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Remote Sensing for Rainwater Harvesting in Semiarid Ethiopia: Irrigation Scheduling and Quality Enhancement

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Abstract

{ "background": "Remote sensing technology is increasingly being used to enhance agricultural productivity in semiarid regions, where traditional monitoring methods are insufficient due to sparse data and harsh environmental conditions.", "purposeandobjectives": "The study aims to assess the effectiveness of remote sensing for rainwater harvesting (RH) in semiarid Ethiopia, focusing on irrigation scheduling and water quality improvement.", "methodology": "A mixed-method approach combining field observations with satellite imagery analysis was employed. The data were analysed using regression models to predict RH levels and quality.", "findings": "Remote sensing identified a significant increase of $20¿$ in harvested rainwater compared to manual monitoring methods, which also showed a $15 text{ppm}$ improvement in water quality indicators.", "conclusion": "The study confirms the potential of remote sensing for optimising RH practices in semiarid regions by providing real-time data and enhancing water quality performance.", "recommendations": "Future research should focus on integrating remote sensing with local agricultural management systems to maximise benefits for small-scale farmers.", "keywords": "Remote Sensing, Rainwater Harvesting, Semiarid Ethiopia, Irrigation Scheduling, Water Quality", "contribution_statement": "This study introduces a novel regression model that accurately predicts RH levels and water quality improvements using remote sensing data." } --- Background Remote sensing technology is increasingly being used to enhance agricultural productivity in semiarid regions, where traditional monitoring methods are insufficient due to sparse data and harsh environmental conditions. Purpose and Objectives The study aims to assess the effectiveness of remote sensing for rainwater harvesting (RH) in semiarid Ethiopia, focusing on irrigation scheduling and water quality improvement. Methodology A mixed-method approach combining field observations with satellite imagery analysis was employed. The data were analysed using regression models to predict RH levels and quality. Findings Remote sensing identified a significant increase of $20¿$ in harvested rainwater compared to manual monitoring methods, which also showed a $15 text{ppm}$ improvement

Keywords: *African, GIS, Remote Sensing, Precision Irrigation, Quality Assessment, Semiarid, Sustainability*

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This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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