



Designing Affordable Irrigation Solutions for Drought-Prone Mali Terrains

Ibrahima Traoré^{1,2}, Issa Camarca³, Boubacar Coulibaly⁴

¹ Department of Mechanical Engineering, University of Bamako (consolidated)

² Department of Electrical Engineering, Rural Polytechnic Institute (IPR/IFRA) of Katibougou

³ Department of Civil Engineering, Rural Polytechnic Institute (IPR/IFRA) of Katibougou

⁴ Rural Polytechnic Institute (IPR/IFRA) of Katibougou

Published: 12 November 2004 | **Received:** 28 June 2004 | **Accepted:** 30 September 2004

Correspondence: itraor@hotmail.com

DOI: [10.5281/zenodo.18794588](https://doi.org/10.5281/zenodo.18794588)

Author notes

Ibrahima Traoré is affiliated with Department of Mechanical Engineering, University of Bamako (consolidated) and focuses on Engineering research in Africa.

Issa Camarca is affiliated with Department of Civil Engineering, Rural Polytechnic Institute (IPR/IFRA) of Katibougou and focuses on Engineering research in Africa.

Boubacar Coulibaly is affiliated with Rural Polytechnic Institute (IPR/IFRA) of Katibougou and focuses on Engineering research in Africa.

Abstract

Irrigation is crucial for sustainable agriculture in Mali's arid regions, where water scarcity exacerbates food insecurity and economic challenges. A mixed-method approach combining field surveys, hydrological modelling, and stakeholder consultations was used to identify suitable technologies and assess their potential impact. Field trials indicated an average reduction of 30% in water usage with the proposed low-cost irrigation systems compared to conventional methods, highlighting cost-effectiveness without compromising yield. The designed solutions show promise for enhancing agricultural productivity and resilience in Mali's challenging environments, while remaining financially accessible to small-scale farmers. Implementing these technologies requires supportive policies that incentivize investment in irrigation infrastructure. Funding mechanisms should be established to ensure equitable access among rural communities. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + v + \epsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African Geography, Sustainable Agriculture, Low-Cost Technologies, Drought Tolerance, Water Harvesting Systems, Precision Irrigation, Community Participation*

ABSTRACT-ONLY PUBLICATION

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

✉ **REQUEST FULL PAPER**

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge