



Mechanization and Appropriate Technologies for Small Farms in Mali: Innovations for Sustainable Agricultural Practices

Amadou Traoré^{1,2}, Mamoudou Diawara³, Issa Keita⁴

¹ Department of Soil Science, University of Bamako (consolidated)

² International Center for Tropical Agriculture (CIAT), Mali

³ University of Bamako (consolidated)

⁴ Rural Polytechnic Institute (IPR/IFRA) of Katibougou

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Correspondence: atraor@hotmail.com

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Author notes

Amadou Traoré is affiliated with Department of Soil Science, University of Bamako (consolidated) and focuses on Agriculture research in Africa.

Mamoudou Diawara is affiliated with University of Bamako (consolidated) and focuses on Agriculture research in Africa.

Issa Keita is affiliated with Rural Polytechnic Institute (IPR/IFRA) of Katibougou and focuses on Agriculture research in Africa.

Abstract

This study examines the adoption of mechanization and appropriate technologies for small farms in Mali, focusing on improving agricultural productivity while maintaining environmental sustainability. A mixed-methods approach combining surveys, interviews, and case studies was employed to gather data from 100 randomly selected small farms across Mali. Farmers reported a significant increase in crop yields by 25% with the use of appropriate irrigation systems ($p < 0.05$). The findings suggest that integrating mechanized tools and localized technologies can lead to substantial improvements in agricultural productivity without compromising environmental health. Government support should be provided for the distribution of affordable, sustainable equipment like drip irrigation systems to small farms in Mali. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, Smallholder farming systems, Mechanization, Conservation agriculture, Input management, Sustainable intensification, Precision farming*

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