

Policy Brief

Global Conservation Priorities for Crop Wild Relatives



Key Facts and Recommendations:

- First of its kind global mapping effort reveals over 70% of essential crop wild relative species are under-represented in genebanks worldwide leaving food security unnecessarily vulnerable to future climate change
- Collection efforts to preserve wild species with resilient traits useful for improving our crops ability to tolerate heat and pests must be stepped up
- Long-term global food security requires international collaboration on collecting, conservation, and sharing these valuable genetic resources.
- Countries are invited to use findings as a baseline to measure their progress on development and conservation commitments e.g. target 2.5 of the UN Sustainable Development Goals



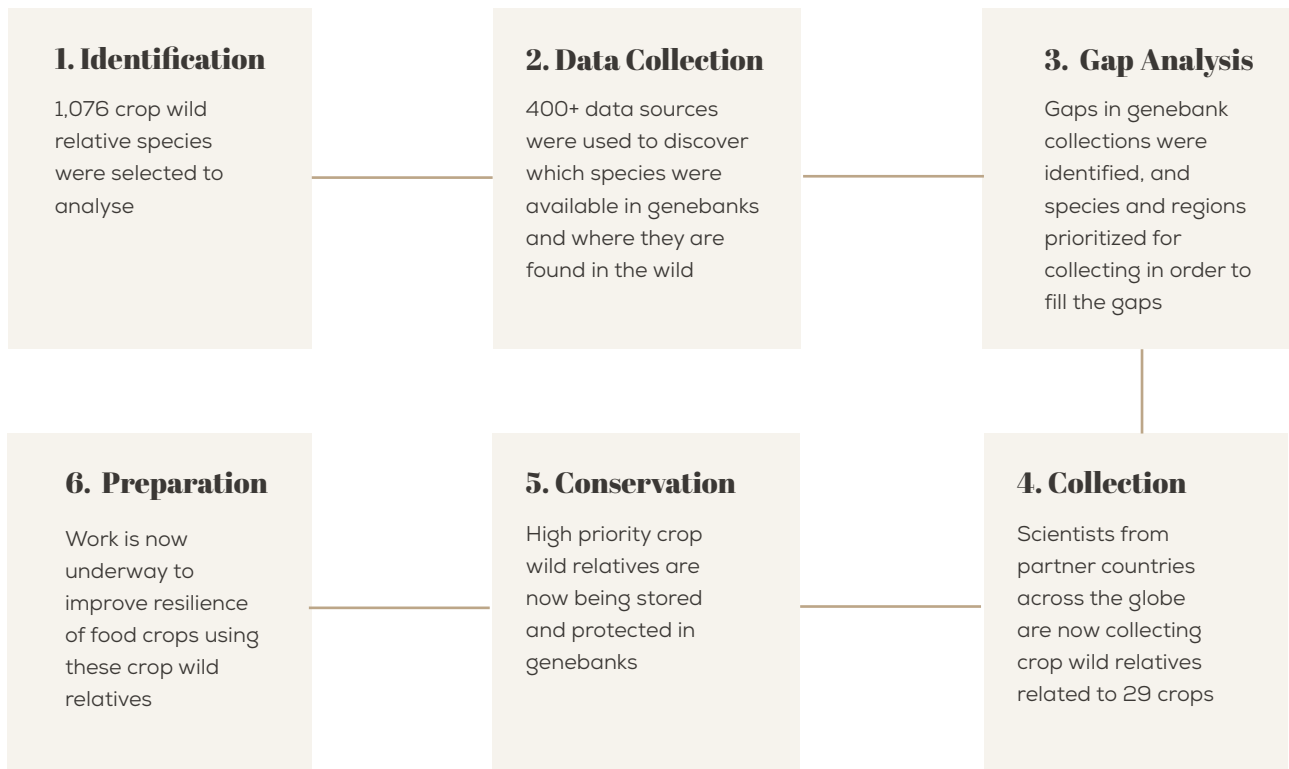
Many of the wild plant species at the foundation of the global food supply are missing from the world's genebanks, according to new research by the International Center for Tropical Agriculture (CIAT) in coordination with the Global Crop Diversity Trust (Crop Trust) and the Royal Botanic Gardens (RBG), Kew.

Crop wild relatives (CWR) are distant cousins of well-known food crops like rice, potato and wheat that contain traits such as drought and heat tolerance, and pest and disease resistance. This genetic diversity makes them an **invaluable resource for plant breeders** working to develop crops capable of adapting to the impacts of climate change, including higher temperatures, increased soil salinity due to rising sea levels, and more frequent and severe pest and disease outbreaks. The inability to access these crop wild relatives removes options to improve crops, leaving our food supply, and agricultural producers, vulnerable.

The new study, entitled "Global Conservation Priorities for Crop Wild Relatives" models how accessible 1,076 crop wild relatives related to 81 crops essential to food security are to plant breeders via genebanks across the world. The result is the very first "atlas" of the distribution of these critical species and indicates that an alarmingly **high percentage of crop wild relatives are currently under-represented** in genebanks worldwide.

The study forms part of the Adapting Agriculture to Climate Change Project, a global 10-year effort to collect, conserve and promote the use of the wild relatives of 29 major crops.

How does the Adapting Agriculture to Climate Change Project work?



Which crop wild relatives are under threat?

