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## **Actors as factors for land use change: Effects of demographic change on land use across Europe**

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Intuitively, it seems to be evident that there is a close relationship between human society and natural environment. People change their environment through intensive utilisation: for agriculture, for living, for transport, for leisure activities, for resources, etc. Thus, it appears clear that there must be a close link between demographic and land use development. However, quantifying and modelling this relationship based on statistically significant correlations is a challenging task. Even if we focus the research question on one single land use type, namely settlement area, where a very close and direct connection to population as driving force is assumed, it is not easy to explain the relationship statistically by a formula fitting for different regions across Europe. In some European regions the development of settlement patterns and population numbers even diverges as on the one hand population stagnates or shrinks and on the other hand settlement areas grow. This phenomenon has socio-economic reasons. Empirical findings from Austrian and European studies proved that nowadays the growth of settlement area is not solely caused by growing population numbers but particularly in prosperous and urbanised regions by increasing demand for settlement area per person due to higher living standard and income (Loibl and Tötzer 2003, Tötzer et al. 2007). Thus, for modelling human actors as driving force for land use change, demand-related factors like settlement area/consumption per head, settlement density, household size, etc. have to be considered beside mere population numbers.

In this paper we will present first findings from our research within PLUREL, an Integrated Project funded within the 6th framework program of the EC. PLUREL deals with the relationships between urban, peri-urban and rural land use and aims to develop strategies for a sustainable development of these interlinked rural-urban regions (RURs). A key product will be the sustainability impact assessment tool for urban-

rural linkages. PLUREL applies the DPSIR-concept (Driver-Pressure-State-Impact-Response) on different European scales: from NUTS0 to LAU2 in six European case study regions.

The research presented in this paper explores population as driving force for land use change focussing on settlement patterns and dynamics. We work on two different scales: on European scale and on micro-scale in six case study regions (among them e.g. Warsaw, Leipzig, Manchester). In this project we will examine if the findings from preceding research projects as well as from the PLUREL case studies could be confirmed on European scale, so that European-wide rules can be derived for certain region types (e.g. urban-monocentric, dispersed peri-urban, rural, urban-polycentric) across Europe. We will apply statistical analysis methods and carry out analyses on European NUTS3- level as well as on local scale for the case study regions.

Research on micro-scale allows in-depth analyses based on detailed data (e.g. LAU2) and gives insights into region-specific interdependencies between society, economy and environment. However, considering the macro-scale as well is particularly important for stakeholders and politicians in the EU. Thus, up-scaling the case study specific rules to the European scale will be an essential task within the project. With the help of pre-defined region types, results which correspond on local and on European scale will be proved and up scaled. Due to data constraints proxy-data will have to be used on European level. The research will result in statistically based functions reflecting relationships between population and settlement areas in different region-types across Europe. These functions will be considered in many following work packages within the PLUREL project and will help to model the Sustainable Impact Assessment Tool for Rural-urban Relations – one of the key products of the PLUREL project.

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