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Adoption Rates in Smallholder Farm Systems: Methodological Evaluation through Randomized Field Trials in Senegal

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Abstract

Smallholder farming systems in Senegal are characterized by diverse practices and limited resource access. Randomized field trials were conducted across three regions in Senegal to assess the impact of a new soil moisture sensor on crop yield and farmer decision-making. The sensor significantly improved water management practices, leading to an average increase of 12% in crop yields among participating farmers (95% CI: 3-21%). Randomized field trials provided robust evidence for the adoption rates of soil moisture sensors in Senegalese smallholder farms. Future research should validate these findings through replication and consider broader socioeconomic factors affecting technology uptake. Agricultural Technology, Smallholder Farmers, Randomized Field Trials, Soil Moisture Sensors The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agroecology, randomized controlled trial, adoption rates, smallholder farming, resource access, geographic information systems, experimental design*

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