



Designing Low-Cost Irrigation Systems for Drought-Prone Mali: An Engineering Perspective

Ibrahim Cissoko^{1,2}, Oumar Dembele³, Alassane Traoré^{4,5}, Mohammed Dicko^{3,4}

¹ University of Bamako (consolidated)

² Department of Sustainable Systems, USTTB Bamako (University of Sciences, Techniques and Technologies)

³ International Center for Tropical Agriculture (CIAT), Mali

⁴ Rural Polytechnic Institute (IPR/IFRA) of Katibougou

⁵ Department of Sustainable Systems, International Center for Tropical Agriculture (CIAT), Mali

Published: 23 March 2004 | **Received:** 17 November 2003 | **Accepted:** 04 February 2004

Correspondence: icissoko@yahoo.com

DOI: [10.5281/zenodo.18794778](https://doi.org/10.5281/zenodo.18794778)

Author notes

Ibrahim Cissoko is affiliated with University of Bamako (consolidated) and focuses on Engineering research in Africa. Oumar Dembele is affiliated with International Center for Tropical Agriculture (CIAT), Mali and focuses on Engineering research in Africa.

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

Mohammed Dicko is affiliated with International Center for Tropical Agriculture (CIAT), Mali and focuses on Engineering research in Africa.

Abstract

Irrigation systems are crucial for agricultural productivity in Mali's arid regions where droughts significantly impact crop yields. A mixed-method approach combining hydrological modelling with empirical site assessments was employed to identify optimal system components and configurations. The preliminary results indicate a potential reduction of water use by 15-20%, which aligns with the objectives set for efficiency improvements. The designed systems show promise in enhancing agricultural resilience against drought, though further testing is required to confirm these findings. Further field trials and cost-benefit analyses are recommended before widespread implementation of the proposed irrigation solutions. Irrigation design, low-cost, hydrological modelling, climate-resilient agriculture The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Sub-Saharan, AgriculturalEngineering, DroughtMitigation, SpatialHydrology, LowCostTechnologies, WaterManagement, SystemsAnalysis

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