

Future rice climates in Africa

by Sander Zwart, Moctar Dembélé, and Pepijn van Oort

Rice is grown in a wide range of climates across Africa, from cold conditions in the highlands of Madagascar, Ethiopia, and Rwanda to extremely hot conditions in the Sahel zone and Egypt. Future rice production

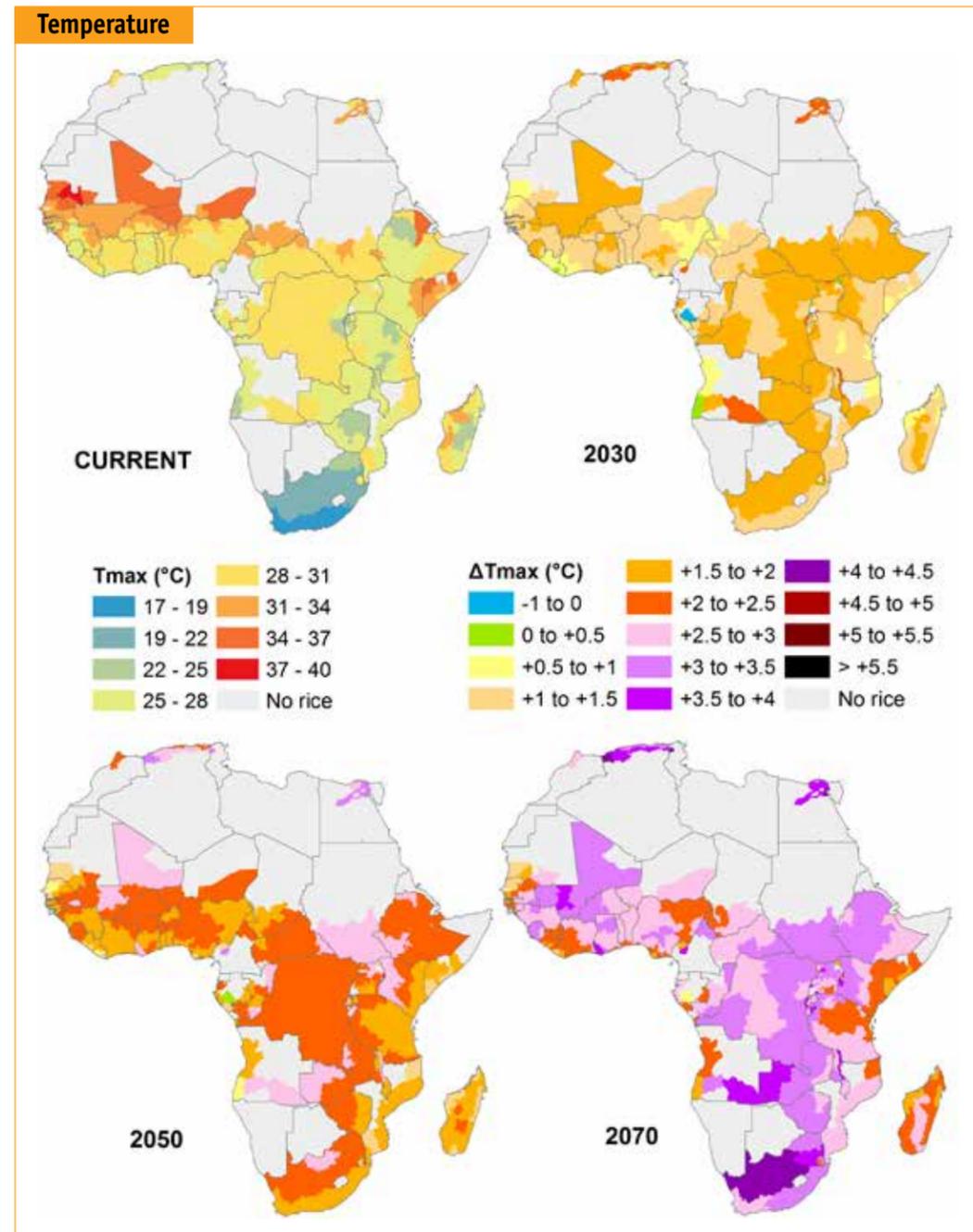
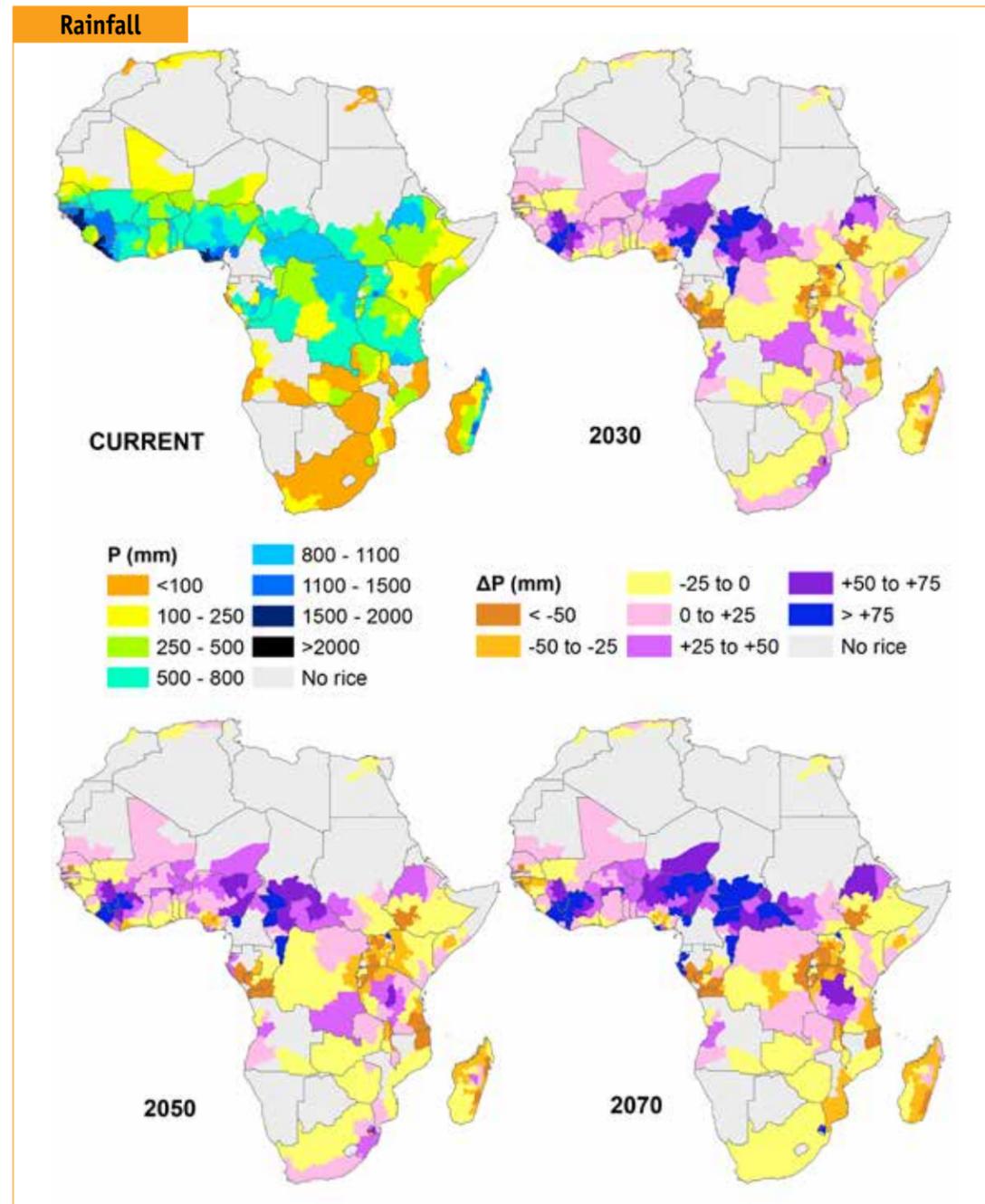
and food security are under pressure as a result of climate change-induced increases in heat, drought, salinity, and floods.

