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Editorial Introduction

Environmental research for sustaining quality and integrity of natural habitat and human settlement

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The research on the quality of natural habitats and human settlements has been paid attention to by academia, design professionals and policymakers in recent years. Most of the concern is driven by rapid spatial transformation of and ecological deterioration in both natural habitats and human settlement globally due to the rapid urbanisation process, climate change, and environmental disasters (Franklin, Anderson, Gutiérrez, & Burnham, 2000; Kareiva, Tallis, Ricketts, Daily, & Polasky, 2011; Zhu et al., 2020). Besides the spatial and environmental changes, various social-demographic and economic factors connected with concerns on gender, age and lifestyle also contribute to the evolution of public space and architectural space that influence the daily life of individuals and communities (Carmona, 2014; Moser, 2017). The questions raised here are, what is the status of habitat quality and the spatial quality in and around the human settlements? How can we assess the status? And to what extent can planners and policymakers develop strategies to better balance the need to sustain the quality of nature and human settlement based on quantitative and qualitative assessment and prediction?

The special section hopes to provide a better understanding of the questions raised above, namely how the spatial, environmental, and social changes influence the quality of natural habitat and human settlement and how natural habitat and human settlement at different spatial scales can be integrated optimally. It consists of five case studies from cities in Asia-Pacific. These papers address a variety of issues at different spatial scales, including changes in urban landscape pattern and habitat quality at a city-region scale, the impact of tree-crown shapes on air quality along the roadside, spatial evolution of vernacular dwellings in an architecture space, townscape modification in suburban residential areas, and devising optimum population capacity in the city-residence attraction area.

The main themes addressed by the selected papers are as following:

The Effects of Urban Landscape Pattern Evolution on Habitat Quality Based on InVEST Model is the first paper. It examines the changes in regional landscape patterns in the City of Harbin, China in the two decades from 2000 to 2020, aiming to investigate these changes' impact on the quality of natural habitat. Utilizing remote sensing data and advanced modelling methods such as InVEST and FRAGSTAT, authors Guo, Lyu,

and Feng (2023) are able to show that the Harbin region's habitat quality experienced a declining trend in the two decades as the landscape patterns became increasingly fragmented and irregular. Based on the findings from this research, the authors offer policy solutions to addressing habitat degradation in the Harbin City that are specific to landscape location and vegetation types. Despite the limitations in its analytical methods, this paper demonstrates a valuable approach to landscape research with significant implications for sustainable landscape planning and management.

The second paper, *Evaluation of The Shape of Tree Crowns to Protect air Quality on The Roadside from The CO2 Dispersion Produced by The Transportation*, investigates tree crowns' environmental impact at a much finer scale, the roadside in the city of Surabaya, Indonesia. Aini, Shen, Wikantiyoso, Tutuko, and Gai (2023) study how tree-crown shapes affect air pollution along the roadside by simulating the spread of CO2 emission in scenarios involving different tree crown shapes and wind directions. The research shows that certain tree crown shapes (e.g., oval, conical, and columnar) appear better at dispersing CO2 emission than others (e.g., round and umbrella). The authors recognize the caveats in the simulation methods and narrow focus on one single pollutant CO2 and make a good argument for the need for future research. This paper offers findings that can inform cities' efforts to reduce air pollution via proper roadside tree selection and management.

The third paper *The Spatial Evolution and Characteristics of Korean Ethnic Dwellings in the Tumen River Basin* by Li and Li (2023) touches upon a relatively under-examined area - how vernacular dwellings such as the Korean ethnic dwellings evolve to adapt to contemporary life in the rural Chinese context. The authors discover various residential behaviours that affect the spatial division: 1) One entrance for all replaced traditional separate entrance due to gender, age, or hygiene concern; 2) Jeongjibang has become the main site for dining and living; 3) The living space is enlarged, separate from the sleeping space and take more the South side too allow more social activities for different generations; 4) Modern cooking facilities and indoor toilets are incorporated. Consequently, the traditional ethnic Korean dwellings increasingly separate public and private space and enriched orderly spatial division. The authors suggest that modern lifestyle, change in family structure, national policies and the examples of other ethnic dwellings influenced the spatial evolution, including the unified entrance via the Badang, the reduced volume of the Ondolbang, modernised kitchen and toilet and the blending of Jeongjibang and Ondolbang to create an enlarged space for daily activities.

The fourth paper, *Influencing Factors on Changes in the Unified Exterior Form Facing the Street*, studies the changing landscape in suburban residential areas in Japan. Arguing for the value of maintaining a townscape's coherence and uniformity typically brought about by its original design and planning, authors Itami et al. (2023) bring our attention to the detrimental effects on townscape identify and harmony from poorly regulated building and maintenance activities. Through visual observations and housing map surveys, this research focuses on the Satsukino residential area in Sakai City Japan and reveals that two distinctive features of the original Satsukino townscape, the planting belt and planting hedge, have experienced significant modifications as a result of rebuilding, household alternation, and private parking space construction. This paper makes suggestions for using design guidelines, joint landscape management, and building common parking space as ways to minimize undesired townscape

modification. It also recommends employing a participatory process to let residents decide whether and how to maintain the townscape. The quality of a human settlement is affected by myriad elements and factors, many of which are rooted in human needs and lifestyle preferences. This paper's in-depth study of townscape change in relation to residents' activities informs the use of community-based approaches to preserving human settlement quality.

