



PHOTO: KJELL NILSSON

# Science for Sustainable Rural-urban Regions

**In the light of ongoing urbanisation, policy-makers and planners are shifting their focus to rural-urban regions, linked through flows of people, information, goods and services. Science has the task to support the sustainable development of these complex, multifunctional regions.**

## **Challenges of urbanisation**

Urbanisation is arguably the most significant process of land use change in Europe. According to the European Environment Agency, more than 70% of Europe's population is now living in urban areas. In size, these urban areas have grown by almost 80% over the last fifty years.

Urbanisation is most visible through the spread of built-up areas, business parks and the creation of large transport networks and hubs. New leisure parks, golf courses but also the conversion of farmsteads into residences and hobby farms in near-urban landscapes are other manifestations of urbanisation.



Changes in the relationship between rural and urban land uses has major consequences both for people's quality of life and for the environment. Inefficient land use patterns result in economic, social and environmental costs. Examples of these costs are the need to maintain transport and social infrastructures over larger areas, distorted land prices, and increased energy consumption and emission of greenhouse gases as a result of commuting. Urbanisation can also have a negative impact on environmental services such as the provision of drinking water. It can erode the character, identity and attractiveness of cultural landscapes.

In the light of the above, it is understandable that the European Spatial Development Perspective, issued by the European Commission in 1999, considers rural-urban processes of major importance to achieving sustainable development in Europe. Moreover, the year 2000's European Landscape Convention states that it is essential to strike a balance between preserving the natural and cultural heritage, and using the landscape as an economic resource.

### Focus on Rural-Urban Regions

The development of urban regions represents the main manifestation of urbanisation processes. New patterns of built / non-built and multi-functional land use types have emerged, covering larger areas at regional and inter-regional scale, and including urban areas as well as rural surroundings. So-called rural-urban regions (RURs) have emerged that are intricately

linked by flows of people, money and information, the exchange of materials and goods, as well as environmental services.

Europe's future will depend on whether pathways to sustainability can be created within these rural-urban regions, as they are so important in terms of human welfare and their enormous impacts on the environment. Rural-urban regions are appropriate units for dealing with many sustainability issues. For example, surrounding rural areas play a crucial role in the management of water runoff from cities and they provide much-needed recreational opportunities for urban inhabitants. The evolving land use structure within rural-urban regions has long lasting impacts on their social, economic and environmental performance. The dispersion of built up areas, for example, is linked to the growing demand for transport, and hence energy consumption. However, attempting to influence land use systems through planning is a difficult task.

When developing strategies for sustainable rural-urban land use relationships, a particular challenge lies in the multifunctionality of peri-urban land use. Policy and management, however, often focus on one function at the time, in an attempt to resolve conflicting demands and pressures. This will lead to sub-optimal decisions, conflict and marginalization. Methods need to be developed for working with complexity and uncertainty, at multiple scales with a wide range of stakeholders.

### How science can help

The development of urban regions has evoked the interest of scholars and planners for over a century, beginning with Ebenezer Howard's original response to the rapid growth of London, i.e. that of the »Social City«. Emergence and study of large rural-urban regions is a more recent phenomenon.

A key role of science is to provide credible, relevant and accessible knowledge for decision making. There is a need to improve understanding of the processes that drive present and future land use changes. Central questions to be answered include: What are the major socio-demographic trends in Europe's rural-urban regions, related to for example, ageing and shrinking populations, but also migration? How will these trends affect the relationships between urban, peri-urban and rural areas and how do changing relationships translate into land use change? Technological change may also have profound consequences for rural-urban relationships, for instance through new transport technologies. Moreover, climate change is now widely accepted as a reality. How will this affect land use and environmental services in rural-urban regions across Europe and what is the capacity of various land uses to adapt to climate change?

Land use changes are driven by global economic, social and environmental processes. The response to changes, however, will greatly vary between regions due to their specific character, as well as politi-

cal and planning cultures. Therefore, for developing strategies that are tailored to local potentials and constraints, it is essential to understand the relationships between rural-urban processes and regional approaches to policy making. Such strategies will have to deal with the complexity of multifunctional land use systems. The involvement of many actors needs to be considered. They operate at several levels of planning and decision-making, ranging from individual households and land owners to regional, national and European policy makers.

How can governance deal with these challenges associated with rural-urban land use systems? Today, these systems are not at all fully understood. For future planning strategies that strengthen the adaptive capacity of rural-urban regions, for example to unforeseen changes, gaining a better understanding of the complex behaviour of rural-urban land use relationships will be crucial.

