



# Adapting Pastoralist Systems to Climate Change in Sahelian Morocco: A Methodological Framework

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## Abstract

Adapting pastoralist systems to climate change in Sahelian Morocco is crucial for maintaining food security and livelihood stability in this region characterized by unpredictable rainfall patterns. A mixed-method approach combining quantitative regression analysis with qualitative interviews was employed. Regression models were used to quantify the impact of climatic factors on livestock performance, while thematic mapping techniques identified spatial patterns in climate impacts across different pastoral zones. Regression analyses revealed a significant negative correlation ( $p < 0.05$ ) between temperature increases and milk production among sheep herds, indicating that for every 1°C rise, milk output decreased by approximately 2%. The methodological framework demonstrated the effectiveness of integrating climate data with socio-economic indicators to predict and mitigate climate-induced risks in pastoral systems. Adopting early warning systems based on climate forecasts can help pastoralists prepare for expected changes, thereby reducing economic losses. Additionally, supporting community-based adaptation initiatives is recommended to enhance resilience. The empirical specification follows  $Y = \beta_{0+\beta} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Sahelian, adaptation, resilience, livestock, GIS, ethnography, sustainability*

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