As a first step in understanding future climate changes and the impact on rice production, spatial

analysts from the Africa Rice Center (AfricaRice) have quantified projected changes in average maximum and minimum temperature (ΔT) and total rainfall (ΔP) during the rice-growing season. Downscaled climate change scenarios were overlaid

with rice maps and rice phenology from *RiceAtlas* of the International Rice Research Institute. The analysis was performed for three time periods (2030s, 2050s, and 2070s), four scenarios developed by the Intergovernmental Panel on Climate Change, Representative Concentration Pathways (2.6, 4.5, 6.0, and 8.5), and two agricultural seasons (wet and dry).

The projected rainfall patterns are diverse; increase in seasonal rainfall is predicted in Central Africa (Nigeria, Niger, Chad, and South Sudan) and northern Ethiopia. Reduction in rainfall is predicted in eastern Africa and Madagascar in all Representative Concentration Pathways (RCPs). Maximum temperature is projected to increase in almost all countries under the different RCPs but at different rates. The strongest temperature increases are predicted for Mali and the bordering administrative units in Burkina Faso where the average maximum temperature are already high, ranging from 30°C to 41°C, during current growing seasons. The second zone where strong temperature increases are predicted is the currently relatively cool belt stretching from Ethiopia to Zimbabwe. Temperature increases in the highland areas in these countries may offer new opportunities for rice farmers. ■



Dr. Zwart is a GIS and remote-sensing specialist, Mr. Dembélé is a postmaster fellow, and Dr. van Oort is crop modeler. All the authors are working in the Sustainable Productivity Enhancement Group at AfricaRice.

For a full explanation of the methodology, reference is made to the citation and link below. All maps are provided as supplementary information and can be downloaded and visualized using GIS software or Google Earth.

Zwart SJ. 2016. Projected climate conditions for rice production systems in Africa. *AfricaRice GIS Report – 1*. Africa Rice Center, Cotonou, Benin. (See <http://dx.doi.org/10.13140/RG.2.2.13172.14728>.)