

Possible futures for rural East Africa under a changing climate

These stories describe three possible futures for rural East Africa in 2050. How the climate will change in the coming decades is uncertain, so three different plausible futures are included to demonstrate this range. These futures do not cover every possible outcome projected by climate models. The stories also describe some of the resulting impacts that could be experienced in rural areas. However, these impacts will vary across the region due to a range of local factors. For a more comprehensive picture of projected climate changes, please see the technical appendix available on the project website: <http://www.futureclimateafrica.org/project/hycrystal/>

Future 1: Much wetter, large increase in extreme rainfall and hotter

In Future 1 in 2050, it is much wetter than it used to be a few decades ago. The total amount of rainfall in the Long Rains has increased by around 25% and the Short Rains are about 20% wetter on average.

However, some areas of the region have seen larger increases than this and some have seen smaller. When it rains, it is usually much more intense and severe storms occur around five times more frequently.

Change in rainfall and temperature since 1980-2010

● % change in rainfall ● Change in temperature (deg C)



The Short Rains now last longer by about a week and the Long Rains start several days earlier too. Dry spells still occur within the rainy seasons as they used to at the start of the century.

Future 2: Increase in extreme rainfall and hotter

In 2050 in Future 2, it is a bit wetter during the Long Rains than it used to be in previous decades, with seasonal totals having returned to the levels seen in the 1970s and 1980s. The Short Rains are much the same as they were at the start of the century. However, when it rains it is often much heavier than it used to be and extreme storms occur about two or three times more frequently.

Change in rainfall and temperature since 1980-2010

● % change in rainfall ● Change in temperature (deg C)



Overall, the timings of the rainy seasons have not changed much, with their onset and cessation occurring at roughly the same time as they used to. Dry spells are now about 50% longer than they used to be compared with the start of the century.

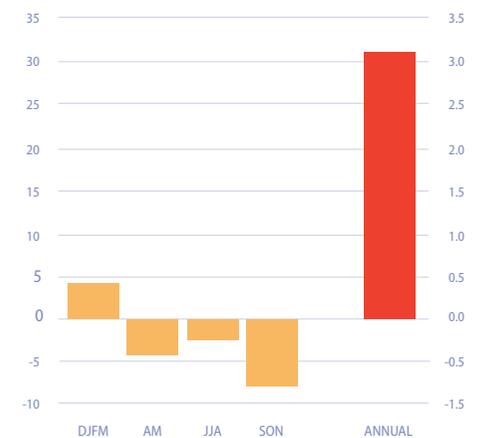
Future 3: Much hotter and drier with more erratic rainy seasons

Temperatures have risen substantially by 2050 in Future 3. These are on average about 3°C hotter across the region. Maximum temperatures have also increased so the hottest days of the year are now unbearably hot, especially in urban areas.

The Long Rains have continued to decline and seasonal totals are about 5% less than they used to be compared with the start of the century. The Short Rains are around 7% drier than in previous decades.

Change in rainfall and temperature since 1980-2010

● % change in rainfall ● Change in temperature (deg C)



The Long Rains are about 10-15 days shorter than at the start of the century and the Short Rains have seen a reduction of at least 5 days. Dry spells are common within the rainy season and often last twice as long as they used to a few decades ago.

Future 1: Much wetter, large increase in extreme rainfall and hotter

Lake Victoria levels have the potential to rise by at least a metre to those seen in the 1960s, depending on hydropower use. River levels have also markedly increased.

It is hotter in 2050, with average annual temperatures about 2°C higher than at the start of the century. Maximum temperatures have also risen, making the hottest days feel much hotter, particularly in cities.

In the longer rainy seasons, many staple crops, such as maize and sweet potatoes, do not properly mature, even though the plants are green and leafy. However, there is much more opportunity to grow perennial crops and a wider variety of fruits and vegetables. Areas of East Africa that have invested in training farmers, developing markets and promoting behaviour change to encourage a change in diet, are seeing a significant positive impact from the increased rainfall. Greater diversity of food has improved nutrition and better local market systems reduce risk from food insecurity.

Areas where little adaptation has taken place to cope with the changes to crop growing conditions are facing high levels of food insecurity. Not enough food is grown and communities are increasingly reliant on external food supplies with higher prices. Disposable incomes have fallen, especially amongst the poorest farmer groups. Communities that have not adapted well to the new climate are suffering from health impacts such as stunting in children, malaria and cholera. Time critical harvests are affected as people are too ill to farm and external labour must be paid for, further reducing disposable incomes.

Future 2: Increase in extreme rainfall and hotter

Lake Victoria has the potential to rise by about half a metre, depending on how much water is used for hydropower. River levels are also higher.

The temperature has notably risen over the past few decades. Average annual temperatures have increased by 2-3°C and even higher temperature rises are felt in urban areas. Maximum temperatures have also increased by a similar amount and hot days are now extremely hot.

The slightly wetter rainy seasons prevent many staple crops from maturing properly. However as there is more water available, some types of perennial crops, such as pigeon peas and bananas, can be grown more commonly. Sugar cane can also be grown in some parts of East Africa.

There has been a range in how well different communities have adapted to the changes in climate. Some communities have continued to rely mainly on their staple crops and during times of poor harvests they have had to rely on external markets with higher prices. They have seen a reduction in disposable incomes and greater food insecurity. A lack of nutrition has led to health impacts such as stunting in the growth of children and an increase in cases of malaria and cholera. People are often too ill to work, so time critical harvests are affected. External labour must be paid for and incomes are further reduced.

Those areas where investment in training and education of farming communities has taken place are adapting better. These communities grow a mix of new staple varieties and perennials. More livestock production takes place in the slightly wetter conditions, resulting in a greater availability of milk.

Future 3: Much hotter and drier with more erratic rainy seasons

Lake Victoria levels have dropped by a metre. River levels in the region have also fallen. When it does rain, showers are sometimes much heavier than they used to be.

In the hot and drier climate, the range of staple crops and perennials that can be grown has decreased. Farmers have seen a big decrease in their incomes and nutrition levels are poor. Health impacts including stunting in the growth of children, malaria and cholera are common.

Many rural communities are seeking alternative livelihoods to farming and the rates of urban migration have increased substantially. Informal settlements around urban centres are growing rapidly, putting great pressure on the limited infrastructure and many issues such as high disease rates are occurring.

Progress is being made by scientists to predict changes to the climate at seasonal and multi-annual timescales. Work is ongoing to train extension workers to make use of the forecasts and projections allowing them to help farmers to plan and prepare their crops and farming strategies for the coming months and years.