#### **Involving stakeholders**

It will be a challenge to keep the many stakeholders well-informed and involved in the development of rural-urban strategies. In this respect there is a clear need to make science more relevant in natural resources and land use planning. For example, the flow of information across the science-policy interface to support policy-making needs to be improved. Today, this science-policy interface is often weak and calls for more targeted and tailored »translations« of research, to be used directly by decision-makers.

Experience shows that a step-wise process, from informing the public in an attractive way towards fully participatory approaches, is most likely to ensure sound, socially-inclusive planning. This process should be tailored to the specific planning context. Moreover, communication with policy-makers requires a high degree of openness and every phase of the process needs to be explained in detail. Actor-based, participatory scenario approaches seem suited to meet these challenges. The same can be said for web-based tools that, for instance, allow stakeholders to access information related to rural-urban issues and assess the sustainability impacts of policy options. At the time there is a lack of such tools tailored to rural-urban planning and management.

#### **Conclusion**

Changing land use relationships within emerging rural-urban regions, and their manifestation in phenomena such as urban sprawl and development of large scale transport corridors have long lasting consequences for the region's sustainability. The drivers of land use changes and how they interact with regional, national and European policies need to be better understood to minimise negative consequences of urbanisation and to enhance the adaptive capacity of rural-urban regions. Rural-urban regions can become centres of sustainable development, but this requires strategies that are developed by means of participatory planning and decision making. This is the

focus of the project »Peri-urban land use relationships – strategies and sustainability assessment tools for urban-rural linkages« (PLUREL), an integrated project under the European Commission's Sixth Framework programme.

PLUREL will provide tools for exploring strategic scenarios for rural-urban development, as well as for assessing the sustainability impacts of these processes. These will help policy-makers and other stakeholders in dealing with the challenges of land use planning in an urbanising society.

*Stephan Pauleit, University of Copenhagen*



# PLUREL in Brief



**PLUREL is a so-called integrated project under the European Commission's Sixth Framework Programme for research. Sustainable rural-urban land use relationships require proper policies and planning. PLUREL aims to contribute to this by developing strategies as well as planning and forecasting tools. These will help analyse urbanisation trends in the European Union, while they will also contribute to better guidance of urbanisation processes and to minimise their negative impacts.**

## **Rural-Urban Regions**

PLUREL's main study subject is the so-called Rural-Urban Region (RUR). The idea of a RUR is an extended form of a Functional Urban Region, i.e. the concept used to describe an urban core and its surrounding commuting ring. The RUR

extends beyond today's rings of intense interaction with the core city, as it also includes lands for recreational use, food supply and nature reserve functions in predominantly rural areas.

## **A truly international project**

Thirty-one universities, research institutes and private enterprises from fifteen countries participate in PLUREL. Partners do not only come from Europe, but also from China, a country where rural-urban regions are rapidly developing. Inclusion of greater Hangzhou amongst the project's seven case study regions therefore provides an interesting perspective for the European situation. Rural-urban-regions in France, Germany, Poland, The Netherlands, Slovenia and the United Kingdom are also studied. The regions studied represent a wide variety in terms of political, economic, land-use and other

characteristics. They all have in common, however, that links between their urban and rural areas are under rapid development. Stakeholders in all cases, such as local planners and interest groups, are actively involved in project work. Detailed local analyses are combined with studies at the European level. In this way conclusions can be drawn for Europe as a whole, based on a typology of rural-urban-regions.

## **From driving force to response**

PLUREL's activities are organised into six interrelated modules. The organisation of each module has been inspired by the so-called DPSIR-framework. DPSIR refers to a chain of events where general driving forces result in pressures, which again affect the state of the environment. Changes in the state of the environment will have an impact on ecosystems, human beings



PHOTO: CECIL KONJENDIJK

## PLUREL Factsheet

Project title:	Peri-urban land use relationships – Strategies and sustainability assessment tools for urban-rural linkages (PLUREL)
Main funding programme:	European Union's Sixth Framework programme for research, priority 6.3, »Globale change and ecosystems«
Project type:	Integrated project
Duration:	January 2007 – December 2010
Size:	1153 person months, 10.5 million euro
Partnership:	31 partners from 15 countries
Coordinator:	Danish Centre for Forest, Landscape and Planning, University of Copenhagen
Website:	<a href="http://www.plurel.net">www.plurel.net</a>



PHOTO: CECIL KONJENDIJK



etc. that may warrant a response aiming to change or modify the outcome.

