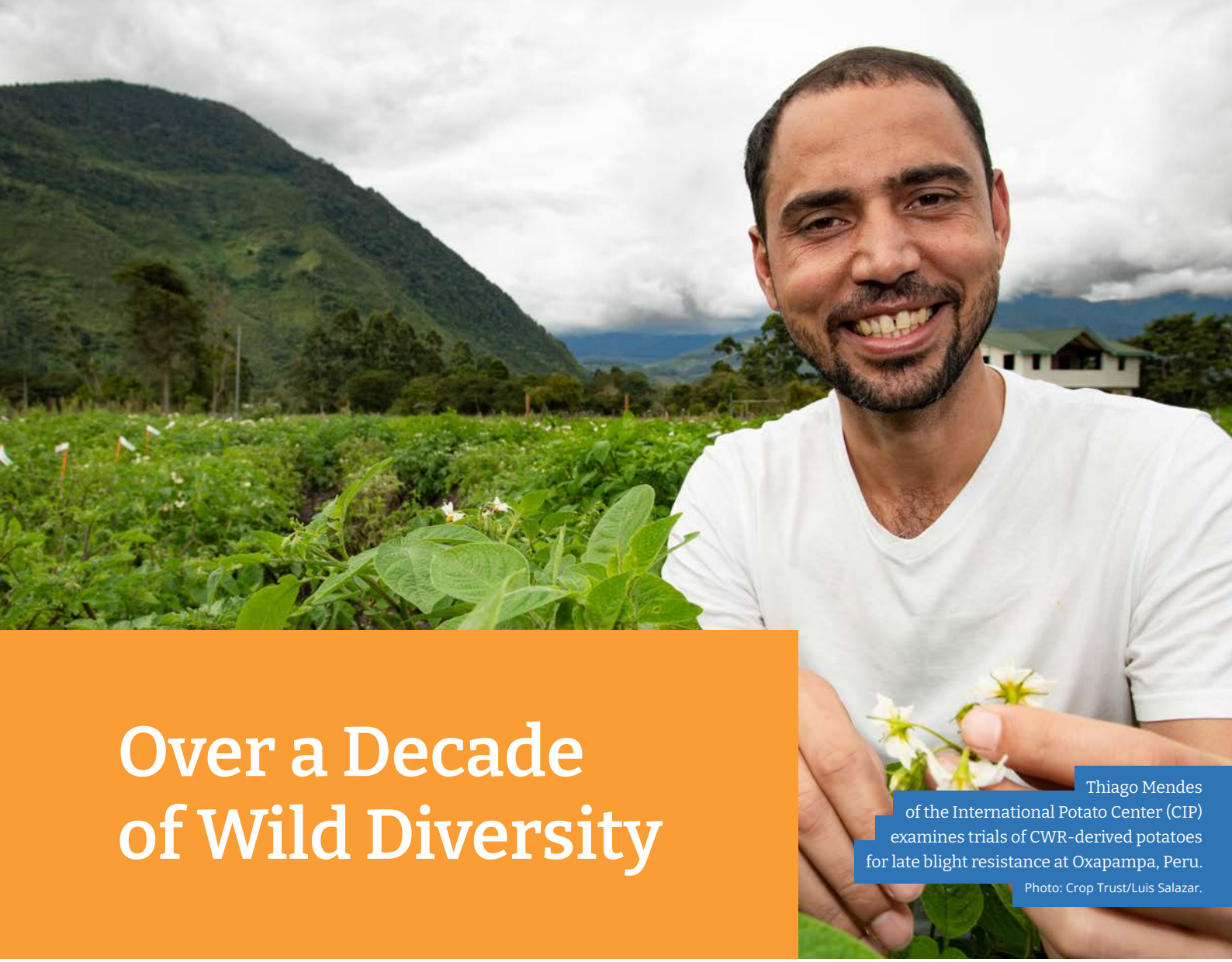


Over a Decade of Wild Diversity

Thiago Mendes of the International Potato Center (CIP) examines trials of CWR-derived potatoes for late blight resistance at Oxapampa, Peru. Photo: Crop Trust/Luis Salazar.

