuania, based on literature and observation, the problems and challenges of landscape planning related to the rural-urban interface originating at the global, regional, national, and local levels, the relevant documents and the

recommended actions for more sustainable development of rurban areas in the overall context of landscape planning were distinguished. Our analysis has shown that the extensive juridical basis and the body of other documents at all levels exist, and these documents discuss successful planning and management of rurban areas in Lithuania; however, the main problems causing the contemporary failure to regulate the urban dynamics and processes of the rural-urban interface are the lack of understanding of rurban problematics, the lack of continental and regional contextualization, the lack of strategic integrated thinking, transparency, and competences in the planning process.

Perspectives. The multiscale planning of the rural-urban interface areas in Lithuania could be realized under certain conditions: *seeing the wider picture* – wise integration of the global continental and regional experience, advances and paradigms corresponding to the country's interests, peculiarities, and identity in the landscape research and territorial planning and their systematic application to the rurban areas; *territorial contextualization* – taking into account the situation including the communication routes and the urban dynamics in the whole continent and in the Baltic Sea Region; *overall vision* – development of a complex, holistic policy of urban, rural, and regional development and the overall vision of the country's spatial development; *continuous monitoring* – urban dynamics, rural-urban interface, rural development, development of the country's regions must be systematically monitored and evaluated; *new competences* – improvement of planning and landscape management competences, understanding of rurban problematics; significant attention and *support of the local context* where the character, identity, functionality, environmental sustainability of rurban areas is revealed; *emphasis on the social realm and public participation* – particular attention should be paid to the development of communities and their participation in decision making concerning the rurban areas.

Rurban aesthetics. The development of the aesthetic image of rurban landscapes must be integrated in their overall sustainable development process: the initial stage of landscape analysis, the zoning of the territory under analysis, and determination of the sensitivity of different zones, the modeling of changes of landscapes, the description and assessment of the proposed development trends, etc. (*Fig. 4.6*).

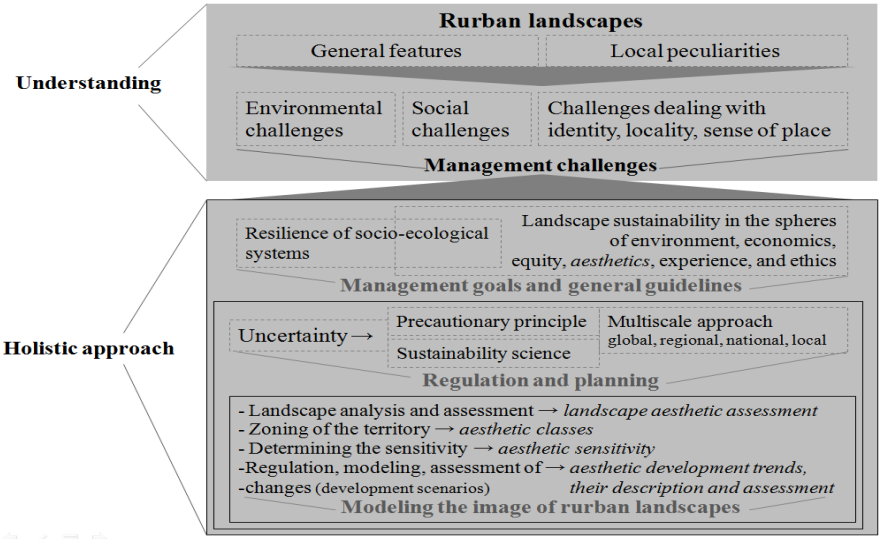


Fig. 4.6. Generalized model for management of landscapes in the areas of rural-urban interface with the emphasis on landscape aesthetics. Scheme by the author

The ecoaesthetic assessment methodology based on the approaches of Tveit *et al*. (2006), Ode *et al*. (2008) and Jankevica (2012) proposed in this research can be applied in the description and assessment of rurban landscape development scenarios and solutions. Considering the holistic approach of Nohl (2001) towards landscape aesthetics in the context of sustainability and his thorough look at the future landscapes as aesthetical objects, his four aesthetic perceptual categories under sustainable landscape conditions – the beautiful, the new sublime, the interesting, and the plain – can be successfully applied in modeling the aesthetics of rurban areas. *Figure 4.6* presents the generalized view of proposals for rurban landscape management and the place of aesthetics in it.

GENERAL CONCLUSIONS

1. Massive urbanization that started in the age of industrial and agricultural revolutions and can be presently evidenced worldwide is strongly related with the emergence of new types of landscapes – rural-urban or rurban landscapes – in the areas of rural-urban interface. Our literature review has demonstrated that these landscapes constituting our everyday living and working environment embody such landscape research challenges as the increasing pace and scale of landscape change, the increasing complexity of landscapes, fragmentation of knowledge regarding landscapes, the rise of the subjective dimension in landscape valuation, and the challenges of landscape aesthetics. Despite the relevance of rurban landscapes to the field of landscape research, they still lack consistent research and management approaches.
2. Considering the relevance of rurban landscapes and the existing research gaps, an approach which was aimed at rurban landscapes as relatively unknown landscapes based on the hermeneutic circle and which allowed gradual learning in the course of landscape analysis was formulated. Our landscape research starts with the first grasp (the general characterization of rurban landscapes), moves to the inspection of details (determining the local peculiarities of these landscapes, their classification, formulation of assessment methodology, assessment), to the contextualization (setting the acquired data into the wider context of sustainable landscape management) and to the deeper understanding (proposals for regulation of changes and the sustainable development of rurban landscapes).
3. Following the research approach, after the analysis of literature, the key terms *remnant* (the presence of rural dimension), *transient* (transition from rural to urban in space and time), *contested* (the areas where numerous conflicts and clashes of values happen), *complex* (diverse, fragmented, complicated areas), and *interdependent* (dependence from the urban area) were selected for the general description of rurban areas. Moreover, the more detailed inspection of this type of landscapes revealed that each country or region is denoted by its own geographical peculiarities, specific rural landscapes and urban development trends, cultural context, and other political, social, economic factors, etc. which condition the local peculiarities of rurban areas. In the case of Lithuania, one of the most important, however, often overlooked, aspect determining the identity of rurban landscapes is the relicts of the local historic types of rural landscapes – *ikivalakinis* (pre-Volok), *valakinis* (Volok), *vienkieminis* (Farmstead) and *kolūkinis* (Kolkhoz) – in these landscapes.
4. A comprehensive classification of rurban landscapes of a country or a region should be based on the understanding of both the general and local features of rurban landscapes and can serve as an important tool in the field of territorial planning and, more broadly, in landscape management. To demonstrate this, a classification of Lithuanian rurban landscapes was formulated. It integrates the general classification of landscapes in the areas of rural-urban interface into five types from ‘rural or natural landscape with slight manifestations of

features of urban environment' to 'urban landscape with slight manifestations of rural environment' and the further subdivisions of these general types based on the prevailing land uses and the extant historical features of Lithuanian rural landscapes. The classification shows that the typology of rurban landscapes depends not only on the character of urbanization but also on the features and values of surrounding rural areas.

5. The issue of landscape aesthetics has deep historical roots and, simultaneously, due to the contemporary scale and pace of landscape change and the shifts in values, currently is as relevant as never before. The contemporary landscape aesthetics challenges range from the lack of understanding of landscape aesthetics as a component of the quality of life to the problems of integration of subjective assessment and objective characteristics in landscape valuation. The rurban landscape as a specific landscape type raises specific aesthetic challenges including the instability of the rurban landscape, the lack of stable aesthetic categories, the lack of a stable and positive image and distinctive aesthetics of rurban landscapes, strong contradictions and conflicts between the aesthetics and ecology, between rural and urban aesthetics in the rurban landscapes. These issues and the lack of experience of the rurban landscape aesthetic assessment and systematic formation encourage looking for specific approaches targeted at landscapes emerging in the areas of the rural-urban interface.
6. Our literature review revealed numerous landscape aesthetics theories (biological, cultural, and mixed) and assessment methods (expert/design approaches, perception-based approaches, integrated approaches; methods of overall impression, methods of structural analysis, complex methods) and their interconnections. For example, concepts used for landscape characterization are rooted in various landscape aesthetic theories – i.e., the explanations why particular landscapes appear aesthetically pleasing yet others do not. Our research has shown that the aesthetic assessment of rurban landscapes featuring rural, natural, and urban features would benefit from the integration of all the basic landscape aesthetic theories and a complex and flexible assessment methodology. Considering this, an approach based on all the main landscape aesthetic theories and landscape characterization concepts – complexity, coherence, disturbance, stewardship, imageability, visual scale, naturalness, historicity, ephemera – was selected for rurban landscape aesthetic analysis and integrated with the ecoaesthetic approach in order to foreground the ecological aspect.
7. The contemporary landscape aesthetics challenges reveal that aesthetics should be seen as a part of the overall landscape sustainability; meanwhile, the landscape aesthetics theories and the complex assessment methodologies demonstrate that the landscape aesthetic perception is affected by biological and cultural factors, by natural and man-made elements, by the past and present of the landscape, etc. This reveals the importance of contextualization of the holistic approach in solving the problems of rurban landscape aesthetics: rurban landscape aesthetics is an integral part of the sustainable

development process of these landscapes which should be based on the comprehensive understanding of global and local features of rurban landscapes and on the knowledge of contemporary landscape management trends: a holistic approach taking into account the environment, economics, equity, aesthetics, experience, and ethics in the landscape management, resilience – the capacity of socio-ecological systems to tolerate disturbance without collapsing into a qualitatively different state, multiscale planning and the related research approach integrating global, regional, national, and local levels.

8. The rural-urban interface landscapes create a new quality of the landscape which is essentially not sufficiently known not only for the general public but also for the majority of the surveyed experts. This suggests that it is necessary to conduct and develop analysis and management approaches for this type of landscape in order to achieve the optimal quality of the living and working environment. The aesthetic modeling of rurban landscapes is a complex multiscale process that can be influenced both by the global ideas and shifts in landscape understanding (for example, internationally used landscape characterization concepts, the ideas how sustainable landscapes of the future should look like) and by the characteristics of each particular place and local community (for example, the presence of the relicts of historic rural landscape).
9. The aesthetic modeling of rurban areas (local identity, legibility, development of a distinctive aesthetic image) should be integrated in the following stages:
   - landscape analysis and assessment;
   - zoning of the territory;
   - determining the sensitivity of different zones;
   - modeling of changes (determining the priorities, constructing and evaluating different scenarios).

   The aesthetic perceptual categories under sustainable landscape conditions – the beautiful, the new sublime, the interesting, and the plain – and their combinations can be applied in modeling the aesthetics of rurban areas; these aesthetic prototypes can be differentiated into the multiplicity of single, unique landscapes by the peculiarities of each region and each particular place. The description and assessment of the proposed aesthetic development trends can be performed by using the methodology based on the ecoaesthetic approach.

REFERENCES

1. Adell, G. (1999). *Theories and models of the peri-urban interface: a changing conceptual landscape*. Development Planning Unit, UCL: University College London. [viewed 12 June 2012]. Online http://discovery.ucl.ac.uk/43/
2. Ahern, J. (1995). Greenways as a planning strategy. *Landscape and urban planning*, 33(1-3), 131-155.
3. Aleknavičius, P., & Valčiukienė, J. (2011) Kaimiškojo kraštovaizdžio raidos ypatumai Vilniaus miesto įtakos zonoje [Features of rural landscape development in Vilnius city influence zone]. *Vandens ūkio inžinerija,* 38(58), 32–41.
4. Allen, A. (2003). Environmental planning and management of the peri-urban interface: perspectives on an emerging field. *Environment and urbanization,* 15(1), 135-148.
5. Antrop, M. (2000). Background concepts for integrated landscape analysis. *Agriculture, ecosystems & environment,* 77(1-2), 17-28.
6. Antrop, M. (2004a). Landscape change and the urbanization process in Europe. *Landscape and urban planning,* 67(1-4), 9-26.
7. Antrop, M. (2004b). Uncertainty in planning metropolitan landscapes. In *Planning Metropolitan Landscapes. Concepts, Demands, Approaches* (pp. 12-25).
8. Antrop, M. (2005). Why landscapes of the past are important for the future. *Landscape and urban planning,* 70(1-2), 21-34.
9. Antrop, M. (2006). Sustainable landscapes: contradiction, fiction or utopia?. *Landscape and urban planning,* 75(3-4), 187-197.
10. Antrop, M. (2008). Landscapes at risk: about change in the European landscapes. In *Evolution of geographical systems and risk processes in the global context* (pp. 57-79). Charles University in Prague. Faculty of Science.
11. Antrop, M., & Van Eetvelde, V. (2000). Holistic aspects of suburban landscapes: visual image interpretation and landscape metrics. *Landscape and urban planning,* 50(1-3), 43-58.
12. Antuchevičienė, J. (2005). *Apleistų pastatų naudojimo modeliavimas darnaus vystymo (-si) aspektu [Modeling of Re-Use of Abandoned Buildings, the Aspect of Sustainable Development]* (Doctoral dissertation, Vilnius Gediminas Technical University).
13. Appleton J. (1975). *The experience of landscape*. London.
14. Apskritis. (2015). [viewed 15 August 2016]. Online http://lt.wiktionary.org/wiki/apskritis
15. Araeen, R. (2009). Ecoaesthetics: A Manifesto for the Twenty‐First Century. *Third Text*, 23(5), 679-684.
16. Ardzijauskas, G. (1979) Antropogeninės veiklos įtaka kraštovaizdžio estetiškumui ir jo dinamikai [Influence of anthropogenic activity on aesthetics and dynamic of landscape]. *Geografinis metraštis* 17: 21–27.
17. Arriaza, M., Cañas, J. F., Cañas, J. A., Ruiz, P., González, J., & Barea, F. (2005, August). Landscape assessment via regression analysis. In *XIth Congress of the EAAE (European Association of Agricultural Economists)* (pp. 1-7). Denmark: Copenhagen.
18. Arriaza, M., Cañas-Ortega, J. F., Cañas-Madueño, J. A., & Ruiz-Aviles, P. (2004). Assessing the visual quality of rural landscapes. *Landscape and urban planning,* 69(1), 115-125.
19. Arthur, L. M., Daniel, T. C., & Boster, R. S. (1977). Scenic assessment: an overview. *Landscape planning*, 4, 109-129.

