



The RSA Research Network on EU COHESION POLICY

RSA workshop on the EU Cohesion Policy: Focus on The Territorial Dimension

05-06 NOVEMBER 2015

Venue: CONFERENCE ROOM OF THE INSTITUTE OF GEOGRAPHY AND SPATIAL PLANNING. (IGOT) - UNIVERSITY OF LISBON CAMPUS - RUA BRANCA EDMÉE MARQUES. 1600-276 LISBOA.

PROJECTING LAND COVER AND POPULATION BASED CHANGES IN URBAN AREAS USING AN EU-WIDE DYNAMIC POPULATION AND LAND USE ALLOCATION MODEL

Mert KOMPIL; Jean-Philippe AURAMBOUT; Ana BARBOSA; Ricardo BARRANCO; Carlo LAVALLE*

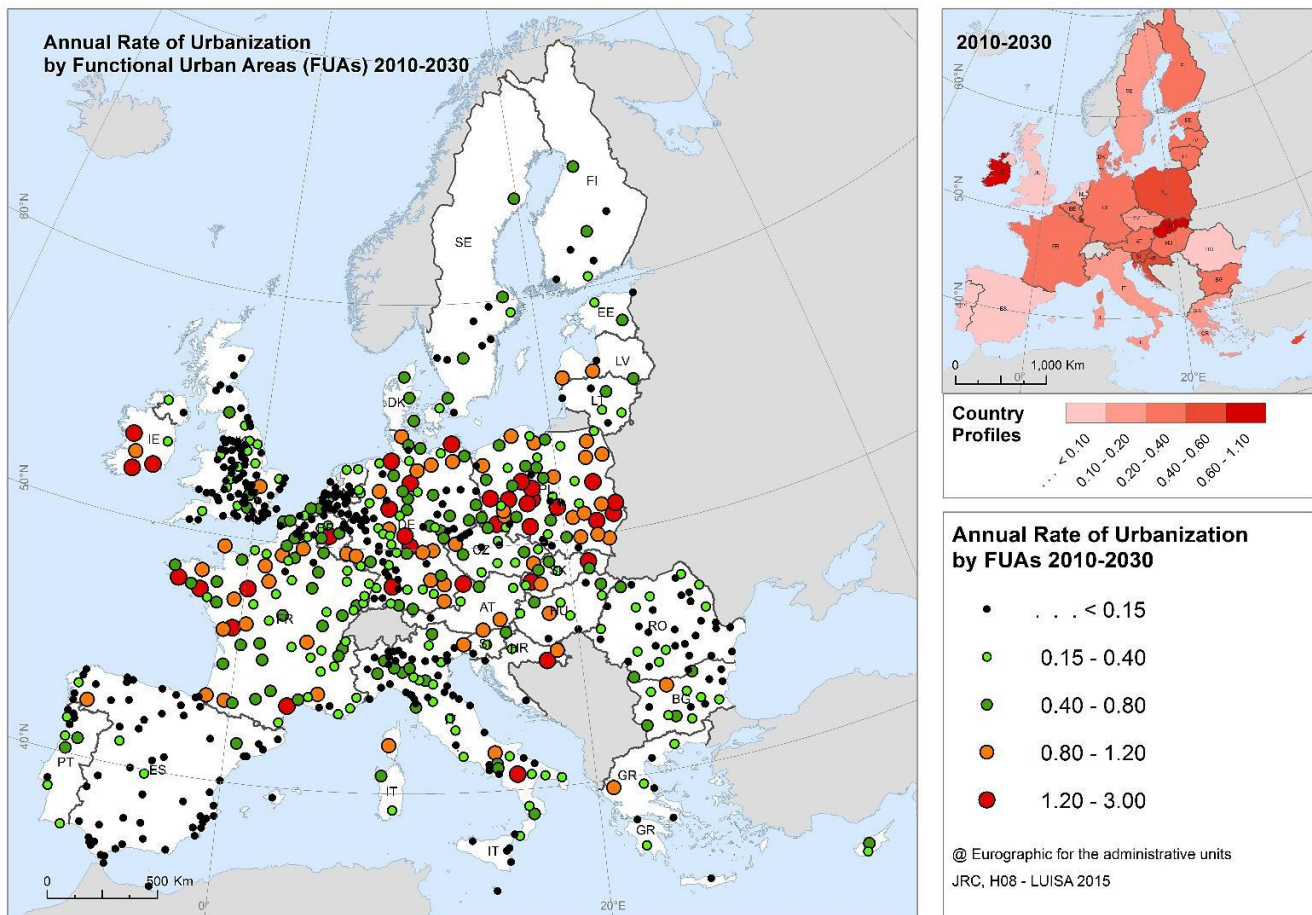
Abstract

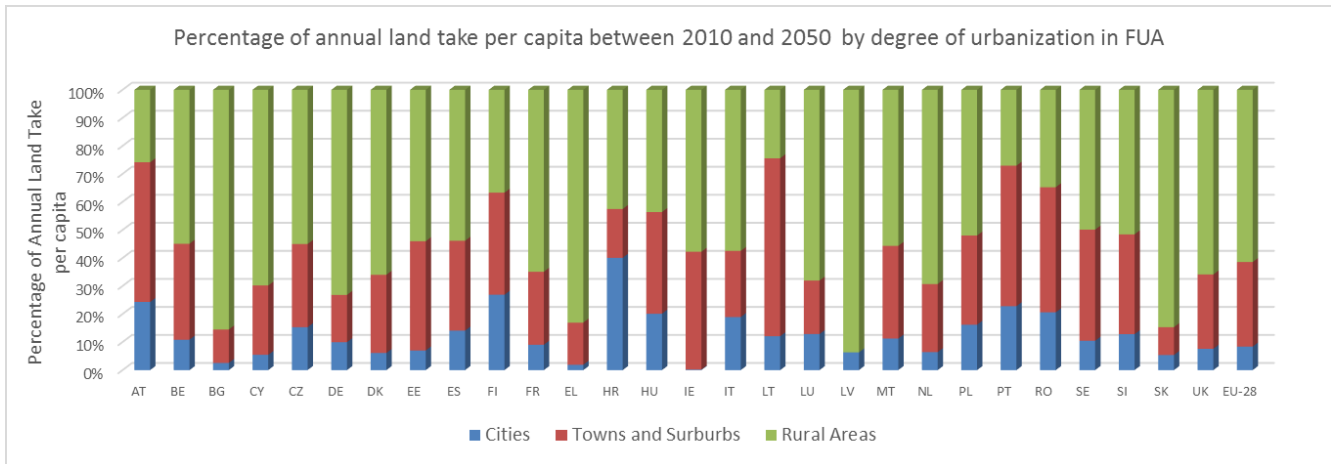
Urban areas take major part of the EU structural funds in Europe. However, the current territorial impact assessment practice is far beyond measuring EU-wide performance of cities and urban areas against a specific policy. Europe-wide spatial models are mainly capable of producing projections at country level and/or for NUTS2 and NUTS3 regions. Moreover, spatial analyses that cover limited number of cities or urban regions bring difficulties in making comparisons among different regions and in monitoring EU-wide impacts of urban policies. At this point, the approach developed by LUISA (Land-Use-based Integrated Sustainability Assessment) creates an important opportunity to fill this gap in territorial impact assessment practice. High resolution land use and population data with data driven 'land functions' in LUISA, bring an efficient method in measuring performance of European cities and in exploring key spatial parameters that shape urban areas in Europe. LUISA is an integrated modelling platform that is primarily used for the ex-ante and ex-post evaluation of EC policies with direct or indirect territorial impacts (e.g. regional and environmental policies). It has been developed by the Joint Research Centre of the European Commission to contribute to the spatiotemporal analysis of the European cities and regions (see Lavallo et al. (2011) and Baranzelli et al. (2014)). At its core, LUISA has a dynamic population and land use allocation module. This module allocates various land uses to most optimal locations using a discrete allocation method based on predefined suitability maps, regional land demand and supply. The land use allocation follows the anterior population estimates and become input for the posterior allocation of the population. It produces three main outputs at a 1 hectare (100x100 meters) spatial resolution between 2010 and 2050: land use/land cover information, population distribution and accessibility maps. The projected land use and population data is then post-processed using the 'land functions' which infer changes in land use and population patterns and link them with other physical, ecological or socio-economic parameters to produce spatially explicit indicators. Hence, these spatial indicators are reported at various regional levels such as at NUTS0, NUTS2, NUTS3 and LAU2 levels or for specific cities or metropolitan areas.

