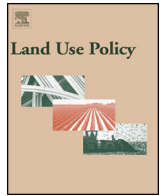




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## Land Use Policy

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# Assessing urban containment policies within a suburban context—An approach to enable a regional perspective

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### ARTICLE INFO

#### Article history:

Received 3 June 2016

Received in revised form 19 October 2016

Accepted 23 October 2016

Available online xxx

#### Keywords:

Urban containment policy

Suburban

Geographic information

Building stock

Population

Accessibility

### ABSTRACT

Regarding suburbanisation, land policies in many countries have undergone profound changes over the past 20 years. While experiencing high growth rates of urban land, policies were reconsidered and adapted with the goal of limiting land consumption in favour of a more sustainable urban development. These changes aim at a higher effectiveness in steering urbanisation processes to limit environmental impacts, but also are criticized regarding possible effects on a sufficient supply of housing. To this regard, also German urban planning policies show considerable dynamics. After several urban containment policies were introduced, the question arises on how to empirically assess their effects. Therefore, monitoring approaches with a regional perspective become more and more relevant, as polycentric, suburban settlement structures constitute the spatial but also institutional context of urban containment policies. Considering suburbanisation as a global phenomenon, we develop a monitoring approach, which allows for a quantitative and qualitative assessment within suburban settlement structures. We propose a set of indicators that integrates urban structure, regional accessibility and usage by population. As data is scarce for a city-regional perspective, we combine geospatial methods for an automatic identification of building types from topographic data and maps, for measuring multi-modal accessibility and for small scale demographic analysis. The approach is applied to the case of a German city-region with splintered planning institutions. The results of the small-scale, but also comprehensive regional analysis allow for a detailed discussion of effects of policy changes on the settlement structure.

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## 1. Introduction

Unprecedented expansion of urban use of land has fuelled an ongoing international discussion on land policies. After decades of suburbanisation, suburban settlement patterns characterise the spatial context and also determine the institutional framework of land policies (Keil, 2013a; Hamel and Keil, 2015). From an environmental point of view, the phenomenon of suburbanisation is closely linked to land consumption and seen as the key challenge for sustainable urban development (Jaeger and Schwick, 2014). Suburbanisation's prevalence raises questions about the role of land use policies, which are intended to distribute land, considered a scarce resource (Needham, 2007), efficiently among competing uses. Hence, a critical debate and reconsideration of land policies, which shape settlement structures and their evolution, is required. At the same time, such a discussion needs to acknowledge the

already existing suburban context within which policies to better contain urban development are applied. Consequently, indicators need to be developed that allow for linking policy changes to spatial processes and can support this highly relevant debate. In this article we develop and reflect on possible indicators for enabling an assessment of urban containment policies.

### 1.1. Need for changes in land policies

Suburbanisation is defined as “an increase in non-central city population and economic activity, as well as urban spatial expansion” (Keil, 2013b, p. 9). It is this spatial expansion that raises concerns over environmental impacts such as the loss of agricultural land, loss of soil functions, traffic induced by de-densification and further related social as well as economic side-effects like rising infrastructure costs (Joerissen and Coenen, 2007; Siedentop, 2010). The increasing awareness of the negative impacts of suburbanisation has sparked an international debate on the “capacity and opportunity” of land policies to recycle land (Dair and Williams, 2006) and thus contain urban expansion. More generally, the effec-

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tiveness of land policies in their function as the legal framework for the distribution of urban growth has come increasingly under question. In light of these concerns, land policies need to be reassessed and reconsidered (Hennig et al., 2015). Specifically, land policies need to be adapted to redirect urban development towards infill development such as redevelopment of brownfield sites and the adaptation of existing settlement structures by means of densification or by revitalizing older existing neighbourhoods (Ganser and Williams, 2007; Burchell et al., 2000; Downs, 2005).

Adaptations in national planning systems can already be seen, e.g., in quantitative, mandatory limits for urban expansion like in England (Ganser and William, 2007) or in political objectives for reducing land consumption, which have been implemented in several European countries (Decoville and Schneider, 2015). In Germany, the national government initiated a programme in 2002 that stressed the spatial dimension of sustainability. In the programme, a first quantitative goal on land consumption was set: By 2020 greenfield development shall not exceed 30 ha per day, (known as 30 ha target) (Bundesregierung, 2002; Joerissen and Coenen, 2007; Davy, 2010). The latest environmental report of the German Advisory Council on the Environment even argues for a net zero target by 2030 (SRU, 2016).

