



RESEARCH PROGRAM ON  
**Climate Change,  
Agriculture and  
Food Security**



## A 10-year US\$50 million programme focused on crop wild relative collection and pre-breeding for climate change adaptation.

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*CCAFS Outcome Case*

Center	International Center for Tropical Agriculture (CIAT)
Year	2011
Contact	Peter Läderach
Theme	Long term adaptation
Geographic focus	Global
<b>Summary</b> <p>CCAFS research demonstrated the threats posed to crop wild relatives by climate change and habitat conversion. Analyses showed the very poor conservation status of these gene pools. Based on this work, the Global Crop Diversity Trust made crop wild relative collecting a high priority activity. Thereafter, the Norwegian Government funded the Global Crop Diversity Trust and the Millennium Seed Bank Partnership, Kew, to establish the 10-year USD 50 million 'Adapting agriculture to climate change: collecting, protecting and preparing crop wild relatives' project focused on crop wild relative collection and pre-breeding for climate change adaptation. Strategic planning research for collecting activities was led by CIAT scientists in collaboration with the University of Birmingham. Regular discussions with the Global Crop Diversity Trust were fundamental in the prioritizing and design of the programme. The project aims to collect the wild relatives of 29 key crops, conserve the specimens in gene-banks, and prepare them for use in plant breeding programmes in time to breed new crop varieties adapted to new climates. The project commenced in 2011, and CIAT continues to provide support in defining priorities.</p>	
<b>Key facts</b> <ul style="list-style-type: none"><li>- CCAFS research demonstrated the threats posed to crop wild relatives by climate change and habitat conversion.</li><li>- Analyses showcased the very poor conservation status of these crop wild relative gene pools.</li><li>- The 'Adapting agriculture to climate change: collecting, protecting and preparing crop wild relatives' project aims to collect, conserve, and breed with the wild relatives of 29 key crops over a 10 year period in order to enhance food security through climate change adaptation.</li></ul>	
<b>Lessons: key elements of success</b> <ul style="list-style-type: none"><li>- Partnership with a key institution was critical to success, in this particular case with the Global Crop Diversity Trust.</li></ul>	

#### Further reading

- CIAT 2011 Annual Technical Report To CCAFS
- [Crop Wild Relatives and Climate Change](#)
- [New website puts emphasis on crop wild relatives and climate change](#)
- Project website ([www.cwrdiversity.org](http://www.cwrdiversity.org)); including over 60 blog articles published on this and related sites

#### Related research outputs

- Cadima, X., van Zonneveld, M., Scheldeman, X., Castaneda, N., Patino, F., Beltran, M., & Van Damme, P. (2014). Endemic wild potato (*Solanum* spp.) biodiversity status in Bolivia: Reasons for conservation concerns. *Journal for Nature Conservation*, 22(2), 113-131. doi: DOI 10.1016/j.jnc.2013.09.007
- Castañeda, N.P., Vincent, H.A., Kell, S.P., Eastwood, R.J., Maxted, N. (2012). Chapter 14: Ecogeographic surveys. *Collecting plant genetic diversity: technical guidelines- 2011 update*. pp. 1-23.
- Dempewolf, H., Eastwood, R. J., Guarino, L., Khoury, C. K., Muller, J. V., & Toll, J. (2014). Adapting Agriculture to Climate Change: A Global Initiative to Collect, Conserve, and Use Crop Wild Relatives. *Agroecology and Sustainable Food Systems*, 38(4), 369-377. doi: Doi 10.1080/21683565.2013.870629
- Gibbs, J. P., Hunter, M. L., & Sterling, E. J. (2008). Climate Envelope Modeling: Inferring the Ranges of Species to Facilitate Biological Exploration, Conservation Planning, and Threat Analysis. *Problem-Solving in Conservation Biology and Wildlife Management*, 244-254.
- Hunter, D., Guarino, L., Khoury, C., Dempewolf, H. (2011). A community divided: lessons from the conservation of crop wild relatives around the world. Appears in: Maxted, N., Dulloo, E., Ford-Lloyd, B., Frese, L., Iriondo, J., (eds.). *Agrobiodiversity Conservation: Securing the diversity of Crop Wild Relatives and Landraces*. CAB International, Wallingford, UK, 392 pp.
- Jarvis, A., Lane, A., & Hijmans, R. J. (2008). The effect of climate change on crop wild relatives. *Agriculture, ecosystems & environment*, 126(1), 13-23.
- Khoury, C. K., Bjorkman, A. D., Dempewolf, H., Ramirez-Villegas, J., Guarino, L., Jarvis, A., Rieseberg, L.H., Struik, P. C. (2014). Increasing homogeneity in global food supplies and the implications for food security. *Proceedings of the National Academy of Sciences of the United States of America*, 111(11), 4001-4006. doi: DOI 10.1073/pnas.1313490111
- Khoury, C. K., Greene, S., Wiersema, J., Maxted, N., Jarvis, A., & Struik, P. C. (2013). An Inventory of Crop Wild Relatives of the United States. *Crop Science*, 53(4), 1496-1508. doi: DOI 10.2135/cropsci2012.10.0585
- Maxted, N., Kell, S., Toledo, Á., Dulloo, E., Heywood, V., Hodgkin, T., Hunter, D., Guarino, L., Jarvis, A., Ford-Lloyd, B. (2010). A global approach to crop wild relative conservation: securing the gene pool for food and agriculture. *Kew Bulletin*, 65(4), 561-576.
- Ramirez-Villegas, J., & Khoury, C. K. (2013). Reconciling approaches to climate change adaptation for Colombian agriculture. *Climatic Change*, 119(3-4), 575-583. doi: DOI 10.1007/s10584-013-0792-6
- van Zonneveld, M., Jarvis, A., Dvorak, W., Lema, G., & Leibling, C. (2009). Climate change impact predictions on *Pinus patula* and *Pinus tecunumanii* populations in Mexico and Central America. *Forest Ecology and Management*, 257(7), 1566-1576.
- Vincent, H., Wiersema, J., Kell, S., Fielder, H., Dobbie, S., Castaneda-Alvarez, N. P., Maxted, N. (2013). A prioritized crop wild relative inventory to help underpin global food security. *Biological Conservation*, 167, 265-275. doi: DOI 10.1016/j.biocon.2013.08.011

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