20. Balevičiūtė, A., & Veteikis, D. (2012). Renatūralizacijos pokyčiai Lietuvos kraštovaizdyje 1995–2010 metais. *Geografija*, 48(2), 132-144.
21. Baležentis, A. (2011). Kaimo vietovių raida ir modeliai: darnaus vystymo požiūris. *Management theory and studies for rural business and infrastructure development*, 2(26), 9.
22. Bardauskienė, D., & Pakalnis, M. (2010). Planavimo dekadansas ir plėtros valdymo šansai. In *IV Lietuvos urbanistinis forumas. Urbanistinė drieka: miesto ir kaimo sandūra* (pp. 104-116). Kaunas: Technologija.
23. Bardauskienė, D., & Pakalnis, M. (2012). Foresighted urban planning. *Environmental Research, Engineering and Management*, 59(1), 63-72.
24. Bargiela-Chiappini, F. (2010). Hyphenated research. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 12, No. 1).
25. Bell, S., Penēze, Z., Nikodemus, O., & Montarzino, A. (2008). Perception of the Latvian landscape during social and economic transitions. *Place and Location VI. Tallinn: The Research Group of Cultural and Literary Theory, Estonian Literary Museum*.
26. Berentsen, W., Roosaare, J., & Samara, P. (2000). Suburbanization and landscape change in Connecticut: Repetition of the patterns in Estonia and elsewhere in Central Europe. *Landscape Perspectives of Land Use Changes, Southhampton, Boston: WIT Press/Computational Mechanics Inc*, 131-166.
27. Berte, E., Panagopoulos, T., & Zanon, B. (2013). An interpretative model for the management of contemporary cultural landscapes in linear infrastructure projects. *Journal of Environmental Engineering and Landscape Management*, 21(4), 248-262.
28. Bontekoe, R. (1996). *Dimensions of the hermeneutic circle*. Atlantic Highlands, NJ: Humanities Press International.
29. Brown, T., Keane, T., & Kaplan, S. (1986). Aesthetics and management: bridging the gap. *Landscape and urban planning*, 13, 1-10.
30. Bučas, J. (1980). Kai kurios agrarinio kraštovaizdžio vizualinės charakteristikos. *Lietuvos TSR architektūros klausimai*, 6 (3), 78-86.
31. Bučas, J. (1983). Kai kurie kaimo kraštovaizdžio kompozicijos aspektai. *Lietuvos TSR architektūros klausimai*, 8, 70-76.
32. Bučas, J. (1988). *Lietuvos kaimo kraštovaizdžio raida ir istorinės vertybės*. Vilnius: Mokslas.
33. Bučas, J. (2001). *Kraštotvarkos pagrindai*. Kaunas: Technologija.
34. Bučas, J. (2007). Miesto įvaizdis naujo požiūrio į apsaugą ir plėtrą kontekste [The image of Kaunas in the context of new attitude towards the preservation and development]. In *Proceedings of international conference "Advanced Construction"* (pp. 204-212). Kaunas: Technologija.
35. Bučas, J. (2010). Miesto drieka kaime: socialinis ir aplinkosauginis aspektai. In *Urbanistinė drieka: miesto ir kaimo sandūra. Mokslo straipsnių rinkinys* (pp. 5-11). Kaunas: Technologija.
36. Bučas, J., & Mlinkauskienė, A. (2002). Kraštovaizdžio vizualinė kokybė – nacionalinio saugumo problema, In *Kraštovaizdžio vizualinė kokybė* (pp. 4-9). Kaunas: Technologija.
37. Budriūnas, A. R., & Ėringis, K. (2000). *Kraštovaizdžio estetinio rekreacinio vertinimo metodika*. Vilnius: Botanikos instituto leidykla.
38. Bukantis, A., Gedžiūnas, P., Giedraitienė, J., Ignatavičius, G., Jonynas, J., Kavaliauskas, P., ... & Šulijienė, G. (2008). *Lietuvos gamtinė aplinka, būklė, procesai ir raida*. Vilnius: Agency of Environmental Safety, 23-37.

39. Bullen, P., & Love, P. (2011). Factors influencing the adaptive re-use of buildings. *Journal of Engineering, Design and Technology*, 9(1), 32-46.
40. Burgess, D., Patton, M., Georgiou, S., & Matthews, D. (2009). Public attitudes to changing landscapes: implications for biodiversity. In *11th BIOECON Conference* (pp. 1-27) [viewed 03 March 2004]. Online https://www.researchgate.net/profile/Myles_Patton/publication/228361677_Public_attitudes_to_changing_landscapes_implications_for_biodiversity/links/02e7e528371d42abdd000000/Public-attitudes-to-changing-landscapes-implications-for-biodiversity.pdf.
41. Burinskienė, M. (2003). *Subalansuota miestų plėtra: monografija*. Vilnius: Technika.
42. Buxton, M., & Choy Low, D. (2011). A resilience approach to peri-urban landscape management. In *State of Australian Cities National Conference* (pp. 1-7). Australian Sustainable Cities and Regions Network (ASCRN).
43. Buxton, M., Tieman, G., Bekessy, S., Budge, T., Mercer, D., Coote, M., & Morcombe, J. (2006). *Change and continuity in peri-urban Australia, state of the peri-urban regions: a review of the literature monograph 1*. Melburne: RMIT University.
44. Čereškevičius, S. (2012). Besitraukiančių miestų fenomenas: Erdvinės struktūros pokyčiai, revitalizacijos principai ir vystymo galimybės [Phenomenon of shrinking cities: Changes of spatial structure, principles of revitalization and development possibilities]. In *Šiuolaikiški miestai ir miesteliai: situacija, vystymosi tendencijos, vizija* (pp. 24-32). Vilnius.
45. Česnulevičius, D. (1999). *Didžiųjų Lietuvos miestų priemiestinių zonų žemės naudojimo geografiniai ypatumai (Vilniaus ir Klaipėdos priemiesčių pavyzdžiu)* (Doctoral dissertation, daktaro disertacija. Vilnius).
46. Cirtautas, M. (2010). State-of-the-art conception of the peri-urban area [Šiuolaikinė priemiestinės zonos samprata]. *Science-Future of Lithuania*, 2(3), 11-17.
47. Cirtautas, M. (2012). Baltijos šalių miestų ekstensyvios plėtros ypatumai [Peculiarities of extensive development of cities in Baltic states]. In *Proceedings of the Fourth Urban Forum* (pp. 62-66). Vilnius: Lithuania. [viewed 12 June 2013]. Online http://www.am.lt/VI/files/File/Urbanistinis%20forumas%20tinklalapiui%20WEB.pdf, accessed 12 June 2013.
48. *City History and Multi-Scale Spatial Masterplanning Research Network*. (2014). [viewed 8 April 2014]. Online https://www.bartlett.ucl.ac.uk/graduate/research/space/research/chamspam, accessed 8 April 2014).
49. Clark, W. C. (2007). Sustainability science: a room of its own. In *Proceedings of National Academy of Sciences*, 104, 1737-1738. doi: 10.1073_pnas.0611291104
50. Conrad, E., Christie, M., & Fazey, I. (2011). Is research keeping up with changes in landscape policy? A review of the literature. *Journal of Environmental Management*, 92(9), 2097-2108.
51. Costa, M. R., & Batista, D. (2011). Towards integrating rural vernacular settlements in urban regions: a study of Algarve, Portugal. *ISVS e-journal. Journal of the International Society for the Study of Vernacular Settlements*, (2 (1)), 35-51.
52. Daniel, T. C. (2001). Whither scenic beauty? Visual landscape quality assessment in the 21st century. *Landscape and urban planning*, 54(1-4), 267-281.

53. Daniel, T. C., & Vining, J. (1983). Methodological issues in the assessment of landscape quality. In *Behavior and the natural environment* (pp. 39-84). Plenum Press: New York.
54. Daniulaitis, G. (1980). Rekreacinio landšafto formavimas planuojant rajonus. *Lietuvos TSR architektūros klausimai*. T. 6, Sąs. 3
55. Daniulaitis, G. J., & Kamičaitytė-Virbašienė, J. (2002). Kraštovaizdžio estetinės ir vizualinės kokybės problema kraštotvarkoje. In *Kraštovaizdžio vizualinė kokybė. Konferencijų pranešimų medžiaga*, (pp. 16-32). Kaunas
56. Daniulaitis, G., & Kavaliauskas, P. (1973). Kraštovaizdis ar landšaftas. *Statyba ir architektūra*, 9, 31-32.
57. *Darnaus vystymosi tikslų integravimas į teritorijų planavimo procesus: Žingsniai darnaus Lietuvos miestų vystymosi link. Rekomendacijos*. (2018). [viewed 25 November 2018]. Online https://am.lrv.lt/uploads/am/documents/files/ES_ir_tarptautinis_bendradarbiavimas/Darnaus%20vystymosi%20tikslai/1_REKOMENDACIJOS_darnus%20miestu%20vystymasis_galutinis_v0911.pdf
58. Daujotaitė, I. (1967). *Vilniaus priemiestinės zonos išplanavimas ir miesto apželdinimo perspektyva. Miestų ir gyvenviečių apželdinimas.* Vilnius, 55-66.
59. Daunora, Z. (1996). Vilniaus priemiesčio teritorijų planavimo principai. *Urbanistika ir architektūra*, 22, 4-21.
60. De Bustos, J. C. M. (2009). Culture, communication and environment: cultural ecology. *Infoamérica: Iberoamerican Communication Review*, (1), 49-58.
61. Dictionary.com (2019). [viewed 5 February 2019]. Online https://www.dictionary.com/browse/sustainability
62. Dijokienė, D. (2006). Vilniaus istorinių priemiesčių genezės, raidos ir vertybių ypatumai. *Town Planning and Architecture*, 30(2), 78-86.
63. Dobson, S. (2008). Exploring Ontologies of Historic Landscape Characterisation: Towards an approach for recognising the impact of incremental change to historic legibility in urban areas. In *Ontologies for urban development: conceptual models for practitioners, 2nd Workshop COST Action C21–Towntology* (pp. 114-124).
64. Dupont, V. (2005). Peri-urban dynamics: population, habitat and environment on the peripheries of large Indian metropolises: a review of concepts and general issues. Centre de Sciences Humaines: New Delhi
65. Dutta, V. (2012). War on the Dream–How Land use Dynamics and Peri-urban Growth Characteristics of a Sprawling City Devour the Master Plan and Urban Suitability?. In *13th annual global development conference, Budapest, Hungary*. [viewed 17 October 2013]. Online http://depot.gdnet.org/newkb/submissions/Venkatesh_Dutta.pdf.
66. Endo, N. (1996). Relevance of the International Communication in the Socio-Cultural Development--With Special Reference to the New Methodology vis-a-vis Application of Engineering Approach. *Dynamics of Communication and Cultural Change. The Role of Networks, special issue,* 12, 197-210.
67. Environmental Commons. 2014. *Precautionary Principle*. [viewed 10 April 2014]. Online http://environmentalcommons.org/precaution.html.
68. *European Landscape Convention*. (ELC, 2000). Council of Europe. [viewed20 January 2013]. Online http://conventions.coe.int/Treaty/Commun/QueVoulezVous.asp?NT=176&CM=8&CL=ENG.
69. Ewald, K. C. (2001). The neglect of aesthetics in landscape planning in Switzerland. *Landscape and Urban Planning*, 54(1-4), 255-266.

70. Favry, E., & Pfefferkorn, W. (2005). The Alps in 2020: Cultural landscapes between the growth of urban agglomerations and the spread of wilderness areas. *Revue de Géographie alpine*, 93(2), 47-54.
71. Free Dictionary. (2009). [viewed 3 March 2014]. Online http://www.thefreedictionary.com/experience.
72. Gadal S. (2012). Riga-Kaunas-Klaipėda road corridors impacts on the urbanization and the spatial structures by multi-level sensors remote sensing (2000-2012). In *Report of research, Central Baltic Interreg IV*, 43.
73. Gadal, S. (2010). Urban dynamics in Kaliningrad and Klaipėda coastal regions by remote sensing and GIS. *Bridges/Tiltai*, 50(1), 101-110.
74. Gadal, S. (2011). The socio-ecological challenge of the metropolised territories: key-notes. In *Ecological architecture 2011, 13 October, 2011* (pp. 8-12). Kaunas: Technologija.
75. Gadal, S., & Lekavičiūtė, J. (2009). *Miestų struktūra Lietuvoje ir jos raida nuo 1990 iki 2007*. [viewed 2 Novermber 2012]. Online http://didzioji1.blogspot.com/2009/10/image-scientifique-vaizdas-moksle.html
76. Gandy, M. (2013). Marginalia: Aesthetics, ecology, and urban wastelands. *Annals of the Association of American Geographers*, 103(6), 1301-1316.
77. Gaudėšius, R. (2013). Landscape architecture features in urban junction of Sendvaris district and Klaipėda city. *Environmental research, engineering and management*, 64(2), 72-80.
78. Geiser, J. (2014). *Coupled Systems: Theory, Models, and Applications in Engineering*. Chapman and Hall: CRC.
79. Gentile, M., Tammaru, T., & Van Kempen, R. (2012). Guest editorial: Heteropolitanization: social and spatial change in Central and East European cities. *Cities*, 29(5), 291-299.
80. Giddens, A. (2001). *Sociology, 4th revised edition*. Blackwell publishing: Oxford.
81. Gobster, P. H., Nassauer, J. I., Daniel, T. C., & Fry, G. (2007). The shared landscape: what does aesthetics have to do with ecology?. *Landscape ecology*, 22(7), 959-972.
82. Gobster, P. H., Nassauer, J. I., Daniel, T. C., & Fry, G. (2007). The shared landscape: what does aesthetics have to do with ecology?. *Landscape ecology*, 22(7), 959-972.
83. Gražulevičiūtė-Vileniškė, I., Gadal, S., & Zaleskienė, E. (2014). Peculiarities of rural-urban interface in Lithuania and implications for landscape management. *Environmental protection engineering*, (32), 211-219.
84. Harvey, D. (2008). *The right to the city. Sustainable Cities.* [viewed 9 August 201]. Online http://www.dac.dk/en/dac-cities/sustainable-cities/experts/david-harvey-the-right-to-the-city/.
85. Heimer, H. (2005). Topophilia and quality of life: defining the ultimate restorative environment. *Environmental Health Perspectives*, 113(2), 117.
86. *Hermeneutics*. (2013). [viewed 7 August 2013]. Online http://qualmethods.wikispaces.com/Hermenutics.
87. Iaquinta, D. L., & Drescher, A. W. (2000). Defining periurban: understanding rural-urban linkages and their connection to institutional contexts. In *Tenth World Congress of the International Rural Sociology Association* (Vol. 1, pp. 3-28).
88. Jacobs, P. (2011). Where have all the flowers gone? *Landscape and Urban Planning*, 100(4), 318–320.

