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Transformation of rural-urban cultural landscapes in Europe: Integrating approaches from ecological, socio-economic and planning perspectives

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Abstract

This paper presents a review of the presentations and synthesis of the discussion during a Symposium on 'Transformation of rural-urban cultural landscapes in Europe: Integrating approaches from ecological, socio-economic and planning perspectives' held at the European IALE conference 2009 in Salzburg, Austria. The symposium addressed an extended and much debated subject of the landscape dynamics in Europe. The papers presented during the symposium showcased a broad spectrum of cutting edge research questions and challenges faced by the cultural landscapes of Europe. During six sessions, 18 presentations (besides 20 posters) were made by 36 scientists (including co-authors) from 14 countries, representing 25 institutions of Europe. A glance at the presentations revealed that the state-of-the-art focuses on driving forces and selected aspects of transformation processes, methods of its analysis and planning support as dimensions of research in this field. However, inter- and transdisciplinary research and integrative approaches to the development of rural-urban cultural landscapes are needed. The extended discussion session at the latter part of the symposium highlighted some critical and unaddressed research questions which remained a pending agenda for future research.

Keywords

landscape dynamics, urban ecology, human ecology, rural development, urban-rural relationships, landscape protection, planning instruments and needs

Introduction

European cultural landscapes are a continuum from rural to urban landscapes, which have often developed over long periods of time. In particular large urban regions must be considered as hybrid landscapes where different urban and rural elements are inseparably mingled. This leads to new challenges, e.g. for the protection of natural resources, but it also provides new opportunities for integrative approaches to landscape management that seek to establish beneficial relationships between urban and rural (CSD 1999). There are big differences between European landscapes which have to be reflected in landscape policies. For instance, urban development has a longer history in the south than in the north. The transformation processes also differ between European landscapes which need to be accounted in planning and management. Moreover, actual challenges of climate change, demographic change, economic globalization, health care and natural risks will affect all of the European cultural landscapes but these drivers of change play out in different ways (Nilsson et al. 2008).

Interaction of socio-economic and ecological aspects is needed to support management decisions for sustainable development. In this respect, the diversity in European landscapes, with their respective challenges and approaches to their management, may be regarded as experiments for sustainable development. Yet, critical monitoring and evaluation is needed to learn from these experiments. For this purpose, development of a common European perspective on all landscapes as cultural landscapes and not only selected ones, which are considered as especially valuable such as National Parks, and cooperation in landscape development across the national borders are necessary. This view conforms with the European Landscape Convention - ELC (CoE, 2000, article 2) which 'applies to the entire territory of the (signatory states) and covers natural, rural, urban and peri-urban areas …It concerns landscapes that might be considered outstanding as well as everyday or degraded landscapes'. Moreover, ELC stipulates in article 9 that signatory states 'shall encourage transfrontier co-operation on local and regional level and, wherever necessary, prepare and implement joint landscape programmes.

Symposium 1 of European IALE conference 2009 explored the transformation processes of different European landscape types on the continuum from urban to rural areas. The symposium aimed to provide a forum for discussion on the following themes:

- Analysis of driving forces and transformation processes in European cultural landscapes on the continuum from rural to urban areas
- Landscape change in the perception of the people of mutliculutural European societies
- Integrated assessment of the transformation processes
- Steering activities of the transformation process at local, regional, national and international/ European levels
- Risk assessment and vulnerability of rural-urban landscape systems
- Monitoring of the transformation processes – related to selected aspects, techniques, and methods
- Strategies for sustainable development of rural – urban landscape in Europe

In total, 18 papers and 20 posters were delivered in this symposium which was the largest one in the conference. Accordingly, a diverse range of research was presented. The following is an attempt to give an overview and provide a synthesis of this symposium. In hindsight, it can be stated that the papers presented at the symposium more or less addressed all of the topics mentioned above. For concise and effective presentation of the synthesis, the papers are grouped into sub-themes within the main topic of the symposium. Each sub-theme covers, but is not limited to, the presentations that fit relatively well within its scope.

