

Urbanization Effects on the Food-Water-Energy Nexus within Ecosystem Services: A Case Study of the Beijing-Tianjin-Hebei Urban Agglomeration in China

Authors : Ke Yang, QiHan, Bauke de Veirs

Abstract : This study addresses the need for coordinated management of natural resources in urban agglomeration. Using ecosystem services theory, The study explore the relationship between land use in the Beijing-Tianjin-Hebei (B-T-H) region and the Food-Water-Energy (F-W-E) nexus from 2000 to 2030. We assess ecosystem services using the InVEST: Habitat Quality (HQ), Water Yield (WY), Carbon Sequestration (CS), Soil Retention (SDR), and Food Production (FP). The study find an annual expansion of construction land alongside a significant decline in cultivated land. Additionally, HQ, CS, and per capita FP decline annually until 2020 and are expected to persist through 2030. In contrast, WY and SDR grow annually but may decline by 2030. Spearman coefficient analysis reveals synergies between HQ and CS, SDR and CS, and SDR and HQ, with trade-offs between CS and WY and HQ and WY. Utilizing the K-means clustering analysis method, we introduce county-based spatial planning for the F-W-E system, offering valuable insights and recommendations for sustainable resource management.

Keywords : food-water-energy (F-W-E), ecosystem services, trade-offs and synergies, ecosystem service bundle, county-based

Conference Title : ICUGED 2024 : International Conference on Urban Growth and Environmental Degradation

Conference Location : Paris, France

Conference Dates : March 25-26, 2024