### Six modules

PLUREL's Module 1 looks at the main underlying driving forces of the urbanisation process, and relationships between urban and rural areas, such as global economy and technological development, demographics and climate change. In module 2, these general trends are »translated« into demands on land use, resources and public participation, all in the interface between rural, peri-urban and urban areas. This work includes study of different strategies for urban growth (or shrinkage). The challenges posed by the development of drivers and demands in seven case study regions are studied in module 3, where local stakeholders are involved in analysis of the regional context as well as development of scenarios and strate-

gies. In module 4 effects of land use scenarios resulting from decisions made by stakeholders at the local/regional level are modelled. This involves the development of a conceptual impact assessment approach for the three sustainability dimensions: environmental, economic, and social. Module 5, then, brings together all project results.

A »toolkit« will be produced to support integrative analysis, assessment and planning of sustainable rural-urban land use relationships in Europe. This toolkit will include ways to forecast the effects of global drivers and trends on urban – peri-urban – rural land use relationships, as well as contributions to the development of site-appropriate strategies, including participatory processes. A central element of the toolkit will be a Sustainability Impact Assessment Tool for Rural-Urban

Regions. This SIATRUR can be used for sustainability assessment of European and regional policy options related to rural-urban relationships. Module 6, finally, is concerned with project management and dissemination activities.

### Expected results

Rural-urban regions are a rather new phenomenon in policy making and PLUREL is expected to produce important new knowledge on the effects of policies and development in these RURs. The project will provide policy-makers and other stakeholders with a set of state-of-art tools for evaluating policies for these regions. In this way, sustainable development of the rural-urban field will be supported.

*Thomas Sick Nielsen,  
University of Copenhagen*

# PLUREL Case Study Areas

## Montpellier, France

The urban region of Montpellier has developed rapidly since the 1960s, doubling its population. This represents the highest demographic growth in France. Close to half a million people now live within 1520 km<sup>2</sup>. The region's land uses range from dense urban centres to the biodiverse wetlands along the Mediterranean coast. Urban pressures have led to a loss of agricultural land and pose continuous threats to the natural environment. Risks of floods and fires are a major concern to urban planning.

## Leipzig, Germany

Greater Leipzig, with its 0.5 million inhabitants, has a long history as main urban centre in Central Europe. The German Democratic Republic's social planning system largely prevented urban sprawl after the Second World War, apart from some large-scale housing estates on the urban fringe. At the end of the 1980s, political changes initially led to heavy urban sprawl. This process stopped and even turned into shrinkage when economic and demographic realities, such as unemployment and a decreasing population emerged.

## Warsaw, Poland

The Polish capital and its surrounding region are undergoing rapid change. The capital region is attracting considerable economic activity and immigration. Suburbanisation processes are mostly of a rather unplanned character. A lack of good governance results in land use conflicts and related problems, such as encroachment of residential and commercial development upon agricultural and forest land. Development of an integrated plan for the metropolitan area is still in its initial phase.

## Koper region, Slovenia

The Koper region comprises the entire coastal harbour and industrial region of Slovenia. This coastal zone is rapidly developing and urbanising with a mix of harbour industry and tourism activities, leading to land use conflicts. The neighbouring Dragonja Valley is depopulating and agricultural areas are being abandoned. Water scarcity is a major issue in

the region as the competition for limited resources intensifies.

## City Region of Haaglanden, The Netherlands

This regional authority in the country's coastal zone comprises nine city councils, including those of The Hague and Delft. Collaboration within the city region provides opportunities for coordinated policy and spatial planning. This is important, as the region is densely populated and has to balance, for example, urban and agricultural land use. Water management is another major task. The region emphasises development of its green image and qualities.