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Nonetheless, several presentations were observed to be fitting into multiple topics. The sub-themes are as follows:

1. Driving forces and transformation processes in European cultural landscapes on the continuum from rural to urban areas, including both theoretical papers and presentations on results from empirical studies
2. Methods for analysis of landscape transformations and impact assessment
3. Landscape ecological studies to substantiate planning in urbanising landscape

Driving forces and transformation processes in European cultural landscapes on the continuum from rural to urban

Transformation of European landscapes is driven by natural and societal processes in the context of global change. Main drivers are social and demographic changes (ageing, shrinking population, migration), economic changes (globalisation), technological change (e.g. development of internet networks), and environmental/climate change. Two papers explored the drivers and their effects in landscape from a theoretical perspective. While Finka et al. (2009) characterised landscapes as adaptive social–ecological systems. Zigraj (2009) points out the challenges for landscape ecology as science to model landscape transformation as multi dimensional socio-natural process. These drivers are connected with change of political and social value systems (e.g. end of communism in Eastern Europe) which have marked effects on landscapes. Importantly, they interact with the planning system and political forces in significant ways.

Therefore, global trends play out very differently across the Europe (Figure 1). While some urban centres continue to grow strongly – particularly in the Central Europe – a dramatic depopulation occurs in the European periphery, most of all in the Eastern Europe. Strong differences can also be observed within single countries. For instance, Dodouras et al. (2009) observed a strong population decline in remote Greek areas where many people leave for the economic centres of Athens and other large cities. Abandonment and neglect of traditional farming landscapes have been a consequence. On the other hand, agriculture has been intensified on more fertile land closer to the urban markets while lack of strong planning and building regulation has led to extensive sprawl around the urban centres.

Similar developments were observed in Slovakia (Finka et al. 2009) where the processes of separation of farming activities occurred. Overall, the arable land, vineyards, and orchards decreased in this country. However, in northern Slovakia, arable land and permanent grassland increased at the expense of pasture land. Loss of farmland was mainly caused by urban development and afforestation of marginal pastureland. Yet, land that was forested was also far from stable as large forest areas changed into transitional woodlands due to calamities such as windthrows (Otahel & Pazúr 2009). In total, land cover changed on not less than 4.2% of Slovakia's surface area within a ten year period between 1990 and 2000 (Otahel & Pazúr 2009). Main changes occurred in mountain areas and other regions with marginal farming conditions. The political and economic transformations after 1989 and the consequent change of farming policy were identified as key drivers for these landscape transformations.

These processes of landscape change can also be observed in other parts of Europe, for instance the Mediterranean countries. Papers presented at the symposium from these countries concentrated in particular on the transformation of agricultural landscapes to landscapes dominated by urban forces and the tertiary economy of services like leisure and tourism. Detailed accounts of land use transitions were contributed from Spain and Portugal. In Olzinelles (NE Spain), a parish of 2286ha in the municipality of Sant Celoi in the province of Barcelona, NE Spain, forest cover increased between 1851 and 2008 from 76% to 92% at the costs of agricultural land, while the cover of settlements increased to 2.6% (Otero et al. 2009). Expansion of woodlands led to a decline in biodiversity dependent on fields and meadows, such as butterflies.

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Also a loss of many cultural and ecological relevant elements such as ponds and stone terraces was observed. While woodlands were protected as natural parks and for leisure, no specific policies existed for conservation of open landscapes. The study also showed that the loss of farming landscapes has been closely related to land ownership. Traditionally, most of the land has been concentrated in the hands of very few land owners while most of the farmers had only very small land holdings. A greater degree of the large estates was already forested in the 19th century and these became more or less entirely forested and converted into the natural park. Vineyards and dry lands, on the other hand, were mostly in the hands of small land holders. Being economically marginal, these areas are particularly vulnerable to landscape change today. In addition, sprawl of urban areas into forests, caused by the almost explosive growth of secondary homes since the 1980s, increased the risk of wildfires.

Urban growth in the Meditarranean was also studied in the valley of the Sousa River in north-western Portugal (Pereira and Pedrosa 2009). In this case, the main interest was to understand how urbanisation changed the risk of damage from natural hazards, i.e. floods, mass movements and wildfires, in the study area. Urbanisation occurred particularly in areas exposed to these hazards. This was the main reason for increase of risks of damage whereas there was no increase in the intensity of hazards.

