Editorial

Spatial Optimization and Sustainable Development of Land Use

Qingsong He [1] (ID)**, Linzi Zheng** [1] (ID)**, Peng Zhou** [2] **and Jiang Zhou** [3,*]

1   College of Public Administration, Huazhong University of Science & Technology, Wuhan 430074, China; heqingsong@hust.edu.cn (Q.H.); 2019010228@hust.edu.cn (L.Z.)
2   College of Civil Engineering and Architecture, Wuhan Institute of Technology, Wuhan 430074, China; 16030101@wit.edu.cn
3   Sichuan Academy of Social Science, Chengdu 610071, China
*   Correspondence: hunterz03132000@scrss.net

1. Introduction

As global urbanization accelerates and climate change intensifies, issues related to land use and management have increasingly garnered attention within the international academic community. In response to these pressing concerns, we organized a Special Issue on "Spatial Optimization and Sustainable Development of Land Use". The call for papers for this Special Issue began in March 2023, and as of 28 October 2024, we have received a total of 38 submissions from various countries and regions. Following a rigorous peer review process, 13 research papers were ultimately selected for publication. The papers included in the Special Issue exhibit several noteworthy characteristics. First, the research perspectives are diverse, encompassing both macro-scale studies of regional development and micro-level case analyses. Second, the employed research methods are advanced, achieving innovative breakthroughs while building upon traditional approaches. Third, the findings process significant practical implications, providing scientific evidence and policy recommendations that contribute to regional sustainable development. These studies collectively promote theoretical innovation and methodological renewal in land science, offering new ideas and solutions to current global land management challenges.

This Special Issue is particularly timely, as it not only aligns with the United Nations Sustainable Development Goals (SDGs) concerning sustainable land use but also offers important theoretical support and practical guidance for coordinated regional development in the post-pandemic era. The research findings presented herein will serve as a crucial reference for academics, policymakers, and practitioners, fostering further exploration in land science and enhancing sustainable development practices.

2. Articles

This Special Issue encompasses four primary research domains: (1) the interactions between land policies and ecosystem services, (2) methodological innovations in the dynamic simulation and spatial analysis of land use, (3) the optimization of regional sustainable development and land management, and (4) studies on land use efficiency and the transfer of factors. The contributed papers demonstrate significant methodological innovations through the application of sophisticated analytical techniques, including nonlinear analysis, spatiotemporal modeling, and geographically weighted regression, while also highlighting the importance of cross-disciplinary integration.

2.1. Research on the Interaction Between Land Policies and Ecosystem Services

The interaction between land policies and ecosystem services is a pivotal research area addressed in this Special Issue. The article titled "The Gains and Losses of Cultivated Land Requisition–Compensation Balance: Analysis of the Spatiotemporal Trade-Offs and Synergies in Ecosystem Services Using Hubei Province as a Case Study" offers an in-depth examination of the spatiotemporal trade-offs and synergies in ecosystem services that arise

from the cultivated land requisition-compensation balance policy, using Hubei Province, China, as a case study (Contributions 1). Another study conducted in Xinjiang, China, titled "Nonlinear Effects of Land Use Conflicts in Xinjiang: Critical Thresholds and Implications for Optimal Zoning" innovatively investigates the nonlinear characteristics of land use conflicts and proposes optimization methods for land use zoning based on ecological thresholds, identified through the delineation of critical threshold values (Contributions 2). Collectively, these studies underscore the significant impact of land policies on ecosystem services, providing essential scientific evidence for informed policy-making.

2.2. Innovations in Land Use Dynamic Simulation and Spatial Analysis Methods

In the realm of methodological innovation, several studies have concentrated on enhancing the simulation accuracy and analytical depth of land use changes. The article "Dynamics of the Oasis–Desert–Impervious Surface System and Its Mechanisms in the Northern Region of Egypt" employs innovative modeling techniques to analyze the interaction mechanisms within the oasis-desert-impervious surface system in northern Egypt (Contributions 3). Additionally, the study "Incorporation of Spatially Heterogeneous Area Partitioning into Vector-Based Cellular Automata for Simulating Urban Land Use Changes" introduces the concept of spatial heterogeneity zoning into vector-based cellular automata, significantly improving the accuracy of urban land use change simulations (Contributions 4). Furthermore, the article "Spatial–Temporal Characteristics and Influencing Factors of Land Use Carbon Emissions: An Empirical Analysis Based on the GTWR Model" conducts an in-depth analysis of the spatiotemporal characteristics and influencing factors of land use carbon emissions using the geographically and temporally weighted regression model (Contributions 5). These methodological innovations provide novel technical approaches and analytical frameworks that advance the field of land use research.

