

A close-up photograph of a tea plant branch with several bright green leaves. On the left side of the image, there is a colorful geometric overlay consisting of several overlapping triangles in shades of green, blue, red, and yellow. The background is a soft-focus field of tea plants.

TEA GENETIC RESOURCES: A GLOBAL STRATEGY

The cultivation of tea has spread rapidly and continually since the nineteenth century, from China and Southeast Asia to diverse habitats around the planet. The crop is now grown in 62 countries, including many developing countries, where millions of people depend on it for their livelihoods. As demands rise, even traditional tea growing and exporting countries have begun to import their tea from elsewhere. A once-regional crop has become global. But the genetic diversity which made this possible is easily lost – and not always easily found again.

A vital but threatened resource

Future tea cultivars will have to meet many challenges: climate change, new pest and disease pressures, and consumer demand for tea grown with fewer chemical inputs. Yet breeders and researchers are aware that the genetic diversity of cultivars currently in farmers' fields is not adequate to meet these challenges. Sustainable and profitable tea cultivation needs a wide genetic base that draws on the diversity found in genebanks, gardens, abandoned fields, and in the wild, which must be readily available for use into the long-term future.

This diversity is also vulnerable, however, to climate change, pests, and diseases – as well as to land use changes, fluctuating markets, and replanting of old fields with clonal cultivars. Even the genebanks tasked with long-term conservation in a number of countries encounter risks in the ongoing work of maintaining field collections of tea diversity. These collections are locally based, unique, and often conserved in only a single field site. There is an urgent need for concrete actions to secure them through safety duplication, including in cryopreservation. At the same time, there is a need for more international exchange of collection information and germplasm to put conserved diversity to use in breeding programs around the world.

Tea is not unique in these needs, but it lags behind other major crops in the development of a coordinated international approach. This is why the Crop Trust has collaborated with the Tea Research Institute, Chinese Academy of Agricultural Sciences (TRICAAS) to develop the Global Conservation Strategy for Tea Genetic Resources. Based on a background review, survey of conservers and users, and visits to the sites of seven key collections, this strategy provides the evidence base to secure the long-term conservation and use of tea genetic resources as effectively and efficiently as possible. It will serve as a framework to bring together stakeholders at all levels – local, regional, national, and global – in building long-term support through greater awareness, increased capacity, greater community engagement, and sustained funding.

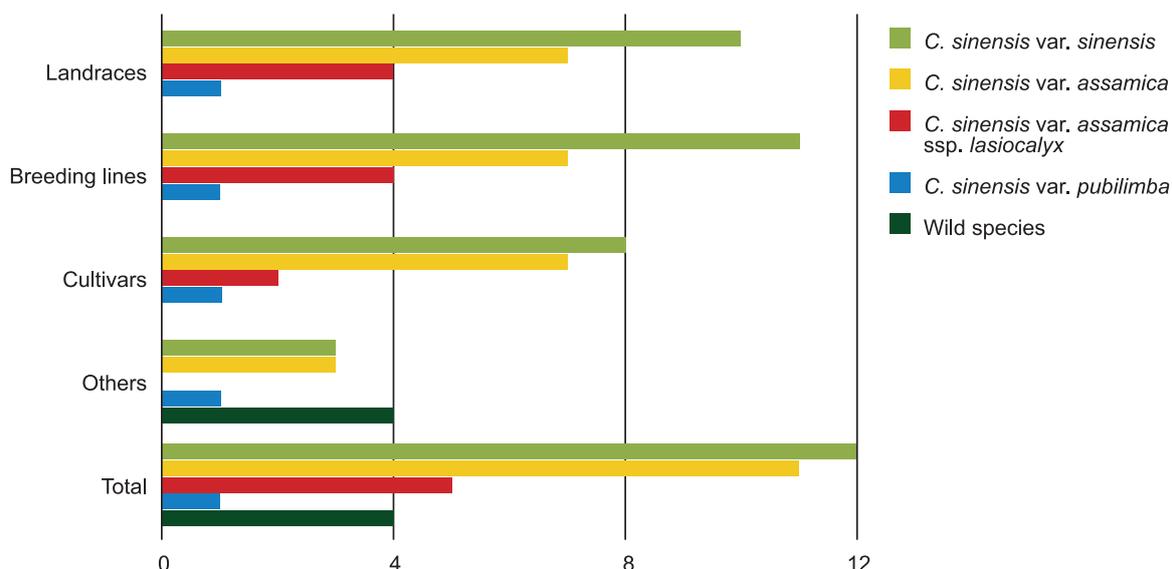
Read the full strategy:

A Global Strategy for the Conservation and Use of Tea Genetic Resources

Paula J. Bramel and Liang Chen, 2018

croptrust.org/saving-tea

Survey of 12 major tea collections holding a total of 17,006 accessions



An inward-looking system

Tea genetic resources are being conserved *ex situ* and *in situ* in a number of tea-producing countries. Along with the main center of diversity in China, there are important sources of diversity in Northeast India and in the northern border areas of Myanmar, Thailand, and Vietnam. Other diversity still exists in old seedling gardens in many parts of the world. This diversity offers unique populations that were a product of the germplasm movement and hybridization that occurred during the early establishment of tea production in China, Japan, Korea, India, Sri Lanka, Malawi, Kenya, Madagascar, and Indonesia. These seed-derived populations have adapted to local conditions and can serve as sources of more specific adaptation.

The 2018 global survey gathered information from 13 major holders of *ex situ* tea diversity. These genebanks primarily conserve accessions that were collected from the field or acquired from their own institutes, and conserve them in field collections without safety duplication. Collections are nationally focused, with the aim of conserving local diversity for institutes' own breeding programs. There are few formal international links between institutes, and very little knowledge of the diversity conserved or its use outside a given institute or country. This is not the secure, rational, global, cost-effective, or sustainable system needed to ensure long-term conservation or use.



Towards a global system for tea diversity

The Strategy recommends the following key investments:

As governments, industry, farmers' organizations, and NGOs consider the future needs for tea sector development, securing the global conservation of tea genetic resources needs to be recognized as a priority.

Conservation should focus on securing unique genetic diversity from all the botanical varieties and wild relatives of *Camellia sinensis* in the Asian centers of diversity, as well as adapted material surviving in old seedling gardens.

Greater global collaboration among collection holders and with users will be kick-started by a global meeting among key stakeholders.

Such a meeting will be an opportunity to communicate the needs of conservation for tea genetic resources within the tea sector and develop collaboration on concrete actions.

Key global actions to address priority needs.

National collection holders with national responsibilities cannot meet the needs of a global system on their own. Global resources are needed to:

- ▶ Implement accession-level documentation sharing on a global platform.
- ▶ Develop internationally agreed standards and technical guidelines for conservation, safety duplication (including cryopreservation), and exchange.
- ▶ Coordinate a global genotyping effort to inform conservation and use and fill gaps in collections.
- ▶ Agree a policy for international exchange of diversity to benefit the tea sector overall.