

Climate change and food security: The view from sub-Saharan Africa

This is a summary of the following paper: *Adesete A, Olanubi O & Dauda R (2022) Climate change and food security in selected sub-Saharan African countries. Environment, Development and Sustainability. <https://link.springer.com/article/10.1007/s10668-022-02681-0>*

Climate change is a global problem, yet its effects are – and will be – most keenly felt by the most vulnerable regions. As a continent, Africa is projected to warm to a greater degree than the global mean, and sub-Saharan Africa in particular will face significant rain variability. As the region is largely dependent on rain-fed agriculture, this meteorological variability is projected to impose a disproportionate impact on these countries and their communities. These events will compound existing drivers of food insecurity in the region, which is beset with high levels of poverty, eroding purchasing power. This paints a bleak picture, yet such challenges can only be targeted once the scale of the problem is identified and dissected.

This paper models the effects of climate change (Box 1) on 30 of the 46 identified sub-Saharan African nations. The sampled countries can be considered to represent the region as a whole, although care should be taken when interpreting the findings as greenhouse gas emissions and inflation rates were used as proxy indicators for climate change and food prices respectively. Gross domestic product per capita was used as a proxy for income level; the inverse of malnutrition prevalence (100-prevalence) was used as a proxy for food security; and food production was used as a proxy for food supply. Climate modelling is notoriously complex, relying on numerous assumptions, so these findings should act as a guide rather than as an absolute predictive model.

Box 1 How did the researchers predict the effects of climate change?

The researchers used panel data analysis, a method used in both epidemiology and the social sciences to analyse cross sectional and longitudinal 'panel data'. Panel data are a collection of values obtained across multiple individuals, which are then assembled over even intervals and subsequently ordered chronologically. Such data are used to reveal future trends by analysing how variables change over time.

The researchers then used a probability model to forecast the possibility of future results. In this case, a Gaussian Mixture Model, a type of analysis that uses normally distributed data (the 'bell curve') to predict the effects of climate change on this population.

Among other assumptions, the model presumes that higher food consumption results in the decline of malnutrition prevalence, that the demand for food is greater than domestic supply (food imports cover the remaining shortfall) and that climate change is a determinant of food supply. These can be considered appropriate assumptions based on the countries in question.

Data were taken from the identified countries between 2000 and 2019 and, given the increasing incidence of extreme weather events as a result of warming global temperatures, such predictions may become less accurate as weather patterns become more volatile in decades to come.

Broadly, the results indicate that climate change and increasing food prices have a negative significant effect on food security. Increasing income and food supply have a positive significant impact of food security in the region. These are not new findings, but the authors go further by distilling three key recommendations from these results.

A shift towards *cleaner energy* is necessary for climate resilience, and sub-Saharan African nations – although responsible for less emissions than developed economies – should intentionally transition to such energy systems. The support of developed nations (which also play a key role in incentivising the protection of forests, such as the Congo Basin) is integral to this, as a decline in carbon emissions is projected to increase agricultural productivity within the region.

Domestic production capacity should be improved through investment in the agricultural sector. Increased local production of food reduces vulnerability to external shocks from changes in the global price of commodities. An increase in domestic food supply will theoretically reduce food costs, which the model highlights as a route towards increased food security.

Policies that target *increased incomes* should also be prioritised to increase local purchasing power, although such an aspirational policy objective is questionable given the existing barriers to development in sub-Saharan Africa.

We already know that this region is particularly vulnerable to climate change and that little can be done to curb these effects without global cooperation. However, this paper does highlight the key drivers that can be acted upon by specific nations to ameliorate the effects of global warming by building food system resilience.

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A group of people displaced from their homes due to floods, use a tarp to float down the Sobat River, searching for higher grounds in South Sudan