This study is based on a recent exercise of the LUISA modelling platform that investigated current and future state of European cities and regions. It made use of several urban indicators considering main dynamics of urbanization and urban development and exploring significant changes in land use/land cover, population growth, recreation potentials, green infrastructure, air quality and accessibility in Europe.

The main purpose of this study is to have a better understanding of urbanization and urban development process in Europe; to analyse temporal territorial dimensions of change and to highlight similarities/dissimilarities within Europe. For the purpose, the results on urban proportion, annual rate of urbanization, land take, land use intensity, population growth and population density are elaborated and presented as key elements of the analysis. In addition to this, the study intends to answer the following questions using these key elements: How do countries, regions and cities differ among Europe? What are the similarities? Is there any difference between cities, towns and suburbs and rural areas? Will the cities perform similarly in the future, if not what will be the differences and the outcomes they bring? Would it be possible to use these territorial differences/similarities as an input to adopt different policies for specific regions?

The production of LUISA high resolution projection maps on land use and population from 2010 to 2050 constitutes the main methodology behind the analysis. In order to analyse urbanization and urban development process in the second step, for each indicators, e.g. annual rate of urbanization or land take per capita, several GIS-based spatial and statistical techniques were applied. The results are summarized at the level of EU-28, Member States, degree of urbanization and functional urban areas. Several cities were also selected and further analysed to demonstrate some local characteristics and trends in urbanization and urban development in Europe. The following figures show an example of the analysis with the annual rate of urbanization and the land take per capita for functional urban areas in Europe.





References

Baranzelli, C., Jacobs-Crisioni, C., Batista e Silva, F., Perpiña-Castillo, C., Barbosa, A., Arevalo Torres J., Lavalle, C., (2014), "The Reference scenario in the LUISA platform – Updated configuration 2014: Towards a Common Baseline Scenario for EC Impact Assessment procedures", EUR 27019 EN, Luxembourg: Publications Office of the European Union.

*Mert KOMPIL, mert.kompil@jrc.ec.europa.eu; Jean-Philippe AURAMBOUT - jean-philippe.aurambout@jrc.ec.europa.eu; Ana BARBOSA - ana.barbosa@jrc.ec.europa.eu; Ricardo BARRANCO - ricardo.barranco@jrc.ec.europa.eu; Carlo LAVALLE - carlo.lavalle@jrc.ec.europa.eu; European Commission, Joint Research Centre, Institute for Environment and Sustainability, Sustainability Assessment Unit, Ispra, Italy.

Lavalle, C., Baranzelli C., Batista e Silva F., Mubareka S., Rocha Gomes C., Koomen E., and Hilferink M., (2011), "A High Resolution Land use/cover Modelling Framework for Europe: introducing the EU-ClueScanner100 model", In *Computational Science and Its Applications - ICCSA 2011, Part I, Lecture Notes in Computer Science vol. 6782*, edited by B. Murgante, O. Gervasi, A. Iglesias, D. Taniar and B. O. Apduhan. Berlin: Springer-Verlag.