A number of further papers and posters were concerned with the consequences of land use change processes; in particular land abandonment and urbanisation, on the ecology of traditional cultural landscapes in the Mediterranean region and approaches to landscape conservation and planning were presented (Simon Rojo, 2009, Vogiatzakis et al. 2009). From the brief discussion of the above papers, a differentiated picture of landscape transformations emerges. In particular, the papers highlighted the need to understand the complex interactions between gobal (e.g. socio-demographic change, climate change etc.) and local determinants (e.g. land ownership, planning system) to develop specific policies for sustainable landscapes.

A second group of papers (and posters) explored more specifically about the transformation processes in urban regions, including changing urban – rural relationships. Notably, emphasis in these studies was less placed on analysis of landscape change as such but most of the papers were more orientated towards analysis of planning policies/strategies and assessment of impacts of urban transformations. Therefore, these papers will be discussed separately later.

Methods for analysis of landscape transformations and impact assessment

The research presented at the symposium offered a wide range of methods and tools to assess landscape transformations. A critical evaluation of these methods is beyond the scope of this summary. Clearly, the selection of method will depend on the objectives of the research. However, when looking across the studies, it seems that a combination of different methods is required to provide detailed information on landscape transformations and gain a deeper understanding of the underlying causes. Elements of an integrated methodology presented at the conference were:

1. Interpretation of remote sensed data (satellite imagery and/or aerial photography), for detailed analysis of landscape change (e.g. Otahel and Pazur 2009, Kupidera et al. 2009). Implemented in a GIS system, these data can be effectively combined with conventional maps such as topographic maps, soils maps, etc. and statistical data (e.g. census data) to assess the impacts on natural resources from landscape change and analyse risks from natural hazards (Pedreira and Pedrosa 2009)

2. While remote sensed data, when available, offers the possibility for spatial analysis of landscape change over larger areas, the papers presented at the conference made it also clear that understanding of the underlying causes and impacts of landscape change requires other, partly qualitative methods, and studies at more detailed scales. Amongst these can be noted:

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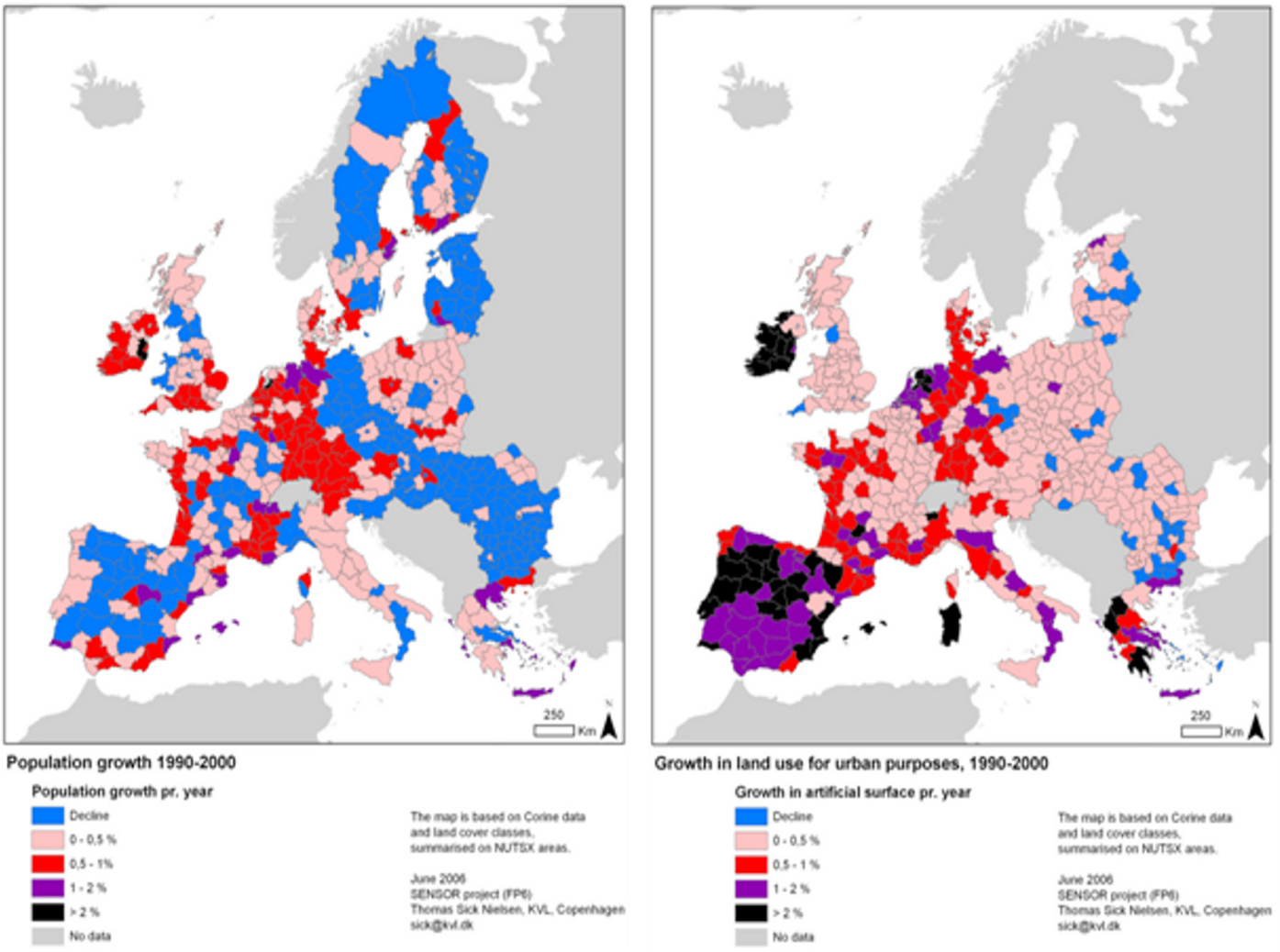