89. Jacobs, P., & Mann, R. (2000). Landscape prospects of the next millennium. *Landscape and urban planning*, 47(3-4), 129-133.
90. Jakaitis, J. (2001). Vilniaus miesto bendrojo ir operatyviojo planavimo patirtis integruotai plėtojant miesto struktūrą ir gretimas teritorijas. *Urbanistika ir architektūra*, 25(4), 190-195.
91. Jakaitis, J. (2005). Miesto architektūros savitumas kaip architektūros ir visuomenės sąveikos rezultatas. *Town Planning & Architecture*, 29(4), 191-202.
92. Jankevica, M. (2012). Comparative analysis of methodologies for landscape ecological aesthetics in urban planning/Kraštovaizdžio ekologinės estetinės urbanistinio planavimo metodologijos palyginamoji analizė. *Mokslas–Lietuvos ateitis/Science–Future of Lithuania*, 4(2), 113-119.
93. Jeffery, C. (1997). L'émergence d'une gouvernance multi-niveaux dans l'Union européenne: une approche des politiques nationales. *Politiques et management public*, 15(3), 211-231.
94. Jorgensen, A. (2011). Beyond the view: Future directions in landscape aesthetics research. *Landscape and Urban Planning*, 100(4), 353-355.
95. Jurevičienė, J. (2005). Kaimo aplinkos reliktai šiuolaikiniame mieste. *Urbanistika ir architektūra*, 29, 62-67.
96. Kamičaitytė-Virbašienė, J. (2001). Kraštovaizdžio vizualinė kokybė, jos reguliavimo svarba ir problemos. *Urbanistika ir architektūra*, 4, 202-209.
97. Kamičaitytė-Virbašienė, J. (2003). *Kraštovaizdžio vizualinės kokybės reguliavimas kraštotvarkoje (Lietuvos pavyzdžiu)* [Landscape visual quality in environmental design (sample of Lithunia)] (Doctoral dissertation, daktaro disertacija. Kaunas: Technologija).
98. Kamičaitytė-Virbašienė, J., & Gražulevičiūtė-Vileniškė, I. (2008). Globalizacijos įtaka miestams ir jos optimizavimo urbanistinės galimybės Kauno centre. *Town Planning and Architecture*, 32(2), 113-124.
99. Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, UK: Cambridge University Press.
100. Kauno miesto bendrasis planas (General Plan of Kaunas). (2013). [viewed 20 June 2016]. Online http://www.kaunoplanas.lt/bendrieji_planai/sprendiniai_2
101. Kauno miesto savivaldybės detalieji planai (Detailed plans of Kaunas City municipality). (2015). [viewed 20 June 2016]. Online http://www.kaunas.lt/urbanistika/detalieji-planai/
102. Kauno rajono savivaldybės bendrasis planas (General Plan of Kaunas District Municipality). (2009). [viewed 19 December 2015]. Online http://www.kaunoplanas.lt/bendrieji_planai/kauno_rajono_savivaldybes_bendrasis_planas_tikroji_bukle
103. Kauno rajono savivaldybės bendrasis planas (General Plan of Kaunas District Municipality). (2009). [viewed 19 December 2015]. Online http://www.kaunoplanas.lt/bendrieji_planai/kauno_rajono_savivaldybes_bendrasis_planas_tikroji_bukle
104. Kavaliauskas, P. (1975). Kraštovaizdžio grožis ir būdai jam išmatuoti. *Statyba ir architektūra*, 8, 23-26.
105. Kavaliauskas, P. (2011). *Kraštovaizdžio samprata ir planavimas*. *Vilnius: Vilniaus universtitetas*.
106. Keleş, E., Atik, D., & Bayrak, G. (2018). Visual Landscape Quality Assessment in Historical Cultural Landscape Areas. *European Journal of Sustainable Development*, 7(3), 287-300.

107. Klaipėdos rajono savivaldybės detalieji planai (Detailed plans of Klaipėda District municipality). (2013). [viewed 20 June 2016]. Online http://www.tpdris.lt/web/guest/Klaipėdos-raj.
108. Klaipėdos rajono savivaldybės teritorijos kraštovaizdžio tvarkymo specialusis planas. (2013). [viewed 20 June 2016]. Online http://www.webpartner.lt/Klaipėda_raj/subsystems/web/doc.php?itemID=13218
109. *Kraštovaizdžio struktūros pokyčių probleminiuose arealuose vertinimas vietiniu lygmeniu [Local Level Assessment of Landscape Structure Changes in Problem Areas]*. (2008). Vilnius: Institute of Geology and Geography. [viewed 5 April 2014]. Online http://gamta.lt/files/Krastovaizdzio_strukturos_pokyciu_probleminiuose_arealuose_vertinimas_vietiniu_lygmeniu.pdf
110. Kučinskienė, J. (2009). Gyvenamosios vietos pasirinkimas: želdinių ekologinių ir estetinių kriterijų įtaka [Selection of the living environment: Influence of ecological and aesthetic criteria of green areas]. *Miestų želdynų formavimas: Mokslo darbai*, 1(6), 62-65.
111. Kuemmerle, T., Olofsson, P., Chaskovskyy, O., Baumann, M., Ostapowicz, K., Woodcock, C. E… & Radeloff, V. C. (2011). Post‐Soviet farmland abandonment, forest recovery, and carbon sequestration in western Ukraine. *Global Change Biology*, 17(3), 1335-1349.
112. *Landscape and sustainable development: challenges of the European Landscape Convention* (2006). Strasbourg Cedex: Council of Europe Publishing [viewed 15 December 2018]. Online (https://rm.coe.int/16804895e6).
113. *Landscape description*. (1997). [viewed 15 December 2018]. Online (https://www.dpaw.wa.gov.au/images/documents/conservation-management/riverpark/about/Landscape%20description%20introduction.pdf).
114. Laukaitytė-Malžinskienė, G. (2005). Priemiestinio kraštovaizdžio vertinimo ypatumai. *Urbanistika ir architektūra*, 29(2), 81-89.
115. Laukaitytė-Malžinskienė, G. I. (2008). Kraštovaizdžio vizualinės raiškos savitumo apsauga didmiesčio priemiestinėse teritorijose. *Town Planning and Architecture*, 32(2), 103-112.
116. Lazauskaitė D. (2012). Lietuva - Europos erdvinio planavimo stebėsenos tinkle [Lithuania - in the European Spatial Planning Observation Network]. In *Proceedings of the Fourth Urban Forum*; *15 November 2012, Vilnius, Lithuania*. Vilnius: Vilnius Gediminas Technical University. [viewed 12 June 2013]. Online http://www.am.lt/VI/files/File/Urbanistinis%20forumas%20tinklalapiui%20WEB.pdf.
117. *Leading Change for Healthy Communities and Successful Land Reuse*. (2010). [viewed 12 June 2013]. Online http://www.atsdr.cdc.gov/sites/brownfields/docs/ATSDR_LandReuse.pdf
118. Lefebvre, H. (2003). *The Urban Revolution*. Mineapolis: University of Minesota Press.
119. Lietuvos Respublikos teritorijos bendrasis planas (General Plan of the Territory of the Republic of Lithuania). (2000). [viewed 20 December 2015]. Online https://map.tpdr.lt/tpdr-gis/index.jsp?action=tpdrPortal&reg_tpd_id=52605
120. Lietuvos Respublikos teritorijų planavimo įstatymas (Law on Territorial Planning of the Republic of Lithuania). (1995). [viewed 22 April 2016]. Online http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=478619

121. Lietuvos Respublikos Vyriausybė. (2004). *Lietuvos Respublikos kraštovaizdžio politikos krypčių aprašas, patvirtintas Lietuvos Respublikos Vyriausybės 2004 m. gruodžio 1 d. nutarimu Nr. 1526* (Žin., 2004, 174-6443).
122. Low Choy D., Harding, J. (2010). *Exploring agents of change to peri-urban weed management*. UMCCC Per-Urban Weed Management Study: Land & Water Australia.
123. Low Choy D., Sutherland, C., Gleeson, B., Dodson, J., & Sipe, N. (2008). *Change and Continuity in Peri-urban Australia. Peri-urban Features and Sustainable Development. 4th monograph.* Brisbane: Griffith University.
124. Low Choy D., Sutherland, C., Scott, S., Rolley, K., Gleeson, B., Dodson, J., & Sipe, N. (2007). *Change and Continuity in Peri-urban Australia. 3rd monograph*. Brisbane: Griffith University.
125. Lunkevičius, S. (2001). *Daugiakriterinis kaimo statinių investicinių projektų efektyvumo vertinimas* [Multicriterial assessment of investment projects of rural buildings] (Doctoral dissertation). Vilnius, Lithuania: Vilnius Gediminas Technical University.
126. Lygis, D. (2000). Lietuva trečiojo tūkstantmečio pradžios vizijoje. Lietuvos Respublikos bendrasis planas–preliminarūs sprendiniai [Lithuania in the vision of the beginning of the third millennium. General plan of the Republic of Lithuania—Preliminary proposals]. *Statyba ir architektūra*, 1, 6-29.
127. Maps.lt. (2014). [viewed 10 September 2014]. Online http://www.maps.lt/
128. Maps4u.lt. (2012). *Istoriniai žemėlapiai*. [viewed 23 November 2012]. Online http://maps4u.lt/lt/news.php?readmore=178.
129. Marshall, F., Waldman, L., MacGregor, H., Mehta, L. and Randhawa, P. (2009) *On the Edge of Sustainability: Perspectives on Peri-urban Dynamics*, STEPS Working Paper 35, Brighton: STEPS Centre
130. Matthews, R., & Selman, P. (2006). Landscape as a focus for integrating human and environmental processes. *Journal of Agricultural Economics*, 57(2), 199-212.
131. Merriam-Webster. (2019). *Environment*. [viewed 17 January 2019]. Online (https://www.merriam-webster.com/dictionary/environment)
132. *Miestų, miestelių ir kaimų (gyvenamųjų vietovių) planavimo normos. Projektas.* (2009). [viewed 17 November 2013]. Online www.am.lt/VI/files/0.456798001240561714.pdf
133. Miškinis, A. (1991). *Lietuvos urbanistika: istorija, dabartis, ateitis*. Vilnius: Mintis.
134. Murno T. (2013). *Aesthetics. Encyclopaedia Britanica*. [viewed 27 February 2014]. Online http://www.britannica.com/EBchecked/topic/7484/aesthetics.
135. Musacchio, L. R. (2009). The scientific basis for the design of landscape sustainability: a conceptual framework for translational landscape research and practice of designed landscapes and the six Es of landscape sustainability. *Landscape Ecology*, 24(8), 993-1013.
136. Nacionalinis kraštovaizdžio tvarkymo planas (National Landscape Management Plan of the Republic of Lithuania). (2015). [viewed 22 April 2016]. Online http://www.am.lt/VI/index.php#a/12733
137. Nassauer, J. I. (1988). The aesthetics of horticulture: neatness as a form of care. *American Society for Horticultural Science*, 23(6), 973-977.
138. Nassauer, J. I. (1995). Messy ecosystems, orderly frames. *Landscape journal*, 14(2), 161-170.
139. Neniškis, E. (2009). Priemiestinis kraštovaizdis–unikali miesto identiteto sudedamoji dalis. *Urbanistika ir architektūra*, 33, 7-9.

140. New urbanism. (2010). [viewed 30 December 2010]. Online http://www.newurbanism.org/.
141. Nilsson K., Sick Nielsen T., Pauleit, S. (2008). A plurel approach to peri-urban areas. *Town & Country Planning*, 77(12), 519–524.
142. Nilsson, K., Pauleit, S., Bell, S., Aalbers, C., & Nielsen, T. A. S. (Eds.). (2013). *Peri-urban futures: Scenarios and models for land use change in Europe*. Springer: Science & Business Media.
143. Nohl, W. (2001). Sustainable landscape use and aesthetic perception–preliminary reflections on future landscape aesthetics. *Landscape and urban planning*, 54(1-4), 223-237.
144. Ode, Å., Tveit, M. S., & Fry, G. (2008). Capturing landscape visual character using indicators: touching base with landscape aesthetic theory. *Landscape research*, 33(1), 89-117.
145. Oficialiosios statistikos portalas. (2014). [viewed 3 February 2014]. Online http://www.osp.stat.gov.lt/home.
146. Olmo, R. M., & Muñoz, S. F. (2004). La Huerta de Murcia: landscape guidelines for a peri‐urban territory. *Landscape Research*, 29(4), 385-397.
147. Overbeek, G., & Terluin, I. (2006). Rural areas under urban pressure. *Case studies of rural-urban relationships across Europe*. [viewed 20 January 2013]. Online http://ageconsearch.umn.edu/bitstream/29080/1/re060001.pdf
148. Pakalnis, M. (2010). *Tamsi teritorijų planavimo Lietuvoje realybė*. [viewed 11 April 2014]. Online http://www.architektusajunga.lt/nuomones/tamsi-teritoriju-planavimo-lietuvoje-realybe.
149. Pakalnis, M., & Bardauskienė, D. (2012). Žalioji ir rudoji urbanistika, priešprieša ar sąlytis, konformistiniai sprendimai urbanistikoje. In *Proceedings of the Fourth Urban Forum* (Vol. 15). [viewed 15 November 2012]. Online http://www.am.lt/VI/files/File/Urbanistinis%20forumas%20tinklalapiui%20WEB.pdf
150. Palang, H., Alumäe, H., & Mander, Ü. (2000). Holistic aspects in landscape development: a scenario approach. *Landscape and Urban Planning*, 50(1-3), 85-94.
151. Palang, H., Printsmann, A., Gyuró, É. K., Urbanc, M., Skowronek, E., & Woloszyn, W. (2006). The forgotten rural landscapes of Central and Eastern Europe. *Landscape Ecology*, 21(3), 347-357.
152. Palang, H., Spek, T., & Stenseke, M. (2011). Digging in the past: New conceptual models in landscape history and their relevance in peri-urban landscapes. *Landscape and urban planning*, 100(4), 344-346.
153. Pašakarnis, G., & Maliene, V. (2010). Towards sustainable rural development in Central and Eastern Europe: Applying land consolidation. *Land Use Policy*, 27(2), 545-549.
154. Patricios, N. N. (2002). Urban design principles of the original neighbourhood concepts. *Urban morphology*, 6(1), 21-36.
155. Phillips, A. (1998). The nature of cultural landscapes - a nature conservation perspective. *Landscape Research*, 23(1), 21-38.
156. Phillips, D., Williams, K., Andrews, G., Clarke, J., Carter, M., Kinsman, P., ... & Hillyer, A. (1999). *Literature review on peri-urban natural resource conceptualisation and management approaches*. [viewed 23 September 2013]. Online http://r4d.dfid.gov.uk/PDF/Outputs/NatResSys/R6949FTR.pdf.

