



# Designing Low-Cost Irrigation Systems for Drought-Prone Areas in Mali: A Technological Framework Approach

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## Abstract

Drought-prone areas in Mali face significant challenges in maintaining agricultural productivity due to erratic rainfall patterns and unpredictable water availability. A mixed-method approach combining quantitative data analysis with qualitative field surveys will be employed to assess system performance and user satisfaction. The technological framework demonstrates significant potential for improving agricultural resilience in Mali's drought-prone regions through efficient and sustainable low-cost irrigation solutions. Government agencies should prioritise the implementation of these systems in conjunction with farmer training programmes to maximise benefits and ensure widespread adoption. The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \varepsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *African Geography, Sustainable Development, Systems Analysis, Water Management, Modelling Techniques, Technological Integration, Green Engineering*

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