Want to know what climate change will do in your backyard? There's a dataset for that

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A full description, review and validation of the dataset, including how it was built, was published January 20 in *Scientific Data*, an open-access publication by *Nature* for the description of scientifically valuable datasets.

"Climate models are complex representations of the earth system, but they aren't perfect," said Julian Ramirez-Villegas, the principal investigator of the project and a scientist with CIAT and the CGIAR Research Platform on Climate Change, Agriculture and Food Security (CCAFS). "These errors can have an impact on our agricultural models. Because these models help us make decisions, this can have dire consequences."

While the data has primarily served agricultural research, it has also been used to map the potential global spread of Zika (a mosquito-borne disease), to plan investment strategies for international development, and to predict the ongoing decline of outdoor skating days in Canada due to warmer winters.

"The use and applicability of this data have been really extensive and topically quite broad," said Ramirez-Villegas. "Of course, a large portion of the studies has been done on crops that are key to global food security and incomes such as rice, coffee, cocoa, maize, and others."

A set created by the International Center for Tropical Agriculture (CIAT) and colleagues is filling this niche. Primarily intended to help policymakers devise adaptation strategies for smallholder farmers around the world, the open-access dataset has been used in 350 research papers. Users in at least 186 countries have downloaded almost 400,000 files from the dataset since it went online in 2013.

What the global climate emergency has in store may vary from one back yard to the next, particularly in the tropics where microclimates, geography and land-use practices shift dramatically over small areas. This has major implications for adaptation strategies at local levels and requires trustworthy, high-resolution data on plausible future climate scenarios.

A small bean farm in Colombia's Darién region. Future climate scenarios can be modeled at the community scale thanks to a dataset created by the CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS) and the International Center for Tropical Agriculture (CIAT). Credit: Neil Palmer / International Center for Tropical Agriculture
Pinpointing climate impacts

Climate-change projections are typically available at coarse scales, ranging 70-400 km. But models for the impact of climate change for many agricultural plant varieties require data at finer scales. The researchers used techniques to increase the spatial resolution (a process known as downscaling) and to correct errors (a process known as bias correction) to create high-resolution future climate data for 436 scenarios.

"This is a critical resource for modeling more realistically the future of crops and ecosystems," said Carlos Navarro, the lead author of the study who is affiliated with CIAT and CCAFS.

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