157. Piorr, A. (Ed.). (2011). *Peri-urbanisation in Europe: towards European policies to sustain urban-rural futures; synthesis report; PLUREL [sixth framework programme]*. University of Copenhagen: Forest & Landscape.
158. Powell, R., & Roberts, D. (2007). Characterizing urban growth and peri-urban landscape change in Rondônia using multiple endmember spectral mixture analysis. In *Proceedings of the AnaisXIII Simpósio Brasileiro de Sensoriamento Remoto* (pp. 6933-6940). [15 April 2015]. Online http://marte.sid.inpe.br/col/dpi.inpe.br/sbsr@80/2006/11.15.17.14/doc/6933-6940.pdf
159. Practice Guidebook on Compliance with Building Safety and Health Requirements under the Buildings Ordinance for Adaptive Re-use of and Alteration and Addition Works to Heritage Buildings. (2012). Hong Kong: Buildings Department. [viewed 20 October 2013]. Online http://www.bd.gov.hk/english/documents/guideline/heritage.pdf
160. Prishchepov, A. V., Müller, D., Dubinin, M., Baumann, M., & Radeloff, V. C. (2013). Determinants of agricultural land abandonment in post-Soviet European Russia. *Land use policy*, 30(1), 873-884.
161. Purvinas, M. (1983). Subjektyvus kraštovaizdžio vertinimas. *Lietuvos TSR architektūros klausimai*, 8(1), 60-67.
162. Rakodi, C. (1999). Poverty and wellbeing in the peri-urban interface of developing country cities: A review. *DFID NRSP Programme Development Report PD070. Hemel Hempstead*. [20 January 2013]. Online http://www.nrsp.org.uk/database/documents/1423.pdf
163. Ramanauskas, E., & Dringelis, L. (2011). Žemės sklypų pertvarkymo patyrimas planuojant miestų teritorijas. *Town Planning and Architecture*, 35(4), 285-294.
164. Ramanauskas, E., & Dringelis, L. (2013). The impact of urban planning on the development of territorial land resources: experience in Lithuania. *Architecture and Urban Planning*, 8, 34-39.
165. Rasa, I., & Nikodemus, O. (2008). The influence of land use structural changes on the landscape ecological, aesthetic and cultural-historical values of the Gauja National Park, Latvia. In *North Vidzeme Biosphere Reserve International Scientific Conference: Economic, Social and Cultural Aspects in Biodiversity Conservation, 1, Valmiera (Latvia), 23 Nov 2006*. Latvia: Academic Press of the University of Latvia. [viewed 7 June 2013]. Online http://old.va.lv/files/biodiversity-rasa.pdf.
166. *Research Approaches*. (2013). [viewed 10 March 2014]. Online http://people.dsv.su.se/~evafaahr/lic/lic-2.html
167. *Resilience Alliance*. (2002). [viewed 11 March 2014]. Online http://www.resalliance.org/.
168. *Review of Existing Methods of Landscape Assesment and Evaluation*. (1997). Scotland: Macaulay Land Use Research Institute
169. *Review of Existing Methods of Landscape Assessment and Evaluation*. (2010). [viewed 28 March 2013]. Online http://www.macaulay.ac.uk/ccw/task-two/evaluate.html#ref
170. Rimkutė, B. (2011). Miestų plėtros nebereikia. *Statyba ir architektūra*. [viewed 8 April 2014]. Online http://www.veidas.lt/miestu-pletros-nebereikia (accessed 08 April 2014).
171. Rozenblat, C. (2009). European urban polycentrism: a multiscale typology. *Geographica Helvetica*, 64(3), 175-185.
172. Šešelgis, K. (1975). *Rajoninio planavimo ir urbanistikos pagrindai*. Vilnius: Mintis. 65-70.

173. Slater, B. H. (2014). *Aesthetics. Internet Encyclopedia of Philosophy*. [viewed 27 February 2014]. Online http://www.iep.utm.edu/aestheti/.
174. State Protected Areas Service under the Ministry of the Environment. (2008). *Apleistų pastatų likvidavimo programa [Program of Liquidation of Abandoned Buildings]*. [viewed 27 February 2014]. Online http://www.vstt.lt/VI/files/File/Projektu%20skyrius/Apleistu_pastatu_likvidavimo_programa.pdf .
175. Stauskas, V. (1966). Landšafto įvertinimo metodika, planuojant poilsio rajonus. *Lietuvos TSR architektūros klausimai*, 3(5), 184-206.
176. Stedman, R. C., & Ingalls, M. (2014). Topophilia, biophilia and greening in the red zone. In *Greening in the red zone*: *Disaster, Resilience, and Community Greening*. (pp. 129-144). Dordrecht: Springer.
177. Steinitz, C. (1990). Toward a sustainable landscape with high visual preference and high ecological integrity: the loop road in Acadia National Park, USA. *Landscape and urban planning*, 19(3), 213-250.
178. Stephenson, J. (2007). Many perceptions, one landscape. *Landscape Review*, 11(2), 9-30.
179. Stephenson, J. (2008). The Cultural Values Model: An integrated approach to values in landscapes. *Landscape and urban planning*, 84(2), 127-139.
180. *Sustainable neighborhood planning for the region*. (2004). [viewed 2 April 2014]. Online http://www.tcrpc.org/orientation/2009%20Orientation%20Series/Council%20Series%2010-16-09%20Neighborhoods,%20Disticts,%20and%20Corridors%20(Center%20and%20Edge).pdf.
181. Swanwick, C. (2002). *Landscape Character Assessment: Guidance for England and Scotland: Prepared on Behalf of the Countryside Agency and Scottish Natural Heritage by Carys Swanwick*. London: The Countryside Agency and Scottish Natural Heritage
182. Swensen, G., & Jerpåsen, G. B. (2008). Cultural heritage in suburban landscape planning: A case study in Southern Norway. *Landscape and urban planning*, 87(4), 289-300.
183. Swensen, G., & Jerpåsen, G. B. (2008). Cultural heritage in suburban landscape planning: A case study in Southern Norway. *Landscape and urban planning*, 87(4), 289-300.
184. Sýkora, L., & Bouzarovski, S. (2012). Multiple transformations: Conceptualising the post-communist urban transition. *Urban Studies*, 49(1), 43-60.
185. Taşan-Kok, T., & Vranken, J. (2011). *Handbook for multilevel urban governance in Europe: Analysing participatory instruments for an integrated urban development*. European Urban Knowledge Network. [viewed 13 October 2014]. Online http://www.mi-is.be/sites/default/files/doc/handbookmultilevel_urban_governance_3.pdf.
186. Taylor, P. J., & Lang, R. E. (2004). The shock of the new: 100 concepts describing recent urban change. *Environment and planning*, 36(6), 951-958.
187. *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*. (1999) [viewed 20 January 2013]. Online http://australia.icomos.org/wp-content/uploads/BURRA_CHARTER.pdf (accessed 20 January 2013).

188. Throsby, D. (2002). *Economics and culture*. Cambridge: Cambridge university press.
189. Tveit, M., Ode, Å., & Fry, G. (2006). Key concepts in a framework for analysing visual landscape character. *Landscape research*, 31(3), 229-255.
190. UNESCO World Heritage Center. (2013). *Cultural Landscape*. [viewed 19 June 2013]. Online http://whc.unesco.org/en/culturallandscape/#2.
191. van Dijk, T., & van der Valk, A. (2007). Shades of urbanity: diverging statistical definitions. In *ENHR conference Sustainable Urban Areas, Rotterdam* (pp. 25-28). Wageningen University.
192. Vanagas, J. (2006). *Vilniaus ir Kauno dvimiestis: idėja, samprata, vizija: straipsnių rinkinys*. Vilnius: Technika.
193. Vanagas, J. (1996). Miesto sociologijos pagrindai. *Vilnius: Aldorija*.
194. Vanagas, J. (2003). *Miesto teorija: vadovėlis aukštųjų mokyklų studentamas*. Vilnius: Vilniaus dailės akademijos leidykla.
195. Vanagas, J., & Neniškis, E. (2000). Lietuvos miestų potencialas Baltijos jūros regiono urbanistiniame kontekste. *Urbanistika ir architektūra*, 24(2), 47-59.
196. Vanempten, E. (2009). Challenging urbanism/the urban reality of the Brussels metropolitan area. In *Transcending the Discipline. Urbanism & Urbanization as receptors of multiple practices, discourses and realities, International Urbanism & Urbanization PhD Seminar, Leuven, Belgium* (pp. 1-3). [viewed 9 April 2014]. Online https://lirias.kuleuven.be/bitstream/123456789/258777/1/Elke+Vanempten_U&U_rban+brussels_2009.pdf
197. Vanempten, E. (2009). Fragmented and dispersed: Designing Brussels rurban landscape. *The new urban question: urbanism beyond neo-liberalism*. [viewed 9 April 2014]. Online http://www.ifou.org/conferences/2009delft/proceedings/6%20The%20Design%20of%20the%20New%20Urban%20Space/full%20papers/D050_Vanempten_Elke_designing%20brussels%20rurban%20landscape.pdf.
198. Vanwambeke, S. O., Meyfroidt, P., & Nikodemus, O. (2012). From USSR to EU: 20 years of rural landscape changes in Vidzeme, Latvia. *Landscape and Urban Planning*, 105(3), 241-249.
199. Vilniaus rajono savivaldybės detalieji planai (Detailed plans of Vilnius City municipality. [viewed 20 June 2016]. Online http://www.vrsa.lt/go.php/lit/Informacija-apie-teritoriju-planavima/232
200. Vilniaus rajono savivaldybės teritorijos dalies („U zonos“) bendrasis planas (General Plan of the Part of Vilnius District Municipality the „U Zonee“). (2017). [viewed 19 December 2017]. Online http://teritorijuplanavimas.vrsa.lt/go.php/Bendrasis-planas911692399861
201. Vilniaus Rajono savivaldybės teritorijos kraštovaizdžio specialusis planas (Special Landscape Plan of Vilnius District Municipality). (2014). [viewed 20 January 2016]. Online http://teritorijuplanavimas.vrsa.lt/go.php/Specialieji-planai63916101118
202. *Visions and Strategies around the Baltic Sea*. (2014). [viewed 17 April 2014]. Online http://www.vasab.org/index.php/about-vasab (accessed 17 April 2014).
203. Vitkuvienė, J. (2005). Buvusių dvarų sodybų reikšmė miesto savitumui. *Town Planning & Architecture*, 29(3), 120-124.
204. Von der Dunk, A., Grêt-Regamey, A., Dalang, T., & Hersperger, A. M. (2011). Defining a typology of peri-urban land-use conflicts–A case study from Switzerland. *Landscape and urban planning*, 101(2), 149-156.

205. Walmsley, A. (1995). Greenways and the making of urban form. *Landscape and urban planning*, 33(1-3), 81-127.
206. Westerink, J., Lagendijk, A., Dühr, S., Van der Jagt, P., & Kempenaar, A. (2013). Contested spaces? The use of place concepts to communicate visions for peri-urban areas. *European Planning Studies*, 21(6), 780-800.
207. *Wingspread Conference on the Precautionary Principle*. (1998). [viewed 10 april 2014]. Online http://www.sehn.org/wing.html.
208. World English Dictionary. (1998). *Precautionary principle*. [viewed 9 April 2014]. Online http://dictionary.reference.com/browse/precautionary+principle.
209. Wu, J. J. (2008). Making the case for landscape ecology an effective approach to urban sustainability. *Landscape journal*, 27(1), 41-50.
210. Zagorskas, J. (2009). Kompaktiško miesto modelis. In *Subalansuotos plėtros idėjų raiška architektūroje ir teritorijų planavime [Ideas of sustainable development in architecture and territorial planning]* (pp. 52-62). Kaunas: Technologija.
211. Zaleskienė, E., & Gražulevičiūtė-Vileniškė, I. (2013). Rurban landscape classification: case of Lithuania. In *Proceedings of the 6th international conference Rural Development* (pp. 28-29). Akademija: Aleksandras Stulginskis University, 6(1), 463-467.
212. Zaleskienė, E., Kamičaitytė-Virbašienė, J., & Graluževičiūtė-Vileniškė, I. (2013). Aesthetic aspects of landscapes in the rural-urban interface zones. *Acta Biologica Universitatis Daugavpiliensis*, 1(13), 15-30.
213. *Žemės dangos pokyčiai 2006 – 2013 [Land Cover Changes 2006 - 2013]*. (2014). Vilnius: Aplinkos apsaugos agentūra. [viewed 15 September 2014]. Online http://gamta.lt/files/CORINE%20informacinis%20koreguotas%20v4.pdf

APPENDIXES

Appendix 1

Lithuanian landscape assessment approaches summarized from Kamičaitytė-Virbašienė (2003)

