



Integration of Precision Agronomic Techniques for Enhanced Rice Yield in Ethiopian Highlands

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Abstract

Rice is a crucial staple crop in Ethiopia's Western Highlands, where climate variability poses significant challenges to yield stability. A randomized block design was employed with treatments including variable rate fertilizer application and optimal planting dates, monitored for five years. An average yield increase of 20% over conventional practices was observed, with a significant reduction in water usage by 15%. The integration of precision agriculture techniques significantly improved rice yields and resource efficiency in the Ethiopian highlands. Further research should explore scalability and economic viability of these methods across different soil types and climates. Rice, Precision Agriculture, Yield Enhancement, Ethiopian Highlands The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Ethiopia, Precision Agriculture, GIS, Remote Sensing, Yield Management, Soil Mapping, Adaptive Irrigation Systems

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