African Intellectual Property Law Journal
(Law/Technology/Arts crossover)

Designing Economical Irrigation Architectures for Drought Mitigation in Mali's Agricultural Sectors

Ibrahima Diallo[1,2], **Siddy Sidibé**[3], **Oumar Diarra**[4,5], **Adama Traoré**[6,7]

[1] Department of Civil Engineering, USTTB Bamako (University of Sciences, Techniques and Technologies)

[2] Department of Sustainable Systems, Rural Polytechnic Institute (IPR/IFRA) of Katibougou

[3] Department of Mechanical Engineering, International Center for Tropical Agriculture (CIAT), Mali

[4] International Center for Tropical Agriculture (CIAT), Mali

[5] Department of Mechanical Engineering, University of Bamako (consolidated)

[6] USTTB Bamako (University of Sciences, Techniques and Technologies)

[7] University of Bamako (consolidated)

Published: 14 July 2004 | **Received:** 07 March 2004 | **Accepted:** 17 June 2004

Correspondence: idiallo@outlook.com

DOI: 10.5281/zenodo.18804134

Author notes

Ibrahima Diallo is affiliated with Department of Civil Engineering, USTTB Bamako (University of Sciences, Techniques and Technologies) and focuses on Engineering research in Africa.

Siddy Sidibé is affiliated with Department of Mechanical Engineering, International Center for Tropical Agriculture (CIAT), Mali and focuses on Engineering research in Africa.

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

Adama Traoré is affiliated with USTTB Bamako (University of Sciences, Techniques and Technologies) and focuses on Engineering research in Africa.

Abstract

Agricultural sectors in Mali are frequently affected by droughts, leading to significant yield losses and economic instability. A mixed-method approach was employed, combining field surveys, expert consultations, and a cost-benefit analysis to evaluate various irrigation system designs. The findings indicate that drip irrigation systems are the most economical option in sandy soils with limited water supply (40% of surveyed areas), while flood irrigation is more suitable for clay soils with higher water retention capacity (60% of surveyed areas). Low-cost irrigation systems, particularly drip and flood irrigation, can be effectively implemented to improve agricultural productivity and resilience in drought-prone regions. Policy recommendations include subsidizing the installation of low-cost irrigation infrastructure and providing training on sustainable water management practices. Irrigation Systems, Drought Mitigation, Mali Agriculture, Low-Cost Solutions The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, AgriculturalEngineering, Low-Cost, Sustainable, Irrigation, Systems, DroughtResilience*

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