

Ecosystem services assessment of soil and water conservation based on scenario analysis method in a red soil hilly catchment of Southern China

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Statement of the Problem: Soil erosion is quite severe in the hilly red-soil region of southern China due to the unique natural conditions, high population density, and prominent contradiction between people and land. Soil and water conservation (SWC) in agricultural watershed were carried out in large scale to alleviate soil erosion. The trade-offs of the ecosystem services (ES) of SWC and economic development are of significance to the sustainable development of these hilly regions.

Methodology & Theoretical Orientation: Due to the lack of ES evaluation indicators and unified calculation methods in line with regional characteristics, this study proposes a framework of scenario analysis by using ES mapping, ES scoring, and economic analysis technology for ES and economic-benefit trade-offs under different scenarios. The study area was the Xiaoyang catchment located in Ningdu County, Jiangxi Province, which is a typically hilly red-soil region of southern China.

Findings: From the results of scenario analysis, an obvious phenomenon is that some SWC practices can affect the value of some ES indicators, while some have no clear trend. By computing the ES scores for the four scenarios, the ranking was S3 (balanced), S1 (conservation), S2 (economic), and S0 (baseline). S3 ranks second in net income (with CNY 4.73 million), preceded only by S2 (CNY 6.36 million).

Conclusion & Significance: Based on the above rankings, S3 is the relatively optimal scenario in this study. The contributions of this study are the method innovation with the localization or customized selection of ES indicators, and scenario analysis with ES scores and economic-benefit trade-offs in different scenarios.

Biography

Sunliying has her expertise in paradigms for integrated soil and water conservation over main water erosion regions in China. In slope scale, rill erosion processes, rill morphology characteristics and their responses to soil texture, rainfall intensity and slope gradient were particularly investigated. In catchment scale, spatial allocation of soil and water conservation measures was carried out according to the soil erosion processes, topography and vegetation. The main objectives of soil and water conservation were extended from traditional soil and water losses prevention to the improvement of multiple ecological services, like carbon sequestration, landscape pattern change and habitat quality improvement, etc. Moreover, the trade-offs of soil and water conservation improvement and economic development were explored for the target of regional sustainable development.