The role of spatial planning in land change: An assessment of urban planning and nature conservation efficiency at the southeastern coast of Brazil

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Abstract

Urban expansion is expected to continue at a fast rate, precisely in peri-urban areas of developing countries surrounded by biodiversity hotspots. The need to assess and potentially restructure urban and environmental planning instruments becomes apparent in scenarios where urban expansion is difficult to manage. Indicators based on spatially explicit datasets have been suggested as effective tools to evaluate spatial planning outcomes because they can shed light on the efficiency of planning measures and the fulfilment of claimed goals. In this work, we evaluated the conformance of stated spatial planning goals and the outcomes in terms of urban compactness, basic services and housing provision, and nature conservation for different land-use strategies. We evaluate the 2005 Ecological-Economic Zoning (EEZ) and two municipal master plans from 2006 in a coastal region in São Paulo State, Brazil. We used Partial Least Squares Path Modelling (PLS-PM) to explain the relationship between the plan strategies and land-use change ten years after implementation in terms of urban compactness, basic services and housing increase, and nature conservation. Our findings suggest that the evaluated plans were influenced by the land-use pattern at the time when the plan was approved (2005). For all evaluated plans, the Urban Use strategy was important to explain the Urban Compactness, but most of the new urban isolated areas occurred outside of the zones where the Urban Use strategy was applied. Two out of three of the evaluated plans were considered efficient in terms of nature conservation. In general, the Urban Use strategy can be considered successful in promoting more compact patterns of new build-up areas (axial and infill growth), but not in containing the emergence of new isolated areas outside the zones with Urban Use strategy. Our findings are in line with those from similar studies showing that areas outside of urban cores are often deprived of efficient spatial planning. The increase in Basic Services and Housing was not sufficient to attend the regional demand, and the inadequacy of these services remains a problem in the region. Future policies for land-use management in NCSP need to address the increasing demand for basic services and housing and to enable urban development inside urban core areas.

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Author keywords

Nature conservation; Planning outcome; Spatial modelling; Urban compactness