

Scientists behind 'doomsday seed vault' ready the world's crops for climate change

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As climate change is credited as one of the main drivers behind soaring food prices, the Global Crop Diversity Trust is undertaking a major effort to search crop collections—from Azerbaijan to Nigeria—for the traits that could arm agriculture against the impact of future changes. Traits, such as drought resistance in wheat, or salinity tolerance in potato, will become essential as crops around the world have to adapt to new climate conditions.

Climate change is having the most negative impact in the poorest regions of the world, already causing a decrease in yields of most major food crops due to droughts, floods, increasingly salty soils and higher temperatures.

Crop diversity is the raw material needed for improving and adapting food crops to harsher climate conditions and constantly evolving pests and diseases. However, it is disappearing from many of the places where it has been placed for safekeeping—the world's genebanks.

Compounding the fact that it is not well conserved is the fact that it is not well understood. A lack of readily available and accurate data on key traits can severely hinder plant breeders' efforts to identify material they can use to breed new varieties best suited for the climates most countries will experience in the coming decades. The support provided by the Global Crop Diversity Trust will not only rescue collections which are at risk, but enable breeders and others to screen collections for important characteristics.

"Our crops must produce more food, on the same amount of land, with less water, and more expensive energy," said Cary Fowler, Executive Director of the Global Crop Diversity Trust. "This, on top of climate change, poses an unprecedented challenge to farming. There is no possible scenario in which we can continue to grow the food we require without crop diversity. Through our grants we seek, as a matter of urgency, to rescue threatened crop collections and better understand and conserve crop diversity."

Through a competitive grants scheme, the Trust will provide funding for projects that screen developing country collections—including wheat, chickpea, rice, barley, lentils, coconut, banana, maize, and sweet potato—for traits that will be essential for breeding climate-ready varieties. These projects involve 21 agricultural research institutions in Argentina, Bangladesh, Brazil, India, Israel, Mali, Nigeria, Niger, Pakistan, Papua New Guinea, Peru, the Philippines, South Africa, Sri Lanka, and Syria.

Scientists will be screening chickpea and wheat collections in Pakistan for traits of economic importance for farmers; characterizing rare coconuts in Sri Lanka for traits of drought tolerance and tolerance to other pests and diseases; screening for salinity tolerance in sweet potatoes in Peru; and identifying drought-tolerant bananas in India.

Much of the screening will take place within collections where many of the unique samples are at risk. Therefore, in addition to its efforts to bolster the development of climate-ready crops, the Trust will provide funding to save unique crop collections that are at risk of disappearing. Crop collections need to be re-grown at regular intervals, and fresh seed harvested and placed in seedbanks to ensure long-term conservation and availability. The Trust is working with more than 60 countries to "regenerate" unique collections of crops critical for food security, and to ensure that they are duplicated elsewhere for safety in a collection that

meets international standards, as well as in the Svalbard Global Seed Vault.

Worldwide, there are a handful of crop collections that can be said to meet international standards. And even these few, despite their role in protecting the foundation of our food supply, lurch from one funding arrangement to the next without ever having any real long-term security. The Trust is now endowing these, the world's most important collections, ensuring their conservation and availability for the future of agriculture. Crops already being safeguarded by the Trust's pledge of financial security include banana, barley, bean, cassava, faba bean, forages, grass pea, lentil, pearl millet, rice, sorghum, taro, wheat and yam. These are housed in collections managed in trust for humanity at eight agricultural institutions that are supported by the Consultative Group on International Agricultural Research (CGIAR) and by the Secretariat for the Pacific Community.

"Secure funding on this sort of time-scale has been unheard of in this field. Crop collections are all too often amassed and then lost according to changing funding fashions and priorities," said Daniel Debouck, Head of the Genetic Resources Unit at the International Center for Tropical Agriculture (CIAT), one of the agricultural institutions supported by the CGIAR. "Genebanking is not something you can turn on and off, and a shortfall in funding of just a few months can result in the permanent loss of unique varieties. We need to be sure that we will have sufficient funding year after year after year. The Trust is now providing that security."

"The contents of our genebanks—some 1.5 million distinct samples—are the result of a 13,000-year experiment in the interaction between crops and environment, climate and culture," said Fowler. "If we are wise enough to conserve these collections, we will have a treasure chest of the very traits that crops used in the past when they successfully adapted to

new conditions—the traits they will need again in the future to adapt as climates and environments change."

Source: Global Diversity Crop Trust

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