



“Gheorghe Asachi” Technical University of Iasi, Romania



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## RESPONSE OF HABITAT QUALITY TO TEMPORAL AND SPATIAL LAND USE CHANGE AND ITS DRIVING FACTORS: A CASE STUDY OF GANJIANG RIVER BASIN

Jiaxin Zheng<sup>1,2\*</sup>, Jie Wang<sup>1,2</sup>, Chunqing Liu<sup>1,2\*</sup>

<sup>1</sup>College of Landscape Architecture and Art, Jiangxi Agricultural University, Nanchang 330045, Jiangxi, China

<sup>2</sup>Rural Culture Development Research Center, Jiangxi Agricultural University, Nanchang 330045, Jiangxi, China

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### Abstract

The Ganjiang River Basin, situated within the Yangtze River Basin, holds substantial ecological significance. A comprehensive understanding of the spatial-temporal variations and underlying drivers of habitat quality in this region is imperative for ensuring ecological security and upholding national ecological rights and interests. In this study, we utilized a remote sensing dataset and employed the InVEST model to analyze habitat quality distribution across both watershed and sub-watershed scales. Additionally, we integrated a land use transfer matrix and Moran's I index to examine the spatial and temporal patterns of habitat quality variation. The impact of 12 primary driving factors on habitat quality distribution was assessed using the geo-detector method. Our findings indicate the following: (1) Over the past two decades, the overall habitat quality in the Ganjiang River Basin has remained high, albeit exhibiting a consistent downward trend. (2) Approximately 60% of the basin area experienced degradation in habitat quality, primarily concentrated in the upper reaches characterized by initially favorable ecological conditions. Conversely, approximately 14% of the area demonstrated improvements in habitat quality, suggestive of the efficacy of select environmental protection initiatives. (3) Land use intensity emerged as the predominant factor influencing habitat quality, with inter-factor interactions exhibiting greater explanatory power than individual factors. Notably, the interaction between land use intensity and terrain exerted the strongest influence, underscoring the disproportionate impact of economic activities in rugged terrain on habitat quality decline. Our findings hold significant implications for guiding ecological protection efforts in critical regions and provide a robust scientific foundation for ecosystem management and sustainable development initiatives.

*Key words:* Ganjiang River Basin, habitat quality, InVEST model, land use change

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\* Author to whom all correspondence should be addressed: e-mail: liuchunqing@jxau.edu.cn, jiaxinzheng08@163.com