

Urban sprawl, compact urban development and green cities. How much do we know, how much do we agree?

Abstract

While urban systems are expanding at very fast rates all over the world, understanding their spatial development remains a complex and controversial issue, burdened with confusion in the literature. A common understanding of the spatial behavior of expanding urban systems needs robust conceptualization and empirical evidence. The physical growth of cities assumes different spatial patterns, usually in the form of urban sprawl resulting from multi-dimensional drivers and causing multi-dimensional economic, social and ecological impacts. The need to manage urban sprawl and its manifold adverse consequences by promoting compact urban development and urban densification/re-utilization has been widely promoted in science and policy-making. However, ensuring a high quality of life for urbanites demands integrative points-of-view for the types of compact development to promote, in particular regarding urban green spaces within densification processes. It is essential to consider the effects of compact development not only at larger scales, but also at neighborhood and household scales to pursue moderated and qualified densification, securing and (re-)developing urban green spaces and their multi-dimensional positive impacts. Urban sprawl and compact green cities require adequate and robust multi-dimensional spatially explicit indicators to support urban planners and policy makers. Through articles of this special issue, we explore in this synthesis paper the current international state of the art in developing, testing and implementing multi-dimensional—ecological, economic, social—and multi-scale—regional, city, neighborhood—indicators characterizing urban sprawl and compact green cities. The articles provide concepts and international case studies for land monitoring and planning

recommendations for sustainable urban development. Such indicators give light to capture the social, economic and environmental dimensions of urban development while assessing the degree and extent of sprawl and compact green cities in a global context.

Section snippets

Introduction: The challenge of urban sprawl and compact green cities
Urban systems are expanding at very fast rates all over the world. Forecasts suggest that expansion rates will dramatically increase the size of cities – threefold by the middle of the century – with expansion rates of 2.4% and expanding speeds over 300 ml per year (Angel et al., 2011; Seto et al., 2012; Inostroza et al., 2013). Such rapid urban development presents challenges to spatial planning frameworks, and needs integrative approaches to cope with the negative environmental, social and

Conceptual grounding for sprawling, compact and green cities

With urban expansion being an unavoidable fact entangled in economic growth, the specific pattern of urban expansion is a relevant aspect for spatial planning and policy making. Sprawled and scattered patterns of expansion have led to severe environmental and social effects on the existing urban functions and other ecosystems, such as increasing congestion and transport costs, social segregation, biodiversity loss, loss of ES, to mention a few (e.g., EEA European Environment Agency, 2016;

Discussions

The papers of this special issue covered a diverse range of topics related to urban sprawl, compact and green city development with the review of the related issues and international state-of-the-art data and methods. Although the findings significantly contributed to our understanding in multi-scale and multi-dimensional perspectives of the issue, three main issues emerged when all these papers are assembled together, calling for a continuous effort from the research community.

First, the need

Conclusion

Given the current often rapid urban expansion and its related multiple environmental, social and economic impacts, there is a pressing need for new analytical tools, innovative concepts and comprehensive planning strategies for compact and green cities. The results of this special issue confirm that a multiscale and multidimensional approach is needed to understand any trade-offs and synergies between scales, targets and actors embedded into the high dynamics affecting urban systems. In this

References (42)

- M. Artmann *et al.*

The role of urban green spaces in care facilities for elderly people across European cities

Urban For. Urban Green.

(2017)

- B. Deal *et al.*

Spatial dynamic modeling and urban land use transformation: a simulation approach to assessing the costs of urban sprawl

Ecol. Econ.

(2004)

- C. Deilmann *et al.*

Data envelopment analysis of urban efficiency—Interpretative methods to make DEA a heuristic tool

Ecol. Indic.

(2018)

- M. Everard *et al.*

Systemic solutions for multi-benefit water and environmental management

Sci. Total Environ.

(2013)

- C. Haaland *et al.*

Challenges and strategies for urban green-space planning in cities undergoing densification. A review

Urban For. Urban Green.

(2015)

- L. Inostroza

The circularity of the urban ecosystem material productivity: the transformation of biomass into technomass in Southern Patagonia

Sustain. Cities Soc.

(2018)

- L. Inostroza

Informal urban development in Latin American urban peripheries. Spatial assessment in Bogotá, Lima and Santiago de Chile

Landsc. Urban Plan.

(2017)

- L. Inostroza *et al.*

Urban sprawl and fragmentation in Latin America : a dynamic quantification and characterization of spatial patterns

J. Environ. Manage.

(2013)

- L. Inostroza *et al.*

Beyond urban – rural dichotomies : measuring urbanisation degrees in central European landscapes using the technomass as an explicit indicator

Ecol. Indic.

(2019)

- P. James *et al.*

Towards an integrated understanding of green space in the European built environment

Urban For. Urban Green.

(2009)