

# Research on land use evolution and ecosystem services value response in mountainous counties based on the SD-PLUS model

Yao Li<sup>1</sup>, Jiulin Li<sup>2</sup>, and Jinlong Chu<sup>2</sup>

<sup>1</sup>Beijing Normal University

<sup>2</sup>Anhui Jianzhu University

March 28, 2022

## Abstract

The rapid urbanization has caused changes in climate and environment and threatened the ecosystem with multiple risks. The ecological service capacity has shown a downward trend accordingly. It is significant to explore the spatio-temporal evolution of land use and ecological service value in mountainous counties at small scales, as it coordinates economic growth and ecological protection, and promotes sustainable and high-quality development. Based on the SD-PLUS model, taking Qianshan city as an example, the study simulated three scenarios of land use change: ecological protection, coordinated development, and economic priority, and studied the impacts of land use change on the value of ecosystem services. Results showed that: Under the three scenarios, the construction land in the study area increased significantly, the forest and water area have a decreasing trend, and the scale of gardens has partly increased. Construction land expands in clusters in the urban built-up areas and dots in mountainous areas; land use changes are primarily affected by roads, followed by areas where artificial facilities are relatively sparse, and DEM has the greatest impact on land use changes. The overall ecosystem service value shows a downward trend, with the comprehensive coordination type dropping the least (8.79%). The value distribution changes little at space scale, and different regions demonstrate different degrees of changes. From the perspective of value type, the service values of climate regulation and water conservation are significantly reduced, while that of food production is relatively stable; and from the perspective of various lands with their ecological service values, cultivated land and forest remain stable. The study results can provide technical ideas for the coordinated economic development and ecological protection of mountainous cities, and boost the implementation of green development.

## Hosted file

Research on land use evolution and ecosystem services value response in mountainous counties based on the SD-PLUS model is available at <https://authorea.com/users/467459/articles/561515-research-on-land-use-evolution-and-ecosystem-services-value-response-in-mountainous-counties-based-on-the-sd-plus-model>