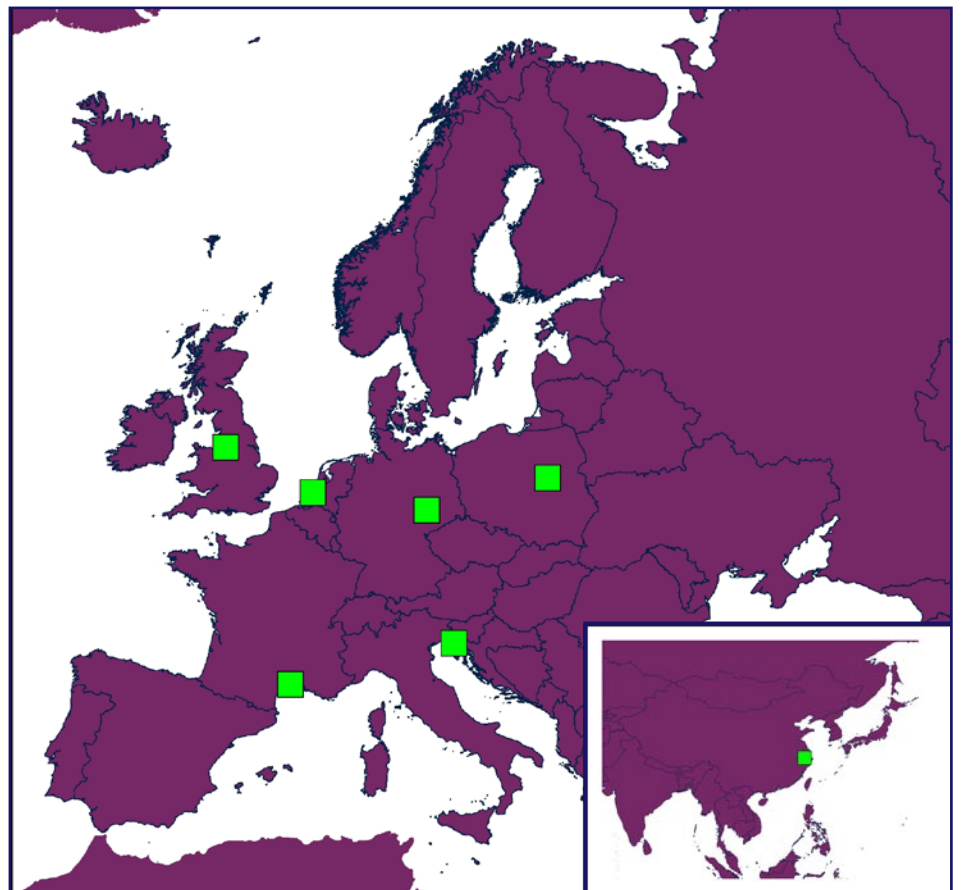
## Greater Manchester, United Kingdom

Greater Manchester is at the centre of a city-region agglomeration of 4.5 million people. It was one of the first industrial and global trading cities, and has seen rapid industrial restructuring and dereliction in and around the urban area.

The peri-urban landscape of airports, motorways and waste treatment infrastructure, also contains innovations in multi-functional land use. These include planning policies, third sector development trusts, community forests and green cycle trails.

## Hangzhou, China

Hangzhou is a major Chinese city, famous for its cultural heritage of gardens, temples and lakes. Situated in the Yangtze River Delta, south of Shanghai, the city lies at the centre of a strongly prospering region which is urbanising at an extreme pace. Already now, Hangzhou has over 6 million inhabitants, and has an estimated annual growth of about 100,000 people. This growth results in major pressures on cultural landscapes and the environment. Hangzhou is thus highly appropriate for studying governance of rural-urban land use relationships in the Chinese context of extreme urbanisation.



# PLUREL People



Interview with Kjell Nilsson, University of Copenhagen



## What is your role in PLUREL?

Our consortium consists of the leading European experts on different aspects of urban development. My primary role as project coordinator is to help everybody find their role in the project and be motivated to work for joint success. My second role is to maintain a close contact with our main funder, the European Commission and to make PLUREL well-known amongst different policy-makers in Europe.

## How will PLUREL benefit from your own expertise?

Most important is my expertise within research management. I have coordinated several interdisciplinary projects and networks dealing with multifunctional land use, urban landscapes and the relationships between people and their environment, both at national and international level.

## What will be PLUREL's most important results?

PLUREL is the only Integrated Project under the 6th Framework Programme dealing exclusively with urban development. It therefore has an important role to play in assisting policy-makers with analysing urbanisation processes and trends in the European Union, in order to support sustainable urban development. In this sense PLUREL is supplementary

to sustainable land use projects funded by EU such as SENSOR (rural areas), SEAMLESS (agriculture) and EFORWOOD (forestry).

## Which challenges can stand in the way of PLUREL's success?

Technically, the most challenging aspect is the integration of different scientific models that use huge amounts of both quantitative and qualitative data into a robust and user-friendly Sustainability Impact Assessment Tool for Rural-Urban Regions (SIAT-RUR). The main operational challenge is to ensure active involvement of stakeholders in the six European case study regions and the Chinese reference study. Our ambitious dissemination plan should help us with this.

