

hotter days and nights, longer dry seasons, shorter rainy seasons and more intense rainfall and storms). These more resilient crops can then be conserved and shared, contributing to long-term, sustained increases in productivity.

### **Acting to conserve crop diversity is urgent and farmers have a vital role to play**

The strategy of using crop diversity to combat climate change can only work if action is taken now to prevent further loss of agrobiodiversity and ensure that farmers have access to climate resilient crop varieties. Current strategies in the Caribbean include conservation of existing local varieties (both landraces and crop wild relatives), breeding new varieties and making them available to farmers, and exchanges of plant genetic resources with other regions whose current climate closely resembles the conditions we expect in the future.

As illustrated by Box 2 above, farmers can play a critical role in adapting to climate change and improving food security by:

- setting aside some of their land to grow multiple crops and/or multiple varieties of crops in order to reduce the risks associated with cultivating a single crop or variety;
- sharing their traditional knowledge, risk reduction strategies, and

### **References**

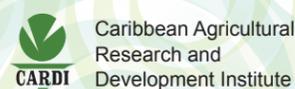
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IMPROVING LIVES THROUGH  
AGRICULTURAL RESEARCH

# FACTSHEET



## CLIMATE CHANGE AND AGRICULTURE

### What Farmers Can Do to Combat Climate Change: Crop Diversity Conservation, Sharing and Utilisation



### Crop diversity in a changing climate

The climate is changing worldwide as a result of human activity. This is already affecting agriculture in the Caribbean and its impacts could be more serious over the coming decades (see CARDI Factsheet *What Farmers Need to Know About Climate Change and Agriculture*).

In the 20<sup>th</sup> century, many farmers moved away from cultivating multiple, local varieties (landraces) in favour of more genetically uniform, high-yielding varieties. As a result, the world lost an estimated 75% of crop diversity. Now climate change threatens to further deplete our plant genetic resources, and particularly crop wild



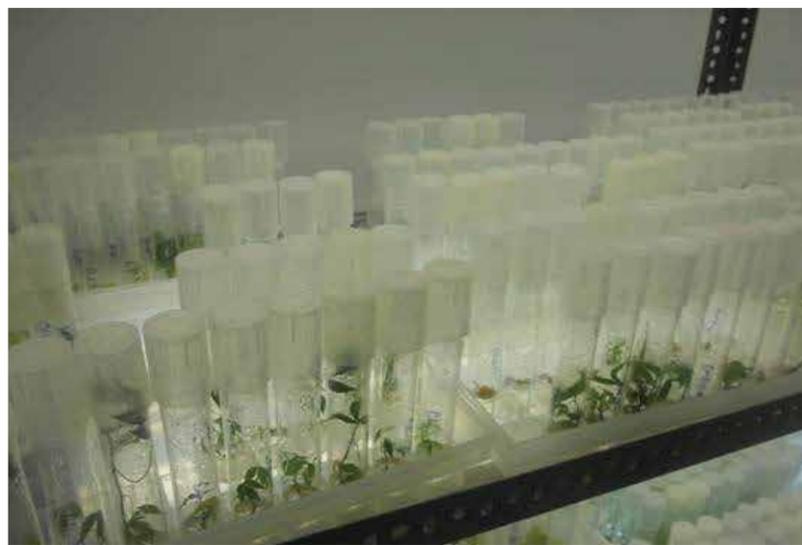
Hot pepper biodiversity conservation in central Trinidad.

#### Box 1: What do we mean by agrobiodiversity?

*Agrobiodiversity* refers to the *variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture*, including crops, livestock, forestry and fisheries. It comprises the diversity of varieties, breeds and species used for food, fodder, fibre, fuel and pharmaceuticals<sup>1</sup>. Agrobiodiversity also encompasses a wide range of organisms that contribute important benefits to farmers *such as water and nutrient cycling, pest and disease regulation, pollination and climate regulation*<sup>2</sup>.

relatives (wild plant species that are genetically related to cultivated crops).

Fortunately for Caribbean farmers, conserving, sharing and utilising **crop diversity** has the potential to be an innovative win-win-win strategy that increases agricultural productivity and food and nutrition security; conserves biodiversity (and specifically **agrobiodiversity**); and reduces their own and the region's vulnerability to climate change.



Varieties of food crops stored in Tissue Culture for preservation, breeding and multiplication to combat the threats of climate change.

For farmers, crop diversity means growing multiple crops and multiple varieties of crops. It is a practice that farmers have traditionally used as a form of insurance against threats like pests and diseases. Similarly, crop diversity now has the potential to help combat the threats and uncertainties posed by climate change. When you grow multiple crops and varieties, it increases the likelihood that some of them will thrive under the new and anticipated conditions in the Caribbean (e.g.

#### Box 2: What Caribbean farmers are doing to support conservation, sharing and utilization of crop diversity

**SJ Seed Savers** is an initiative of two farmers in Trinidad to save local varieties (landraces) of both fruits and vegetables and to supply farmers and home gardeners with the species and varieties best suited to their growing conditions. They have teamed up with research institutes like CARDI and CABI to select the best varieties and species, which they then grow and harvest in ways that ensure the best seed quality. Through the use of appropriate seed treatments and a proper storage system, the seeds are available throughout the year. Continuous germination tests are done to maintain germination quality. By working with women home gardeners in areas where employment opportunities are limited, the project has contributed significantly to household food security and women's empowerment<sup>3</sup>.

As part of its commitment to developing, using and sharing plant material that is more disease resistant and climate resilient, the **Christiana Potato Growers Cooperative Association (CPGCA)** in Jamaica operates a tissue culture laboratory that it constructed in 2005/2006<sup>4</sup>. More recently, CPGCA has partnered with CARDI to investigate mass propagating of sweet potato planting material in protected structures to determine the best practice for the production of disease-free planting material from tissue cultured plantlets<sup>5</sup>.

In Trinidad and Tobago, farmers' groups, such as the **Cunupia Farmers' Association, Rio Claro Farmers' Association, and Tobago Cassava Producers**, are working in collaboration with CARDI to establish and use community 'genebanks' or 'nurseries' of improved planting material of cassava and sweet potato.

**Farmer groups in Dominica, Jamaica, St. Vincent and the Grenadines, and Trinidad and Tobago** are also collaborating with CARDI to evaluate the suitability of 50 varieties of dasheen from the Pacific for use in the new climate conditions that we are experiencing or expect in the future in the Caribbean.

In Guyana, traditional forms of cassava production in **the hinterland Amerindian communities** have not only guaranteed food security but are now playing a vital role in maintaining cassava genetic diversity. Practices include cultivation of distinct landrace varieties, constantly adding new varieties, and a continuous cycle of cassava cultivation that is oblivious to seasonal variations. As a result, it is anticipated that the varietal mixture will have the ability to withstand the anticipated impacts of climate change, including pest extremes<sup>6</sup>.

**Over 50 farmers in Trinidad and Tobago** are working alongside the International Cocoa Genebank (ICG) in its Partnership in Conservation. With ICG often having only a single example of each 'accession' (item in its collection), there was a high risk of permanent loss as a result of fires, disease, pests etc. Now farmers are growing subsets of the ICG collection (50-100 accessions per farm), with the goal being to have at least three on-farm examples of each accession. This will significantly reduce the risk of permanently losing cocoa genetic resources.



Farmer R. Boondoo in one of his Sweet Potato fields. Boondoo has been conserving and breeding Sweet Potato varieties for resistance to climate change.