Assessing the impacts of climate change on agricultural land suitability for cash and staple crops in Benin and Ghana

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Introduction

Climate change is a critical global challenge (Dervis, 2007), significantly affecting agricultural land suitability (Challinor et al., 2014), especially in vulnerable regions like Sub-Saharan Africa.

This study examines how climate change affects the agricultural land suitability for 12 staple and cash crops in Benin and Ghana, crucial for food security and economic development with a focus on cereals.

Methodology

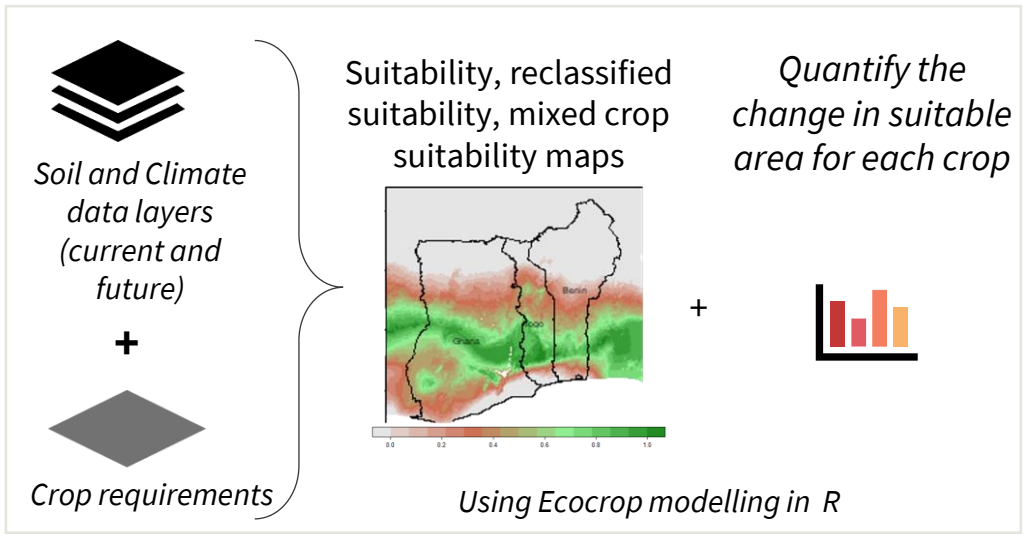

Fig.1: Process of land suitability modelling.

Model accuracy calculated by comparing suitability maps with crops occurrence data from the Global Biodiversity Information Facility (GBIF) to improve accuracy level of the maps (Akpoti et al., 2019).

Results & Discussion

Key findings: Need to adapt crop selection to changing climate conditions. Millet may become a more favourable option, while maize and rice require year- and location-specific strategies to maintain agricultural productivity in the long term. Benin faces greater negative impacts than Ghana.

The results align with Ramírez Villegas et al. (2015) who reported that millet is the most resilient to climate change, followed by maize, which is more adaptable than rice. Sultan et al. (2014) also highlight how crop responses can vary by region, suggesting the need for location-specific strategies.

