EQUATOR INITIATIVE

UNDP

# ZONA DE AGROBIODIVERSIDAD ANDENES DE CUYOCUYO

Republic of Peru

EQUATOR PRIZE WINNER

## Equator Initiative Case Studies

Local sustainable development solutions for people, nature, and resilient communities

Photo credit: WCS, Feria Cuyocuyo

# UNDP EQUATOR INITIATIVE CASE STUDY SERIES

Indigenous Peoples and local communities across the world are advancing innovative sustainable development solutions that work for people and the Planet. Few publications or case studies tell the full story of how such initiatives evolve, the breadth of their impact, or how they change over time. Fewer still have undertaken to tell these stories with community practitioners themselves guiding the narrative. The Equator Initiative aims to fill that gap. This is precisely the reason why this case study has been crafted through a collaborative process with the representatives of the winning initiatives. The goal is to thoroughly integrate their voices and experiences, showcasing their efforts in driving local action within their respective environments.

The **UNDP Equator Initiative**, supported by generous funding from the Norwegian Agency for Development Cooperation (NORAD) and the German Federal Ministry for Economic Cooperation and Development (BMZ), awarded the Equator Prize in 2025 to 10 outstanding Indigenous Peoples and local community-led initiatives from nine countries. The winning organizations showcase innovative, nature-based solutions for tackling biodiversity loss and climate change. Selected from a pool of over 700 nominations from 103 countries, this year's winners align with the Equator Prize 2025 theme 'Nature for Climate Action,' showcasing groundbreaking solutions across three categories: Nature for Climate Mitigation, Nature for Climate Adaptation and Resilience, and Nature for a Just Transition. All 10 winners were celebrated at a high-profile event, held virtually, on December 11th. The event was part of the **Nature for Life Hub**, a three-day series of virtual events designed to raise ambition for nature-based solutions in global biodiversity and climate policy. The Equator Prize 2025 winners are restoring ecosystems, revitalizing traditional knowledge, and building inclusive, nature-positive economies that advance climate resilience, protect biodiversity, and drive a just transition.

The following case study is one in a growing series that describes vetted and peer-reviewed best practices intended to inspire the policy dialogue needed to scale nature-based solutions essential to achieving the Sustainable Development Goals (SDGs).

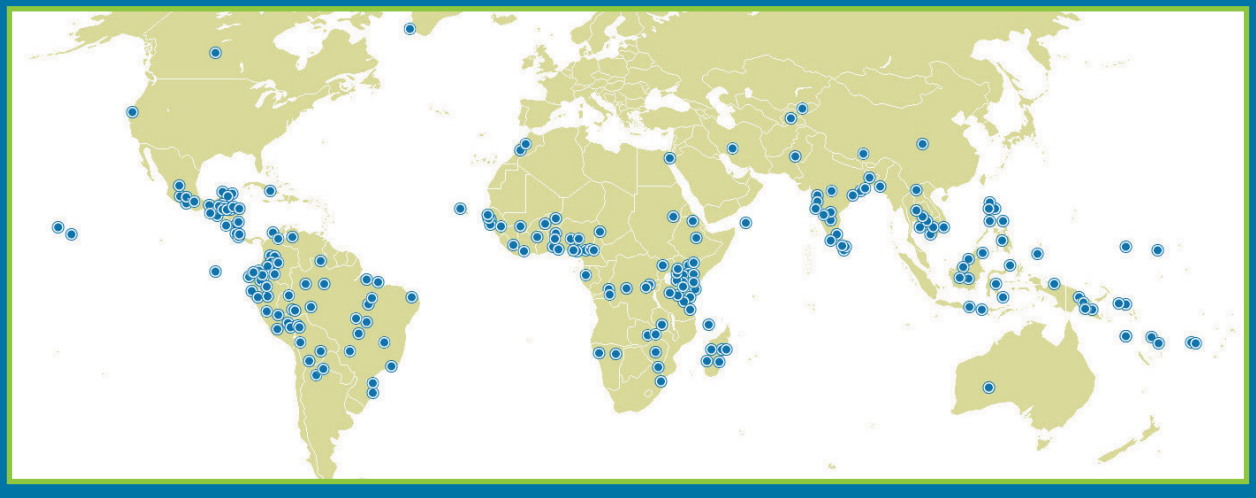


Photo credit: WCS, Feria Cuyocuyo

# PROJECT SUMMARY

The Zona de Agrobiodiversidad (ZABD) initiative in Peru is a formally recognised territorial governance framework that supports Indigenous Peoples and campesino communities in conserving agrobiodiversity, strengthening traditional food systems, and securing collective rights over ancestral territories. ZABDs are community-led landscapes where native crops, wild relatives, and associated traditional knowledge are actively protected and managed. Recognised by national policy and implemented in partnership with local governments and community organisations, ZABDs respond to threats like climate change, land conversion, and the erosion of traditional agricultural practices, while reinforcing Indigenous governance systems and cultural identity across diverse Andean and Amazonian ecosystems.

Through the recognition of ZABDs, communities have strengthened in situ conservation of native crops such as potatoes, maize, quinoa, and other locally adapted varieties, while revitalising traditional farming techniques and seed-exchange systems, improving food security, enhancing climate resilience, and increasing community participation in territorial planning and natural resource management. By embedding agrobiodiversity conservation within national legal frameworks, ZABDs have been able to scale and endure, demonstrating how policy-backed, community-driven approaches can safeguard biological and cultural diversity while supporting sustainable rural development.


