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Assessing impact of forest landscape restoration on the erosion of agricultural land in sub-Saharan Africa Mékrou's watershed

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Abstract

Soil erosion stands as one of the foremost challenges confronting agricultural productivity, posing a significant threat to global food security. Numerous studies have explored the potential of Forest Landscape Restoration (FLR) practices to mitigate the adverse effects of soil erosion. However, it's crucial to recognise that the efficacy of these practices may vary across different contexts and environments. Our primary objective is to evaluate the impact of FLR initiatives on reducing soil erosion in agricultural lands within the Head of Mékrou Watershed (TBVM) in Benin. TBVM correspond to a semi-arid area of 361 km^2. We assessed the potential annual soil loss within the watershed by using the Revised Universal Soil Loss Equation (RUSLE) in combination with geographic information system (GIS) technology and remote sensing data. Rain erosivity (R-factor) estimate using rain data, Erodibility of soil (K-factor), Land Use/Cover (C-factor), Length and Steepness of soil slope (LS-factor) and the Practices of soil conservation factor (P-factor) have been estimated for the study area. Our findings reveal a substantial reduction in erosion rates – exceeding 50% – within areas undergoing forest landscape restoration compared to conventional croplands. Furthermore, our analysis indicates that erosion mitigation is particularly pronounced in forest plantations relative to other forms of FLR practices. These results not only offer valuable insights for policymakers and land managers to prioritise intervention efforts in vulnerable areas but also underscore the potential benefits of restoring forest landscapes within the TBVM. By elucidating the effectiveness of FLR in mitigating soil erosion, our study contribute to informed decision-making processes and underscores the importance of sustainable land management practices in safeguarding agricultural productivity and environmental resilience.

Keywords: Benin, GIS, remote sensing, soil erosion

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