African Hydrogeology (Earth Science)

Geothermal Development in the East African Rift Valley: A Case Study in Mauritius

Komal Chandran Krishnan[1]

[1] African Leadership College (ALC)

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Correspondence: kkrishnan@outlook.com

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Author notes

Komal Chandran Krishnan is affiliated with African Leadership College (ALC) and focuses on Energy research in Africa.

Abstract

Geothermal energy is a sustainable source of power that has been harnessed in various parts of the world. Mauritius, located in the East African Rift Valley, possesses geothermal resources which have not yet been extensively exploited. A combination of remote sensing analysis, geological surveys, and thermal gradient measurements were employed to identify promising geothermal areas. Economic models incorporating energy demand forecasts and current electricity costs were used to evaluate the financial feasibility of geothermal development projects. Geophysical data indicate a significant thermal anomaly coinciding with known hydrothermal systems, suggesting potential for high-temperature geothermal fields. Preliminary cost-benefit analyses suggest that geothermal energy could become competitive with existing fossil fuel-based power plants within five years under current economic conditions. While the findings are preliminary and subject to further investigation, they indicate a promising pathway towards harnessing Mauritius' geothermal resources for sustainable energy production. The study recommends continued exploration and detailed cost-benefit analyses before full-scale development can be considered. Further detailed surveys should be conducted to confirm resource potential and economic viability. Policy mechanisms aimed at incentivizing geothermal investment should also be explored. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geothermal, Rift Valley, Sustainable Energy, Case Study, Innovation, Renewable, Technology Transfer*

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