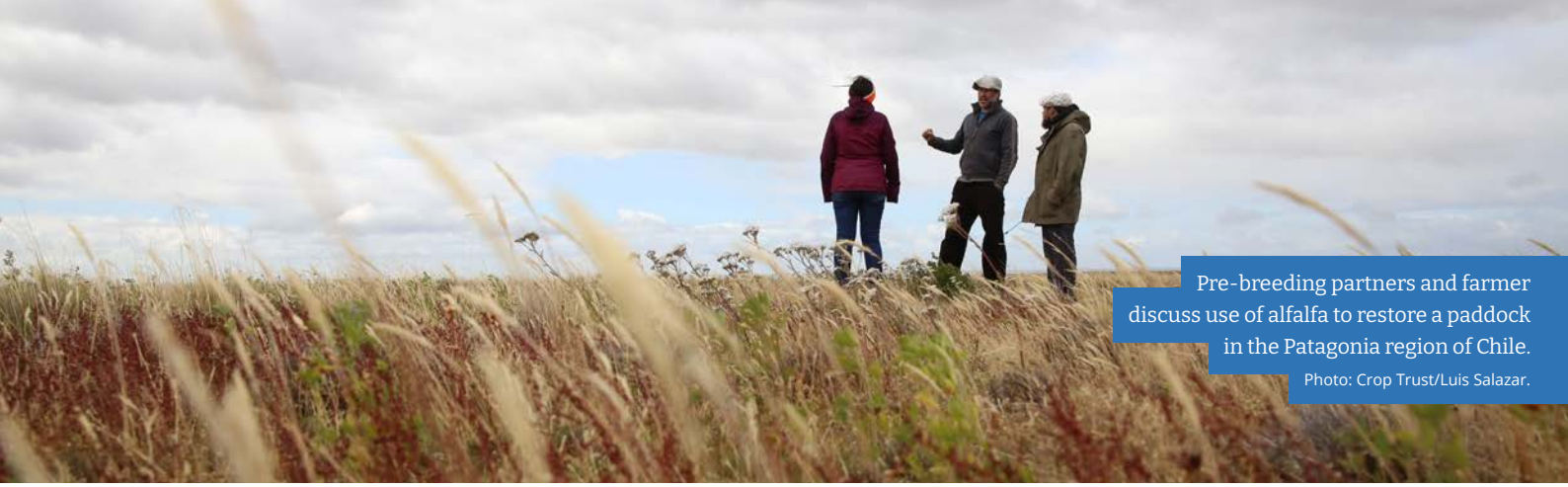
Looking Back on the Crop Wild Relatives Project

Crop wild relatives are the cousins of our food crops that still grow in nature. Many have evolved to survive tough conditions, such as dryness, wetness, high temperatures and poor soils. This means they can be a source of new genetic diversity—diversity that plant breeders can tap to develop more resilient food crops.

But the existence of crop wild relatives is being threatened by deforestation, the expansion of cities and agriculture and climate change. If they disappear from the wild, the valuable genes they contain will be lost forever.

Over the last decade, the Crop Wild Relatives Project, funded by the Government of Norway, has brought together institutions, researchers, plant breeders, farmers and industry to collect, conserve and use the wild relatives of priority crops to help future-proof the world's food supplies.

The Crop Wild Relatives Project was not just about conservation. Another component focused on pre-breeding—crossing wild relatives with domesticated varieties to transfer genes for useful traits such as disease and pest resistance, and heat and drought tolerance.



Pre-breeding partners and farmer discuss use of alfalfa to restore a paddock in the Patagonia region of Chile.
Photo: Crop Trust/Luis Salazar.

Taking a Walk on the Wild Side

In the first 6 years of the project, more than 100 scientists from 25 countries collected 4,587 seed samples of more than 355 wild relatives of 28 key crops—diversity that might otherwise have been lost forever.

