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Editorial

Urban Planning and Sustainable Land Use

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1. Introduction

The main purpose of this Special Issue is to gather the literature from diverse disciplines on contemporary urban planning and land use in different regions, in order to contribute to addressing the global challenges of sustainable urban development. We conduct research on sustainable urban land use by combining the perspectives of land resource sustainability and urban spatial structure, and by drawing upon disciplines such as urban planning, geographic information systems (GIS), ecology, and others. We aim to reveal the spatial patterns and dynamic changes in urban land use and summarize and propose strategies for implementing sustainable land utilization to meet the various requirements of urbanization, while minimizing harmful social and ecological impacts as much as possible. We are delighted to receive attention from scholars across different regions of the world. They have contributed new research cases, academic insights, and advanced technologies for sustainable land use studies. This has positive implications for us in terms of understanding spatial patterns, driving mechanisms, and predictive simulations of urban planning and land use with different backgrounds.

2. Overview of Published Papers

As of 5 June 2023, we have received a total of 23 submissions. After careful screening and professional review by the editorial team and expert reviewers, 13 papers have been accepted for publication. The author team consists of researchers from Australia, Turkey, South Korea, and China. The research topics can be categorized into three areas, which are spatial simulation/optimization models, indicator-based quantitative measurements/evaluations, and studies on planning practices and management.

2.1. The Development of Spatial Simulation/Optimization Models

The article 'Hybrid Economic–Environment–Ecology Land Planning Model under Uncertainty—A Case Study in Mekong Delta' [1] and the article 'A Two-Stage Fuzzy Optimization Model for Urban Land Use: A Case Study of Chongzhou City' [2] both propose land use optimization model tools based on uncertainty. The authors of the former article focus on three uncertainties in land use systems, which are interval uncertainty, fuzzy uncertainty, and random uncertainty, and propose an interval probabilistic fuzzy land use allocation (IPF-LUA) model to manage these uncertainties. They also apply their model to the Mekong Delta to help policy makers find a balance between economic and ecological efficiencies subject to different objectives in land use planning cycles. From a different perspective, the perspective of structural reform in land supply, the latter article utilizes Bayesian networks and fuzzy mathematical programming to investigate the impact mechanisms of land use under uncertain conditions in Chongzhou, China. It optimizes the land use structure, providing methodological references for the development of more sustainable and ecologically friendly land use plans.

The article 'Multi-Scenario Simulation of Urban Growth under Integrated Urban Spatial Planning: A Case Study of Wuhan, China' [3] and the article 'The Evolution of Ecological Space in an Urban Agglomeration Based on a Suitability Evaluation and

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Cellular Automata Simulation' [4] both propose improved CA models. The former focuses on construction land as the main object, combining the trade-off between urban development and nature conservation with zone-based planning implementation mechanisms. By adjusting preference parameters in different planning zones, multiple planning constraint scenarios are generated. The authors use the case of the Wuhan Urban Development Area, China, to apply the model for simulating current and future urban scenarios. The results demonstrate that compared to the baseline model without planning constraints, the simulated model exhibits higher accuracy. The latter focuses on ecological land as the main object and simulates and predicts the ecological spatial evolution of the Changsha–Zhuzhou–Xiangtan urban agglomeration in China based on the suitability assessment of land use zoning. The results suggest that the total area of ecological space in this region will decrease by 2035.

The article 'An Innovative Framework on Spatial Boundary Optimization of Multiple International Designated Land Use' [5] focuses on addressing the issue of overlapping boundaries among different types of protected areas. It constructs a research framework called Candidate Area–Natural background–Heritage Resource–Construction (C-NHC) and takes the Jiangshan Nature Reserve in China as an example to optimize the boundaries of the protected area. This technical framework can provide a valuable reference for the boundary delineation of protected areas, not only in China but also worldwide.

The article 'Multi-Scenario Simulations of Land Use and Habitat Quality Based on a PLUS-InVEST Model: A Case Study of Baoding, China' [6] employs the PLUS-InVEST model and ESV model to simulate and analyze the land use and habitat quality changes in Baoding City, China, in four scenarios: natural development (ND), water protection (WP), forest rehabilitation (FR), and cultivated land protection (CP). The results demonstrate that the CP and FR scenarios will establish a land use pattern characterized by "high ecological quality and high value", which can effectively balance the economic development and ecological conservation in Baoding.

2.2. Index Measurement and Assessment

The article 'Does Agroforestry Correlate with the Sustainability of Agricultural Landscapes? Evidence from China's Nationally Important Agricultural Heritage Systems' [7] qualitatively evaluates the correlation between agroforestry and the comprehensive sustainability of the landscape. The research findings indicate that agriculture and forestry are closely associated with most sustainability indicators, such as biodiversity, income diversity, resource utilization, hydrogeological protection, and water resource management. Based on these findings, the article discusses the role of agroforestry in promoting sustainability.