Figure 1: Population change (left) and urban growth (right) in Europe during 1990-2000 (Source: Geitner et al., 2009)

- Historical analysis, for instance use of old cadastral maps and historical statistical data (e.g. records on cultivated crops, farm sizes and land ownership) as used by Otero et al. (2009) cadastral maps, land ownership.
- Ecological studies, e.g. on biodiversity such as the detailed analysis of impacts of land use change on selected species groups in the Olzinelles study (Otero et al. 2009).
- Social studies, for instance on the perception of landscape change and management activities by the local population or park uses as in the case of Sarlöv-Herlin and Deak's study on use of cattle to manage a peri-urban landscape in Sweden. This type of study should be particularly relevant for involvement of the public in landscape management.
- Policy analysis: A comparative study on urbanisation patterns in three municipalities in Switzerland (Gennaio & Hersperger 2009) provided interesting insights in this respect. It could be shown that different rates of urban expansion were related to the dominance of specific parties in local politics, distribution of resources among the actors (e.g. access to press media, influence of land owners, etc.), new scientific knowledge but also change in public opinion at national level as an external driving force.
- Analysis of planning systems, policies and cultures: In the symposium Kristensen (2009) provided a comparative study on peri-urbanisation in three countries which showed that planning approaches are important determinants of landscape change but, in turn, they are dependent on natural and so-

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cial determinants, such as the population density, relative abundance of land and role of agriculture influence on shaping planning systems and policies, historically and today. In the Netherlands, for instance, which is densely populated and where therefore land resources are scarce, local plans regulate the entirety of the land, whereas in much less densely populated Sweden they are restricted to urban areas. This is also the case for Denmark, where farming holds a strong position – one of the main reasons why urban growth boundaries are strong instrument in this country to preserve valuable farmland. Consequently, patterns of urbanisation are different in these three countries.

- In yet other studies, methods were employed for understanding decision-making processes which closely work together with decision makers and stakeholders. These collaborative research methods (e.g. Simon Rojo 2009) may hold potential for transdisciplinary research.

It appears from the above discussion that studies of landscape change should adopt methodological approaches which combine different disciplinary methods. This calls for integrated and even transdisciplinary research. Yet, the studies presented at the symposium still seemed mostly using only one or a few of the approaches above, for instance analysis of remote sensed data while the combination of natural scientific, social and political science approaches still rather appeared to be the exception.