*The depiction and use of boundaries and related information shown on maps or included in the text of this document are not guaranteed to be free from error, nor do they imply official acceptance or recognition by the United Nations.*

# KEY FACTS

**Equator Prize winner**

2025

**Founded**

2019

**Location**

Cuyocuyo, Sandia, Puno, Republic of Peru

**Beneficiaries**

3,000 direct beneficiaries across six communities of Indigenous Peoples in the ZABD; 2,000 indirect beneficiaries outside of six communities

**Thematic areas**

Sustainable agriculture and food security; Biodiversity conservation; Nature climate solutions

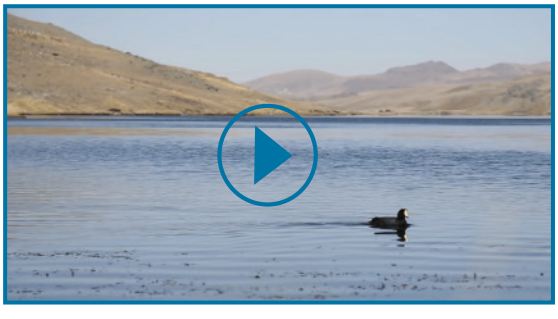
**Fields of work**

Regenerative agriculture; Ecosystem conservation; Mountains

**Sustainable Development Goals addressed**


SUSTAINABLE DEVELOPMENT GOALS

# EQUATOR PRIZE 2025 WINNER FILM



# BACKGROUND AND CONTEXT

Photo credit: WCS, Santiago Barco

*Some time ago, my classmates and I were taken on a trip to visit other communities in Cusco and represent our communities. As community members from Cuyocuyo, who come from Puno, we saw that the people of Cusco lived a beautiful life. They valued their seeds and took care of them, and everything was organised. Their diet was natural; they ate only what they produced and had many products from their own crops. There were no processed foods. They had several foods that we also have, like potatoes, oca, olluco, and izaño in many colours, as well as vegetables and even edible mushrooms growing at the base of their trees. It was beautiful to see how they worked their land according to an agricultural calendar. Every time they worked the fields, they looked at the moon to see if it was time to plant, and they listened to the sounds of the animals to predict the weather for today, tomorrow, or later. Throughout the trip, my classmates and I talked about how things could be the same in our area because everything was similar. Our grandparents taught us many things, but all that knowledge was being lost and forgotten. Our grandparents always fed us with natural foods, which is why people used to live for many years without getting sick. Money wasn't a problem because everything was obtained through bartering. We had other foods like fruits and vegetables by trading with the communities in the rainforest. There weren't as many problems then as there are now. All of this concerned us, and we wanted to preserve what we were taught, what we have.*

*Our idea from that day forward was to recover much of the knowledge of our ancestors that is still useful to us today. After that, we met with our brothers and sisters from other communities, and with the support of professionals, they encouraged us to petition the government to recognise the work we have been doing: our traditional farming methods, our medicinal plants, our customs, our language, and our landscapes. With all of this, we have travelled from place to place to achieve recognition as the first Agrobiodiversity Zone. With formalisation, we were able to form a management committee that today continues to address the needs of our communities.*

Sergio Ochochoque Mamani, member of the Huancasayani Cumani community, member of the Agrobiodiversity Zone management committee, and municipal councillor of the Cuyocuyo district

High in the Andes mountains of southeastern Peru, in the district of Cuyocuyo, Quechua communities cultivated an intricate mosaic of ancient agricultural terraces (called *andenes* in Spanish). In 2019, the Peruvian Ministry of Agriculture and Irrigation (*Ministerio de Agricultura y Riego*) officially recognised these terraces as part of the country's first Zona de Agrobiodiversidad (Agrobiodiversity Zone or ZABD by its acronym in Spanish). The ZABD Andenes de Cuyocuyo (Andenes de Cuyocuyo ZABD) covers approximately 6,554 hectares of highland ecosystems and living cultural landscapes that embody a long history of sustainable agriculture and biodiversity stewardship. Shaped by centuries of interaction and adaptation between people and nature, Peru's Ministry of Culture also officially recognised Cuyocuyo as a Cultural Landscape in 2021, reinforcing the area as an integral part of the cultural heritage of the nation.

The rugged topography and range of elevations in Cuyocuyo support varied microclimates that drive the evolution of distinct crop adaptations. The Andenes de Cuyocuyo ZABD spans an altitudinal gradient from 2,764 to 4,466 metres above sea level and encompasses a striking convergence of ecosystems, from glaciers, wet puna grasslands and high-altitude bogs, to cloud forests where the Andes meet the Amazon. The climate

is generally cold and humid, with frequent frosts during the coldest months. The zone encompasses a remarkable genetic repository of traditional Andean crops and associated wild relatives: more than 1,281 native agricultural varieties have been documented. Community members grow more than 150 varieties of seven potato species (out of the eight existing in the world) and more than 150 varieties of other Andean tubers and grains, alongside 100 cultivated medicinal plants. These crops form a cornerstone of local diets and food security, while their diversity reflects millennia of Traditional Ecological Knowledge (TEK) about plant cultivation, crop rotation, and adaptation to microclimates.

Cuyocuyo communities not only support crop diversity but also high-altitude Andean forests, called *Q'ueñua* forests (*Polylepis spp.*), which make up some of the highest naturally occurring tree lines in the world (up to 5,000 metres). Composed of species from the Polylepis family, many of which have been identified as endangered by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, these slow-growing trees are distinctive, with thick, multi-layered red bark and twisted branches to protect from cold and wind. Environmentally, the zone sits within the broader Tropical Andes Biodiversity Hotspot, recognised by the Critical Ecosystem Partnership Fund (CEPF) as one of the most biologically diverse regions on Earth, with exceptional levels of plant and animal endemism. Across the forests and grasslands of Cuyocuyo, one can find iconic wildlife, like the Andean cat (*Leopardus jacobita*), endangered on the Red List, as well as the Andean bear (*Tremarctos ornatus*), Taruca (*Hippocamelus antisensis*), and Andean Condor (Vultur gryphus), all considered vulnerable on the Red List. Other species include the near-threatened pampas cat (*Leopardus colocolo*), vicuña (*Vicugna vicugna*), puma (*Puma concolor*), Peruvian viscacha (*Lagidium peruanum*), and Andean fox (*Lycalopex culpaeus*). In addition, the Wildlife Conservation Society (WCS) recorded 102 bird species distributed among 28 families, as of 2016.

