ADAPTATION

Adapting sowing in east Africa

Weath. Clim. Soc. http://doi.org/r8f (2014)

KEREN SU/CHINA SPAN / ALAMY

Climate variability increases farmers' risk of sowing failure by challenging their ability to anticipate rainfall and synchronize sowing accordingly. Observing changes in the practices of farming communities is crucial to better understand adaptation to future climate change, but requires costly long-term studies.

Caroline Mwongera, of AGAP Joint Research Unit, France, and colleagues used a space-and-time substitution approach to observe adaptation to climatic change. They compared two communities that migrated along the slope of Mount Kenya, Africa: the Tharaka community moved from the lowlands (750 m) to the midlands (950 m) and the Mwimbi went from upland (1100 m) to the midlands. Here, changes in location corresponded to changes in time, as induced by environmental alteration. The researchers surveyed 40 farms from 2009 to 2011 (a period including both short and long rainy seasons). They found significant differences in sowing failure risks between the two communities across seasons. They attributed the differences to the role of historical and social factors — such as better experience in managing rainfall variability and within-community exchange of drought-resistant seeds — in the adaptation process. *MC*

AGRICULTURE

Limits of eco-intensification

Environ. Res. Lett. **9,** 044004 (2014)

Sub-Saharan Africa (SSA) has among the lowest yields in staple food production globally, a situation that climate change is expected to exacerbate. Consequently, when selecting between available management options to improve yields, the efficacy of management practices needs to be compared with expected future conditions as well as those that prevail today.

Christian Folberth, from the Swiss Federal Institute of Aquatic Science and Technology, and colleagues used an agronomic model to project the potential impacts of climate change on maize yields in SSA under different intensification levels. They considered three management options; conventional intensification with a high mineral nitrogen supply and a bare-soil fallow period, and two options with moderate mineral nitrogen supplies and rotation with different nitrogen-fixing crops (cowpea or the tree *Sesbania sesban*).

They found that, until the 2040s, maize rotation with *Sesbania* (with the addition of a moderate mineral nitrogen supply) leads to the greatest simulated yield improvement and also has co-benefits for water infiltration and soil-water retention. However, simulated yields declined in all of the management scenarios towards the end of the century. *AB*

PLANT ECOLOGY

Friendly neighbours

Ecol. Lett. http://doi.org/r8d (2014)

The ability of a species to track the changing spatial distribution of climatic conditions will be a key determinant of their continued success. The extent to which biotic interactions, such as competition, influence this ability remains largely unknown, hampering understanding of potential species distribution responses to climate change.

Marko Spasojevic, from the University of California Davis, and colleagues investigated these effects by transplanting three plant species from a region that had experienced recent rapid warming (The Siskiyou Mountains, USA) to sites that were colder due to their aspect and altitude. Adjacent plants were removed in some cases (while in others they were left) to investigate the role of inter-plant interactions in modulating the success of transplanted individuals.

After two years of monitoring, two of the species had greater success (as indicated by growth) in their new cooler locations, and this effect was enhanced for those with neighbouring plants. This positive interaction was explained in terms of a buffering of the minimum growing season temperatures experienced by plants with close neighbours. *AB*

ATMOSPHERIC SCIENCE

Land–sea contrast

Clim. Dynam. http://doi.org/r8h (2014)

Temperature differences between the land and the sea influence interdecadal variability of large-scale circulation and atmospheric blocking — near-stationary pressure fields. Yongli He and colleagues, at Lanzhou University, China investigate this relationship and its impact on enhanced winter warming in the Northern Hemisphere.

They define a land–sea index for December to February (Northern Hemisphere winter), which is defined by the temperature anomaly of the North Pacific Ocean and Labrador Sea compared with sections of Russia and North America respectively. The index shifted from a negative to a positive anomaly in the 1980s; that is, land has warmed to a greater extent than the sea. However, since the 2000s there has been a decrease in the index.

A positive index weakens planetary wave activity — high-altitude wind meanders — altering circulation and reducing the chance of blocking as it favours westerly wind acceleration. These changes could strengthen the cold-ocean/warm-land pattern (positive index), and increase regional warming. *BW*

CRYOSCIENCE

Prediction skill

Geophys. Res. Lett. http://doi.org/r8k (2014)

Predictions of the September Arctic sea-ice extent (summer minimum) are made at the start of every summer. Since 2008 they have been collected by the Study of Environmental Arctic Change (SEARCH) to form the Sea Ice Outlook. There are a number of techniques used to create these projections, including modelling and statistical methods.

Julienne Stroeve, of the National Snow and Ice Data Centre, Boulder, Colorado, USA and co-workers investigated the skill of the collected predictions for the six years of available data. Comparing the ensemble of predictions with the September mean extent shows that for years when sea-ice extent is in agreement with the overall decreasing trend, the median predictions are accurate. Whereas for anomalous years the prediction skill is poor. The authors note that the error value is only a slight improvement on a series of linear predictions based on the historical trend. This work highlights that predicting year-to-year variations in of Arctic sea-ice extent remains a challenge. *BW*

Written by Alastair Brown, Monica Contestabile and Bronwyn Wake.