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Dynamics of ecosystem services and their driving factors in China's Beijing-Tianjin-Hebei regional development

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Abstract: A comprehensive study on the dynamics of ecosystem services and their driving factors is the key prerequisite for enhancing local ecological sustainability. Based on relevant sets of big data, including spatial land data, soil data, DEM, climatic data and social-economic data, using InVEST model and multivariate logistic regression model, the study firstly assessed the spatiotemporal variation of ecosystem services for China's Beijing-Tianjin-Hebei (Jing-Jin-Ji) region from 1990 to 2015. The study then analyzed the natural and socioeconomic factors affecting the ecosystem services. The results show that large spatial and quantitative differences exist in the supply of multiple ecosystem services, and the changes of different types of ecosystem services are driven by different factors. For water yield, the areas of arable land, wetland and built-up land and precipitation are the most influential factors; The areas of arable land, precipitation, temperature, altitude, urbanization rate and amount of nutrient applied per unit area are determinants of changes in nutrient retention; The areas of grassland and forest, temperature, altitude, GDP per capita and urbanization rate affect the soil retention to great extent; for carbon storage, its key influential factors are the areas of different land use types and urbanization rate. The study can facilitate identification of where and how to enhance multiple ecosystem services.

Keywords: dynamics of ecosystem services, driving factors, InVEST, multivariate logistic regression model