The article 'Multi-Source Data-Based Evaluation of Suitability of Land for Elderly Care and Layout Optimization: A Case Study of Changsha, China' [8] utilizes multiple data sources and constructs suitability evaluation indicator systems for community-based residential land and institutional elderly care land development. The results reveal significant spatial variations in the suitability of elderly care facility land. The authors accordingly propose a coping strategy to establish a three-tiered senior care service structure of "district–county–community–street (township)" that effectively connects urban and rural areas.

The article 'Study on Green Utilization Efficiency of Urban Land in Yangtze River Delta' [9] contributes a set of indicators and evaluation methods to measure urban land green utilization efficiency. Building upon the calculation of urban land green utilization efficiency in the Yangtze River Delta region, China, the study employs the Dagum Gini coefficient, decomposition method, and exploratory spatial data analysis method to analyze the spatiotemporal evolution characteristics of urban land green utilization efficiency in the Yangtze River Delta region. The results indicate a fluctuating upward trend in urban land green utilization efficiency in the region, with the formation of two agglomeration patterns: high agglomeration in areas with the strongest comprehensive strength and low agglomeration in areas with the weakest comprehensive strength.

Based on the space syntax theory, the article 'Sustainable Planning and Design of Ocean City Spatial Forms Based on Space Syntax' [10] measures the sustainability of urban spatial morphology in Shenzhen Bay, China, and assesses whether the internal spatial configuration of the city can effectively support the sustainable and healthy operation of a marine city with different features. Based on the research findings, the authors summarize the strategies for the spatial design framework of a transitional marine city.

2.3. Urban Planning and Governance

The main contribution of the article 'A Low-Carbon Land Use Management Framework Based on Urban Carbon Metabolism: A Case of a Typical Coal Resource-Based City in China' [11] lies in its proposal for a land use management framework oriented towards low-carbon development in coal resource-based areas. It is based on the analysis of carbon metabolism networks in the urban three-life spaces of "ecology–production–living" and the identification of ecological relationships between different land use types. The application case in Yuling, China, demonstrates the effectiveness of this framework.

The article 'The Assessment of Greyfields in Relation to Urban Resilience within the Context of Transect Theory: Exemplar of Kyrenia–Arapkoy' [12] focuses on the buffer zone between urban and rural areas, known as "greyfields", and proposes a roadmap for redeveloping greyfields for public uses based on the framework of transect theory. This roadmap aims to guide future planning activities and enhance urban resilience.

The article 'Kerbside Parking Assessment Using a Simulation Modelling Approach for Infrastructure Planning—A Metropolitan City Case Study' [13] observes spatial views of parking through manually collected and video-captured camera data. It discusses the impacts of curbside parking demand and supply on short-term parking (STP) and freight activity space (FAS). Furthermore, it identifies the mismatched areas in time and space between parking demand and load distribution in Parramatta, Australia. The study explores the potential of reducing peak parking times by changing parking limits. The proposed benchmarking model provides recommendations for infrastructure planning and the formulation of travel demand management strategies in future predictive scenarios.

3. Discussion and Perspectives

Land is a finite resource. Effective land use research enables the optimal utilization of available space. It involves analyzing land suitability, determining appropriate land uses, and allocating land for residential, commercial, industrial, and recreational purposes to meet the needs of a growing population. Urban planning involves the systematic and strategic organization of land use within urban areas. It encompasses the allocation of land for various purposes such as residential, commercial, industrial, recreational, and public spaces. Urban planning and land use research play a crucial role in shaping sustainable, equitable, and livable cities, and provide the foundation for creating sustainable, inclusive, and resilient cities that improve the quality of life for their residents while balancing environmental and economic considerations.

The academic community welcomes the diverse development in this research field, but here I would like to emphasize the application of artificial intelligence (AI) in this domain. AI in urban planning and land use research holds significant potential for transforming how cities are planned, developed, and managed. For example, AI can analyze large and diverse datasets, including satellite imagery, sensor data, and social media feeds, to provide valuable insights for urban planners and land use researchers. It enables data-driven and evidence-based decision making by identifying patterns, trends, and correlations that were previously difficult to discern. AI algorithms can forecast future scenarios by integrating historical data with real-time information. This capability allows urban planners to anticipate population growth, traffic patterns, land use changes, and other factors, enabling more proactive and efficient planning processes. AI techniques, such as machine learning and computer vision, can extract valuable information from geospatial data. This includes land cover classification, urban form analysis, identifying vacant or

underutilized land, and assessing the suitability of areas for specific purposes such as green spaces or affordable housing. AI also can facilitate public participation in the planning process by collecting and analyzing citizen input, sentiment analysis of social media data, and creating virtual environments for collaborative design. This allows for more inclusive and transparent decision-making processes.

However, while the application of AI in urban planning and land use research presents promising opportunities, it also raises concerns related to privacy, bias in algorithms, and ethical considerations. Therefore, careful consideration of these issues and robust governance frameworks are essential to ensure the responsible and inclusive implementation of AI in this domain.

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