The Cuyocuyo ZABD is home to 3,000 people across six Quechua farming communities: Puna Ayllu, Ura Ayllu, Cojene Rotojoni, Puna Laqueque, Huancasayani Cumani, and Ñacoreque. Livelihoods are based on small-scale, family farming and pastoralism, drawing on ancestral agricultural techniques that allow communities to cultivate multiple altitudinal zones. Farmers maintain extraordinary crop diversity while maintaining alpaca herding for fibre production, with smaller numbers of llamas, sheep, and cattle raised for household consumption and local markets. The Cuyocuyo communities are widely recognised for their textile traditions, which feature Andean-Amazonian iconography, and for ceremonial dances such as the Ayarachis (meaning 'crying soul' in Quechua), a recognized national cultural heritage. The territory is also traversed by the Qhapaq Ñan (the Great Inca Road) and contains archaeological features such as chullpas (funerary towers) and ancient settlements. As descendants of the Kallawaya, historically known as the 'doctors of the Andes,' community members continue to use varied medicinal plant species, maintaining deep reservoirs of Traditional Ecological Knowledge linked to health, agriculture, and landscape management.

## ORIGIN AND STRUCTURE

The Quechua Indigenous Peoples of Cuyocuyo have a long history of conserving their agrobiodiversity. However, in the mid-2000s, their crops, livestock, and knowledge were at risk of being lost due to mining expansion, the impact of climate change, market pressure for homogeneous and mass-produced crops, and the migration of young people to the cities. Faced with this situation, the authorities of six Quechua communities—*Puna Ayllu, Ura Ayllu, Cojene Rotojoni, Puna Laqueque, Huancasayani Cumani*, and *Ñacoreque*—requested that the Ministry of Agrarian Development and Irrigation (MIDAGRI, by its Spanish acronym) recognise part of their territories as an Agrobiodiversity Zone (ZABD).

After three years of dialogue, agreements, and procedures between community authorities and conservation practitioners in the mid-2010s, including technical accompaniment from the Wildlife Conservation Society (WCS), the first Agrobiodiversity Zone in Peru was finally recognised in 2019 as the *Andenes de Cuyocuyo ZABD*. Through the process, community members became increasingly aware of the importance of formally recognising their seeds, agricultural practices, and cultural traditions as part of Peru's national agrobiodiversity framework. Local leaders convened meetings across the six communities and undertook collective learning visits within and beyond the district, including to Cusco and Lima. These exchanges strengthened a shared resolve to seek official recognition of their territory based on its terraces, crop diversity, and living cultural heritage.

Since its establishment, the six Quechua communities of the Andenes de Cuyocuyo ZABD have jointly managed the zone, using its official recognition as a territorial

*"We've had several visitors, and one of them was Engineer Fernando from WCS. He always talked to us about registering our seeds, our customs, and our traditions, which motivated us to get to work. At that time, I held a position in the community, and together with the community president, we had several meetings with our brothers and sisters from other communities in Cuyocuyo. We travelled to various places within and outside the district, reaching Cusco and then Lima. It was during one of our trips to Cusco that we were truly inspired to take action. A considerable amount of time passed, and we managed to get Cuyocuyo recognised by the state as the First Agrobiodiversity Zone because of our terraces, our crops, and our traditions. We went to Lima to receive the recognition, and since then, we've carried that pride with us. In the fields, we continue working on our farms, and every year we plant a communal plot to preserve our varieties. Now we also have a seed bank to protect, share, and recover more seed varieties."*

Sergio Ochochoque Mamani, member of the Huancasayani Cumani community, member of the Agrobiodiversity Zone management committee, and municipal councillor of the Cuyocuyo district

protection strategy. The mission of the Cuyocuyo ZABD is to maintain native crops and their wild relatives, Traditional Ecological Knowledge, and the availability of seeds and plant material to recover and preserve crop genetic diversity for the benefit of the population. The zone's governance is rooted in collective decision-making, organised through a Management Committee composed of two representatives from each community, appointed by their respective community assemblies. The committee coordinates implementation of the ZABD management plan, liaises with government bodies and partner organizations, and reports regularly to community assemblies. Ultimate authority rests with the assemblies themselves, where all adult women and men registered in the community participate with equal voting power. Elders' knowledge is highly respected, and decisions affecting the ZABD are made through majority agreement.

Photo credit: WCS, Diego Pérez

# LOCAL CHALLENGES

Photo credit: WCS, Santiago Barco

## Drought and erratic rainfall patterns

The Quechua communities of the Andenes de Cuyocuyo ZABD rely on predictable seasonal cycles to sustain their high-altitude terrace agriculture and livestock herding. In recent years, these cycles have become increasingly disrupted, with significant delays in the onset of rain and shifts in rainfall intensity that local organizations and farmers link to broader climatic changes. For example, in 2024, the rainy season did not begin until January, despite traditionally arriving months earlier in November, a delay that occurred after the main planting period had already commenced. These climatic shifts have resulted in prolonged dry spells that stress staple crops, such as potatoes, oca, and mashua, and the pastures on which alpacas and llamas depend for fodder.

The consequences of drought extend beyond crop failure. During extended dry seasons, communities have been forced to purchase fodder from outside the zone to sustain livestock through periods of water and pasture scarcity, adding unexpected financial burdens to households already operating within a largely subsistence economy. When rains finally do arrive, they often do so with irregular intensity, leading to excessively humid conditions that facilitate the spread of fungal diseases among tubers. These pathogens thrive in prolonged dampness and can devastate yields of high-altitude tubers, undermining food security and household resilience.

Traditional water management approaches, such as the reservoirs and stone terrace networks that have sustained cultivation for generations, were not designed for the increasing variability now being experienced. The emerging variability raises broader concerns about long-term water reliability. Communities have noted that surface water sources fed by rains and highland wetlands now fluctuate dramatically from year to year, complicating planting calendars, diminishing pasture growth, and destabilising the delicate balance needed for high-altitude terrace cultivation. For communities whose livelihoods are tightly coupled to the rhythms of Andean seasons, the delayed rains and subsequent agricultural stress pose a direct threat to both food production and pasture availability for livestock, undermining the sustainability of their farming lifeways.