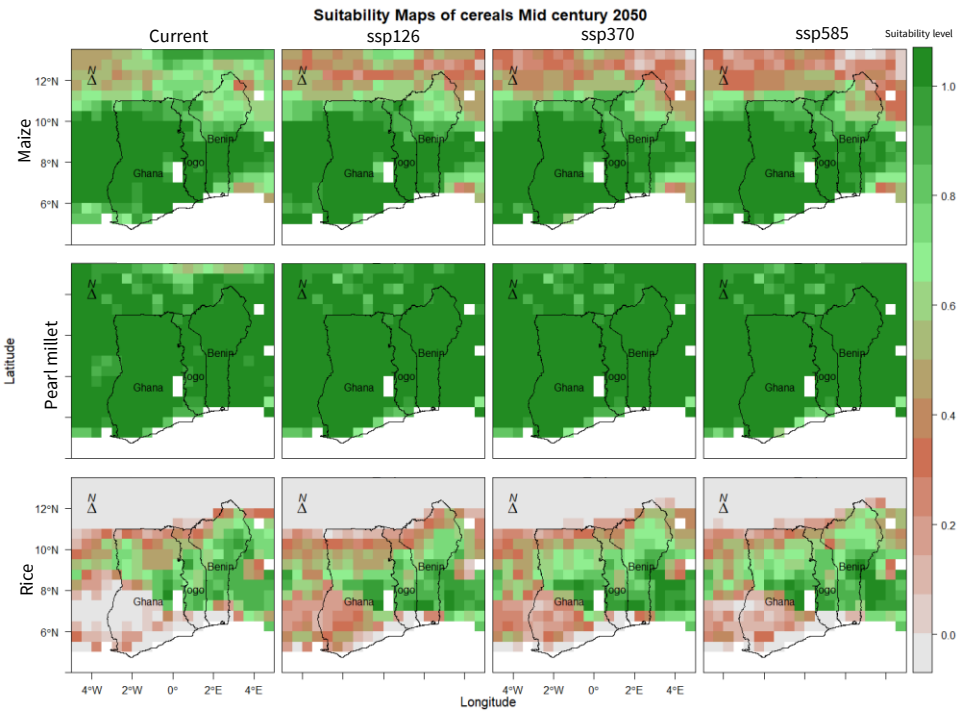

Fig.2: Suitability maps of cereals for current years and 2050.

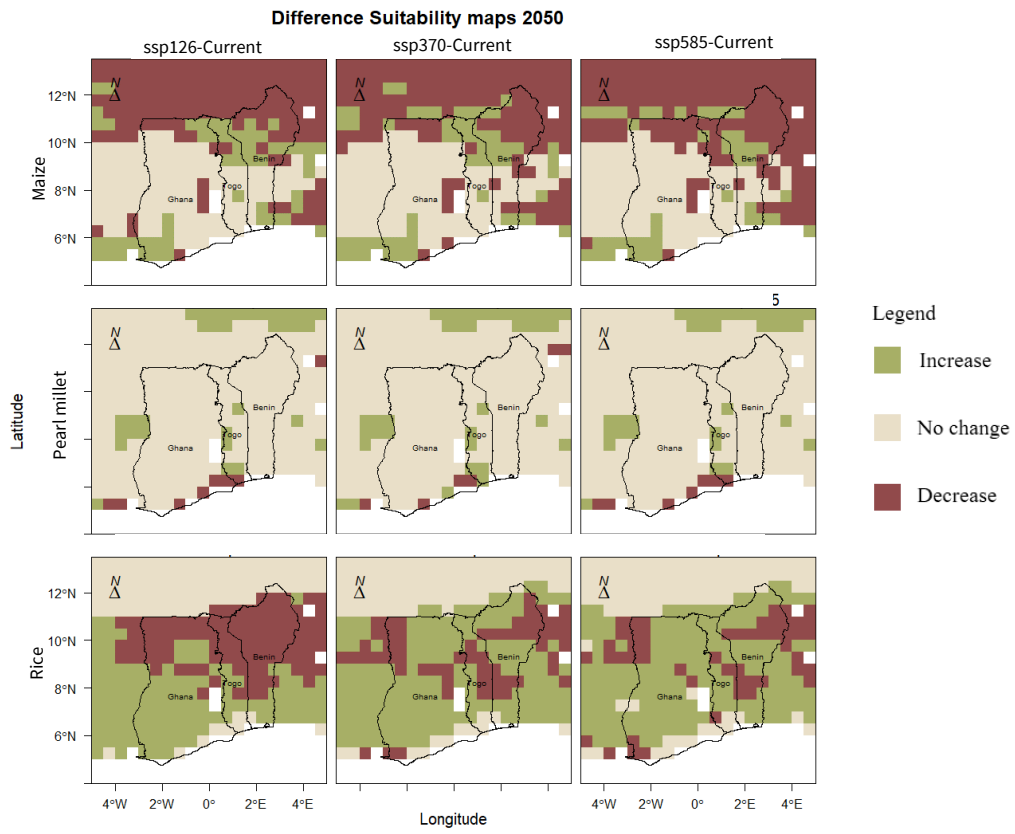

Fig.3: Changes in cereal suitable areas between 2050 and current year.

Conclusions

Crop resilience varies requiring tailored adaptation strategies. Regional variability emphasizes the need for localized agricultural research.

Future research may focus on less resilient crops like rice, incorporate additional variables such as pests, diseases, and biophysical factors important for plant growth, and emphasize long-term monitoring for improved predictions.

References

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