



Jul 1st, 12:00 AM

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Schetke, Sophie, "Quantification of land use changes, modelling of processes and impacts of shrinkage and the question of scale" (2008). *International Congress on Environmental Modelling and Software*. 47.  
<https://scholarsarchive.byu.edu/iemssconference/2008/all/47>

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# **Quantification of land use changes, modelling of processes and impacts of shrinkage and the question of scale**

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**Keywords:** *land use changes, impact analysis, quality of life, ecosystem services, scale.*

## **Introduction**

Following the purpose of understanding and analysis of interactions between society and landscape in urban areas this paper tries to give a methodological and practical insight into the assessment of socio-environmental impacts under conditions of uneven spatial development. In that context the paper draws special attention to the quantification and modelling of land use changes and shrinkage processes, in particular, based on empirical ascertainable and communal data and empirical research techniques. A second focus highlights a conceptual approach for the assessment of functionality of urban green spaces against the concepts of quality of Life (QoL) and associated Ecosystem Services (ESS) in urban areas dealing with both quantitative modelling and empirical qualitative research techniques. In a third focus the question of choosing the right scale for assessment and modelling of land-use changes will be dealt with as spatial dynamics and their socio-environmental effects seem to be very variable on a smaller scale and extreme within shrinking cities.

## **Interactions of society and landscape**

Friction is the prerequisite for dynamism and interaction. Heterogenous and uneven spatial development are that friction between landscape and society in shrinking cities. Regarding a surplus of open spaces resulting from enormous vacancies and demolition on the one side and a decreasing number of inhabitants on the other both domains appear to be under pressure. How do these citizens deal with their changed – sometimes blurred and unstructured- living surroundings, what kind of socio-environmental impacts derive from that dynamism and come to pass in post-shrinkage landscapes? In that context I will introduce into a recent study focussing on the quantification and assessment of socio-environmental impacts according to various demolition scenarios in the city of Leipzig, Eastern-Germany (Schetke & Haase 2007, in press). Main outcome of this study is a set of indicators focussing on both structural-ecological assessment (e.g. LSM) as well as on modified social spaces deriving from modified accessibilities of social infrastructure (green and technical ones). The emphasis of this set of indicators is the quantification and socio-environmental assessment of land use changes and shrinkage processes using empirical ascertainable (e.g. communal) quantitative and qualitative data.

## **Attractiveness of urban life. Concepts for assessment**

After the introduction into a model of the assessment of socio-environmental impacts I want to expand these findings by going a bit deeper into the analysis of the attractiveness and quality of urban live by presenting a conceptual approach (see Schetke, Haase & Breuste 2008, in prep.) focussing on the functionality of green spaces according to the concepts of quality of life (see Burgess et al. 1988; Givoni 1991; Kawka & Sturm 2006) and associated ecosystem services (Bolund & Hunhammar 1999; Constanza 1997 et al.; de Groot et al. 2002).

Following the presentation of an indicator set quantifying and assessing socio-environmental impacts in shrinking this conceptual approach widens its view by focussing more clearly on the interactions between society and landscape in urban areas. To achieve this not only the area of research has been expanded by adjusting the model towards the analysis of the functionality of urban green under conditions of uneven – that means shrinkage and growth side by side- spatial development. But also the compilation of data implemented into the model has to be enlarged using not only administrative quantifiable land-use and social data but qualitative empirical data highlighting the perceptive side of land- use changes by clearly focussing on social-spatial interdependencies, as well.

Beside the scientific claim in analysing the socio-spatial interactions in urban landscapes the focus on specifically the functionality of urban green is founded on the fact that urban green and open spaces are among the driving factors of quality of life and of that attractiveness of urban life planners are in charge to provide.

Keeping in mind that this affects both planners and scientists the gap between the two domains can be bridged by the conscious implementation of valuable communal and empirical ascertainable data into such a model. Also planners are more and more in charge to estimate spatial and social dynamics in order to remain able to steer a sustainable spatial development and to promote the attractiveness of urban life. In that context a conceptual model not only dedicated to quantify land-use changes but also able to analyse and to depict socio-spatial interactions contributes to both side's gain of knowledge and progress.

### **Spatial and land use effects caused by demographic change. Choosing the right scale**

In shrinking cities socio-environmental dynamics can be very heterogenous and diverse amongst different neighbourhoods and urban structure types. Both ecological and social affairs - each type of a single urban ecosystem, each social group of citizens- are affected in a different way with sometimes severe and sometime almost unnoticeable impact. The more, the process of shrinkage and the often accompanying demolition occurs in different spatial and temporal ways which make a general large-scale assessment and modeling (e.g. on city or regional scale) of land use changes and shrinkage processes difficult and redundant in meaning. The question of scale is long discussed in terms of land use assessment. Especially in terms of quantifying and modelling of both presented socio-environmental impacts of shrinkage and a more in-depth analysis of socio-spatial interactions and the functionality (see QoL and ESS) of urban green it is still a sensitive matter to discuss and to keep in mind.

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