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The Impacts of Land Use Change and Extreme Precipitation Events on Ecosystem Services

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Abstract : Urban areas contain abundant potential biochemical storages and renewable and non-renewable flows. Urban natural environments for breeding natural assets and urban economic development for maintaining urban functions can be analyzed form the concept of ecological economic system. Land use change and ecosystem services change are resulting from the interactions between human activities and environments factually. Land use change due to human activities is the major cause of climate change, leading to serious impacts on urban ecosystem services, including provisioning services, regulating services, cultural services and supporting services. However, it lacks discussion on the interactions among urban land use change, ecosystem services change, and extreme precipitation events. Energy synthesis can use the same measure standard unit, solar energy, for different energy resources (e.g. sunlight, water, fossil fuels, minerals, etc.) and analyze contributions of various natural environmental resources on human economic systems. Therefore, this research adopts the concept of ecological, economic systems and energy synthesis for analyzing dynamic spatial impacts of land use change on ecosystem services, using the Taipei area as a case study. The analysis results show that changes in land use in the Taipei area, especially the conversion of natural lands and agricultural lands to urban lands, affect the ecosystem services negatively. These negative effects become more significant during the extreme precipitation events.

Keywords : urban ecological economic system, extreme precipitation events, ecosystem services, energy
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