In some cases, such as for three wild potato relatives, the seed samples collected under the project are the *only* examples held in any genebank.

Taming the Wild Genes

But the Crop Wild Relatives Project was not just about conservation. Another component focused on pre-breeding—crossing wild relatives with domesticated varieties to transfer genes for useful traits such as disease and pest resistance, and heat and drought tolerance. The resulting seeds can be further developed by breeders or, in some cases, taken up directly by farmers.

By mid-2021, 19 pre-breeding projects in 43 countries had developed new crops adapted to climate change, with much of the work being carried out in collaboration with farmers (and potential consumers) to ensure that the resulting crops met local needs and growing conditions. Materials from the pre-breeding projects are available through a Standard Material Transfer Agreement according to the rules of the Plant Treaty.

Uncovering Useful Traits

The project's evaluation studies have assessed the performance of these crop wild relatives and their crosses under a range of conditions and climates in different countries. Some of the results are very exciting! For example, scientists in Morocco and Tunisia have identified resistance in wild grasspea species to two forms of broomrape, an aggressive parasitic weed. These results may revive cultivation of this highly drought-tolerant crop in some Mediterranean countries, where it has been abandoned because of the weed.

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Sharing the Data

The project has worked with the James Hutton Institute, UK, to make information from the pre-breeding and evaluation projects widely available through new, crop-specific databases on the well-known Germinate platform.

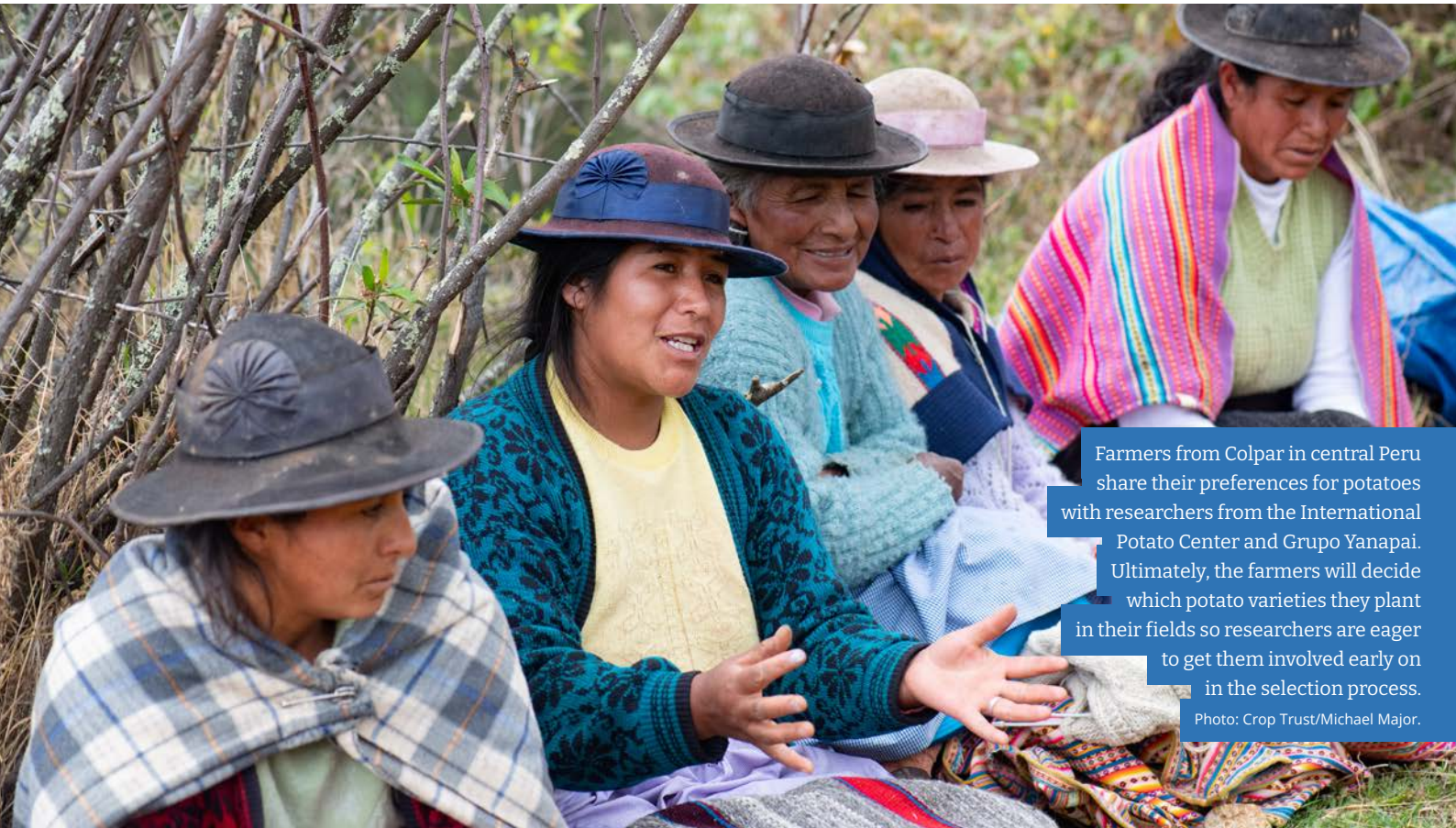
Such data are invaluable to researchers and plant breeders seeking to develop improved varieties to meet current and future needs of farmers and consumers because they help identify possible sources of desired traits.