## Climate change and water scarcity

Linked to erratic rainfall is the broader impact of climate change on the hydrological systems that sustain the Andenes de Cuyocuyo communities. Residents have observed tangible reductions in the water levels of high-altitude lakes and wetlands that historically fed irrigation channels, pastures, and household supplies. These wetlands, known locally as *bofedales*, are vital for livestock forage and for stabilising soil moisture in the region's fragile mountain ecosystems. A sustained decline in lake volumes impacts not only irrigation but also domestic water use, forcing households to adjust their routines and ration scarce supplies.

Communities also report significant glacial retreat in the surrounding Andean slopes, a trend consistent with scientific studies linking rising temperatures to accelerated ice melt in the tropical Andes. The loss of glacial mass reduces dry-season runoff, which historically buffered communities against seasonal drought. Without consistent glacial meltwater, the timing and quantity of water available for agriculture and livestock become less predictable, intensifying competition for limited resources.

Reduced water availability has further consequences beyond agriculture. In many parts of Cuyocuyo and surrounding districts, electricity is generated through small hydroelectric facilities that rely on consistent stream flows. Diminished water during extended dry periods has led to interruptions in electricity generation, affecting basic services, household routines, and the operation of community infrastructure.

## Threats to agrobiodiversity and cultural continuity

The terrace agriculture of the Andenes de Cuyocuyo supports a remarkable array of genetic resources, including more than 150 varieties of seven potato species, alongside numerous varieties of other tubers and grains. These crops not only anchor food security but also embody a wealth of Traditional Ecological Knowledge. However, the conservation of this agrobiodiversity is increasingly threatened by socioeconomic pressures and external influences.

One prominent driver of change is market demand for standardised, high-yield crop varieties that are favoured in commercial agricultural systems. These uniform varieties often outperform traditional crops in short-term yield or marketability, creating incentives for young farmers to prioritise them over ancestral varieties. Yet these commercial varieties lack the broad genetic diversity that confers resilience to pests, diseases, and climatic variability. As a result, market pressures risk eroding the genetic base that underpins long-term food security and cultural identity.

This erosion is compounded by demographic shifts. Many young people in Cuyocuyo are drawn to urban centres in search of wage labour and education opportunities, a pattern that challenges the intergenerational transmission of agricultural knowledge. Moreover, activities in adjacent areas, such as legal and illegal gold mining, inadequate waste management in nearby towns, and the use of fire in land clearing, exert additional pressure on ecosystems and biodiversity. These external impacts degrade habitat quality, introduce pollutants and fragment the landscapes that sustain both wild plant species and the ecological functions upon which traditional agriculture depends. For communities that rely daily on biodiversity for food, medicine, and cultural practices, the loss of species diversity threatens not only ecological integrity but also cultural survival and the viability of livelihoods.

## Poverty and social inequality

Socioeconomic conditions in Cuyocuyo reflect deep patterns of rural poverty and inequality, common in high-altitude Andean regions of Peru. Official statistics indicate that more than half of the district's population lives in a situation of poverty, with WCS citing 83 percent living without at least one basic need met in 2017, a figure that is typically higher in rural communities with limited access to formal employment, sanitation infrastructure, education, and healthcare. These structural inequalities compound the challenges faced by residents of the agrobiodiversity zone, especially those who speak only Quechua and have not completed formal schooling.

While traditional knowledge holders possess profound expertise in managing local crops, medicinal plants, and ecological systems, they often receive little recognition or economic reward for this expertise at the regional and national levels. Discrimination against Indigenous Quechua speakers further marginalises Elders and women within broader Peruvian society. As most meetings and training activities involving government institutions and external organizations are conducted in Spanish, Quechua-speaking Elders and women often face barriers to meaningful participation. This results in the exclusion of their reflections, knowledge, and contributions, despite their central role in community conservation efforts. The result is a paradox: those conserving and transmitting agrobiodiversity knowledge are often the most socially and economically disadvantaged.

This inequality extends to access to services. Rural households frequently lack dependable access to basic healthcare and sanitation, and families must often balance time spent on subsistence activities with the pursuit of scarce wage labour opportunities. Limited infrastructure and geographic isolation add to the cost of accessing education and markets, restricting opportunities for livelihood diversification and reinforcing cycles of poverty. For communities whose survival has been tied to ancestral agricultural systems, entrenched inequality complicates efforts to sustain cultural and ecological heritage. As households struggle to meet basic needs, the imperative for economic stability can pull labour away from traditional practices, weaken community cohesion, and diminish resilience in the face of environmental change.

## Limited recognition of Traditional Ecological Knowledge

Despite the official recognition of the Andenes de Cuyocuyo Agrobiodiversity Zone, the Indigenous management systems and Traditional Knowledge that underpin its conservation are often undervalued within national policy frameworks. At the community level, Elders and experienced cultivators are respected custodians of seed varieties, farming techniques, and ecological understanding. These practices, honed over generations, sustain both crop diversity and soil health. Yet at broader institutional levels, modern scientific or technical approaches frequently receive greater attention and resources than Indigenous systems of knowledge.

One reflection of this imbalance is the challenge of aligning community-designed seed banks and in-situ conservation practices with national technical standards for ex-situ seed storage. Peruvian agricultural policy tends to prioritise centralised genebanks with standardised protocols, which may not accommodate the dynamic seed systems that Cuyocuyo communities maintain through exchange, selection, and seasonal adaptation. The result is a tension between locally appropriate practices and externally determined technical criteria, which can complicate access to institutional support or recognition.