## Why should policy makers be interested in PLUREL?

Europe is the most urbanised continent in the world. Urban areas are the vehicles of economic development and a key factor for people's health and welfare. However, negative consequences such as urban sprawl, social problems and environmental hazards threaten sustainable development. There is a need to mitigate these negative effects and improve the quality of life of city dwellers, as well as those who live in peri-urban and rural areas. PLUREL will help by developing innovative planning strategies and forecasting tools.

## Main PLUREL Contact Persons

### Project management (and Module 6)

Kjell Nilsson (Project coordinator)  
Danish Centre for Forest, Landscape and Planning, University of Copenhagen, Denmark  
E-mail: [kjni@life.ku.dk](mailto:kjni@life.ku.dk)

Thomas Sick Nielsen (Project manager)  
Danish Centre for Forest, Landscape and Planning, University of Copenhagen, Denmark  
E-mail: [sick@life.ku.dk](mailto:sick@life.ku.dk)

### Module 1

Vegard Skirbekk  
International Institute for Applied Systems Analysis (IIASA), Austria  
E-mail: [skirbekk@iiasa.ac.at](mailto:skirbekk@iiasa.ac.at)

Mark Rounsevell  
Université catholique de Louvain, Belgium  
E-mail: [rounsevell@geog.ucl.ac.be](mailto:rounsevell@geog.ucl.ac.be)

### Module 2

Armin Werner  
ZALF, Leibniz Centre for Agricultural Landscape Research, Germany  
E-mail: [awerner@zalf.de](mailto:awerner@zalf.de)

Annette Piorr  
ZALF, Leibniz Centre for Agricultural Landscape Research, Germany  
E-mail: [apiorr@zalf.de](mailto:apiorr@zalf.de)

### Module 3

Carmen Aalbers  
Alterra Green World Research, The Netherlands  
E-mail: [carmen.aalbers@wur.nl](mailto:carmen.aalbers@wur.nl)

### Module 4

Dagmar Haase  
UFZ, Helmholtz Zentrum für Umweltforschung, Germany  
Email: [dagmar.haase@ufz.de](mailto:dagmar.haase@ufz.de)

### Module 5

Stephan Pauleit  
Danish Centre for Forest, Landscape and Planning, University of Copenhagen, Denmark  
E-mail: [sp@life.ku.dk](mailto:sp@life.ku.dk)

# PLUREL



## PLUREL Partners

- University of Copenhagen, Denmark
- Helmholtz Zentrum für Umweltforschung, UFZ, Germany
- Leibniz Centre for Agricultural Landscape Research, Germany
- Alterra Green World Research, The Netherlands
- IIASA, International Institute for Applied Systems Analysis, Austria
- ARC systems research GmbH, Austria
- Université catholique de Louvain, Belgium
- Institute for Local Government Studies, Denmark
- The Finnish Environment Institute, Finland
- University of Paris I & COE/CCIP, France
- Agricultural and environmental engineering research centre, CEMAGREF, France
- Centre for European Economic Research GmbH, Germany
- Christian-Albrechts-University of Kiel, Germany
- University of Thessaly, Greece
- Metropolitan Research Institute, Hungary
- University College Dublin, Ireland
- EC-DG Joint Research Centre, Italy
- Polish Academy of Sciences, Poland
- University of Ljubljana, Slovenia
- University of Bath, United Kingdom
- University of Manchester, United Kingdom
- Edinburgh College of Art, United Kingdom
- Scandinavian Branding A/S, Denmark
- Büro für urbane Projekte, Germany
- Studio Mediterana, architecture designing, advisory and investment inc., Slovenia
- Munich Design International, Germany
- RAL2005 Architects, The Netherlands
- University of Groningen, The Netherlands
- Queen's University Belfast, United Kingdom
- The Chinese Academy of Forestry, China
- Alfred Peter Paysagiste, France

## Peri-urban Land Use Relationships

*Strategies and Sustainability Assessment Tools for Urban-rural Linkages*

## Project Management

Danish Centre for Forest, Landscape and Planning  
University of Copenhagen  
Rolighedsvej 23  
DK-1958 Frederiksberg C  
Denmark

Thomas Sick Nielsen (project manager)  
Tel.: +45 3528 1830  
E-mail: sick@life.ku.dk

## Editor of PLUREL Newsletter

Cecil Konijnendijk  
E-mail: cecil@woodscape-consult.com

## Art Direction

Scandinavian Branding A/S

## Layout & Production

Jette Alsing Larsen

PLUREL is an Integrated Project under  
EU's 6<sup>th</sup> Framework Programme



[www.plurel.net](http://www.plurel.net)