Building Future Capacity

Finding and collecting seeds of crop wild relatives is no easy task, and neither is ensuring that they are properly documented and conserved in genebanks. Utilizing wild relatives in improvement programs is also a new frontier for many breeders.

The Crop Wild Relatives Project addressed these challenges and others through training and capacity building as well as IT audits and upgrades for genebanks. IT audits were carried out for 37 national and regional genebanks, while 27 received IT upgrades.

Over 12,000 people from 124 institutions in 71 countries participated in training and capacity building programs.



Farmers from Colpar in central Peru share their preferences for potatoes with researchers from the International Potato Center and Grupo Yanapai. Ultimately, the farmers will decide which potato varieties they plant in their fields so researchers are eager to get them involved early on in the selection process.

Photo: Crop Trust/Michael Major.

CWR-derived Crops in Farmers' Hands

Salt-tolerant Rice Lines Adopted by Vietnamese farmers

Increasing salinity of soil and water is a major problem affecting rice production in the coastal zone of the Mekong Delta in Vietnam. Breeders at Can Tho University, Vietnam, working with local farmers, have developed salt-tolerant rice varieties incorporating genes from rice wild relatives. Four of these have already been adopted by local farmers and are now being widely tested.

CWR-derived Potato Clone Released in Peru

Late blight – the disease that caused the Irish potato famine in the 1800s – is a major problem for potato farmers around the world. The International Potato Center in Peru has used potato wild relatives to breed CIP512010.1, a late-blight-resistant potato clone. Much liked by local farmers, the variety was released in Peru in September 2021.

CWR-derived Durum Wheat Variety Released in Lebanon

Farmers in Lebanon are now growing Zagharin 2, a drought-tolerant durum wheat variety incorporating genes from wheat wild relatives identified by the International Center for Agricultural Research in the Dry Areas. It is also under consideration for release in Morocco.

CWR-derived Alfalfa Variety Widely Adopted in Kazakhstan and Inner Mongolia

Freezing winter temperatures hamper production of forage for livestock in many parts of the world. An alfalfa variety incorporating genes for cold tolerance from wild relatives, Zhongcao No.3, has been developed by the Grasslands Research Institute, Chinese Academy of Agricultural Sciences. It is being widely adopted by farmers in northern Kazakhstan and Inner Mongolia, boosting livestock productivity.

ICARDA scientists visited the pictured on-farm trials near Tadla, Morocco to gather the opinions of farmers about CWR-derived durum wheat lines.
Photo: Crop Trust/Michael Major.

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