



Designing Economical Irrigation Solutions for Drought-Affected Mali Areas

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Abstract

Irrigation is crucial for agriculture in Mali, particularly in drought-prone areas where traditional methods are insufficient to sustain crop yields. A participatory approach was employed involving local farmers, engineers, and government officials. A cost-benefit analysis framework informed the design of the irrigation systems. The new irrigation designs reduced water usage by approximately 20% compared to traditional methods, with a success rate of over 85% in field trials. Low-cost irrigation solutions significantly improved crop yields and farmer incomes in Mali's drought-prone regions. Promote replication of these designs across Mali and seek funding for further research and implementation. 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, Participatory Design, Low-Cost Engineering Solutions, Drought Tolerance, Sustainable Agriculture Systems*

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