Coordination with government organizations, such as the National Institute of Agricultural Innovation, and nongovernmental partners, like the Wildlife Conservation Society, has been productive in securing formal recognition and technical advice. Yet community leaders report that the substantive value of their own knowledge systems is not always fully appreciated in policy dialogues or agricultural development programmes. This dynamic reflects a broader pattern in which Quechua agricultural expertise is acknowledged rhetorically but not always incorporated meaningfully into policy or resource allocation.

For communities that view traditional practices as inseparable from their cultural identity and environmental stewardship, limited recognition of Traditional Ecological Knowledge can feel like a continuation of historical marginalisation. While community assemblies and local governance structures ensure that land use decisions remain rooted in local priorities and wisdom, the broader inequality in how knowledge systems are valued creates ongoing challenges for integrating Indigenous approaches into national biodiversity and agricultural strategies.


Photo credit: WCS, Uriel Montúfar

# LOCAL RESPONSES

Photo credit: WCS, Fernando Perez

## Revitalising and expanding ancestral water harvesting and conservation practices

Ensuring reliable access to water is a central priority for the six Indigenous communities of the Andenes de Cuyocuyo Agrobiodiversity Zone, given their exposure to prolonged droughts, delayed rainfall, and increasing climatic variability. Agriculture, livestock herding, domestic water use, and local hydroelectric generation all depend on the careful management of scarce water resources. In response, communities have revitalised and expanded ancestral water harvesting and conservation practices through collective action, drawing on Traditional Ecological Knowledge and learning exchanges with other Quechua communities in Peru.

Across the territory, community members have constructed infiltration ditches designed to slow surface runoff and increase groundwater recharge during periods of rainfall. To date, five kilometres of infiltration ditches have been established through communal labour, improving soil moisture retention and reducing erosion on steep slopes. In parallel, communities have built ten family-level water reservoirs that support 80 alpaca-raising households, providing critical water access during the dry season when natural pastures are scarce.

Irrigation infrastructure has also been prioritised. Eight kilometres of ancestral irrigation canals are maintained annually through community work projects, supplying water to approximately 500 hectares of terraced cropland. These canals distribute water from lakes, wetlands, and seasonal streams to fields planted with native tubers and grains, reinforcing the viability of terrace agriculture under increasingly variable climatic conditions. In several high-altitude water sources, small dikes have been constructed to stabilise water levels in lagoons and lakes, helping regulate seasonal flows for downstream use.

Complementing these efforts, communities are preparing to implement a reforestation and conservation initiative focused on *queñua* (*Polylepis spp.*), a native Andean tree species known for its capacity to retain soil moisture and regulate local hydrological cycles. The planned project includes the conservation of 100 hectares of existing *queñua* forest and the reforestation of an additional 15 hectares. Together, these actions strengthen water security for crops, livestock, households, and energy generation, while reinforcing community stewardship of water as a shared source of life.

## KEY IMPACTS

### Revitalising and expanding ancestral water harvesting and conservation


- Community members worked communally to establish five kilometres of infiltration ditches.
- Community members built ten water reservoirs for the use of 80 alpaca-raising families.
- Community members maintain eight kilometres of irrigation canals that supply water to 500 hectares of crops.
- In several high-altitude water sources, small dikes have been constructed to stabilise water levels and regulate seasonal flows.
- Community members have planned a project to conserve 100 hectares of *queñua* forest and reforest an additional 15 hectares.

## Combining ancestral techniques with climate-adapted practices

Agriculture in the Andenes de Cuyocuyo Agrobiodiversity Zone (ZABD) is deeply rooted in terrace systems that have evolved over centuries to manage steep slopes, microclimates, and soil fertility. As climate change alters rainfall patterns and increases the prevalence of pests and diseases, communities have responded by adapting their agricultural practices while remaining grounded in ancestral knowledge. Over the past five years, farmers have collaborated with technical advisors from the Wildlife Conservation Society to test climate-adapted practices that combine ancestral techniques with selected organic agronomic methods.

Communities continue to apply at least 33 ancestral agricultural technologies, including terrace construction, organic fertilisation, frost management, and traditional planting calendars. At the same time, farmers have begun using organic pest and disease control measures as preventive tools, responding to increased humidity and fungal outbreaks that disproportionately affect tubers. These practices include the preparation and application of organic fertilisers, timely planting and harvesting, and non-synthetic treatments to reduce crop losses.

In addition, each of the six communities maintains a permanent conservation plot where crop rotation, mixed planting, and varietal diversity are deliberately maximised. These plots serve as living laboratories for conserving genetic diversity while testing cultivation strategies that reduce vulnerability to climate-related shocks. Through these combined approaches, the communities maintain and use 1,500 hectares of terraced farming systems, conserve more than 150 varieties of seven potato species originating from seven of the eight diverse Andean and global lineages, alongside 56 varieties of *oca*, 69 of *olluco*, 12 of *mashua*, 22 of corn, one *arracacha*, and one *mauka* variety recently recorded by the International Potato Center (CIP). This breadth of agrobiodiversity enhances resilience to climate variability while maintaining culturally important food systems that underpin household nutrition and food sovereignty.

## KEY IMPACTS

### Combining ancestral techniques with climate-adapted practices


- Communities maintain and use 1,500 hectares of terraced farming systems.
- Members use 33 ancestral agricultural technologies adapted to changing climate conditions.
- The ZABD conserves over 150 varieties of seven potato species.
- The ZABD conserves 56 varieties of oca, 69 of *olluco*, 12 of *mashua*, 22 of corn, one *arracacha*, and one *mauka* variety.

## Strengthening communal seed banks and seed exchange [SDG 2; SDG 13; SDG 15]

To counter the risk of agrobiodiversity loss linked to climate stress, market pressures, and declining intergenerational transmission of farming knowledge, communities in the Andenes de Cuyocuyo Agrobiodiversity Zone have strengthened local seed conservation systems. These efforts centre on two complementary practices: the establishment of communal seed banks and the organisation of annual seed exchange fairs among the six communities.

