Empowering Farmers through Agroforestry: An Assessment of Community-Based Programmes in Central Mali's Desertification Battle

Toumani Dicko[1], Mamoudou Cissoko[2], Séni Diallo[3,4]

[1] Department of Artificial Intelligence, Rural Polytechnic Institute (IPR/IFRA) of Katibougou

[2] Department of Software Engineering, International Center for Tropical Agriculture (CIAT), Mali

[3] Department of Cybersecurity, University of Bamako (consolidated)

[4] Rural Polytechnic Institute (IPR/IFRA) of Katibougou

Author notes

Toumani Dicko is affiliated with Department of Artificial Intelligence, Rural Polytechnic Institute (IPR/IFRA) of Katibougou and focuses on Computer Science research in Africa.

Mamoudou Cissoko is affiliated with Department of Software Engineering, International Center for Tropical Agriculture (CIAT), Mali and focuses on Computer Science research in Africa.

Séni Diallo is affiliated with Department of Cybersecurity, University of Bamako (consolidated) and focuses on Computer Science research in Africa.

Abstract

Desertification in Central Mali poses significant challenges to agricultural productivity and rural livelihoods. Efforts to combat desertification through community-based agroforestry programmes have been implemented, aiming at sustainable land management. Quantitative surveys were conducted with a sample size of 150 farmers, utilising a mixed-method approach combining qualitative interviews and quantitative data analysis to assess the outcomes of agroforestry interventions. A preliminary analysis indicated that among participants who adopted agroforestry practices, there was an average increase in crop yields by 24% compared to non-participants. Soil health parameters showed a significant improvement with a median soil organic matter content rise from 1.5% to 2.0%. The results suggest that agroforestry programmes have contributed positively to both farmer empowerment and desertification mitigation in Central Mali. Programmes should be expanded to cover more communities, with a focus on training farmers in advanced agroforestry techniques to enhance long-term sustainability. Policy support is also recommended for increased funding and capacity-building efforts. 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: *Desertification, Sahel, Agroforestry, Community Development, Participatory Approach, Sustainable Practices, Livelihood Enhancement*

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