2.3. Regional Sustainable Development and Land Management Optimization

Researchers have proposed several innovative solutions to address land management challenges related to regional sustainable development. The article "Territorial Spatial Resilience Assessment and Its Optimization Path: A Case Study of the Yangtze River Economic Belt, China" pioneers a systematic assessment of regional territorial spatial resilience within the Yangtze River Economic Belt, establishing a comprehensive evaluation index system (Contributions 6). Another study, "Dynamic Matching and Spatial Optimization of Land Use and Resource-Environment Constraints in Typical Regions of the Yellow River Basin in China", introduces a dynamic matching framework that aligns land use with resource-environmental constraints in typical regions of the Yellow River Basin (Contributions 7). Additionally, the paper "The Impact of Urban Renewal on Spatial–Temporal Changes in the Human Settlement Environment in the Yangtze River Delta, China" systematically evaluates the multidimensional impacts of urban renewal on the human settlement environment in the Yangtze River Delta region (Contributions 8). The article "Research on the Manifestation and Formation Mechanism of New Characteristics of Land Disputes: Evidence from the Yangtze River Economic Belt, China" examined the emerging characteristics and formation mechanisms of land disputes in the Yangtze River Economic Belt (Contributions 9). Finally, the study "Temporal and Spatial Effects of Heavy Metal-Contaminated Cultivated Land Treatment on Agricultural Development Resilience" analyzes the spatiotemporal effects of remediation efforts on heavy metal-contaminated farmland and their impact on agricultural development resilience (Contributions 10). Collectively, these studies contribute to establishing a theoretical framework for regional sustainable development in land management, providing scientific guidance for practical applications.

2.4. Research on Land Use Efficiency and Factor Transfer

This Special Issue also emphasizes issues on land use efficiency and factor transfer. The article "Impacts of Rural–Urban Labor Transfer and Land Transfer on Land Efficiency in China: An Analysis of Mediating Effects" innovatively explores the mechanisms by

which rural labor migration and land transfer influence land use efficiency (Contributions 11). Another study, "A Multi-Attribute Approach for Low-Carbon and Intensive Land Use of Jinan, China", employs a gray fuzzy integral multi-attribute evaluation model to systematically assess the efficiency and factor transfer of low-carbon intensive land use in Jinan from 2010 to 2017, revealing a dynamic transition in land use patterns from high consumption and emissions to low consumption, low emissions, and high efficiency (Contributions 12). The paper "Expanded Residential Lands and Reduced Populations in China, 2000–2020: Patch-Scale Observations of Rural Settlements" highlights the contradiction between the expansion of rural residential land and the decline in population in China from 2000 to 2020, exposing issues of low land use efficiency and resource waste (Contributions 13). These studies examine the relationship between factor mobility and land use efficiency from different perspectives, providing important references for policy-making.

3. Conclusions and Perspectives

The thirteen studies included in this Special Issue provide substantial theoretical contributions and practical insights into sustainable land management and regional coordinated development. They have advanced understandings in several key areas: the interaction between land policies and ecosystem services, innovations in spatial analysis methods, optimization of regional sustainable development, and improvements in land use efficiency. Methodologically, the research has evolved from traditional linear analysis to nonlinear approaches, transitioning from single-perspective evaluations to multi-dimensional, comprehensive assessments, thereby showcasing significant methodological innovations within land science.

These studies also highlight critical issues in regional development, providing scientific evidence that can inform policy-making. However, as global climate change intensifies, digital technologies rapidly evolve, and profound adjustments patterns undergo profound adjustments, land science research faces new challenges and opportunities. Future research needs to focus on several key areas:

1. Digital Technology Integration: There is a pressing need to enhance research on the application of digital technologies in land monitoring and management, particularly the integration of advanced technologies such as artificial intelligence and big data with traditional land science methodologies.
2. Vulnerability and Adaptability: Increased emphasis should be placed on studying land system vulnerability and adaptability in the context of climate change.
3. Cross-Regional Coordination Mechanisms: Research on the mechanisms for cross-regional coordination in land management should be strengthened, especially concerning the balance between key ecological function areas and economic development zones.
4. Policy Evaluation Methods: There is a need for further exploration of methods to evaluate the effectiveness of land policy implementation, aimed at providing more precise scientific support for policy optimization.