Methodology			**Criteria**
Title	*Author(-s)*	*Year*	
Assessment of Lithuania's aesthetic resources	K. Ėringis and A. R. Budriūnas	1966	Expressiveness of relief, presence of water bodies, presence of forests, suitability for recreation
Methodology for aesthetic-recreational assessment of landscape	K. Ėringis and A. R. Budriūnas	1970	General impression, expressiveness of relief, spatial diversity of vegetation, appropriateness and diversity of man-made objects
Methodology for analysis of psychological-aesthetic potential of landscape	M. Purvinas	1983	Type of landscape spatial structure, naturalness, diversity, general psychological-aesthetic potential
Methodology for landscape aesthetic quality assessment	V. Stauskas	1966	Objective: relief height, size and character of water bodies, character and spatial structure of vegetation and land surface, links between relief, water bodies and vegetation, spatial structure of man-made elements; Subjective: general impression, visibility, uniqueness, diversity, colorfulness, importance of man-made elements, associative elements.
Landscape ranking / applied landscape geography; Psychonomic analysis of territory	P. Kavaliauskas	1975	Aesthetic potential: expressiveness of structure, compositional harmony, individuality of structure, meaningfulness of expression, viability of environment; Visual expressiveness: degree of culturization, orographic subdivision, water bodies, character of built-up areas, type of vegetation
Landscape ranking / applied landscape geography	G. J. Daniulaitis	1970-1980	Landscape health, diversity, uniqueness, purposefulness, compositional harmony
Methodology for aesthetic quality assessment of agrarian flatlands landscape	V. Palys	1979	Functionality: naturalness, natural diversity, technological optimality, Compositional harmony: diversity, individuality, clarity, cultural-historic significance
Landscape formation criteria	K. Šešelgis	1975	Regional identity, optimal location of visual landmarks and accents and their exposition in landscapes, compositional harmony of buildings and natural components, diversity of visual spaces, minimization of landscape visual pollution, protection of picturesque natural landscape
Assessment of visual character and compositional aspects of spatial structure of rural landscape	J. Bučas	1980-1983	Compactness, proportion, hierarchy, complexity, integrity of compositional structure
Methodology for aesthetic-recreational assessment of landscape	K. Ėringis and A. R. Budriūnas	2000	General impression, expressiveness of relief, spatial diversity of vegetation, appropriateness and diversity of man-made objects
Visual landscape quality assessment criteria	J. Kamičaitytė - Virbašienė	2001, 2003	Viability, diversity, complexity, harmony, expressiveness, uniqueness, functionality, meaningfulness

Kamičaitytė-Virbašienė, J. 2003. Kraštovaizdžio vizualinės kokybės reguliavimas kraštotvarkoje (Lietuvos pavyzdžiu): daktaro disertacija [Landscape visual quality in environmental design (sample of Lithunia)]. Kaunas, Technologija.

Appendix 2
Development of ecoaesthetic assesment methodology for rurban landscaes

Concepts and indicators for landscape character analysis, summarized by author from Tveit *et al*. (2006) and Ode *et al*. (2008). The introduced additional indicators are typed in bold

Concept	**Description**	**Related theories of landscape preference and experience**	**Dimensions** (Dimensions describe different aspects of the concept at the abstract level; Dimensions are determined by physical attributes in the landscape)	**Attributes** (Landscape attributes can be described by using visual indicators)	**Potential indicators** (Tveit *et al*. 2006) (Indicators represent the level at which the physical landscape attributes are counted, measured or scaled to allow different landscapes to be compared or to identify change in the same landscape over time)	**Detailed indicators** (Ode *et al*. 2008)
Complexity	The diversity and richness of landscape elements and features, their interspersion as well as the grain size of the landscape	Biophilia	Diversity, variation, richness, complexity of patterns and shapes, spatial pattern / combination	Linear features, point features, land cover, land form	- Number of objects and types - Evenness index - Dominance index - Diversity indices - Shape diversity - Size variation indices - Heterogeneity indices - Edge density - Aggregation indices	**Distribution of landscape attributes** - Richness of landscape elements - Diversity of land cover **Spatial organization of landscape attributes** - Edge density - Heterogeneity - Aggregation of land cover/patches **Variation and contrast between landscape elements** - Contrast - Shape variation - Size variation

Coherence	Reflection of the unity of a scene, where coherence may be enhanced through repeating patterns of color and texture. Coherence is also a reflection of the correspondence between land use and natural conditions in an area Coherence enhances people's ability to orient themselves, both in time and space, which is dependent on the readability of the landscape	Information Processing Theory	Correspondence with ideal situation, harmony, unity, holistic, land-use suitability, balance and proportion, intactness	Land use, water, pattern	- Percentage of land use in correspondence with natural conditions - Water presence and its spatial location - Repeating colors and patterns	**Spatial arrangement of water** - Presence of water - Correspondence of land form and water location **Spatial arrangement of vegetation** - Correspondence with natural conditions - Fragmentation - Repetition of pattern across the landscape **Spatial arrangement of buildings** **Correspondence with a particular landscape type**
Disturbance	Lack of contextual fit and coherence, where elements deviate from the context. Disturbance is related to constructions and interventions occurring in the landscape, of both temporary and permanent character	Biophilia	Intrusion, alteration, impact, lack of contextual fit, lack of coherence	Extraction, natural disturbance (fire, windfall, etc.), constructions (infrastructure, urban elements, temporary constructions, etc.)	- Number of disturbing elements - Percentage of area impacted by disturbance - Visibility of disturbing elements	**Presence of disturbing elements** - Landscape elements classified as disturbing **Visual impact of disturbing elements** - Area visually affected by disturbance
Stewardship	Presence of a sense of order and care, contributing to a perceived accordance to an 'ideal' situation. Stewardship reflects human care for the landscape through active and careful management	Aesthetic of care	Sense of order, sense of care, upkeep	Signs of use / non-use, vegetation succession, buildings, linear features (fences, paths, etc.), management detail, drainage, waste	- Percentage of abandoned land and stage of succession - Status of maintenance of buildings - Management type and frequency - Length and condition of linear features (for example, fences and walls) - Presence of waste - Wet areas in crop fields - Presence of weed	**Level of management for vegetation** - Level of abandonment - Presence of weed - Management type - Management frequency **Status and conditions of man-made structures in the landscape** - Condition / maintenance of structures such as fences, buildings

Imageability	Qualities of a landscape present in totality or through elements; landmarks and special features, both natural and cultural, making the landscape create a strong visual image in the observer, and making landscapes distinguishable and memorable Imageability applies to qualities that are special for a landscape and hence make the place distinguishable from other places	Spirit of place / genius loci, Vividness, Topophilia	Sense of place, *genius loci*, place identity, uniqueness, distinctiveness; vividness	Spectacular elements, panorama, landmarks, water, iconic elements	- Viewpoints - Presence of spectacular, unique or iconic elements and landmarks - Presence of historic elements and patterns - Presence of water bodies - Percentage of area of moving water	**Spectacular, unique and iconic elements** - Density of spectacular, unique or iconic built features - Density of landmarks - Proportion of water - Density of historical elements **Viewpoints** - Density of viewpoints
Visual scale	Perceptual units that reflect the experience of landscape rooms, visibility and openness	Prospect-refuge theory, Information Processing Theory	Landscape room, visibility, openness, enclosure, spaciousness, grain size	Topography, vegetation, man made obstacle	- View shed (an area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point) size - View shed form - Depth of view - Degree of openness - Grain size - Number of obstructing objects	**Open area** - Proportion of open land - View shed size - View shed shape - Depth / breadth of view **Obstruction of the view** - Density of obstructing elements - Degree of visual penetration of vegetation
Naturalness	Closeness to a preconceived natural state	Restorative landscapes, Biophilia hypothesis	Intactness, wilderness, natural, ecologically robust, vegetation health	Natural features, structural integrity of vegetation, vegetation / land-cover type, water, management, patch shape, edge shape	- Fractal dimension - Vegetation intactness - Percentage of area with permanent vegetation cover - Presence of water - Percentage of area of water - Presence of natural features - Lack of management - Management intensity (type and frequency) - Naturalism index - Degree of wilderness	**Naturalness of vegetation** - Proportion of natural vegetation - Level of succession (the observed process of change in the species structure of an ecological community over time) - Shape of edges **Pattern in the landscape, as perceived as natural or not** - Fractality - Fragmentation **Water** - Proportion of water

Historicity	Historical continuity reflects the visual presence of different time layers, also influenced by the age of the layers, while historical richness relates to the amount, condition and diversity of cultural elements	Topophilia, Landscape heritage / historic landscapes	Historical continuity, historical richness	Visible time layers, cultural elements (historical agricultural buildings, grave mounds, ruins, cairns, signs of earlier cultivation, fences, stone walls, historical roads and paths, etc.), traditional agricultural structures	- Presence of cultural elements - Shape and type of linear historical elements - Age of historical elements - Number of time layers - Percentage of area of historic continuity - Presence of traditional land use and pattern	**Vegetation with continuity** - Proportion of landscape with continuity of land cover - Proportion of landscape with traditional land use **Organization of landscape attributes** - Field size - Field shape -Spatial arrangement of vegetation **Landscape elements** - Density of cultural elements - Shape of linear features
Ephemera	Elements and land-cover types changing with season and weather	Restorative landscapes	Seasonal change (human imposed and natural), weather changes	Land cover / vegetation, animals, land use (ploughing, etc.), water (color reflections and waves), weather	- Percentage of land cover with seasonal change - Presence of animals -Presence of cyclical farming activities -Percentage of area of water - Projected and reflected images - Presence of weather characteristics	**Season-bound activities** - Presence of animals - Presence of cyclical farming activities **Landscape attributes with seasonal change** - Seasonal variation in natural vegetation - Seasonal variation on agricultural land - Water with seasonal change **Landscape attributes with weather characteristics** - Presence of water

Preliminary and detailed characterization of indicators for landscape visual character analysis by Tveit et al (2006) and Ode et al. (2008) demonstrating the possibility to use different data sources

Concept and indicators	**Preliminary characterization**	**Detailed characterization**			
		Data source			
		Landscape photos	Orthophotos	Land cover data	Field observations
Complexity					
Distribution of landscape attributes	- Richness of landscape elements (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Number of landscape elements per view *Absolute value*	- Number of landscape elements per area *Absolute value*	- Number of landscape elements per area *Absolute value*	- Number of landscape elements per area *Absolute value*
	- Diversity of land cover (1-4) (1-low; 2-moderate; 3-average; 4-high)	-Number of different land covers per view *Absolute value*	- Diversity and evenness indices *Absolute value*	- Diversity and evenness indices *Absolute value*	- Number of different land covers per area *Absolute value*
Spatial organization of landscape attributes	- Edge density (1-4) (1-low; 2-moderate; 3-average; 4-high)		-Edge density *Absolute value*	-Edge density *Absolute value*	
	- Heterogeneity (1-4) (1-low; 2-moderate; 3-average; 4-high)		- Heterogeneity index *Percent*	- Heterogeneity index *Percent*	
	- Aggregation of land cover/patches (1-4) (1-low; 2-moderate; 3-average; 4-high)		- Aggregation indices *Percent*	- Aggregation indices *Percent*	
Variation and contrast between landscape elements	- Contrast (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Degree of contrast between land covers in view *Percent* (1-4) (1-low; 2-moderate; 3-average; 4-high)			- Degree of contrast between land covers (1-4) (1-low; 2-moderate; 3-average; 4-high)

	- Shape variation (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Degree of variation between shapes in view *Percent* (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Shape indices *Absolute value*	- Shape indices *Absolute value*	- Degree of variation between shapes (1-4) (1-low; 2-moderate; 3-average; 4-high)
	- Size variation (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Degree of variation between sizes in view *Percent* (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Size distribution indices *Absolute value*	- Size distribution indices *Absolute value*	- Degree of variation between sizes (1-4) (1-low; 2-moderate; 3-average; 4-high)
Coherence					
Spatial arrangement of vegetation	- Correspondence with natural conditions (1-4) (1-low; 2-moderate; 3-average; 4-high)	- % of area in correspondence *Percent*	- % of area in correspondence *Percent*	- % of area in correspondence *Percent*	- Proportion of area in correspondence (1-4) (1-low; 2-moderate; 3-average; 4-high)
	- Fragmentation (1-4) (1-low; 2-moderate; 3-average; 4-high)		- Fragmentation indices *Absolute value*	- Fragmentation indices *Absolute value*	
	- Repetition of pattern across the landscape (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Presence of repeated patterns (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Autocorrelation indices *Absolute value*	- Autocorrelation indices *Absolute value*	- Presence of repeated patterns (1-4) (1-low; 2-moderate; 3-average; 4-high)
Spatial arrangement of buildings and structures	- Correspondence of building arrangement with natural conditions (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence of buildings and structures arrangement with natural conditions (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence of buildings and structures arrangement with natural conditions (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence of buildings and structures arrangement with natural conditions (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence of buildings and structures arrangement with natural conditions (1-4) (1-low; 2-moderate; 3-average; 4-high)

	- Correspondence of building arrangement with landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence of building arrangement with landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence of building arrangement with landscape type ((1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence of building arrangement with landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence of building arrangement with landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)
Correspondence of area with particular landscape type	- Correspondence of area with particular landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence with particular landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence with particular landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence with particular landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Correspondence with particular landscape type (1-4) (1-low; 2-moderate; 3-average; 4-high)
Disturbance					
Presence of disturbing / disturbed elements	- Presence of landscape elements classified as disturbing (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density of disturbing elements in the view (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- % of area classified as visually disturbed *Percent*	- % of area classified as visually disturbed *Percent*	- Density of disturbing objects (1-4) 1-absent; 2-moderate; 3-average; 4-high)
Visual impact of disturbing elements	- Area visually affected by disturbance (1-4) (1-absent; 2-moderate; 3-average; 4-large)		- % of area visually affected *Percent*	- % of area visually affected *Percent*	- proportion of area visually affected (1-4) (1-absent; 2-moderate; 3-average; 4-high)
Stewardship					

Level of management for vegetation	- Level of abandonment (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- % of vegetation in different stages of abandonment *Percent*	- % of vegetation in different stages of abandonment *Percent*	- % of vegetation in different stages of abandonment *Percent*	- Proportion of vegetation in different stages of abandonment (1-4) (1-no maintenance; 2-poorly maintained; 3-partly maintained; 4-highly maintained)
	- Presence of weed (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density of weed (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density of weed (1-4) (1-absent; 2-moderate; 3-average; 4-high)		- Density of weed (1-4) (1-absent; 2-moderate; 3-average; 4-high)
	- Management type (1-4) (1-no maintenance; 2-poorly maintained; 3-partly maintained; 4-highly maintained)	- % of area under different management regimes *Percent*	- % of area under different management regimes *Percent*	- % of area under different management regimes *Percent*	- management regimes of the area (1-4) (1-no maintenance; 2-poorly maintained; 3-partly maintained; 4-highly maintained)
	-Management frequency (1-4) (1-no management; 2-random; 3-satisfactory; 4-systematic)	- Number of highly maintained features *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)			- Number of highly maintained features *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)
Status and conditions of man-made structures in the landscape	- Condition / maintenance of structures such as fences, buildings (1-4) (1-no maintenance; 2-poorly maintained; 3-partly maintained; 4-highly maintained)	- Condition of structures (1-4) (1-no maintenance; 2-poorly maintained; 3-partly maintained; 4-highly maintained)			- Condition of structures (1-4) (1-no maintenance; 2-poorly maintained; 3-partly maintained; 4-highly maintained)
Imageability					