In addition, the study by Kristensen showed the importance of comparative research. Similarly, Pileri et al. (2009) undertook comparative research between cases in Italy and Germany to identify strategies for reducing land consumption. Studies on cross-border initiatives aiming at sustainable development of landscapes may offer a particular opportunity for this type of research (Elkabidze et al. 2009) as the implementation of similar programmes (e.g. funded by the European Union) can be studied in a similar landscape context but different planning systems.

Finally, the symposium included some studies where approaches for assessment of landscape transformations were developed and tested. Geitner and Tusch (2009) presented a methodology for assessment of soil functions in rural and urban areas in the Alps, resulting in a soil evaluation system and guidelines for planning. Schetke et al. (2009) developed a multicriteria approach for assessment of the socio-economic impacts of new housing estates in shrinking cities. This was the only presentation in the symposium which approached the phenomenon of shrinking cities whereas all other presentations rather considered urban expansion. However, shrinking cities are already a quite widespread phenomenon and should therefore become an important topic of urban landscape ecological research. Processes of shrinkage may even offer an opportunity for ecological restructuring of cities. However, this requires methodologies to assess the sustainability impacts of different planning concepts such as infill development and urban extensions. To this end, Schetke et al. (2009) operationalised the concepts of 'urban ecosystem services' and 'quality of life' to be integrated into a decision support system. Both assessment studies of Geitner and Tusch (2009) and Schetke et al. (2009) show how assessment can help to bridge between landscape ecology as science and decision making.

Landscape ecological studies to support planning in urbanising landscapes

The theme of urbanisation was strongly represented in the symposium. In many papers, it was considered as a pressure on rural landscapes (see section 3). A second group of papers was rather interested in identification and assessment of approaches for the sustainable development of urban landscapes.

Urbanisation is a major driver of landscape transformations in Europe where already 70-80% of the population is living in urban areas. Urbanisation is often considered as a one way process. Between 1990 and 2000 alone, the growth of urban areas and associated infrastructures consumed more than 8,000 km2, equivalent to the entire territory of the State of Luxembourg (Nilsson et al., 2008). Only a negligible amount of land use has been reconverted back from urban to

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agriculture, forest or natural, in the same time, on the other hand. Moreover, European cities have expanded on average by 78% between 1950 and 1990 whereas the population has only grown by 33% in the same period (EEA 2006). This process is also called 'urban sprawl'. Sprawl gives raises much concern from an ecological perspective, as it can disrupt and fragment wildlife habitats, destroy productive soils, ad negatively impact on soil, air and water quality. Most of all, it increases energy consumption from car based traffic and thence the ecological footprint of urban areas (Newman and Kenworthy 1989).

Therefore, there is an urgent need to find suitable strategies to reduce land consumption from urbanisation and promote more sustainable patterns of urban development. In this context, Pileri et al. (2009) presented first results from a study to establish comparative information on land sue changes in selected German and Italian cities. It could be shown that amount of land converted to urban considered between the selected cities and moreover that trends were different. For instance, in the Stuttgart case land consumption was much reduced recently whereas the two Italian regions of Milano and Brescia showed ongoing high losses of agricultural land and natural areas. The authors of the study conclude that regional and urban land use planning needs to use a portfolio of policies and instruments which are specific to the local context. In the case of the Italian city regions, they argue that priority should be given to effective protection of open spaces close to the central cities e.g. through greenbelts. As Stuttgart is characterised by a dispersed pattern of urban growth, it is suggested to favour infill policies in the core area and to constrain the growth in small settlements. Certainly, these conclusions will have to be further corroborated by further evidence on the sustainability impacts of different planning policies in these different cities. However, the need for contextualised policies is also emphasised by Kristensen's study on urban – rural landscape policies which has been reported in the previous section.

Is infill development a suitable means to slow urban sprawl or does it have negative impacts on quality of life and ecological services in the city? This question was addressed by Schetke et al. (2009). The study was carried out in the city of Essen in the Ruhr area (Germany) which goes through a period of population and economic decline. This trend has major consequences for society which are also reflected in land use change. Large areas of derelict land are the most visible sign of this process. The shrinkage of cities is now a widespread phenomenon throughout Europe which raises difficult new questions for urban ecology and urban planning. Is shrinkage a sign of decline or does it offer opportunities for ecological reconstruction of cities as a basis for their regeneration? Therefore, Schetke et al. addressed an important topic where more research would be required.

