



CARIBBEAN CLIMATE HUB

for Tropical Forestry and Agriculture

"No challenge poses a greater threat to future generations than climate change."

*~President Obama~
2015 State of the Union Address*

What type of agricultural production is in the Caribbean?

Agriculture and forestry in the Caribbean is diverse, and includes products like coffee, tropical fruits, ornamentals, beans, root crops, livestock, dairy products, and various wood products. The people of the Caribbean depend heavily on these products for subsistence, in addition to exporting as valuable cash crops. Puerto Rico and the U.S. Virgin Islands, however, import the vast majority of their agricultural products, and local production is well below its full potential. Increasing production capacity has the potential to improve food security, the standard of living and the economy, as well as providing opportunities to preserve the region's unique culture.



Mission & Vision of the Caribbean Climate Hub

Climate change is one of the biggest challenges facing the agricultural sector, threatening food security and sustainable development. The Caribbean region is particularly vulnerable to the effects of climate change due to its geographical location and socio-economic condition. To deal with these climate challenges, we must strengthen ties of cooperation between government agencies, research institutions, community-based organizations, farmers and agricultural entrepreneurs.

The Caribbean Climate Hub for Agriculture and Tropical Forestry (CCH), located at the International Institute of Tropical Forestry in Puerto Rico, is committed to improving and fostering the sustainable production of agricultural and forest lands in the Caribbean. Our job is to disseminate information on the projected effects of climate change, as well as building tools and communicating strategies for adaptation and mitigation. The CCH provides a collaborative space for connecting multiple interest groups with the goal of achieving positive change in the use and sustainable management of agricultural lands in order to improve the quality of life in Puerto Rico and the Virgin Islands. The educational and scientific outreach projects of the CCH, carried out with the collaboration and participation of universities, instructors and local producers, are tools for building resilience to climate change in tropical areas.

How is climate change effecting producers in the US Caribbean?

Regional climate models project accelerating sea level rise and a warmer, dryer and more variable climate, with frequent droughts and intense storm events. It is projected that variable rainfall patterns will aggravate current problems of water scarcity and soil erosion. Recently, Puerto Rico and the Virgin Islands experienced severe droughts followed by extreme rain events that severely affected livestock and agriculture. In addition, climate changes in other regions of the world have an impact on food supply and food security in the Caribbean, for instance, given an increase in the costs of food production and the price of food. These global and local factors influence the decisions regarding the use and management of agricultural and forest lands. The challenges and effects of climate change in the Caribbean are:

Changes in rainfall patterns and temperature

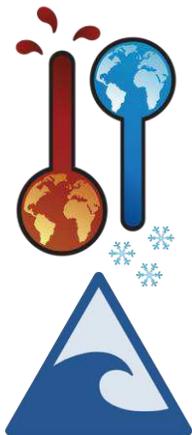
Higher temperature on the Caribbean could cause a drop in the yield of crops and drastic changes in the schedule of agricultural production as the result of the intensification of droughts. The 2014 drought costs to Puerto Rico's agriculture industry were estimated at \$20 million and affected about 4,000 farmers; 50% of the coffee farms and 28% of livestock farms were affected. The proliferation of new and existent pests could adversely affect humans, livestock, wildlife and crops.

Effects of the sea level rise

The rise in sea level and salt water intrusion are affecting coastal populations, aquifers and prime agricultural lands located in the coastal plains. The Caribbean islands are susceptible to hurricanes and have a longer recovery period. Food security is subject to local productivity, to the effects of extreme weather events, to the logistics of maritime transportation, and to the stability of global markets.

Socio-economic challenges

Rising energy costs could make local production costs higher than the costs of importing food and timber, threatening the viability of local agriculture. Population density, levels of unemployment and poverty of Puerto Rico and the Virgin Islands are among the highest in the US, therefore the limited capacity of agricultural production is essential to supply local foods.





Research, Information Synthesis & Data Sharing

>**Accomplishments:** Evaluation completed: "Vulnerability and adaptation to expected climate change impacts on Agriculture and Forestry in the US Caribbean" (September 2015). Macro analysis of the potential impacts of climate change on the agricultural sector and on the socio-economic and ecologic vulnerabilities of Puerto Rico and the US Virgin Island, as well as the viable adaptation and mitigation strategies. Agricultural experts and farmers were interviewed to gather their perceptions on climate change and to identify the gaps of information needed to set the priorities for the future projects of the CCH.

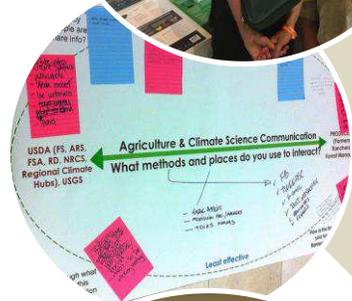
>**NEXT STEPS:** Research and document the effects of climate change on the coffee and livestock sectors and the implications for the management of water for agriculture through participatory research projects involving scientists and producers. To create a digital platform for exchanging information: "CCLIMAg: Caribbean Climate and Agriculture Geodatabase". To set the Caribbean Atlas as a planning tool. To bring NIFA results to the producers and to provide assistantships for students and researchers.



Education, Communication & Scientific Dissemination

>**ACHIEVEMENTS:** Launched the ADAPTA project, a series of educational videos featuring examples of climate adaptation through stories of local farmers who are practicing soil and water conservation, crop rotation, integrated pest management, composting of organic residues, and agroforestry among other good practices. The CCH offered webinars and workshops to present the new climate models for the Caribbean and Puerto Rico, and to discuss strategies for adaptation and mitigation of greenhouse gases. The participants in these workshops included employees from USDA agencies, agricultural extension and from research stations, universities and NGOs. As part of the efforts of scientific outreach of CCH, we created a blog (caribbeanclimatehub.org) and a series of podcasts on agriculture and climate change through the program Desde la EEA from the Agricultural Experimental Station UPR with the purpose of discussing adaptation and mitigation strategies.

>**NEXT STEPS:** Develop educational materials to provide virtual workshops (distance learning) and create an online repository in collaboration with the Agricultural Extension Service and the Experimental Station of the UPR. Raise funds to establish a small grants program in order to do pilot projects for climate change adaptation and mitigation in farms that include the participation of students and researchers.



Creating Partnerships and Collaboration Networks

>**ACHIEVEMENTS:** The CCH represented USDA in national and regional forums (LCCs, CSCs, RISAs, DNER) and served as a connector between agencies and organizations working with climate change and agriculture in Central America and the Caribbean with the purpose of exchanging knowledge and practical information. Established a network of ~ 700 collaborators through which the CCH delivers climate services and provides educational resources for professionals in the agricultural and forestry sectors.

>**NEXT STEPS:** Establish collaboration agreements (MOU) with the University of Puerto Rico, with universities in the Virgin Islands, with the Tropical Agriculture Research Station, NIFA and other partners to facilitate collaborative research in the region. Offer workshops that connect science with management.



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Caribbean Climate Hub

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I am a farmer or forest owner, how I can build resilience to climate change?

The Caribbean Climate Hub provides information, access to resources, tools and lectures on sustainable management practices for adaptation and mitigation of climate change.

In order to assist you, please contact us and let us know: What types of crops do you have? What are the most serious challenges you are currently facing? What kind of training do you need? Our mission as part of the USDA Climate Hubs Network is to educate and disseminate scientific information to increase climate resilience in the US Caribbean.



INTERNATIONAL INSTITUTE OF TROPICAL FORESTRY