Spectacular, unique and iconic elements	- Density of spectacular, unique or iconic built features (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density in view *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)			- Density *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)
	- Density of landmarks (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density in view *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)			- Density *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)
	- Proportion of water (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- % of water in view *Percent*	- % of water *Percent*	- % of water *Percent*	- Proportion of water *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)
	- Density of historical elements (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density in view *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)			- Density *Absolute value* (1-4) (1-absent; 2-moderate; 3-average; 4-high)
Viewpoints	- Density of viewpoints (1-4) (1-low; 2-moderate; 3-average; 4-high)		- Density of viewpoints through visibility analysis *Absolute value* (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Density of viewpoints through visibility analysis *Absolute value* (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Density of viewpoints *Absolute value* (1-4) (1-low; 2-moderate; 3-average; 4-high)
Visual scale					
Open area	- Proportion of open land (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- % of open land *Percent*	- % of open land *Percent*	- % of open land *Percent*	- proportion of open land (1-4) (1-absent; 2-moderate; 3-average; 4-high)

	- Viewshed size (1-4) (1-small; 2-moderate; 3-average; 4-large)		- Size of viewshed *Absolute value*	- Size of viewshed *Absolute value*	
	- Viewshed shape (1-3) (1-patchy open area; 2-split open area; 3-large open area)	- Classification of view shape (1-3) (1-patchy open area; 2-split open area; 3-large open area)	- Shape index of viewshed *Absolute value*	- Shape index of viewshed *Absolute value*	- Classification of view shape (1-3) (1-patchy open area; 2-split open area; 3-large open area)
	- Depth / breadth of view 1-3) (1-short; 2-medium; 3-long)	- Estimation of depth of view (1-3) (1-short; 2-medium; 3-long)	- Length of radius of view *Absolute value*	- Length of radius of view *Absolute value*	- Estimation of depth of view (1-3) (1-short; 2-medium; 3-long)
Obstruction of the view	- Density of obstructing elements (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Density of obstructing objects (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density of obstructing objects (1-4) (1-absent; 2-moderate; 3-average; 4-high)		- Density of obstructing objects (1-4) (1-absent; 2-moderate; 3-average; 4-high)
	- Degree of visual penetration of vegetation (1-4) (1-blocked; 2-dense; 3-semi-open; 4-open)	- Proportion of vegetation with different levels of visual penetration (1-4) (1-blocked; 2-dense; 3-semi-open; 4-open)			- Proportion of vegetation with different levels of visual penetration (1-4) (1-blocked; 2-dense; 3-semi-open; 4-open)
Naturalness					
Naturalness of vegetation	- Proportion of natural vegetation (1-4) (1-low; 2-moderate; 3-average; 4-high)	- % of natural vegetation in the view *Percent*	- % of natural vegetation *Percent*	% of natural vegetation *Percent*	- Proportion of natural vegetation (1-4) (1-low; 2-moderate; 3-average; 4-high)

	- Level of succession (the observed process of change in the species structure of an ecological community over time) (1-4) (1- no succession; 2- primary succession; 3- intermediate succession; 4- climax)	- % of vegetation in different stage of succession *Percent*	- % of vegetation in different stage of succession *Percent*	- % of vegetation in different stage of succession *Percent*	- Proportion of vegetation in different stage of succession (1-4) (1- no succession; 2- primary succession; 3- intermediate succession; 4- climax)
	- Shape of edges (1-3) (1-geometrical; 2- intermediate; 3- complex)	- Interpretation of edge types (1-3) (1-geometrical; 2-intermediate; 3-complex)	- Shape indices *Absolute value*	- Shape indices *Absolute value*	- Interpretation of edge types (1-3) (1- geometrical; 2- intermediate; 3-complex)
Pattern in the landscape, as perceived as natural or not	- Landscape visual fragmentation (1-4) (1-low; 2- moderate; 3- average; 4-high)		- Fragmentation indices *Absolute value*	- Fragmentation indices [1] *Absolute value*	
Water bodies with natural appearance	- Proportion of water in landscape (1-4) (1-absent; 2- moderate; 3- average; 4-high)	- % of water in the view *Percent*	- % of water *Percent*	- % of water *Percent*	- Proportion of water (1-4) (1-absent; 2- moderate; 3- average; 4-high)
Historicity					
Vegetation with continuity	- Proportion of landscape with continuity of land cover (1-4) (1-low; 2- moderate; 3- average; 4-high)	- % of view with continuity of land cover *Percent*		- % of area with continuity of land cover *Percent*	- Proportion of area with continuity of land cover (1-4) (1-low; 2- moderate; 3- average; 4-high)

	- Proportion of landscape with traditional land use (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- % of view with traditional land use *Percent*	- % of area with traditional land use *Percent*	- % of area with traditional land use *Percent*	- Proportion of area with traditional land use (1-4) (1-absent; 2-moderate; 3-average; 4-high)
Organization of landscape attributes	- Traditional field shapes (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Presence of traditional field shapes (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Shape indices *Absolute value*	- Shape indices *Absolute value*	- Presence of traditional field shapes (1-4) (1-absent; 2-moderate; 3-average; 4-high)
	-Traditional spatial arrangement of vegetation (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Presence of traditional spatial arrangement (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Aggregation indices *Percent*	- Aggregation indices *Percent*	- Presence of traditional spatial arrangement (1-4) (1-absent; 2-moderate; 3-average; 4-high)
Landscape elements	- Density of cultural elements (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density of cultural elements (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Density of cultural elements (1-4) (1-absent; 2-moderate; 3-average; 4-high)		- Density of cultural elements (1-4) (1-absent; 2-moderate; 3-average; 4-high)
	- Cultural significance of landscape elements (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Cultural significance of landscape elements (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Cultural significance of landscape elements (1-4) (1-low; 2-moderate; 3-average; 4-high)		- Cultural significance of landscape elements (1-4) (1-low; 2-moderate; 3-average; 4-high)
	- Presence of time layers (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Presence of time layers (1-4) (1-low; 2-moderate; 3-average; 4-high)	- Number of time layers *Absolute value*	- Number of time layers *Absolute value*	- Presence of time layers (1-4) (1-low; 2-moderate; 3-average; 4-high)

	- Presence of traditional linear shapes (1-4) (1-absent; 2-moderate; 3-average; 4-high)		- Shape indices *Absolute value*		- Presence of traditional shapes (1-4) (1-absent; 2-moderate; 3-average; 4-high)
Ephemera					
Season-bound activities	- Presence of animals (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- Seasonal presence of animals (1-4) (1-absent; 2-moderate; 3-average; 4-high)			- Seasonal presence of animals (1-4) (1-absent; 2-moderate; 3-average; 4-high)
	- Presence of cyclical farming activities (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- % of land cover with cyclical farming activities in view *Percent*	- % of land cover with cyclical farming activities *Percent*		- Proportion of land cover with cyclical farming activities (1-4) (1-absent; 2-moderate; 3-average; 4-high)
Landscape attributes with seasonal change	- Seasonal variation in natural vegetation (1-4) (1-low; 2-moderate; 3-average; 4-high)	- % of area with seasonal changing vegetation in view *Percent*	- % of area with seasonal changing vegetation *Percent*	- % of area with seasonal changing land cover *Percent*	- Proportion of area with seasonal changing vegetation (1-4) (1-low; 2-moderate; 3-average; 4-high)
	- Seasonal variation on agricultural land (1-4) (1-low; 2-moderate; 3-average; 4-high)	- % of agricultural land with seasonal variation in view *Percent*	- % of agricultural land with seasonal variation *Percent*		- Proportion of agricultural land with seasonal variation (1-4) (1-low; 2-moderate; 3-average; 4-high)

Landscape attributes with weather characteristics	- Presence of water or other expressive attributes with weather characteristics in landscape (1-4) (1-absent; 2-moderate; 3-average; 4-high)	- % of water in view *Percent*	- % of water *Percent*	- % of water *Percent*	- Proportion of water or other expressive attributes with weather characteristics (1-4) (1-absent; 2-moderate; 3-average; 4-high)

Ecoaesthetic landscape assesment methodology by Jankevica (2012) and its application to rurban landscapes

Jankevica (2012) presents a combined landscape assessment matrix including ecological and aesthetic values. The valuable features of landscape in the matrix have been selected from scientific literature; landscapes were evaluated according to 1–10 score system; 1 point goes to low quality, 10 points are assigned to the highest quality.

The table presents the assessment of different landscape types, such as woodland, English landscape parks, and residential areas from the ecological and aesthetic points of view by Jankevica (2012) and provides preliminary evaluation of different types of rurban landscapes in order to demonstrate the problems of ecoaesthetics in the areas of the rural-urban interface. The evaluation confirms the ambiguous character of rurban areas if compared to such clearly natural landscapes as woodland or clearly artificial and purposely designed environments as multi-storey residential areas or French formal gardens.

Combined assessment matrix with ecological and aesthetical values based on Jankevica (2012)

Approach	**Types of landscape values**	**Landscape types**									**Rural-urban interface landscapes**				
		Traditional small gardens	Multi-storey residential areas	French formal gardens	English landscape parks	Woodland	Overgrown meadow	Untouched waterbed	Degraded abandoned sites	Industrial areas	Rural or natural landscape with **slight** manifestations of features of urbanization	Rural landscape with **clear** features of urbanization	Landscape where rural and urban features are **equally** present	Urban landscape with **clear** features of rural environment	Urban landscape with **slight** manifestations of rural environment
Aesthetics	Order, regularity	8	4	10	5	4	1	1	1	2	2	3	4	5	5
	Quality of man-made elements	9	8	9	5	1	1	1	1	8	5	5	6	7	7
	Visible human intention	10	6	10	7	3	1	1	1	4	3	6	5	5	7

	Particularity	7	4	10	9	6	1	3	1	4	3	5	5	6	6
	Use of outlandish species	9	4	10	6	1	1	1	1	2	2	2	3	4	3
	Use of natural forms	6	4	3	10	10	10	10	5	3	8	7	6	4	4
	Accordance with architecture	7	4	10	9	-	-	-	-	4	2	5	6	6	6
Ecology	Biodiversity	5	3	2	7	9	10	9	2	2	9	7	5	3	3
	Accordance with landscape type	8	5	8	9	10	9	9	1	4	9	7	6	6	8
	Native species	5	4	4	7	10	10	9	3	2	9	7	6	3	3
	Natural elements	7	3	3	8	10	10	10	2	2	9	7	6	3	3
	Carelessness	1	3	1	4	9	10	10	7	1	9	7	5	3	3
	Wildlife	4	2	2	7	10	10	10	2	1	9	6	5	2	2
	Unaffected nature processes	1	1	1	5	8	10	10	3	1	9	6	3	1	1

Ecological indicators for landscape analysis by Jankevica (2012) and their preliminary characterization

Concept	**Preliminary characterization**
Biodiversity (*rich biodiversity characteristic for geographic area under analysis, vegetation health*)	(1-4) (1-low; 2-moderate; 3-average; 4-high)
Accordance with landscape type (*ecological situation corresponds to particular landscape type*)	(1-4) (1-low; 2-moderate; 3-average; 4-high)
Predominance of native species (*ecosystems dominated by native species*)	(1-4) (1-low; 2-moderate; 3-average; 4-high)
Predominance of natural elements (*unaltered and undisturbed natural elements prevail*)	(1-4) (1-low; 2-moderate; 3-average; 4-high)
Carelessness (*landscapes in succession*)	(1-4) (1-low; 2-moderate; 3-average; 4-high)
Presence of unaffected nature processes (*wilderness, natural landscape development without significant human intervention prevails*)	(1-4) (1-low; 2-moderate; 3-average; 4-high)

Jankevica, M. (2012). Comparative analysis of methodologies for landscape ecological aesthetics in urban planning/Kraštovaizdžio ekologinės estetinės urbanistinio planavimo metodologijos palyginamoji analizė. *Mokslas–Lietuvos ateitis/Science–Future of Lithuania*, 4(2), 113-119.

Ode, Å., Tveit, M. S., & Fry, G. (2008). Capturing landscape visual character using indicators: touching base with landscape aesthetic theory. *Landscape research*, 33(1), 89-117.

Tveit, M., Ode, Å., & Fry, G. (2006). Key concepts in a framework for analysing visual landscape character. *Landscape research*, 31(3), 229-255.

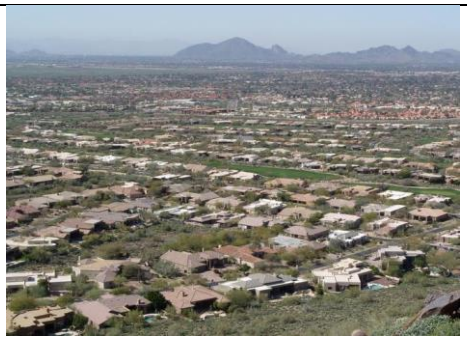
Appendix 3
Expert survey questionnaire

INVESTIGATION „LANDSCAPES OF RURAL AND URBAN INTERFACE AREAS“

I am Erika Zaleskiene, PhD student at Kaunas University of Technology, Department of Architecture and Urbanism. Currently, I am studying the landscapes that are emerging in urban and rural interface areas, seeking to reveal the peculiarities of the Lithuanian case. In order to clarify the hypothetical statements formulated in my work, I carry out a survey of specialists working in various fields of environmental (landscape) research and formation. Your opinion as an expert on this study is very important, so please feel free to answer the following questions. Please select the answer options that are acceptable to you and, if necessary, enter your answer option. All data will be analyzed in general, so your anonymity is guaranteed.

1. CONCEPTION AND DESCRIPTION

1.1. Please suggest your keywords, word combinations that fit to describe the landscapes shown in the photos. Record under photos.