Results indicate that abundant brownfield sites, from former industrial uses, reduce quality of life as most of these areas are not accessible. Concurrently, they are low on ecosystem services as most of these areas are covered by non-vegetated and water impervious surfaces. Cases of infill development were shown to have positive effects on quality of life and ecosystem services as they increased the amount of accessible green spaces. Therefore, it is concluded that in the case of Essen, fears expressed by planners that infill development may have negative social and ecological impacts are not supported by evidence. These results may not be transferable to every city, e.g. growing cities in southern Germany which are already very compact. However, they offers a suitable methodology to assess the impacts of different urban development models.

Three further papers on urban issues were presented in this session. Mörtberg et al. (2009) presented the results from a project to develop a joint policy document for the landscape of six municipalities north of Stockholm. Biodiversity, recreation and cultural history were priority themes in this project. A Landscape Ecological Assessment was prepared for this purpose. Special to this assessment was the participative process whereby biodiversity targets were formulated. This approach was key to achieving an integrated landscape strategy and gains its broad support by the different local authorities.

The German Nature Conservation Agency (Bundesamt für Naturschutz) now engages in urban nature conservation. This is a significant development as the

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Agency has traditionally almost exclusively focused on nature conservation in rural areas. However, Kube (2009) gave an overview over the Agency's programme for urban areas and the activities supported by the Agency within this programme. Nature conservation is broadly conceived in this programme in line with the German Act for Nature Conservation which applies to all landscapes, also urban and requires not only conservation of species and habitats but also ecosystem services and access to nature for people. "Urban Woodlands in Leipzig" is one of the ambitious projects funded by the Nature Conservation Agency. The project aims to reintegrate abundant wastelands into the urban fabric as spaces for nature experience, enhancement of biodiversity and improvement of urban climates. The study showed that creation of urban forests on these sites is able to combine qualities of traditional parklands with ecological goals. Forests are a comparatively low cost solution but highly attractive for urban residents. Currently, implementation of the concept of urban woodlands is tested on selected sites in Leipzig.

Exploring new methods of landscape management in urban areas has also been the focus of a paper by Sarlöv-Herlin and Deak (2009). They studied the public perception of grazing with cattle in an urban park at the fringe of Malmo (Sweden) – with encouraging results. The majority of reactions towards the grazing animals were positive. Interestingly, respondents with an urban background were more aware of ecological and heritage issues than interviewees with a non-urban background. This may be taken as a positive signal that urban dwellers will give strong support to preservation of this valuable landscape and accept novel ways of landscape management which can be beneficial for biodiversity. Going even one step further, engaging local people in collaborative landscape management is argued to be an important means for reconnecting people to the landscape (Oliveira et al. 2009).

Conclusions

Overall, the symposium ended with a consolidated understanding – broadly supported by scientific evidence – to be used by the researchers so as the practitioners. A broad range of topics were discussed beyond traditional ecological studies; starting from theoretical concepts to methodological aspects, and to the application of scientific principles in practice – maturing the approaches addressing rural and urban landscapes. It was shown that urban development and demographic changes in the European cultural landscapes are multifaceted drivers of landscape change. Henceforth, there is a need for a scientific consensus in research that concentrates on the urban–rural linkages. The scale of further investigations could vary from local to regional and ultimately global, to meets the targets of sustainability in the biosphere. Furthermore, there is a need to understand the impact of planning strategies and peculiar issues such as shrinking cities. Therefore, it is a considerable scientific challenge to come to a common decision and agreement in a meeting which was actively attended by researchers from a wide variety of academic disciplines – not only ecologists but also the participants from social sciences and planning.

Nevertheless, the sectorial analytic approaches are still predominant and there is a need for inter- and transdisciplinary research – with the active involvement of the stakeholders. It would allow the real time application and testing the state-of-the-art. Most of all, testing-retesting methods would help to improve the fragile scientific methods with on-ground prototyping in urban-rural landscapes. However, there is yet another challenge to overcome that is how to involve the practitioners in complex debates and developments in the science and how to cope with their technocratic thinking?

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