Two communities, Puna Laqueque and Huancasayani Cumani, currently operate communal seed banks that store and manage native potato seeds harvested from conservation plots. Each seed bank is governed by a community-appointed committee and regulated through locally agreed rules governing seed deposits, loans, and returns. As of 2025, each seed bank conserves approximately 70 potato varieties, with plans to expand holdings to at least 100 potato varieties and 50 additional tuber varieties in the coming years.

The seed banks serve as a safety net for families who lose crops to pests, disease, or drought, while also enabling farmers to diversify their plots and reintroduce at-risk varieties. Through these systems, four endangered

potato varieties have been recovered and reintroduced into active cultivation. Each of the six communities also maintains a permanent conservation plot dedicated to seed multiplication and varietal preservation.

Seed exchange fairs are held once or twice annually, immediately before planting season, with logistical support from the municipality of Cuyocuyo and technical accompaniment from the Wildlife Conservation Society. From 2023 to 2025, more than 150 native potato varieties were registered during these fairs, and the exchange of 32 uncommon varieties was closely monitored. These events strengthen social ties, promote equitable access to genetic resources, and ensure that agrobiodiversity is distributed across the territory rather than concentrated in a few locations.

## KEY IMPACTS

### Strengthening communal seed banks and seed exchange


- Two communities, Puna Laqueque and Huancasayani Cumani, operate community seed banks conserving approximately 70 potato varieties, with plans to expand holdings to at least 100 potato varieties and 50 additional tuber varieties in the coming years.
- The ZABD recovered four endangered potato varieties.
- The ZABD established six permanent conservation plots (one per community).
- The ZABD holds annual seed exchange fairs, helping conserve and circulate more than 150 native potato varieties registered between 2023 and 2025.

Photo credit: WCS, Diego Pérez

## Establishing a high-value market for native potato varieties

In 2025, the six Indigenous communities of the Andenes de Cuyocuyo ZABD collectively entered the market with native potatoes, marking a significant step toward linking conservation with sustainable livelihoods. For the first time, communities coordinated production, pricing, and marketing strategies to sell native potato varieties beyond local sales. Through this process, communities sold 2,000 kilograms of native potatoes representing 40 distinct varieties.

Community members calculated production costs, determined profit margins, and estimated surplus volumes that could be sold without compromising subsistence needs. Samples of native potatoes were prepared and presented to restaurants in the city of Puno, highlighting varietal diversity, cultural significance, and culinary value. Sales were made to eight restaurants in Puno, supported by a commercial partnership with the MOJSA restaurant, which played a facilitative role in connecting producers with buyers. As a result of these direct sales, the value of native potatoes increased by approximately 60 percent compared to previous market prices, demonstrating the economic potential of biodiversity-based products when appropriately valued.

Beyond immediate sales, communities are actively engaged in identifying mechanisms that reward agrobiodiversity conservation, including market-based incentives and compensation schemes that recognise the public benefits of genetic resource stewardship. These efforts seek to ensure that Quechua communities are fairly compensated for maintaining crop diversity and contributing to national food security and climate resilience.

### KEY IMPACTS

#### Establishing a high-value market for native potato varieties


- The ZABD established eight commercial alliances with restaurants in the city of Puno.
- The ZABD sold 2,000 kilograms of native potatoes, representing 40 varieties, to restaurants in 2025.
- The purchase value of native potato varieties increased by 60 percent compared to previous market prices.

Photo credit: WCS, Diego Pérez

## Documenting and conserving medicinal plants

The conservation of medicinal plants is central to cultural continuity and community wellbeing in the Andenes de Cuyocuyo Agrobiodiversity Zone. Elders possess extensive knowledge of plant-based remedies used to treat common ailments, yet this knowledge has historically been undervalued and is at risk of erosion. To address this, communities have implemented initiatives that document medicinal plant use while engaging children and youth as knowledge holders.

In 2022, with support from the Wildlife Conservation Society (WCS), communities conducted a comprehensive inventory of medicinal plants, documenting 110 species used to treat more than ten ailments. This documentation reduced the risk of knowledge loss that had previously been transmitted mainly through oral traditions. A catalogue was developed to systematise and disseminate this knowledge, sparking interest among youth and children. In 2023, students from three community schools undertook participatory research projects focused on medicinal plants, guided by Elders and family members. Activities included ethnobotanical walks, the establishment of a school herbarium, and the creation of a medicinal plant first-aid kit. Research findings were shared through drawings, murals, and public exhibitions that celebrated local knowledge systems. During these activities, parents and grandparents participated both as advisors and as observers, creating spaces for intergenerational exchange that strengthened interest in and appreciation of Traditional Ecological Knowledge. To broaden outreach, medicinal plant recipes and uses were disseminated through five radio segments broadcast on the region's main radio station, ensuring accessibility for Elders and Quechua-speaking listeners. Together, these actions strengthen cultural identity, support community health, and elevate the status of Traditional Ecological Knowledge as a living and relevant system of care.

## KEY IMPACTS

### Documenting and conserving medicinal plants

- The ZABD documented the cultivation and use of 110 medicinal plants to treat more than ten ailments.
- Students from three schools in the ZABD implemented research projects on medicinal plants.
- Medicinal plant recipes and uses were disseminated through five radio segments.


Photo credit: WCS, Uriel Montúfar

# POLICY IMPACTS

## National policy impacts

The Andenes de Cuyocuyo Agrobiodiversity Zone (ZABD) is influencing policy at local, regional, and national levels by demonstrating how community-led agrobiodiversity conservation can contribute to territorial development, climate resilience, and food security. As the first ZABD formally recognised in Peru, Andenes de Cuyocuyo has become a reference case for national authorities responsible for agrobiodiversity policy, including the Ministry of Agrarian Development and Irrigation (*Ministerio de Desarrollo Agrario y Riego*) and the National Institute of Agricultural Innovation (*Instituto Nacional de Innovación Agraria*). The zone is integrated into the Regional Conservation System of the Puno region and is located within one of the region's priority conservation areas, reinforcing the role of Indigenous governance in achieving public conservation objectives.

