

A seed for all seasons: can ancient methods future-proof food security in the Andes?

In Peru's remote villages, farmers have used diverse crops to survive unpredictable weather for millennia. Now they are using this knowledge to adapt to the climate crisis



Men in Ccachin, a village near Cusco, Peru, meet to drink *chicha*, made from fermented maize, before working in the fields. Photograph: Dan Collyns/The Guardian

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Dan Collyns in *Choquecancha*

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n a pastoral scene that has changed little in centuries, farmers wearing red woollen ponchos gather on a December morning in a semicircle to drink *chicha*, made from fermented maize, and mutter an invocation to Pachamama – Mother Earth – before sprinkling the dregs on the Andean soil.

Singing in **Quechua**, the language spread along the vast length of the Andes by the Incas, they till the soil around plants in the numerous small plots terraced into a patchwork up and down the Peruvian mountainside.

The Andes sustains one of the most diverse food systems in the world. Through specially adapted farming techniques, these farmers conserve a great variety of maize, also known as corn, and other biodiverse crops that could be key to food security as global heating causes a more erratic climate. Maize has been grown in Lares, near Cusco, for thousands of years, in one of the highest farming systems in the world. Choquecancha and Ccachin communities specialise in more than 50 varieties of the cereal in a myriad of different sizes and colours.

It would be difficult to produce one variety of one crop. In one year you have frosts, hail, droughts or torrential rain
Javier Llacsá Tacuri, agrobiodiversity expert

“In the old days, the Incas grew these ecotypes and now we continue the path set down by our ancestors,” says Juan Huilca, a conservationist in Choquecancha, a tiny mountainside village.

On a blanket are ears of corn ranging in colour from faintly yellowed white to deep purple. All have thick kernels and evocative names. Yellowish corncobs with red tinted kernels are called *yawar waqaq* (blood crier). White cobs flecked with grey, whose toasted kernels are served as crunchy *canchita* with

Peru's flagship dish *ceviche*, are more prosaically called *chuspi sara* (small corn).

Historians believe what is now the world's most widely grown cereal crop was first domesticated by people in modern-day Mexico about 10,000 years ago and subsequently spread south down the spine of the Andes to reach Peru about 6,000 years ago.



Maize from Lares province near Cusco, where the crop has been grown for thousands of years. Photograph: Dan Collyns/The Guardian

Long before the climate crisis, these farmers' ancestors adapted to growing crops in different niche ecosystems, from icy mountain peaks to sunny valleys.

“In this landscape it would be difficult to produce just one variety of one crop, because in one year you can have frosts, hail, droughts or torrential rain,” says Javier Llacsá Tacuri, an agrobiodiversity expert who manages a project to safeguard the farming techniques, which have been identified as one of a handful of **globally important agricultural heritage systems**.

“With a few varieties, you could not face a farming year, so the response is to have many varieties. The frosts and hailstorms have always occurred and their ancestors knew how to face them,” he says.

With more than 180 native domesticated plant species and hundreds of varieties, Peru has one of the world's richest diversity of crops.

Backed by the UN's **Food and Agriculture Organization**, the project supports the farmers to preserve the native species, and Llacsá Tacuri and colleagues help find markets for the multicoloured corns.

“Peru is one of eight places in the world which is considered **a centre of origin for agriculture**,” says Llacsá Tacuri. “The first inhabitants and their descendants – the peasant farmers who are here – started their adaptation to this landscape more than 10,000 years ago.”

Huillca says his village and its neighbours are already feeling the **climate crisis**.

“Diseases like stem rust or blight arrive, sometimes we get frost or hail. That's why we have our seed bank in order not to lose our maize ecotypes, so we can recover what we've lost and resow those varieties,” he says.



‘We continue the path set down by our ancestors,’ says Juan Huillca, farmer and maize conservationist, Choquecancha, near Cusco. Photograph: Dan Collyns/The Guardian

In a simple farmhouse in Ccachin lies the genetic heritage of thousands of years of crop domestication and variation. Dozens of types of dried kernels are stored in plastic containers for rainy days.

“But many young people migrate to the city because this doesn’t generate much income,” Huillca adds. “What we do doesn’t bring enough income to sustain the family, so they move to the city.”



‘Hidden pandemic’: Peruvian children in crisis as carers die

Sonia Quispe, a maize conservationist in Choquecancha, says the harvest is half what it would normally be.

“With the climate crisis, there’s less harvest, but we substitute our diet with potatoes,” she says. “It’s important to work with the different varieties of maize for our food security. With global heating, there are varieties that are more resistant to illnesses and pests.”

Quispe can identify the variety of three-month-old maize shoots from the stalks. She explains that the ones with red at the base will produce red-tinted cobs with a bitter taste that repels pests, which are moving further up the mountain as the sun becomes more intense.



Maize is collected and stored in a seed bank in Ccachin to prevent varieties being lost. Photograph: Dan Collyns/The Guardian

Julio Cruz Tacac, 31, a *yachachiq*, or farming teacher, who returned to Ccachin after studying in Cusco, has seen weather patterns change.

“When I was little, the sun didn’t shine with such intensity, the temperature was mild,” he says.

“It’s as if we live in an Eden in terms of food products, we have everything to hand,” he says of his childhood home. This is in contrast to city life, where “everything is money”, he says, and which became even **harder during the Covid-19 pandemic** – Peru had the world’s highest Covid mortality rate.

The custom of *ayni*, reciprocal communal work, remains in these remote villages, but a bartering form of exchange, known as *trueque*, has been hit by the pandemic’s economic impact.



'With the pandemic the people don't want to barter, they want money,' says Genara Cárdenas, a farmer in Ccachin, Cusco. Photograph: Jorge De La Quintana

"We go to the market and we trade with the fruit and coca from the farmers in the valley," says Genara Cárdenas, 55, from Ccachin. "But now with the pandemic the people don't want to barter, they want money."

Financial pressures have affected the village's traditional way of life, but their crops have helped them remain self-sufficient despite the economic problems.

Even so, the climate crisis presents new challenges, says 55-year-old farmer Victor Morales.

"When I was young, the rains, the frost, all had their time. But today everything has changed. We had many types of potatoes and maize, now we have varieties which are more resistant to climate change."