In light of these considerations, we are pleased to announce the launch of the second volume of this Special Issue available at https://www.mdpi.com/journal/land/special_issues/FN3NW08B0A (accessed on 10 November 2024). We warmly invite scholars from around the world to engage in further research on related topics. We look forward to collaborating with the global academic community to advance knowledge in land science and provide more theoretical guidance and practical references for promoting regional sustainable development. This new Special Issue will continue to uphold rigorous academic standards, offering a high-quality platform for scholarly exchange that fosters the deepening of land science research.

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

List of Contributions:

1. He, Q.; Jiang, X.; Zhang, Y. The Gains and Losses of Cultivated Land Requisition–Compensation Balance: Analysis of the Spatiotemporal Trade-Offs and Synergies in Ecosystem Services Using Hubei Province as a Case Study. *Land* **2024**, *13*, 1641. https://doi.org/10.3390/land13101641.
2. Wu, J.; Wang, C.; He, X.; Zhou, C.; Wang, H. Nonlinear Effects of Land-Use Conflicts in Xinjiang: Critical Thresholds and Implications for Optimal Zoning. *Land* **2024**, *13*, 612. https://doi.org/10.3390/land13050612.
3. Liu, Y.; Ma, C.; Ma, L. Dynamics of the Oasis–Desert–Impervious Surface System and Its Mechanisms in the Northern Region of Egypt. *Land* **2024**, *13*, 1480. https://doi.org/10.3390/land13091480.
4. Zhu, J.; Zhu, M.; Na, J.; Lang, Z.; Lu, Y.; Yang, J. Incorporation of Spatially Heterogeneous Area Partitioning into Vector-Based Cellular Automata for Simulating Urban Land-Use Changes. *Land* **2023**, *12*, 1893. https://doi.org/10.3390/land12101893.
5. He, J.; Yang, J. Spatial–temporal characteristics and influencing factors of land-use carbon emissions: An empirical analysis based on the GTWR model. *Land* **2023**, *12*, 1506. https://doi.org/10.3390/land12081506.
6. Cui, J.; Jin, H.; Kong, X.; Sun, J.; Peng, Y.; Zhu, Y. Territorial Spatial Resilience Assessment and Its Optimisation Path: A Case Study of the Yangtze River Economic Belt, China. *Land* **2024**, *13*, 1395. https://doi.org/10.3390/land13091395.
7. Yu, Z.; Su, D.; Wang, S.; Wei, C.; Li, N.; Qu, Y.; Wang, M. Dynamic Matching and Spatial Optimization of Land Use and Resource-Environment Constraints in Typical Regions of the Yellow River Basin in China. *Land* **2023**, *12*, 1420. https://doi.org/10.3390/land12071420.
8. Zheng, L.; Zheng, Y.; Fu, Z. The Impact of Urban Renewal on Spatial–Temporal Changes in the Human Settlement Environment in the Yangtze River Delta, China. *Land* **2024**, *13*, 841. https://doi.org/10.3390/land13060841.
9. Tan, S.; Zou, S.; Zhao, Y.; He, Q.; Zhang, M. Research on the Manifestation and Formation Mechanism of New Characteristics of Land Disputes: Evidence from the Yangtze River Economic Belt, China. *Land* **2024**, *13*, 1002. https://doi.org/10.3390/land13071002.
10. Chen, D.; Hu, W. Temporal and spatial effects of heavy metal-contaminated cultivated land treatment on agricultural development resilience. *Land* **2023**, *12*, 945. https://doi.org/10.3390/land12050945.
11. Pei, S.; Zhao, S.; Li, X.; Li, J. Impacts of Rural–Urban Labour Transfer and Land Transfer on Land Efficiency in China: A Analysis of Mediating Effects. *Land* **2024**, *13*, 702. https://doi.org/10.3390/land13050702.
12. Yu, Q.; Li, J.; Lu, X.; Wang, L. A Multi-Attribute Approach for Low-Carbon and Intensive Land Use of Jinan, China. *Land* **2023**, *12*, 1197. https://doi.org/10.3390/land12061197.
13. Yang, F.; Sun, J.; Yang, J.; Liang, X. Expanded Residential Lands and Reduced Populations in China, 2000–2020: Patch-Scale Observations of Rural Settlements. *Land* **2023**, *12*, 1368. https://doi.org/10.3390/land12071368.