At the regional level, the conservation of agrobiodiversity for the benefit of local populations has been incorporated into the Puno Regional Government's Concerted Development Plan. Regional authorities have participated in the development of the management plan and have expressed commitment to supporting value chains linked to native potatoes and South American camelid fibre, as well as community-led water management initiatives. This alignment has strengthened coordination between Quechua communities and regional institutions, helping ensure that community data, priorities, and knowledge inform public planning processes.

Nationally, Andenes de Cuyocuyo has influenced the recognition and replication of ZABDs across Peru. Lessons learned from the recognition and governance process have contributed to streamlining approval procedures for other communities seeking similar designation, with nine additional ZABDs now established in the country. The Cuyocuyo experience has also served as a model for participatory management planning, demonstrating how communities can design and approve management plans through assemblies and implement them through representative management committees. In parallel, community representatives have contributed to national discussions on mechanisms to reward agrobiodiversity conservation, advocating for policies that recognise the societal benefits generated by Indigenous stewardship of crop genetic diversity.

## Contributions to the global agenda

At the global level, the Andenes de Cuyocuyo Agrobiodiversity Zone supports the implementation of several multilateral agreements, including the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), and the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development (2030 Agenda). Through the conservation of 6,555 hectares of high-Andean agrobiodiversity landscapes governed by Indigenous communities, the initiative demonstrates how integrated approaches can simultaneously advance biodiversity conservation, climate adaptation, and sustainable livelihoods.

Within the framework of the CBD, the Andenes de Cuyocuyo ZABD directly contributes to the Kunming–Montreal Global Biodiversity Framework, particularly Goal 3 on conserving at least 30 percent of land and sea areas by 2030. The communities have submitted the required documentation for the ZABD territory to be registered as an Other Effective Area-Based Conservation Measure (OECM) in the global database, a process currently evaluated by Peru's Ministry of the Environment as the national CBD focal point. The registration process was completed in December 2025, formally recognising Indigenous-led agrobiodiversity conservation as a complement to state-managed protected areas.

The initiative also aligns with Peru's commitments under the UNFCCC by strengthening climate adaptation in high-Andean farming systems. ZABDs are recognised nationally as adaptation measures, as the conservation of diverse crop varieties, terraces, wetlands, and peatlands increases resilience to changing temperature and precipitation patterns. In Cuyocuyo, the integration of water harvesting, climate-adapted agriculture, and ecosystem conservation enhances adaptive capacity while contributing to climate mitigation through the protection of carbon-rich high-Andean peatlands.

The Andenes de Cuyocuyo ZABD contributes to SDGs, including progress on poverty reduction (SDG 1) by strengthening self-employment and income generation for nearly 3,000 community members. It advances food security (SDG 2) by conserving more than 150 potato varieties and dozens of other tubers and grains that underpin local and global food resilience. By revitalising and expanding ancestral water harvesting and conservation practices, the ZABD supports clean water (SDG 6). The initiative supports climate action (SDG 13) through adaptation-focused land management and ecosystem conservation, and life on land (SDG 15) by maintaining representative samples of high-Andean ecosystems under Indigenous stewardship. Together, these contributions highlight the role of community-led agrobiodiversity conservation in advancing interconnected global goals.

Photo credit: WCS, Diego Pérez

# REPLICATION, SCALABILITY, AND SUSTAINABILITY

Photo credit: WCS, Diego Pérez

## Replication

The experience of the Andenes de Cuyocuyo Agrobiodiversity Zone demonstrates that community-led planning and governance models for agrobiodiversity conservation can be replicated in other communities, with adaptations to local ecological, cultural, and institutional contexts. The participatory process used in Cuyocuyo, rooted in community assemblies, representative management committees, and collectively approved management plans, offers a practical framework for other agrobiodiversity zones seeking to consolidate effective governance after formal recognition. Specific practices developed by the communities, including the management of communal conservation plots and community seed banks, have proven especially transferable. These mechanisms allow communities to conserve crop genetic diversity in situ while strengthening social cohesion and knowledge exchange, and they have already informed similar initiatives in other high-Andean regions of Peru.

## Scalability

Building on the recognition of Andenes de Cuyocuyo as Peru's first Agrobiodiversity Zone in 2019, the initiative has contributed to a broader scaling-up of agrobiodiversity policy and practice nationwide. To date, nine additional agrobiodiversity zones have been recognised across high-Andean ecosystems in Peru. Together with Andenes de Cuyocuyo, these zones cover approximately 233,643 hectares, involve 52 rural communities, and safeguard more than 9,500 crop varieties alongside over 360 systems of Traditional Knowledge. While the initial recognition process in Cuyocuyo was complex and lengthy, the lessons learned helped streamline subsequent procedures, enabling more efficient government processes and encouraging other Indigenous communities to pursue formal recognition of their agrobiodiversity landscapes.

## Sustainability

The conservation of agrobiodiversity has long been part of daily life for the Quechua communities of Cuyocuyo, providing a strong foundation for long-term sustainability. However, maintaining the ZABD requires sustained financial and institutional support, particularly to convene management committee meetings and implement activities outlined in the management plan. To address these challenges, the communities maintain ongoing collaboration with partners such as the Wildlife Conservation Society, municipal and regional governments, and the National Institute of Agricultural Innovation. A key element of the ZABD's sustainability has been increasing the visibility of community-led conservation efforts, helping external actors recognise that safeguarding agrobiodiversity not only sustains local livelihoods and culture, but also provides long-term benefits to society through the conservation of globally important crop genetic resources.

## FUTURE PLANS

In the short term, the communities of the Andenes de Cuyocuyo Agrobiodiversity Zone aim to join a national network of agrobiodiversity-conserving communities to share experiences, strengthen collective learning, and contribute to policy dialogue. Over the medium term, they plan to add value to native seeds, crops, and livestock products, creating stronger incentives, particularly for young people, to remain engaged in traditional practices.

