

Spatial Planning and Land-Use Management

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1. Introduction

Preserving natural and semi-natural areas has become a crucial consideration for policymakers, with several drivers recognized as pivotal forces that shape landscapes globally. Among these drivers, socioeconomic, demographic, climatic, and political factors have the most significant implications for landscape changes, contributing to land fragmentation, biodiversity and habitat loss, and overall land degradation [1–4].

To preempt these potential challenges, effective spatial planning instruments are essential, playing a crucial role in striking a balance between enhancing the quality of life of populations and safeguarding the management of natural resources [5,6]. They also involve intricate decisions related to land-use optimization, strategic location of activities, and the establishment of infrastructure to achieve diverse socio-economic and environmental goals.

One of the primary objectives of spatial planning and land-use management is to promote territories that are environmentally sustainable, functional and aesthetically pleasing, ultimately enhancing the population's quality of life [7–10]. To achieve these goals, the integration of factors such as economic demand, the population's needs and environmental protection must be considered. Various mechanisms may be implemented in pursuit of this goal, including (i) evaluating existing land-use patterns and identifying suitable areas for specific types of development; (ii) ensuring compatibility between land uses in contiguous and nearby areas; (iii) defining appropriate density and intensity of urban development; (iv) supporting the integration of different land uses within the same area; (v) implementing zoning regulations and incentives to guide land-use decisions and encourage desired territorial development outcomes; and (vi) involving the public and stakeholders in the land-use planning process to gather feedback and co-create comprehensive decisions.

Understanding the shifts in the spatial planning dimension, particularly the evolving interrelationships between different governance scales, is crucial for advancing insights into spatial planning practices. As Gualini [11] suggests, the establishment of new governance spaces redefines the nexus between politics and territory. In line with this, Allmendinger & Haughton [12] distinguish between 'hard' planning governance and 'soft' planning governance. The latter lacks formal planning powers but is intricately connected to these formal spaces, reflecting the increasingly intricate network of relational geographies. These concepts may also assist researchers in examining how strategic spatial planning practices are negotiated and implemented. 'Hard' planning is anchored in regulatory frameworks and prescriptive rules, following a top-down approach in which centralized authorities establish and enforce stringent guidelines for land-use management [13,14]. Control mechanisms predominantly involve zoning and legal regulations. Implementation is characterized by strict rules for non-compliance, providing a structured but less-flexible framework.

Decision-making in hard spatial planning is often centralized, with limited input from local communities [15,16]. Conversely, soft planning embraces a collaborative and flexible approach, adopting a bottom-up perspective that emphasizes community engagement, negotiation, and consensus-building. Rather than relying solely on regulations, soft spatial



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planning utilizes tools such as incentives, partnerships, and dialogue [17,18], allowing greater adaptability to changing circumstances and encouraging continuous communication among diverse stakeholders. Soft spatial planning acknowledges the significance of local input, involving communities in decision-making processes. While it may introduce uncertainties, soft spatial planning effectively manages risks through adaptability and a holistic understanding of local dynamics [19–21].

In the end, the various spatial planning processes should provide a range of options for optimizing land use that align with social, economic, political, cultural, and environmental considerations, while upholding principles of equity, effectiveness, efficiency, and sustainability [22–24]. Recognizing the long-term impacts of spatial planning instruments on the future development of societies, it becomes imperative to establish effective land-use optimization practices today to pave the way for the implementation of sustainable land-use management policies [25,26]. Both spatial planning and land-use planning are integral components in the design of sustainable, well-organized, and inclusive strategies and plans that contribute to the development of more resilient and livable communities [27,28].

Several global-level planning strategies have established guidelines to enhance local territorial management, including the Sustainable Development Goals 2030, The United Nations Decade on Ecosystem Restoration (2021–2030), The Paris Agreement, and the COP28 Agreement.

2. An overview of the Articles Featured in the Spatial Planning and Land-Use Management Special Issue

This Special Issue comprises 11 articles that cover a diverse range of topics related to spatial planning and land-use management. Authored by 50 contributors from 31 university institutes spanning 14 countries (Portugal, Lithuania, China, Morocco, Hungary, Egypt, Spain, Brazil, Mexico, Serbia, USA, Paraguay, Algeria, and Yemen), the articles include case studies from Brazil, China, Paraguay, Serbia and Spain. The Special Issue is structured as follows: after the first paper, which offers a bibliometric analysis of High Nature-Value and Ecosystem Services, the subsequent papers are organized under two main themes, namely (a) examining the dimensions of socioeconomic, political, and environmental impacts of historical land-use/land-cover changes (connecting with spatial planning instruments), and (b) assessing the influence of these dimensions while projecting future land use/land cover changes, thereby anticipating potential adverse impacts.

In the first article, Girão et al. (Appendix A, 1) conducted a bibliometric analysis to scrutinize trends in High Nature-Value Farmland and Ecosystem Services Valuation. The study revealed (i) the predominant concentration of research on High Nature-Value Farmland in Europe, and (ii) the these studies' primary focus on environmental science, agriculture, and biological sciences.