Following up on the 30 ha target, a broad academic and political debate discussed options for changes in land policies to better contain urban expansion (Henger and Bizer, 2010; Bock et al., 2011; Bizer et al., 2009; Lieber and Preuss, 2010). As a consequence, new informal and formal planning instruments were developed and partly integrated into direct and indirect land policies. The German Federal Building Code (“BauGB”) that regulates urban planning of municipalities has been amended in several steps. In 2004, the objectives of sustainability and urban redevelopment were introduced as objectives for municipal land use planning. In 2007, redevelopment was further encouraged by reducing planning regulatory requirements for infill development. Since 2013, German law requires municipalities to mandatory proof screen for infill opportunities (Söfker, 2014). Also indirect policies, e.g. national incentives with a side effect of encouraging development on greenfield sites for the financing of residential real estate, were withdrawn (Umweltbundesamt, 2010). The evolution of German land policies shows an ongoing effort to implement the concept of urban containment, also referred to as land thrift (‘flächenhaushalt’) in the German context (Davy, 2009).

## 1.2. Assessing envisaged changes

The ongoing adaptation of land policies raises interest in an assessment of the spatial effects of the policy changes. This, firstly, requires a framework for analysing urban containment policies and, secondly, demands the development of indicators to measure spatial effects. Addressing the need to describe the underlying principles and rationales of land policies, Hartmann and Spit (2015) provide a systematic framework enabling a perspective that covers more than just technical functionality of land policies. They propose the four criteria of legitimacy, effectiveness, efficiency and justice as components of a comprehensive explanatory model for planning systems and instruments. Democratic legitimacy relates to the degree to which governmental intervention is in accordance with societal demands and goals. Efficiency relates “the outcome – the built environment – to the effort, namely the land management approach” in terms of costs (Hartmann and Spit, 2015, 731). Effectiveness of a policy describes the “grade of achievement” of a planning goal and thus contrasts policy objectives and changes in space (Hartmann and Spit, 2015, 731). Justice in general captures the fairness of the distribution of goods by spatial planning. Three alternative concepts of justice are distinguished: utilitarian, liberal and social justice. Consequently, what is understood as a just dis-

tribution depends on the concept. The first two criteria describe the functions of land policies themselves. Effectiveness and justice in contrast address also the effects of land policies on space and society. In order to assess land thrift policies, it is these latter two effects that we are interested in.

Focusing on effectiveness and justice also enables us to identify a dilemma which is central for urban containment policies. The aim of limiting land consumption – in its utilitarian notion – means to enhance the economic and environmental justice of urban development, as it tries to reduce negative effects for the society. However, these overall benefits are obtained at the costs of municipalities and households, which might rely on greenfield site development. In this regard, the German Association of Towns and Municipalities stressed possibly negative social consequences of land thrift policies, as they might compromise the creation of a sufficient supply of affordable housing. Further, the Association argued that in the end only larger cities with enough resources for infill development would be able to pursue urban development. The suburban fringes of city regions or peripheral rural areas might be deprived of development opportunities (Joerissen and Coenen, 2007). With this understanding, the effectiveness of land thrift policies can be assessed by its capacity to limit urban expansion and promote infill development. Justice, on the other hand, is seen in the distributional effect of policy changes. From a utilitarian perspective, the overall benefit of reduced land consumption needs to be compared to the costs resulting from the redirection of development rights for municipalities and supply of housing for the population. The justice of the distributional effect is determined by the redirection of development – either into more central or more peripheral locations in suburban city regions.

A further step is to operationalise the criteria, to measure their effects in space and time with the aim of passing the results back into political debate. The diverse literature on approaches for measuring urban growth and urban sprawl are helpful in developing an analytical concept (e.g. Ewing, 1994; Torrens and Alberti, 2000; Siedentop and Fina 2010). In a recent study Decoville and Schneider (2015) e.g. focus on the amount of urbanisation with regard to quantitative limits set by national policy objectives, thus allowing for an estimation of effectiveness of urban containment policies on a national level. In Germany, official land use statistics on municipalities are employed to measure annual urban growth rates and contrast them with the 30 ha target (Umweltbundesamt, 2016). A spatial approach was developed by Meinel et al. (2009) and Meinel et al. (2011) that tracks urban development at the building level, giving more precise information on where urban growth appears. Focusing on urban sprawl, Jaeger et al. (2010) propose raster based, spatial indicators for including a measurement of the quality of urban expansion. They propose to measure the dispersion as well as the utilisation of urban area by inhabitants and jobs. Bervoets et al. (2014) go into more detail by analysing the use of floor area by inhabitants in suburban areas at the building level. Understanding the usage becomes particularly important when it comes to the analysis of distributional effects.

While these approaches can be generally applied to analyse the effects of land thrift policies, an assessment of effectiveness and justice of land thrift policies within a suburban context requires consideration of further aspects, which so far has been hindered by data limitations (regarding data limitation in assessing land policies see for example Einig et al., 2011; Haußmann, 2014; Kroll and Haase, 2010; Siedentop and Fina, 2010). Hence, new ways of data acquisition need to be discussed. In Germany, one obstacle is the limitation of demographic data to show changes at a finer level of detail than the statistical level of municipalities (Kroll and Haase, 2010). A more detailed data source is required to measure distributional effects in the use of housing. A second obstacle lies in the need to define the location of urban development within the subur-

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