The last paper *Prediction on optimum population capacity determined by facility density: A case of residence attraction areas in Kumamoto* by Wang and Homma (2023) discuss how to use quantitative methods to measure the balance between people and urban environment and predict optimal population capacity. The Random Forest Regression method is used in this study to define the prediction model of the carrying capacity of the human population in the urban environment. The authors suggest that welfare, medical facilities, and park facilities have the greatest impact on population density. To assess whether urban environments can support population capacity in the future in the study location, the authors compared the result of the Cohort method with the population capacity based on facilities by Random Forest regression. What is innovative in this research is that the authors use quantitative methods to highlight the impact of urban environments on population capacity, a method seldom explored in previous studies.

Taking together, these papers contribute to the understanding of the quality of the natural landscape and human settlement by studying their underlying factors and transformation processes. Most of the research also applies rigorous assessment methods and engages in policy discussions about necessary actions or strategies aimed at optimal integration. The five papers provide us with an interesting insight into the impact of various factors, such as urban landscape patterns, tree-crown shapes, hedges, facilities, or even changes in lifestyles and social structures, on the quality of both natural habitat and human settlements. They show that advanced modelling tools, survey research, and visual observations can all be utilized in environmental analysis to improve our understanding of environmental changes and offer valuable insights into sustainable urban development and governance offer more insight into the assessment or prediction. Policymakers can develop their policy solutions based on the input from more tailored assessments and predictions and move forward to developing strategies that sustain the quality and integrity of natural habitats and human settlements.

REFERENCES

Aini, N., Shen, Z., Wikantiyoso, R., Tutuko, P., & Gai, A. (2023). Evaluation of The Shape of Tree Crowns to Protect air Quality on The Roadside from The CO2 Dispersion Produced by The Transportation. *Internatioanl Review for Spatial Planning and Sustainable Development, 11*(2), 26-41. doi:https://doi.org/10.14246/irspsd.11.2_26

Carmona, M. (2014). The place-shaping continuum: A theory of urban design process. *Journal of Urban Design, 19*(1), 2-36. doi:https://doi.org/10.1080/13574809.2013.854695

Franklin, A. B., Anderson, D. R., Gutiérrez, R., & Burnham, K. P. (2000). Climate, habitat quality, and fitness in northern spotted owl populations in northwestern California. *Ecological Monographs, 70*(4), 539-590.

Guo, R., Lyu, S., & Feng, J. (2023). The Effects of Urban Landscape Pattern Evolution on Habitat Quality Based on InVEST Model. *Internatioanl Review for Spatial Planning and Sustainable Development, 11*(2), 5-25. doi:https://doi.org/10.14246/irspsd.11.2_5

Itami, E., Aoki, T., Kobayashi, F., Itami, K., Takashi, Y., & Iida, T. (2023). Influencing Factors on Changes in the Unified Exterior Form Facing the Street. *Internatioanl Review for Spatial Planning and Sustainable Development, 11*(2). 61-80 doi:https://doi.org/10.14246/irspsd.11.2_61

Kareiva, P., Tallis, H., Ricketts, T. H., Daily, G. C., & Polasky, S. (2011). *Natural Capital: Theory and Practice of Mapping Ecosystem Services*. Oxford: Oxford University Press.

Li, H., & Li, M. (2023). The Spatial Evolution and Characteristics of Korean Ethnic Dwellings in the Tumen River Basin *Internatioanl Review for Spatial Planning and Sustainable Development, 11*(2), 42-60. doi:https://doi.org/10.14246/irspsd.11.2_42

Moser, C. O. (2017). Gender transformation in a new global urban agenda: challenges for Habitat III and beyond. *Environment Urbanization, 29*(1), 221-236. doi:http://doi.org/10.1177/0956247816662573

Wang, Y., & Homma, R. (2023). Prediction on optimum population capacity determined by facility density: A case of residence attraction areas in Kumamoto. *Internatioanl Review for Spatial Planning and Sustainable Development, 11*(2), 81-98. doi:https://doi.org/10.14246/irspsd.11.2_81

Zhu, C., Zhang, X., Zhou, M., He, S., Gan, M., Yang, L., & Wang, K. (2020). Impacts of urbanization and landscape pattern on habitat quality using OLS and GWR models in Hangzhou, China. *Ecological Indicators, 117*, 106654. doi:https://doi.org/10.1016/j.ecolind.2020.106654