Scientists Eye 'windows Of Opportunity' For Adapting Food Crops To Climate Change

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This release is available in Spanish ***[1].***

COPENHAGEN, DENMARK (3 OCTOBER 2011)-Responding to appeals from African leaders for new tools to deal with the effects of climate change on food production, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) has released a series of studies focused on "climate proofing" crops critical to food security in the developing world.

The studies constitute various chapters in a new book titled Crop Adaptation to Climate Change from John Wiley & Sons, which was developed by an international team of the world's leading climate and agricultural researchers to provide adaptation strategies for more than a dozen crops-such as potatoes, beans, bananas and cassava-on which billions of people depend worldwide.

The studies describe how climate change could threaten food production and how specific adaptation strategies could neutralize or at least significantly lessen the impact. They argue that investments are urgently needed to identify important genetic traits, including drought tolerance and pest resistance, which will be critical for helping farmers adapt to new growing conditions.

"In these studies, we've brought together the best climate science with the best knowledge of crop improvement to spell out how crops will be affected and what plant breeders can do to avert or at least cushion potentially devastating blows," said Julian Ramirez, a scientist at the Colombia-based International Center for Tropical Agriculture (CIAT) and one of the authors of the studies.

The studies indicate that many of the critical traits farmers will need to deal with hotter, dryer, and in some cases, wetter conditions likely reside in seeds now safeguarded by international crop genebanks. But researchers note that tapping the potential of plant genetic resources, particularly the rich vein of traits contained in the wild relatives of key crops, will require more intensive application of cutting edge biotechnology, including new tools from the rapidly developing fields of genomics and transgenics.

"These results offer plant breeders a strong foundation for establishing research priorities for the next two decades, which is about the time they'll need to develop new generations of crop varieties suited to shifting agriculture environments," said Bruce Campbell, CCAFS director.

The studies indicate that the most direct impact on crop yields will come from changes in temperature and rainfall. But they also warn that indirect effects of

climate change could result from altered incidence of pests and disease, though these changes will not always be for the worse.

Scientists report that the potato, for example, a dietary staple for millions of people around the world, is especially vulnerable to heat stress, which reduces growth and starch formation. Rising temperatures in southern Africa and tropical highlands worldwide could be particularly hazardous. Scientists believe that developing and distributing heat-tolerant potato varieties could reduce climate-related damage for about 65 percent (7.7 million hectares) of the world's potato crop.

Also of concern is the potato tuber moth, which could spread northward and to higher elevations as a result of climate change. But drier, warmer summers in some regions will likely depress the incidence of potato's worst disease - late blight, which caused Ireland's potato famine in the 19th century.

Data on the projected impacts of climate change on bananas, beans, cassava and potatoes are available on the website of the recently launched Adaptation and Mitigation Knowledge Network (AMKN) (www.amkn.org [2]). This online platform brings together a large volume of knowledge from diverse sources about climate mitigation and adaptation and links it to interactive maps. Users can access tools and information, such as climate models, drought indexes, and socio-economic data about agriculture, together with farmer comments on video and photos from pilot sites across the tropics.

"Until now, all this information has been widely dispersed, making it hard for scientists, policy-makers, and civil society actors to get a proper grasp of the complex interactions between agriculture and climate change," said Andy Jarvis, an agricultural geographer at CIAT who also oversees CCAFS research on climate change adaptation. "By making key information freely and easily available for the first time, the AMKN should greatly enhance our understanding of the threat that climate change poses to food security and ultimately our ability to curb the threat."

For many crops, developing the traits needed to cope with climate change promises to be a long, arduous process, the new studies suggest. Past banana and potato breeding has focused mainly on yield, product quality, and pest- and disease-resistance, while tolerance to drought and heat has received scant attention.

Yet, scientists express confidence that the thousands of samples of traditional varieties and crop wild relatives held in genebanks likely contain a wide diversity of tolerance traits. Though largely neglected in modern crop breeding, traditional varieties and crop wild relatives could play a vital role in helping farmers adapt to climate change, despite the challenges of crossing species that are distantly related.

To overcome those barriers, researchers say they need more detailed information on the traits contained in crop genebanks and more support for deploying biotechnology tools to gather and use this information.

"This pioneering research, which considers crop-by-crop how climate change will

alter food production in the future, opens up new windows of opportunity for research to deal with the challenges that farmers face around the world," said Campbell. "But given how rapidly growing conditions are changing, these windows won't be open for long. We must act now to ensure that in the coming decades farmers have the technologies they need to maintain a food-secure world."

SOURCE [3]

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