International crop breeding programme needed for African farming

Climate change poses a large threat to African agriculture, but there is little research on how to respond. A recent study indicates that traditional adaptation methods are not enough and international collaboration is needed in ‘planned adaptation’ by collecting and conserving certain crops for the future.

A large proportion of the African population – mainly the poor - depend on agriculture for their livelihoods and use their own seed material, handed down since generations. In the past, this has allowed African farmers to adapt to changes in climate by adopting new crops, selecting the most appropriate genetic material or changing the timing of planting. However, more rapid adaptation may now be needed to cope with current and future climate change. In Asia and Latin-America, specific crop varieties have been bred to overcome climate problems, but this strategy is rarely used in Africa. International ‘genebanks’, which hold collections of genetic material from crops, include few African crops and many traditionally cultivated plants and varieties may still be unknown or unregistered.

The research used historical climate data, maps of crop area and climate model data from the IPCC fourth report (using the A1B scenario) to investigate the likely future changes in crop climates across Sub-Saharan Africa. It examined the three major crops - maize, millet and sorghum – which together provide about 30 per cent of calories consumed in Africa.

The results suggest that within two decades the average temperature in the growing season will be higher than in any previous recorded year, for four years out of ten, for most of the maize area. This will increase to nearly nine out of 10 years by 2050, and nearly 10 out of 10 by 2075. Similar results were found for millet and sorghum. For all three crops this temperature change will occur sooner in coastal areas.

The researchers call for crop breeding programmes to prepare for these rapidly warming environments. They investigated the form these programmes could take, including by looking at the overlap of current crop climates in a given country with future crop climates.

For most countries the range of temperatures is expected to increase significantly. For example, in 51 per cent of the countries, more than half of the maize area in 2050 will see temperatures that are not present in their current climate. Countries may therefore have to look outside their borders to find crop varieties suitable for their new climates.

Projected 2050 climates from each country were compared with current climates in all African countries. This indicated that current temperature ranges for some countries will be similar to the future ranges of others. For example, the current range for maize in 14 countries overlaps more than 75 per cent with the future range of five or more other countries. However, very few crops from some of these so-called ‘analogue’ countries, such as Cameroon, Nigeria, Mozambique and Sudan, are in international genebanks.

The research suggests crops in these countries should be collected and conserved so that they can be developed to withstand climate change. In addition, there are a worrying set of countries that may have difficulty finding crops from other countries which can cope with their own future climate, including Niger, Burkina Faso, Mali and Chad.

1. See http://www.ipcc.ch/


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