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"Competing pathways for equitable food systems transformation: Trade-offs and synergies"

# Addressing future food demand in The Gambia: Can increased crop productivity and climate change adaptation close the supply-demand gap?

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## Abstract

The Gambia faces numerous food system challenges, including growing food demand, climate change, land degradation, low agricultural productivity, and a high dependence on food imports that are at risk from external shocks. To address these challenges, there is a need to increase domestic food production while limiting deforestation. In this study, we used the FABLE Calculator, a food and land-use system model, to simulate scenarios for future food demand and increasing domestic food production. We considered the impacts of climate change on crops, the implementation of climate change adaptation techniques, as well as the potential of enhanced fertilisation and irrigation to boost crop productivity, and assessed whether these measures would be sufficient to meet the projected increase in food demand.

Our results suggest that relying solely on increasing crop production will not be sufficient to meet national food demand by 2050. In the absence of increased imports, cropland expansion, or prioritising domestic food crops over export crops, a significant supply-demand gap will emerge. However, investing in the scaling-up of productivity-enhancing farming techniques could potentially halve this gap. Such investments would require a substantial increase in fertiliser application and irrigation technologies. To ensure adequate food supply and minimise the need for further cropland expansion, it is crucial to improve trade by diversifying partners and addressing barriers. Moreover, as dietary habits potentially shift towards healthier diets, domestic production and trade require further adjustments to accommodate the increased demand for nutritious food groups.

Our study highlights the urgent need for sustained investment and policy support to comprehensively enhance domestic crop production and trade flows to ensure sufficient and healthy food supplies amidst growing demand and climate change challenges.

**Keywords:** Climate change adaptation, crop productivity, food security, food system

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