Replicating Geotechnical Engineering Practices in Expansive Soils Across Sudan and Uganda

Otombe Muteesa[1], Musoke Kizza[1,2], Ssekitiro Mukasa[3,4], Okothi Ssenko[1]

[1] Uganda National Council for Science and Technology (UNCST)

[2] Makerere University, Kampala

[3] Medical Research Council (MRC)/UVRI and LSHTM Uganda Research Unit

[4] Mbarara University of Science and Technology

Author notes

Otombe Muteesa is affiliated with Uganda National Council for Science and Technology (UNCST) and focuses on Engineering research in Africa.

Musoke Kizza is affiliated with Uganda National Council for Science and Technology (UNCST) and focuses on Engineering research in Africa.

Ssekitiro Mukasa is affiliated with Medical Research Council (MRC)/UVRI and LSHTM Uganda Research Unit and focuses on Engineering research in Africa.

Okothi Ssenko is affiliated with Uganda National Council for Science and Technology (UNCST) and focuses on Engineering research in Africa.

Abstract

In expansive soils such as loess and calcareous materials, foundations can experience significant settlement and heaving over time, leading to structural instability. A comparative analysis of existing geotechnical reports from both countries, using a mixed-method approach including field investigations and literature review to identify common challenges and solutions. Foundation designs showed an average reduction in settlement by 20% when incorporating expansive soil treatment techniques, with significant variability between sites due to differing soil characteristics. The replicated geotechnical practices can significantly improve the durability of infrastructure projects in both Sudan and Uganda, reducing long-term maintenance costs and enhancing structural integrity. Adopting standardised design guidelines for expansive soils is recommended, with ongoing research into site-specific variability to refine these recommendations. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sudan, Uganda, Loess, Geosynthetic Reinforcement, Soil Mechanics, Pile Foundation Design, Settlement Prediction Models*

ABSTRACT-ONLY PUBLICATION

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