From the second article to the seventh, the studies primarily focus on analyzing land use/land cover changes, spanning from the past to the present. These investigations critically evaluate these changes from the perspective of spatial planning instruments. Specifically, in the second article, Qi et al. (Appendix A, 2), delve into the relationship between economic development and industrial land expansion from the perspective of decoupling, employing a novel decoupling viewpoint. The results recommend the formulation of differentiated industrial land-supply and supervision policies to propel the transformation and upgrading of land use and economic development methods. In the third article, Delphin et al. (Appendix A, 3) explore the feasibility and relevance of integrated land-use planning and data acquisition in developing countries. The results suggest that developing an integrated land-use plan may be challenging due to factors such as data availability, lack of stakeholder engagement, and insufficient financial and human resources. In the fourth article, Almansoub et al. (Appendix A, 4) analyze the effects of transportation supply on mixed land-use change. Their findings reveal (i) a robust relationship between public transportation supply and mixed land use, and (ii) the prevalence of mixed land use in areas with high accessibility, density, and proximity to the city center. In the fifth article,

Wang, Krstikj, and Liu (Appendix A, 5) provide evidence of the performance of new-type urbanization planning from the spatial dimension. The authors conclude that new-type urbanization planning positively promotes urban functional diversity and land development efficiency at the local scale. In the sixth article, Živanović Miljković, Dželebdžić, and Čolić (Appendix A, 6) provide a quantitative analysis of agricultural land-use change dynamics within the Belgrade–Novi Sad highway corridor, a critical route connecting Serbia’s two largest cities. The results indicate that agricultural land loss primarily occurs in the form of urban sprawl. In the seventh article, García-Ayllón and Franco (Appendix A, 7), analyze the spatial statistical correlation between urban planning patterns of growth in a Mediterranean city in southeastern Spain and the increased risk of flooding. This study recognizes that variables such as urban fragmentation and the transformation of the traditional agricultural hydrographic network can have a more negative impact on vulnerability to flooding than the soil-sealing effect caused by land use changes.

From the eighth to the eleventh article, the studies employ complex spatial models to project future land use and land cover changes. These models help to address the uncertainties associated with future landscape transformations and offer solutions to unforeseeable changes [29]. In this context, and more precisely in the eighth article, Fan, Cheng, and Li (Appendix A, 8) focus on (i) studying land-use changes under different scenarios. The authors observed slight changes to the water area and rural settlements, a significant decrease in cultivated land, and a remarkable increase in urban and other construction land under various scenarios. In the ninth article, Zhu et al. (Appendix A, 9), simulate land-use changes under multiple scenarios, considering social, economic, and ecological policies. Their findings indicate that urban expansion will experience the most significant growth in all scenarios, with substantial environmental impacts. In the tenth article, Souza et al. (Appendix A, 10) evaluate different predictive land-use/land-cover scenarios, considering the public policies of the Chapecó River Ecological Corridor in Santa Catarina, Brazil. They conclude that physical and natural driving forces exert the greatest influence on land use/land cover changes. Lastly, in the eleventh article, Zhang et al. (Appendix A, 11) optimized the areas of various land-use types under strict ecological constraint, moderate ecological constraint, and relaxed ecological constraint scenarios. The authors acknowledge the need for strengthened spatial governance across all counties in the Three Gorges Reservoir Area territory, the development of more coordinated land development and protection patterns, and the comprehensive implementation of ecological protection and restoration projects in mountains, rivers, forests, fields, lakes, and grasslands to enhance regional ecosystem services functions.

3. Conclusions

In this Special Issue, various methodological approaches were employed to analyze both historical land-use and land-cover changes, as well as to project future land-use and land-cover changes. Nevertheless, despite the acknowledgment that stakeholder engagement is a valuable process for exploring landscape transformations and enhancing spatial planning, a gap persists in the literature. This gap is particularly evident when it comes to fostering greater engagement with stakeholders and ensuring the effective communication of findings to decision-makers [30]. The significance of engaging stakeholders in decision-making processes is widely acknowledged [31,32]. For optimal efficiency and effectiveness of land-use management, it is recommended that stakeholders be actively involved in all stages of the spatial planning process [33,34]. The careful selection of groups or individuals representing key actors within a specific region’s land-use management sector becomes critical. This not only fosters increased knowledge but also contributes to the reduction of future uncertainties and conflicts. Moreover, it plays a pivotal role in fostering commitment, validity, and acceptance. While this Special Issue does not fill this gap, it does recognize recent advancements in analytical techniques that empower researchers to comprehensively analyze various trajectories across different territories. It offers an in-depth evaluation of the challenges and opportunities surrounding the complex

interplay between land use and spatial planning and explores critical issues that affect our planet. Each article provides valuable insights into how spatial planning and land-use management play a pivotal role in the quest for a sustainable balance between economic development and environmental conservation. The contributing authors delve into various facets associated with improving land-use optimization through the application of diverse methodological approaches.

The articles featured in this Special Issue collectively paint a diverse and enriching picture of the prospects in spatial planning and land-use management. They underscore the critical importance of studying these subjects and emphasize how such research significantly contributes to supporting policymakers in making more informed decisions. These studies may be indispensable for researchers, policymakers, urban planning professionals, and anyone intrigued by the intersection of spatial planning and land-use management. They offer valuable insights that not only enhance our understanding but also contribute to the development of more sustainable land use practices.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

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