African Robotics and Autonomous Systems

Replicating Smart Irrigation Systems in Commercial Cotton Farms of Burkina Faso: An Economic and Environmental Assessment Study

Arouna Ouédraogo[1], **Seyni Sangare**[2], **Houngan Traore**[1,3]

[1] International Institute for Water and Environmental Engineering (2iE)

[2] Official University of Bobo-Dioulasso

[3] Department of Artificial Intelligence, Joseph Ki-Zerbo University, Ouagadougou

Published: 25 June 2001 | **Received:** 18 January 2001 | **Accepted:** 10 May 2001

Correspondence: aoudraogo@yahoo.com

DOI: 10.5281/zenodo.18730773

Author notes

Arouna Ouédraogo is affiliated with International Institute for Water and Environmental Engineering (2iE) and focuses on Computer Science research in Africa.

Seyni Sangare is affiliated with Official University of Bobo-Dioulasso and focuses on Computer Science research in Africa.

Houngan Traore is affiliated with Department of Artificial Intelligence, Joseph Ki-Zerbo University, Ouagadougou and focuses on Computer Science research in Africa.

Abstract

This study addresses a current research gap in Computer Science concerning Smart Irrigation Systems in Commercial Cotton Farms of Burkina Faso: Economic and Environmental Benefits in Burkina Faso. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Smart Irrigation Systems in Commercial Cotton Farms of Burkina Faso: Economic and Environmental Benefits, Burkina Faso, Africa, Computer Science, replication study This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *African, GIS, IoT, Precision Agriculture, Sustainability, Modelling, Simulation*

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