1.2. How would you describe landscapes emerging in urban and rural interface areas (both globally and in Lithuania)? Please select one of the most acceptable answers for you.

These are the so-called suburban areas where urban lifestyle and suburban architecture are predominant
This is a chaotic, ever-changing transit area, typical to the territorial development of the city
These are areas that are characterized by both urban and rural environments
These are areas of new quality, in which the interaction of rural and urban environments features creates new quality of landscapes
Other (please specify).....

1.3. What factor plays a decisive role in shaping landscapes in urban and rural interaction areas (both globally and in Lithuania)? Please select one of the most acceptable answers for you.

The urban factor (territorial development of the city, the real estate market)
The rural factor (the features of the rural environment, historical relics of the rural environment)
Equivalent interface of urban and rural factors
Other (please specify) .....

1.4. Which terms, in your opinion, would be most appropriate for describing landscapes in urban and rural interface zones (both in the world and in Lithuania in general)? Please select several answer options that are acceptable for you.

Dynamism (constant change)
Historicity (historical relics of the rural environment in urban environment)
Complexity
Chaotic character
Sudden, emergent change
Conflicts of interests
Dependence on the city
Other (please specify) .....

2. LOCAL FEATURES, CLASSIFICATION

2.1. Please suggest your keywords, word combinations that fit to describe the landscapes shown in the photos. Record under photos.

2.2. What according to your opinion determines the characteristics of landscapes in urban and rural interface zones in different regions or countries? Please mark one or more of the answer options that are acceptable to you.

Geographical features of local landscape, climate, relief, etc.
Urbanization trends, city size
Historical features of rural landscape
Agricultural peculiarities
National, social, cultural peculiarities
Economic development of the country
Such peculiarities do not exist
Other (please specify) .....

2.3. Do the landscapes emerging in the rural-urban interface areas of Lithuania have any peculiarities? Please select one of the most acceptable answers for you.

No, most of all, there are global problems
Yes, the peculiarities are obvious
I can't say, it would require further research
Other (please specify) .....

2.4. What do you think are the characteristics of landscapes in urban and rural interface areas in Lithuania that link them with similar territories in the world? Please mark one or more of the answer options that are acceptable to you.

Territorial development of cities (so-called urban sprawl or suburbanisation)
Similar suburban architecture
A similar lifestyle in the suburbs
Similar functions in the areas of city influence: infrastructure, logistics, individual dwellings, etc.
Other (please specify) .....

2.5. What features, in your opinion, of the landscape of rural-urban interface in Lithuania determine their distinctiveness? Please mark one or more of the answer options that are acceptable to you.

Peculiarities of the development of urbanization (for example, sudden urbanization during the Soviet period and irregular urban sprawl after the independence)
Size of Lithuanian cities
Shrinking cities with declining of population
Territorial expansion of major cities in the country with decreasing population
Relatively sustainable development of regions in the Soviet period, abundance of small and medium-sized cities
Current uneven development of regions
Agricultural peculiarities in the country
Peculiarities of development of rural landscape
Sudden changes in agriculture after the restoration of independence
Other (please specify) .....

2.6. What features, in your opinion, determine the peculiarities of the Lithuanian rural-urban interface landscape? Please mark one or more of the answer options that are acceptable to you.

Rural landscape as a formant of the country's identity
Historical rural environment relics in the areas of urban influence
The peculiarities of the country's natural landscape
The natural environment of Lithuanian cities
Other (please specify) .....

2.7. What approach, in your opinion, is the best when classifying landscapes of rural-urban interface areas in Lithuania? Please select one of the most acceptable answers for you.

Apply universal international classifications
Create the unique classification, taking into account the peculiarities of the region
Classify according to the current legislation of the Republic and existing landscape classification
The universal international classifications adapted to the peculiarities of the country
No additional classification is necessary, the current legislation is sufficient
Other (please specify) .....

3. INVESTIGATION AND EVALUATION

3.1. What kind of features do you think should have the research methodology used in the studies of landscapes in rural-urban interface areas? Please mark one or more of the answer options that are acceptable to you.

Comprehensiveness (the opportunity to describe the landscape both in a general way and explore it in detail)
Interdisciplinarity (possibility to integrate functional, morphological, aesthetic, heritage protection aspects)
Universality (possibility to apply to various landscapes)
Specificity (the possibility to study only specific types of landscapes in detail)
Flexibility of application (option to adapt, modify depending on location characteristics, ability to measure changes in landscape)
Other (please specify) .....

3.2. Please evaluate the suitability of different landscape assessment methods for rural-urban interface landscapes investigation? Please select the answer options that are acceptable to you.

Method	**Very appropriate**	**Appropriate**	**More appropriate than inappropriate**	**Inappropriate**	**I can't say**
General impression method (Landscape and its impression are seen as a whole)					
Structural comparative anglysis (The landscape is analysed and described according to the formal aesthetic criteria: distinguished, described and evaluated features of biophysical landscape (geomorphologic forms, vegetation, water bodies), they are associated with characteristics important for					

landscape aesthetics (shape, lines, texture, colour) and links between them (diversity, viability, integrity, harmony).					
Structural estimation analysis (The landscape is analysed and evaluated in points by formal aesthetic criteria).					
Method of visual characterization of landscape (The landscape is analysed and evaluated according to a pre-defined set of criteria (complexity, mystery, naturalness, legibility, coherence, etc.).					
Complex approach (Looking for a connection between landscape features, components, and observers priorities with regard to the landscape).					
Other methods (please suggest).....					

3.3. What criteria, in your opinion, are relevant for assessment of landscapes in urban-rural interaface areas? Please record .....

3.4. Please assess the suitability of the presented concepts to describe landscapes in urban-rural interaface areas. Please mark the answer options that are acceptable to you.

Criteria	**Very appropriate**	**Appropriate**	**More suitable than inappropriate**	**Inappropriate**	**I don't know**
Complexity (variety and richness of landscape elements and features**)**					
Coherence (the impression of integrity, harmony, repetitive colors, textures, elements. Consistency of land use with properties of natural areas)					
Disturbance (lack of integrity and contextuality, contextual "dropout" elements**)**					
Stewardship (impression of regularity and care. Man's concern for the landscape is through active and careful handling**)**					
Imageability (The landscape creates a strong visual impression, is exceptional and memorable**)**					
Visual scale (clearly					

perceived and separated optimum landscape spaces)					
Naturalness (landscape is close to natural, intact nature)					
Historicity (historical continuity and visible historical richness. There are layers reflecting different times, different cultural historical relics**)**					
Ephemera (landscape elements and coatings are rapidly changing due to natural or man-made seasonal change**)**					

3.5. Please evaluate landscapes of urban and rural interface areas according to the given criterias from 1 to 4 points (1 – feature is completely absent; 4 – feature is particularly manifested)

				
Complexity	Complexity	Complexity	Complexity	Complexity
Coherence	Coherence	Coherence	Coherence	Coherence
Disturbance	Disturbance	Disturbance	Disturbance	Disturbance
Stewardship	Stewardship	Stewardship	Stewardship	Stewardship
Imageability	Imageability	Imageability	Imageability	Imageability
Visual scale	Visual scale	Visual scale	Visual scale	Visual scale
Naturalness	Naturalness	Naturalness	Naturalness	Naturalness
Historicity	Historicity	Historicity	Historicity	Historicity
Ephemera	Ephemera	Ephemera	Ephemera	Ephemera
				
Complexity	Complexity	Complexity	Complexity	Complexity
Coherence	Coherence	Coherence	Coherence	Coherence
Disturbance	Disturbance	Disturbance	Disturbance	Disturbance
Stewardship	Stewardship	Stewardship	Stewardship	Stewardship
Imageability	Imageability	Imageability	Imageability	Imageability
Visual scale	Visual scale	Visual scale	Visual scale	Visual scale
Naturalness	Naturalness	Naturalness	Naturalness	Naturalness
Historicity	Historicity	Historicity	Historicity	Historicity
Ephemera	Ephemera	Ephemera	Ephemera	Ephemera

3.6. Which of the descriptions are the most suitable for the landscapes presented in the photographs? Estimate points from 1 to 4 (1 - description is suitable least of all; 4 - description fits best).

									
The plain		The plain		The plain		The plain		The plain	
The interesting		The interesting		The interesting		The interesting		The interesting	
The beautiful		The beautiful		The beautiful		The beautiful		The beautiful	
The (new) sublime		The (new) sublime		The (new) sublime		The (new) sublime		The (new) sublime	
									
The plain		The plain		The plain		The plain		The plain	
The interesting		The interesting		The interesting		The interesting		The interesting	
The beautiful		The beautiful		The beautiful		The beautiful		The beautiful	
The (new) sublime		The (new) sublime		The (new) sublime		The (new) sublime		The (new) sublime	

4. REGULATION AND MODELING

4.1. Please distinguish the most important goals of the development of rural-urban interface areas. Please mark one or more of the answer options that are acceptable to you.

Preserve valuable historical relics of rural landscapes
Purposefully use the relics of the rural environment in the development of the city
To preserve functioning relics of the rural environment
To maintain agricultural activities as much as possible
Promoting environmentally-friendly suburban and urban farming
To seek optimal landscape visual diversity
Systematically shape the image of rurban territories
To strive for the specific aesthetics of the rurban landscapes
Sustainable diversity of functions that complement each other in the rurban areas
To form independent communities with the necessary infrastructure and workplaces
Adapt for recreation natural areas and historical relics of the rural environment
To use natural areas in the formation of the city's green areas
Search for specific architectural and urban solutions that correspond the specificities of rurban areas
Maintain ecological stability of these territories and use them for eco-compensation
Maintain valuable features of the natural environment
Other (please specify) .....

4.2. Please indicate the most important levels of sustainable development of urban and rural interface areas. Please mark one or more of the answer options that are acceptable to you.

International
National
Regional (within the territory of the state)
Municipal
Local (part of the municipality)
All levels are equally important
Other (please specify) .....

4.3. Please assess the necessity of the presented measures for the regulation and modeling of the development of rural-urban interface areas. Please mark the answer options that are acceptable to you.

	Very necessary	**Necessary**	**More needed than unnecessary**	**More unnecessary than needed**	**Unnecessary**	**No opinion**
Analysis of the current state						
Analysis of historical development						
Heritage analysis and evaluation						
Aesthetic analysis and evaluation						
Assessment of the social-economic potential, possibilities of use						
Ecological analysis and evaluation						
Permanent monitoring						
Prognosis of change						
Zoning of territory according the level of urbanization, cultural and social significance, aesthetic value						
Aesthetic, ecological, etc. assesment						
Definition of aesthetic classes for exclusive landscape areas						
Preparation of common guidelines for the development of rurban areas						
Determining priorities for the development of a particular territory						
Development and evaluation of alternative scenarios for the development of specific territories						
Proposals for the formation image of a specific territory						
Other (please specify).....						

4.4. What do you think should be the role of the National Landscape Management Plan for the sustainable development of urban and rural interface territories? Please select one of the most acceptable answers for you.

Solutions of the National Landscape Management Plan should determine the most important guidelines for the sustainable development of rural-urban interface areas

Solutions of the National Landscape Management Plan should regulate in detail the management of rural-urban interface areas

Solutions of the National Landscape Management Plan have no influence on the sustainable development of rural-urban interface areas

5. DATA ABOUT YOU

5.1. Your education (please specify) .....
5.2. Specialty you have acquired (please specify) .....
5.3. Area where you work (please specify) ……...
5.4. Your seniority (please specify) .....

Appendix 4

Material of authors publications which was used in some parts of the dissertation

Publication	The material of the publication has been used in these dissertation parts/sections
[S3; LT] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė; Landscape aesthetics theories in modeling the image of the rurban landscape // Journal of sustainable architecture and civil engineering = Darnioji architektūra ir statyba / Kaunas University of Technology. Kaunas : Technologija. ISSN 2029-9990. 2014, vol. 7, no. 2, p. 10-21. DOI: 10.5755/j01.sace.7.2.6731. [IndexCopernicus] [M.kr.: 03H] [Value: 0.500]	Introduction, subsections: 1.3; 3.1; 3.2; 3.4; 4.3; 4.4; Appendix 1
[S2; LV] **Zaleskienė, Erika**; Kamičaitytė-Virbašienė, Jūratė; Gražulevičiūtė-Vileniškė, Indrė. Aesthetic aspects of landscapes in the rural-urban interface zones // Acta biologica universitatis Daugavpiliensis. Daugavpils : University of Daugavpils. ISSN 1407-8953. 2013, vol. 13, no 1, p. 173-188. [Zoological Record; BIOSIS Previews] [M.kr.: 03H] [Value: 0.333]	Introduction
[P1d; IT] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė. Landscape management in rurban areas: Lithuanian case in global context // Proceedings of 7th international conference on contemporary problems of architecture and construction, 19-21 November 2015, Florence, Italy / edited by: S. Bertocci, P. Puma. Florence : University of Florence, 2015. ISBN 9788865424315. p. 377-382. [M.kr.: 03H] [Value: 0.500]	Introduction, subsections: 1.2; 2.2; 2.4; 2.5; 4.1
[P1a; LT] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė. Rurban landscape classification: case of Lithuania // Rural development 2013 : proceedings of the 6th international scientific conference, 28-29 November, 2013, Kaunas district, Lithuania. Akademija : ASU Publishing Center. ISSN 1822-3230. 2013, Vol. 6, book 1, p. 463-467. [Academic Search Complete; Conference Proceedings Citation Index - Social Science & Humanities (Web of Science)] [M.kr.: 03H] [Value: 0.500]	Subsections: 1.1; 2.4; 2.5; 3.1; General conclusions
[S3; LT] Gražulevičiūtė-Vileniškė, Indrė; **Brinkytė, Erika**. Landscape research trends and some insights from rurban landscape = Kraštovaizdžio tyrimų tendencijos ir keletas įžvalgų apie miesto ir kaimo sandūros teritorijose besiformuojančius kraštovaizdžius // Aplinkos tyrimai, inžinerija ir vadyba = Environmental research, engineering and management . Kaunas : KTU. ISSN 1392-1649. eISSN 2029-2139. 2014, Nr. 1 (67), p. 43-53. DOI: 10.5755/j01.erem.67.1.5984. [Pollution Abstracts; TOC Premier; Current Abstracts; INSPEC; CAB Abstracts] [M.kr.: 03H] [Value: 0.500]	Subsections: 1.3; 1.4; 1.5; 2.2
[S2; US] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**; Baltrušaitytė, Gintarė; Rubikaitė, Lauryna. Urbanization influence on the relicts of Soviet rural landscape: case of Lithuania // SAGE Open. Thousand	Subsections: 1.3; 2.2; 3.1; 4.3