Crop wild relatives that were assigned a “high priority score” by the study, and are therefore in urgent need of collection and conservation include those related to important food security crops such as **plantain, cassava, sweetpotato** and **millet**, and fruits and vegetables such as **apples, bananas, carrots, mango** and **pineapple**. Even for the wild relatives of vital staples like **rice, wheat, potato**, and **maize** – which tend to be better represented in genebanks – there are still significant gaps in the collections.

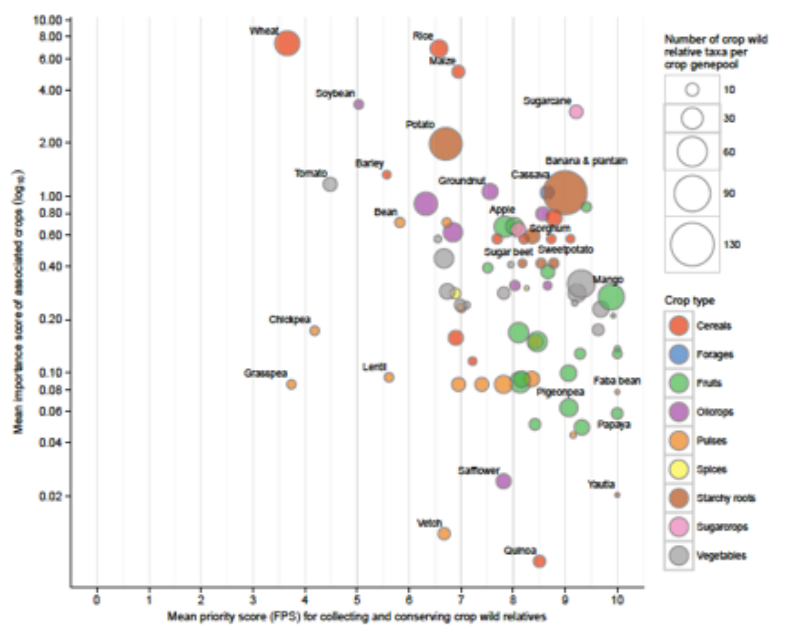


Diagram source: Nature Plants 10.1038 NPLANTS.2016.22

Where in the world can the missing species be found?

The study has mapped which regions of the world can be considered “hotspots” for finding the missing crop wild relatives. These include regions in the **Mediterranean and Near East; western and southern Europe; Southeast and East Asia; and South America**. For example, 29 high priority potato wild relative species are concentrated in the north–central Andes, particularly in Peru, whereas the six priority banana species can be found in the Philippines and in Southern China. In addition, the authors highlighted that some of the crop wild relatives marked as high priorities for collection and conservation are **under threat, from war and civil strife** in places like the Near East and Middle East and from **changes in land use, such as deforestation** in southeast Asia.

How Crop Wild Relatives have bolstered food supply and trade through the ages

In the early 1900s the wild North American grape species *Vitis rupestris* Scheele., *Vitis berlandieri* Planch. and *Vitis riparia* Michx. were used to breed grapes that are resistant to an aphid-like insect that threatened the entire French wine industry. The sugarcane industry also avoided disaster when new cane varieties were introduced that carried resistance to sugarcane mosaic virus from the wild relative *Saccharum spontaneum* L.. In the 1940s, a single wild tomato species provided genes boosting solids content by 2.4%, estimated to be worth about US\$250 million a year to the global tomato industry today. In the 1970s, the wild rice species *Oryza nivara* S.D.Sharma & Shastry was used to develop rice varieties resistant to the grassy stunt virus, a disease that caused hundreds of millions of dollars of damage to Asian farmers.

Time to act:

AUTHOR RECOMMENDATIONS

The authors stress the urgency for acting on these new findings, by collecting, protecting and using crop wild relatives to improve future food security:

- Long-term funding and capacity support for plant conservation organizations, crop breeders, and plant researchers is required to expand this invaluable project, as significant gaps still exist for many crops in many regions.



- This work should generate a debate on current genetic resource policy and foster collaboration between nations to fulfill shared food security goals.
- Countries are invited to take advantage of this information, which provide a baseline for understanding the state of conservation of crop wild relatives, to measure their progress on development and conservation commitments, including Target 2.5 of the UN Sustainable Development Goals, and Aichi Biodiversity Target 13.
- The findings can contribute to complementary efforts to conserve crop wild relatives in the wild. National and international policy makers, who define such targets are invited to make use of this invaluable resource for their decision making.
- Long term food security must be recognized as a truly global issue, with important crop genetic diversity distributed across continents and in many regions undergoing rapid change, war, and with limited financial resources for conservation.
- Support for mechanisms to make this diversity available and accessible to plant breeders worldwide- particularly the International Treaty on Plant Genetic Resources for Food and Agriculture- is needed in order to improve the resilience of the global food system.

About the Crop Wild Relatives Project

The **Adapting Agriculture to Climate Change Project** is a global, 10-year effort to collect, conserve and promote the use of the wild relatives of 29 major crops. The initiative is generously funded by **the Norwegian government**, and managed by the Global Crop Diversity Trust in partnership with the **Millennium Seed Bank of the Royal Botanic Gardens, Kew**. The Project is being implemented in close collaboration with national and international organizations involved in crop conservation and breeding efforts, including many of the agricultural research centers of the CGIAR. The **International Center for Tropical Agriculture (CIAT)** is the organization responsible for completing the analysis of gaps in the conservation of the wild relatives of 81 globally important crops.



Crop Wild Relative collecting - in action - in a rainforest in Malaysia.

Further information and contact

- More information about the project, as well as interactive tools to explore results can be found at www.cwrdiversity.org.
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