

Farmers reclaim traditional crops with the help of Incan terraces

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TOP: Women sort potatoes in the Andes Mountains near Cusco, Peru. MIDDLE: Farmers harvest potatoes in the Andes near Cusco. Photos by Tom O'Neill/NurPhoto, Courtesy of Getty Images. BOTTOM: Agricultural terraces are pictured along the Sacred Valley of the Incas. Photos by Jim Dyson, Courtesy of Getty Images.

The Andes are some of the tallest, starkest mountains in the world. Yet the Incas, and the civilizations before them, coaxed harvests from the Andes' tough climate. They developed hardy breeds of crops such as potatoes, quinoa and corn. They built cisterns and irrigation canals that snaked and angled down and around the mountains. They also cut terraces into the hillsides from the valleys up the slopes. At the height of the Incan civilization in the 1400s, the system of terraces covered about a million hectares, or about 3,800 square miles, throughout Peru.



Over the centuries, cisterns fell into disrepair, canal beds dried up and terraces were abandoned. This process began when the Spanish conquistadors forced people off the lands to farm and mine for them. The local populations were devastated by war and, more significantly, by disease. Some researchers estimate that as many as half of the Incan population died soon after the Spanish arrived. Much of the traditional farming knowledge and engineering expertise was also lost.

The ghost of the Incas' farming achievements still shadows the Andes. The remnants of ancient terraces appear as lines of green on the mountains. Former irrigation canals carve hollows into the land. Today, in a corner of the Andes, people are breathing new life into ancient practices. Inspired by recent archaeological research, they are rebuilding terraces and irrigation systems and reclaiming traditional crops and methods of planting. Incan agricultural techniques are more productive and more efficient in terms of water use, and these modern farmers also believe the Incan ways can offer simple solutions to help protect communities' food supply in the face of climate change.

"Like Stairs In A Staircase"

Archaeologist Ann Kendall began studying terraces in the Cuzco region of Peru in 1968. She intended to focus on Incan architecture and stonework, but she became fascinated by the dry canal beds and terraces. She remembers thinking, "if only one could study traditional technology and rehabilitate all this in the Andes, wouldn't it be wonderful."

Over the years, she learned how the Incan builders used stones of different heights, widths and angles to create the best structures and water systems, and how they filled the terraces with dirt, gravel and sand.



In the 1600s, Garcilaso de la Vega, the child of a conquistador father and an Incan noblewoman, described the Incan terracing system in *The Royal Commentaries of the Incas*: “In this way the whole hill was gradually brought under cultivation, the platforms being flattened out like stairs in a staircase, and all the cultivable and irrigable land being put to use.”

The terraces had several unexpected advantages, Kendall discovered. The stone retaining walls heat up during the day and slowly release that heat to the soil as temperatures plunge at night. They kept sensitive plant roots warm during the sometimes frosty nights, which lengthened the growing season. The terraces are also extremely efficient at conserving scarce water from rain or irrigation canals, says Kendall, who added that the Incan terraces are even today probably the most sophisticated in the world.

"Lessons From The Patacancha Valley"

Over the past three decades, a development charity called the Cusichaca Trust, began by Kendall, repaired and irrigated about 395 acres (160 hectares) of terraces and canals in the Patacancha Valley, near Cuzco. The project improved irrigation and agricultural production. Lessons from the Patacancha Valley are helping to restore Incan agricultural systems in other areas of Peru.

The thud of a hammer on rock reverberates in a remote valley in the Apurímac region. A worker from a nearby village swings a mallet and chips off the edges from a massive stone. That rock will form one wall of the repaired irrigation channel. He and a half-dozen others have been hard at work for a month already and have rebuilt about one-third of the channel.

The work is part of a two-year project to reduce the effects of climate change called Cusichaca Andina.

Staring Down Climate Change

In the few restaurants that can be found in nearby villages, rice is on the menus more frequently than the local quinoa, which is considered to be a food for the poor.



Local grains are more nutritious and better suited to the Andean land and climate. So Cusichaca Andina has conducted educational training campaigns and given away seeds for quinoa, corn and amaranth.

The organization has also focused on rescuing seeds and varieties that have been in danger of disappearing, such as huaña. It is a bitter potato variety that resists hail, frost, droughts and excess rain.

“Now that we’re facing the crisis of climate change, it’s worth recovering crops such as these,” said Adripino Jayo, the regional director of Cusichaca Andina.

Clemente Utani, the mayor of the nearby town of Pomacocha, added, “We’re recovering what we lost from our ancestors.”

Spreading The Word

Approaches such as these might be crucial for poor Peruvian farmers. They get most of the water from glacial melt and the seasonal rains. These water sources are already affected by climate change. Rains have begun to show signs of decreasing, temperature swings have become more extreme, and Peru’s glaciers have shrunk about 20 percent since the 1970s.

“At first people thought I was a bit of a nutter with my terraces,” Kendall says with a laugh, “but now this is the word everywhere it seems in Peru.” And not only in Peru. The Andes stretch from Venezuela and wind down South America as far as Argentina and Chile. Kendall says that groups in Bolivia and elsewhere are expressing interest in learning from Cusichaca’s experience.

Kendall spoke at a terracing conference in southern China in 2010. She and 50 experts were taken by bus to view the rice terraces there and meet with farmers. Through the bus windows, Kendall saw evidence of mostly abandoned terraces lining the hills and mountainsides — terraces potentially ripe for rehabilitation.

Quiz

- 1 Which of the following sentences BEST develops a central idea of the article?
- (A) Over the centuries, cisterns fell into disrepair, canal beds dried up and terraces were abandoned.
 - (B) Inspired by recent archaeological research, they are rebuilding terraces and irrigation systems and reclaiming traditional crops and methods of planting.
 - (C) The stone retaining walls heat up during the day and slowly release that heat to the soil as temperatures plunge at night.
 - (D) Kendall says that groups in Bolivia and elsewhere are expressing interest in learning from Cusichaca's experience.
- 2 The central idea of the article is mostly developed by:
- (A) describing terrace farming in detail
 - (B) discussing the current economy of Peru
 - (C) contrasting different methods of farming
 - (D) providing facts about Peruvian crops

- 3 Read the following paragraph from the introduction [paragraphs 1-3].

The Andes are some of the tallest, starkest mountains in the world. Yet the Incas, and the civilizations before them, coaxed harvests from the Andes' tough climate. They developed hardy breeds of crops such as potatoes, quinoa and corn. They built cisterns and irrigation canals that snaked and angled down and around the mountains. They also cut terraces into the hillsides from the valleys up the slopes. At the height of the Incan civilization in the 1400s, the system of terraces covered about a million hectares, or about 3,800 square miles, throughout Peru.

Why does the author include this paragraph in the article?

- (A) to demonstrate that the Incan farming methods are obsolete
- (B) to explain that the Incan farming systems were effective
- (C) to criticize modern farmers for attempting to recreate ancient farming systems
- (D) to compare South American farming systems before and after the Spanish conquest

- 4 Why does the author include the following quote from the section "Like Stairs In A Staircase"?

In the 1600s, Garcilaso de la Vega, the child of a conquistador father and an Incan noblewoman, described the Incan terracing system in The Royal Commentaries of the Incas: "In this way the whole hill was gradually brought under cultivation, the platforms being flattened out like stairs in a staircase, and all the cultivable and irrigable land being put to use."

- (A) to describe how terrace farming was developed
- (B) to emphasize the importance of terrace farming during this time period
- (C) to provide the reader with a clear image of what terrace farming landscapes looked like
- (D) to incorporate a primary source description of terrace farming