

Climate Change and Maize Production in Kenya: Adaptation Options

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Introduction

Maize is the most consumed cereal in Kenya and is synonymous with food and nutrition security. However, maize yield has been on the decline over the past few years. For instance, it declined from 42.1 million bags in 2020 to 36.7 million bags in 2021, translating to 12.8% decrease in total production owing to climate-related factors such as unreliable rainfall and increase in temperatures, drought and related events. Further, maize is the most consumed crop in Kenya, and its continued decline in yield is likely to affect the consumption basket of most Kenyans, especially the poor and marginalized groups.

The country has been experiencing unreliable rainfall, and this has led to deteriorating crop yield and food insecurity. Over the years, the situation has adversely affected maize yield because a significant per cent of food production in Kenya is grown under rainfed agriculture. The Kenya Food Security Steering Group (KFSSG) report (2022) states that maize harvest in the marginal agricultural areas is 45-50% of the five-year national maize production average. The crop failure in the country points to acute hunger in the country, as indicated in the Short Rains Assessment Report by the KFSSG, indicating that 3.1 million Kenyans are facing hunger in pastoral and marginal areas, representing a 48% increase since August 2021.

While the effects of climate change are directly reflected in a decrease in yields, climate change also provides a conducive environment for the breeding of pests such as army worms, which have also played part in the decline in maize yield in Kenya. For instance, the country lost significant maize yields following the Fall Army Worm (FAW) reported in March 2017.

Climate change has greatly affected maize yields in Kenya due to overreliance on rainfed agriculture. The Kenya National Bureau of Statistics Economic Survey

2020 showed that about 98% of Kenya's agriculture is rainfed. Therefore, with the changing weather patterns, it is difficult for farmers to be sure of when to plant and harvest their maize. The uncertainty of the best planting time has led to loss of farmer's confidence in predicting the best farming processes.

The inadequacy of irrigation schemes to supplement rainfed agriculture has also played a part in the decline in maize yield. In spite of weather changes, only 3% of the total arable land in Kenya is irrigated, with the other 97% depending on rainfall that may not be reliable. Further, small scale farmers contribute to about 78% of total food production in the country but the few irrigation schemes are mostly directed to large scale production.

Climate Change and Maize Production

Climate change has led to more frequent and intense extreme weather events such as drought, floods, strong winds, hailstorms, and frosts. Drought has led to losses in investments in crop production due to reduced yields or total crop failure as a result of water stress, inhibiting plant nutrient abstraction from the soil and vital physiological processes of the plant.

Over the years, climate change has continued to impact the contribution of agriculture to Kenya's GDP growth rate. About 70% of the rural population draws their incomes from agriculture, and maize contributes about 30% of total production in the country. Therefore, there is need to increase maize yield to mitigate the loss of livelihoods and combat food insecurity in the country. Maize yield is highly susceptible to temperature and rainfall variability, and extreme climate events.

Increasing temperature has negative effects on maize yield. Maize is highly sensitive to climate variability than other cereal crops in the country. Precipitation is among the most important factors influencing maize

yield. Additionally, water deficit with the combination of precipitation and temperature (which is one of the most important parameters for climate change) is even more significant and critical for maize production.

Dry weather conditions in 2017 led to declines in the production of most agricultural commodities (KNBS, 2017). The real gross value added in the agriculture sector grew at a decelerated rate of 1.6% from Ksh 879.6 billion in 2016 to Ksh 893.3 billion in 2017, with 6.3% decline in maize production between 2016 and 2017.

The Kenya Vision 2030 takes cognizance of climate change as a risk that could slow the country's development. Therefore, several interventions have been put in place, such as establishment of Climate Change Fund to finance mechanisms for priority climate actions and interventions; National Climate Change Response Strategy (2010); National Adaptation Plan 2015-2030 to United Nations Framework Convention on Climate Change (UNFCCC) 2017; Kenya Climate Smart Agriculture (2017-2026) to adapt to climate change and build the resilience of agriculture systems for enhanced food, and nutrition security while improving livelihoods; and the National Climate Finance Policy (2018).

Policy Options

To mitigate the effects of climate change on maize production, the Government of Kenya could consider the following recommendations:

- (i) Implement water harvesting and storm water management initiatives to preserve water during rainy seasons in the country. These initiatives will go a long way to supplement the government aspirations for sustainable and climate-smart agriculture.
- (ii) Invest in Early Warning Systems to enhance the resilience of farmers in adapting and mitigating the effects of climate change.
- (iii) Dedicate efforts towards improving agriculture technology, including appropriate tillage, and agricultural water management, to cope with climate change. There is also need to develop improved maize seeds that are climate resilient.
- (iv) Increase investment in irrigated agriculture both by the National and County governments. This can be done through sustained investment in the Galana Kulalu irrigation project to increase the area under irrigation.

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KIPPRA Policy Briefs are aimed at a wide dissemination of the Institute's policy research findings. The findings are expected to stimulate discussion and also build capacity in the public policy making process in Kenya.

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