Looking ahead, the communities will continue implementing their management plan, with priorities that include securing clean and reliable water for households, crops, and livestock; improving and maintaining agricultural terraces; recovering and increasing native crop varieties; strengthening alpaca and llama production; conserving wetlands and native forests; restoring medicinal plants; accessing markets for native and processed products; promoting community-based tourism; and revaluing cultural practices, language, and customs. Together, these goals reflect a holistic vision in which agrobiodiversity conservation underpins livelihoods, culture, and resilience for present and future generations.

# PARTNERS

- ***Cuyocuyo District Municipality:*** Local government partner supporting territorial management and coordination of the Agrobiodiversity Zone.
- ***Helvetas:*** NGO partner supporting community projects on agrobiodiversity conservation, territory management, and climate resilience.
- ***National Institute of Agricultural Innovation (INIA), MIDAGRI:*** Provides technical support for agrobiodiversity conservation through its Directorate of Genetic Resources and Biotechnology.
- ***Regional Government of Puno:*** Manages the Puno Regional Conservation System, within which the Agrobiodiversity Zone is formally integrated.
- ***Tambo Program, Ministry of Development and Social Inclusion (MIDIS):*** Provides logistical support for coordination, meetings, and management activities of the Agrobiodiversity Zone.
- ***UNDP Small Grants Programme (SGP):*** Provides project-based funding for agrobiodiversity conservation, climate resilience, and territorial management initiatives.
- ***Wildlife Conservation Society (WCS):*** Long-term NGO partner supporting recognition, management, and conservation of the Agrobiodiversity Zone and its biodiversity since 2016.

# SOURCES AND FURTHER RESOURCES


Critical Ecosystem Partnership Fund (CEPF). 'Tropical Andes.' 2021. Available online here.

Government of Peru. 'Andenes de Cuyocuyo: Datos Generales' ('Terraces of Cuyocuyo: General Data'). Ministerio de Desarrollo Agrario y Riego (Ministry of Agrarian Development and Irrigation). In Spanish. 2019. Available online here.

Government of Peru. 'MINAGRI designa a Andenes de Cuyo Cuyo en Puno como Primera Zona Agrobiodiversidad' ('MINAGRI designates Andenes de Cuyo Cuyo in Puno as the First Agrobiodiversity Zone'). Ministerio de Desarrollo Agrario y Riego (Ministry of Agrarian Development and Irrigation). In Spanish. 2019. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Andean Cat (*Leopardus jacobita*).' 2024. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Andean Bear *Tremarctos ornatus*).' 2016. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Taruca (*Hippocamelus antisensis*).' 2016. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Andean Condor (*Vultur gryphus*).' 2020. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Pampas Cat (*Leopardus colocolo*).' 2014. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Vicuna (*Vicugna vicugna*).' 2018. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Puma (*Puma concolor*).' 2014. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Southern Mountain Viscacha (*Lagidium viscacia*).' 2016. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Culpeo (*Lycalopex culpaeus*).' 2016. Available online here.

International Union for Conservation of Nature (IUCN) Red List of Threatened Species. 'Q'euña (*Polylepis flavipila*).' 2023. Available online here.

UNDP. 'The Andenes de Cuyocuyo Agrobiodiversity Zone wins the Equator Award.' 2025. Available online here.

UNEP-WCMC. Protected Area Profile for Zona de Agrobiodiversidad Andenes de Cuyocuyo. World Database on Protected Areas. 2026. Available online here.

Wildlife Conservation Society (WCS). '"Andenes de Cuyocuyo": Peru's First Agrobiodiversity Zone.' WCS Newsroom. 2019. Available online here.

Wildlife Conservation Society (WCS). 'Catálogo de Variedades de Papa Nativa de la Zona de Agrobiodiversidad Andenes de Cuyocuyo' ('Catalog of Native Potato Varieties from the Cuyocuyo Terraces Agrobiodiversity Zone'). *WCS Peru*. In Spanish. [PDF]. 2022. Available online here.

Wildlife Conservation Society (WCS). 'Cuyocuyo: De la Puna a las Yungas' (Cuyocuyo: from the Puna to the Yungas'). *WCS Peru*. In Spanish. n.d. Available online here.

Wildlife Conservation Society (WCS). 'De la Puna a Las Yungas: Los Andenes de Cuyocuyo Creación de Dos Nuevas Áreas de Conservación Local en Beneficio de Comunidades Quechuas' ('From the Puna to the Yungas: The Terraces of Cuyocuyo Creation of Two New Local Conservation Areas for the Benefit of Quechua Communities'). *WCS Peru*. In Spanish. [PDF]. 2021. Available online here.

Wildlife Conservation Society (WCS). 'Más de 100 plantas medicinales de Cuyocuyo y sus usos, Puno, Perú' ('More than 100 medicinal plants from Cuyocuyo and their uses, Puno, Peru'). *WCS Peru*. In Spanish. [PDF]. 2022. Available online here.

Wildlife Conservation Society (WCS). 'Reporte de la Implementación de Acciones para Fortalecer el Intercambio de Saberes sobre Plantas Medicinales en Cuyocuyo' ('Report on the Implementation of Actions to Strengthen the Exchange of Knowledge about Medicinal Plants in Cuyocuyo'). *WCS Peru*. In Spanish. [PDF]. 2022. Available online here.

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### Editors

*Contributing Editors (Zona de Agrobiodiversidad (ZABD) Andenes de Cuyocuyo):* Sergio Ochochoque Mamani, Exaltación Condo Mayhua, Loyola Escamilo Boggio
*Contributing Editors (Equator Initiative):* Miguel Luis Uson Arias, Alina Klimantovych, Anna Giulia Medri, Camila Miranda

### Writer

Meredith Beaton

### Design

Kimberly Koserowski

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EQUATOR INITIATIVE

Equator Initiative
Sustainable Development Cluster
United Nations Development Programme (UNDP)
304 East 45th Street, 15th Floor
New York, NY 10017
www.equatorinitiative.org

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