Oaks, CA : SAGE Publications. ISSN 2158-2440. 2015, vol. 5, iss. 3, p. 1-18. DOI: 10.1177/2158244015601718. [Emerging Sources Citation Index (Web of Science); Scopus] [CiteScore: 0,34, SNIP: 0,391, SJR: 0,190 (2015, Scopus JM)] [M.kr.: 03H] [Value: 0.250]	
[S5; LV] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**; Veinberga, Maija. Framework for understanding and analysis of rural-urban interface areas and other relatively unknown landscapes: cultural ecology perspective // Landscape architecture and art : scientific journal. Jelgava : Latvia University of Agriculture. ISSN: 2255-8640. 2016, vol. 8, no. 8, p. 7-19. [M.kr.: 03H] [Value: 0.333]	2.1 subsection
[P1f; LT] Gražulevičiūtė-Vileniškė, Indrė; Gadal, Sebastien Jean-Paul; **Zaleskienė, Erika**. Peculiarities of rural-urban interface in Lithuania and implications for landscape management. // 17-osios Lietuvos jaunųjų mokslininkų konferencijos "Mokslas - Lietuvos ateitis" teminė konferencija, Aplinkos apsaugos inžinerija, 2014 m. balandžio 10 d. Vilnius = Proceedings of the 17th conference for junior researchers „Science – Future of Lithuania“, Environmental protection engineering, 10 April, Vilnius, Lithuania. Vilnius: VGTU, 2014. art. no. 32, ISSN: 2029-5456, p. 211-219. [M.kr.: 03H] [Value: 0.333]	Subsections: 2.2; 2.5; 4.2; 4.4
[S4; LV] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**. Rurban areas as reflected in Lithuanian territorial planning documents // Architecture and urban planning = Arhitektūra un pilsetplānošana. Riga : RTU Press ; Warsaw : De Gruyter Open. ISSN 1691-4333. 2016, vol. 12, iss. 1, p. 17-25. DOI: 10.1515/aup-2016-0010. [Art and Architecture Complete] [M.kr.: 03H] [Value: 0.500]	Subsections: 2.3; 2.5
[S4; LV] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė. Guidelines for landscape management in the areas of rural-urban interface: continuity and innovation // Arhitektūra un pilsetplānošana = Architecture and urban planning. Riga : RTU izdevnieciba. ISSN 1691-4333. 2014, t. 9, p. 21-26. DOI: 10.7250/aup.2014.003. [Art and Architecture Complete] [M.kr.: 03H] [Value: 0.500]	Subsections: 4.1; 4.4

LIST OF PUBLICATIONS:

Articles in reviewed periodical scientific publications
International publishing houses

1. [S4; LV] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**. Rurban areas as reflected in Lithuanian territorial planning documents // Architecture and urban planning = Arhitektūra un pilsetplānošana. Riga : RTU Press ; Warsaw : De Gruyter Open. ISSN 1691-4333. 2016, vol. 12, iss. 1, p. 17-25. DOI: 10.1515/aup-2016-0010. [Art and Architecture Complete] [M.kr.: 03H] [Value: 0.500]
2. [S5; LV] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**; Veinberga, Maija. Framework for understanding and analysis of rural-urban interface areas and other relatively unknown landscapes: cultural ecology perspective // Landscape architecture and art : scientific journal. Jelgava : Latvia University of Agriculture. ISSN: 2255-8640. 2016, vol. 8, no. 8, p. 7-19. [M.kr.: 03H] [Value: 0.333]
3. [S2; US] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**; Baltrušaitytė, Gintarė; Rubikaitė, Lauryna. Urbanization influence on the relicts of Soviet rural landscape: case of Lithuania // SAGE Open. Thousand Oaks, CA : SAGE Publications. ISSN 2158-2440. 2015, vol. 5, iss. 3, p. 1-18. DOI: 10.1177/2158244015601718. [Emerging Sources Citation Index (Web of Science); Scopus] [CiteScore: 0.34, SNIP: 0.391, SJR: 0.190 (2015, Scopus JM)] [M.kr.: 03H] [Value: 0.250]
4. [S4; LV] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė. Guidelines for landscape management in the areas of rural-urban interface: continuity and innovation // Arhitektūra un pilsetplānošana = Architecture and urban planning. Riga : RTU izdevnieciba. ISSN 1691-4333. 2014, t. 9, p. 21-26. DOI: 10.7250/aup.2014.003. [Art and Architecture Complete] [M.kr.: 03H] [Value: 0.500]
5. [S2; LV] **Zaleskienė, Erika**; Kamičaitytė-Virbašienė, Jūratė; Gražulevičiūtė-Vileniškė, Indrė. Aesthetic aspects of landscapes in the rural-urban interface zones // Acta biologica universitatis Daugavpiliensis. Daugavpils : University of Daugavpils. ISSN 1407-8953. 2013, vol. 13, no 1, p. 173-188. [Zoological Record; BIOSIS Previews] [M.kr.: 03H] [Value: 0.333]

National publishing houses

6. [S4; LT] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**. Management of cultural heritage areas in rural-urban interface zones in Lithuania: the elaboration of provisions of the national landscape management plan // Journal of sustainable architecture and civil engineering = Darnioji architektūra ir statyba. Kaunas : Technologija. ISSN 2029-9990. 2017, vol. 18, iss. 1, p. 5-18. DOI: 10.5755/j01.sace.18.1.16753. [IndexCopernicus] [M.kr.: 03H] [Value: 0.500]
7. [S4; LT] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**. Nacionalinio kraštovaizdžio tvarkymo plano sprendinių aptarimas miesto ir kaimo sąveikos kraštovaizdžių aspektu = Discussion of the solutions of the national landscape management plan from the point of view of rural-urban interface landscapes // Miestų želdynų formavimas = Formation of urban green areas. Klaipėda : Klaipėdos valstybinė kolegija. ISSN 1822-9778. eISSN 2029-4549. 2016, Nr. 1(13), p. 112-129. [IndexCopernicus] [M.kr.: 03H] [Value: 0.500]
8. [S3; LT] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė; Gadal, Sebastien Jean-Paul. Perspective of multiscale planning of rurban development: case of Lithuania // Journal of sustainable architecture and civil engineering = Darnioji architektūra ir statyba / Kaunas

University of Technology. Kaunas : Technologija. ISSN 2029-9990. 2015, vol. 10, no. 1, p. 13-25. DOI: 10.5755/j01.sace.10.1.8801. [IndexCopernicus] [M.kr.: 03H] [Value: 0.333]
9. [S3; LT] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė; Landscape aesthetics theories in modeling the image of the rurban landscape // Journal of sustainable architecture and civil engineering = Darnioji architektūra ir statyba / Kaunas University of Technology. Kaunas : Technologija. ISSN 2029-9990. 2014, vol. 7, no. 2, p. 10-21. DOI: 10.5755/j01.sace.7.2.6731. [IndexCopernicus] [M.kr.: 03H] [Value: 0.500]
10. [S3; LT] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė. Rurban landscapes: characterization, assessment, regulation of changes // Miestų želdynų formavimas : mokslo darbai = Formation of urban green areas : scientific articles. Klaipėda : Klaipėdos valstybinė kolegija. ISSN 1822-9778. 2014, Nr. 1 (11), p. 216-227. [IndexCopernicus] [M.kr.: 03H] [Value: 0.500]
11. [S3; LT] Gražulevičiūtė-Vileniškė, Indrė; **Brinkytė, Erika**. Landscape research trends and some insights from rurban landscape = Kraštovaizdžio tyrimų tendencijos ir keletas įžvalgų apie miesto ir kaimo sandūros teritorijose besiformuojančius kraštovaizdžius // Aplinkos tyrimai, inžinerija ir vadyba = Environmental research, engineering and management . Kaunas : KTU. ISSN 1392-1649. eISSN 2029-2139. 2014, Nr. 1 (67), p. 43-53. DOI: 10.5755/j01.erem.67.1.5984. [Pollution Abstracts; TOC Premier; Current Abstracts; INSPEC; CAB Abstracts] [M.kr.: 03H] [Value: 0.500]
12. [S3; LT] **Brinkytė, Erika**; Gražulevičiūtė-Vileniškė, Indrė. Urbanizuotojo ir kaimiškojo kraštovaizdžių sąveikos raiška ir panaudojimas formuojant miestų želdynus // Miestų želdynų formavimas : mokslo darbai = Formation of urban green areas : scientific articles. Klaipėda : Klaipėdos valstybinė kolegija. ISSN 1822-9778. 2013, Nr. 1 (10), p. 30-41. [IndexCopernicus] [M.kr.: 03H] [Value: 0.500]

Conference materials

13. [P1d; IT] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė. Landscape management in rurban areas: Lithuanian case in global context // Proceedings of 7th international conference on contemporary problems of architecture and construction, 19-21 November 2015, Florence, Italy / edited by: S. Bertocci, P. Puma. Florence : University of Florence, 2015. ISBN 9788865424315. p. 377-382. [M.kr.: 03H] [Value: 0.500]
14. [P1f; LT] Gražulevičiūtė-Vileniškė, Indrė; Gadal, Sebastien Jean-Paul; **Zaleskienė, Erika**. Peculiarities of rural-urban interface in Lithuania and implications for landscape management. // 17-osios Lietuvos jaunųjų mokslininkų konferencijos "Mokslas - Lietuvos ateitis" teminė konferencija, Aplinkos apsaugos inžinerija, 2014 m. balandžio 10 d. Vilnius = Proceedings of the 17th conference for junior researchers „Science – Future of Lithuania“, Environmental protection engineering, 10 April, Vilnius, Lithuania. Vilnius: VGTU, 2014. art. no. 32, ISSN: 2029-5456, p. 211-219. [M.kr.: 03H] [Value: 0.333]

National publishing houses

15. [P1e; LT] Gražulevičiūtė-Vileniškė, Indrė; **Zaleskienė, Erika**. Management model for rural-urban interface landscape with emphasis on rurban aesthetics // Ecological architecture 2015 : proceedings of the 3th international scientific conference dedicated to sustainability in architecture and planning, 22-23 October, 2015, Kaunas, Lithuania / Kaunas University of Technology, Faculty of Civil Engineering and Architecture, Department of Architecture and Urbanism. Kaunas : Technologija. ISSN 2345-0738. 2015, p. 29-33. [M.kr.: 03H] [Value: 0.500]

16. [P1a; LT] **Zaleskienė, Erika**; Gražulevičiūtė-Vileniškė, Indrė. Rurban landscape classification: case of Lithuania // Rural development 2013 : proceedings of the 6th international scientific conference, 28-29 November, 2013, Kaunas district, Lithuania. Akademija : ASU Publishing Center. ISSN 1822-3230. 2013, Vol. 6, book 1, p. 463-467. [Academic Search Complete; Conference Proceedings Citation Index - Social Science & Humanities (Web of Science)] [M.kr.: 03H] [Value: 0.500]

CONFERENCE PRESENTATIONS

In total, participation in the 12 scientific conferences abroad and in Lithuania:

1. Young Scientists Conference of KTU „Statyba ir architektūra“, title of the presentation: „Miesto ir kaimo kraštovaizdžių sąsajų ypatumai ir reikšmė", 2012-11-23, Kaunas.
2. International scientifical-practical conference Miestų želdynų formavimas 2013: sveika aplinka”, title of the presentation: „Urbanizuotojo ir kaimiškojo kraštovaizdžių sąveikos raiška ir panaudojimas miestų želdynų formavime“, 2013-04-18-19, Klaipėda.
3. VII International Conference "Research and conservation of biological diversity in Baltic Region", title of the presentation: „Aesthetic aspects of landscape in the rural-urban interface zones“, 2013-04-25-27, Daugavpils, Latvia.
4. Scientifical seminar „Šiaurės Lietuvos kraštovaizdis: vystymo tendencijos, dabartis ir perspektyvos”, title of the presentation: „Urbanizuotojo ir kaimiškojo kraštovaizdžių sąsajų raiška ir tipologija“, 2013-10-22, Šiauliai.
5. International scientifical conference “Ecological architecture 2013”, title of the presentation: „Relicts of soviet rural landscape in the zone of influence of the city: ecoaesthetic challenges“, 2013-10-24, Kaunas.
6. The sixth international scientific conference “Rural development 2013: innovations and sustainability”, title of the presentation: „Rurban landscape clasification: case of Lithuania“, 2013-11-28-29, Kaunas, Akademija.
7. 17th Conference of Young Scientists "Mokslas - Lietuvos ateitis: Aplinkos apsaugos inžinerija", title of the presentation: "Kraštovaizdžio valdymas Lietuvoje: kaimo ir miesto sąveikos ypatumai", 2014-04-10, Vilnius.
8. International scientifical-practical conference „Miestų želdynų formavimas 2014“, title of the presentation: „Rurban landscapes: characterization, assessment, regulation of changes“, 2014-04-23, Klaipėda.
9. 4th International Conference "Advanced Construction", title of the presentation: "Landscape Aesthetics Theories in Modeling the Image of the Rurban Landscape", 2014-10-9-10, Kaunas.
10. 55th International Scientific Conference, title of the presentation: „Guidelines for Landscape Management in the Areas of Rural-Urban Interface“, 2014-10-15, Latvija, Ryga.
11. 7th International Conference on Contemporary Problems of Architecture and Construction, Florence, 19th-21st November 2015, title of the presentation: "Landscape Management in Rurban Areas: Lithuanian Case in Global Context", 2015-11-18-21, Italy, Florence.
12. International scientifical conference „Ecological Architecture 2015“, title of the presentation: “Management Model for Rural-Urban Interface Landscape with Emphasis on Rurban Aesthetics”, 2015-10-23-24, Kaunas.

SL344. 2019-06-17, 26,25 leidyb. apsk. l. Tiražas 12 egz. Užsakymas 137.
Išleido Kauno technologijos universitetas, K. Donelaičio g. 73, 44249 Kaunas
Spausdino leidyklos „Technologija“ spaustuvė, Studentų g. 54, 51424 Kaunas