

Shock absorbers: How resilience strategies old and new help one Andean community survive in a changing climate

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It is known that high altitude regions and areas near the equator are especially vulnerable to climate change, as are marginalised communities. 4,000 meters above sea level in the Bolivian Andes, a harsh climate is nothing new. But now - as climate change creates unpredictable conditions - indigenous communities in the region are using knowledge of their local circumstances, and techniques handed down from generations, to increase their resilience to these changes. Lanqaya, a community in the Bolivian department of Norte Potosí, sits at climate ground zero, but its people have survived and maintained a strong local culture despite these challenges.



A view of the valley and some of the homesteads in Lanqaya. Photo: Sian Cowman

Members of [the Democracy Center](#) took a trip Lanqaya to stay with a family and try to understand some of these aspects of local climate resilience. At the behest of the community and the NGO assisting us to make the visit, [Vecinos Mundiales](#) (World Neighbours), we also planned a workshop on climate change - an exchange of ideas and information with the community. From our side, this involved an explanation of the unseen forces

causing the changes in Lanqaya's climate, and from theirs, relating to us the climate impacts they have experienced and how they have dealt with them.

What do we mean by climate resilience? Look at it like an elastic band: if you stretch it a little, it will return to its original shape, or close to it. Stretch it too far and it's likely to become misshapen and maybe useless. Communities are resilient if they can return to close to their original shape after a shock, such as drought, flood, or income fluctuation.

In ecological terms, an ecosystem is resilient if it is diverse: no matter what the shock, there will be some plants and animals that will survive in those circumstances, and so the system will also survive in some form. The high diversity/high resilience rule applies to human communities as well: diversity of crops, seeds, skills, water sources, income sources etc can provide resilience.

Livestock, tubers, and trees: Survival threats and opportunities in Lanqaya

People have been living in the community of Lanqaya since around 1915, when two *abuelos* ('grandfathers'), moved here from the mines and started farms and families. Now, there are about 40 families in adobe homes, spread widely along a steep valley.

In Lanqaya, people's survival depends on their livestock and crops to an extent that would be very unfamiliar to most urban people in the 'developed' economies.

In the climate change workshop, people explained their food and growing practices to us: "We grow potato, papa lisa, barley, oats, oca; the oats are for animal feed, and we eat the barley."

Oca and papa lisa are two nutritious tubers, native to the Andes, that can deal with high altitudes, poor soil and harsh climates. They are produced in volumes second only to potatoes, *papas*. *Papas* come in many varieties, some with beautiful local names: *yana imilla*, *papa kbollu*, *papa itamaqui*.

People grow more cereals and starchy staples than vegetables, due to the cold climate and the better storage capacity of the carbohydrates. 'Chuño', dehydrated potato, is the most important as it can be stored for up to five years. It is made by laying small potatoes out on the ground to freeze overnight and then compressing them with your feet to eliminate the water. They then dry out in the sun - dark brown, wrinkly, and about the size of pebbles.



Chuño being made. Photo: Sian Cowman

The diversity of crops sown in Lanqaya, and the diversity of varieties, ensures resilience: some crops will do well even when shocked by the weather. In a community where fridges and freezers are rare, chuño's capacity for long-term storage makes it a fall-back plan in the case of the failure of other crops.

That's not to say growing practices have always been the same: "We used to only grow enough to eat because it was hard to get to the towns to sell," we were told. "Now we only grow enough to eat because the land doesn't give as much. Our harvests were bigger before because we used *abono fino*, not chemical fertilizers. Back then the soil was really good, not like now."

People used to use chemical fertilizers and pesticides, but now the community is once again moving away from these. Instead, they're using animal manures and compost foliar sprays for boosting soil fertility and crop yields ecologically, in part following advice received by Vecinos Mundiales. And they're seeing good results.



One of the few large native trees left in Lanqaya. Photo: Sian Cowman

As people told us about the soil and growing practices, they began to talk about the trees - an important part of the ecosystem and people's livelihoods. Cooking is done on wood fires. "Before we had *kemina* and *kbemalla* and other trees; one *kbemalla* could give enough firewood for ten persons without cutting down the tree." There aren't many of these native trees now. People use a native bush called *th'ola* for firewood, but it's also diminishing.

Trees anchor the soil and prevent erosion. Native trees are also important for soil fertility, providing their leaves as compost, and some varieties adding extra nitrogen to the soil. Most of the

trees in Lanqaya are eucalyptus (an introduced variety not native to Bolivia), and as one resident told us, “They aren’t so good: they need a lot of water, and any crops near them don’t produce well. When you look at the soil around them it’s dry.”

Livestock are another part of this community’s strategy for survival. Mostly, sheep are kept; they provide a cushion in case of a shock as they can be sold or exchanged. You can see people carding the wool on spools as they walk to their fields. It is then used for weaving the beautiful *aguayos*, square cloths that are used for carrying just about anything and are surprisingly waterproof. The sheep are only eaten on special occasions.

But the combination of few trees and the hooves of the livestock can contribute to erosion on the steep slopes, making it easier for heavy rains to wash away the soil. Sheep hooves are especially damaging to soil, but people keep them for a reason. “To grow potatoes you need manure, and we get it from the animals; that’s why we have sheep.”



Sheep corralled for the night. Photo: Sian Cowman

Facing the unknown: The challenge of climate unpredictability

Along with changes in the soil quality, crop yields, and the loss of native trees, the climate has changed. In the workshop, we asked the community to outline some of these changes. It is the older people who are really able to tell the difference over time: “when I was young, it rained in its time, it froze in its time, now it rains or freezes anytime, it’s all completely changing”, one elder man told us.

In contrast, the young *alcalde communal* (elected leader) thought that “in our community climate change isn’t too strong yet”, but also told us that “above all, the hail affects us, because it makes the potatoes small, it destroys the leaves. We have heavy rains; they carry away the potatoes, the soil, and the river opens a new path. Frosts also, as you’ll all remember we had a frost one year that killed all our crops.



Walking to the fields to tend the chuño. The bare slopes exacerbate erosion from heavy rains. Photo: Sian Cowman

There have always been frosts and some heavy rains – in fact, making chuño depends on hard frost - but they came in ‘their time’; they were predictable. Subsistence farmers rely on the signs from the seasons to plan their planting. Now, as one farmer told us, “the seasons are variable; not even the wind comes when it should, it doesn’t rain in its time, and when the rain does come it is crazy and wild.” Severe weather at unpredictable times is destructive: for example heavy rains can destroy small seedlings, or recently harvested crops.

And it's getting warmer; the chuño makes that obvious. According to Lanqaya residents, it used to take only a few nights to freeze enough to make good chuño, and now it can take a few *weeks*. People are worried, as “we don't know if it's going to freeze in the coming years.”

But this is not the first time that Lanqaya has faced this kind of change in the climate. Years ago, the community moved in its entirety an hour's hike higher up the mountains due to changes in temperatures.

The move was in pursuit of more frost for the chuño, and more pasture for the sheep. Now the old area of residence, a lower valley, is used for growing crops. The warmer temperatures are an opportunity: recent plantings have included vegetables, apple trees, and the edible prickly pear *tuna*, which never grew here before. A new irrigation system is being put in these fields by the community, assisted by Vecinos Mundiales.



A view of the new growing areas in the lower valley.
Photo: Sian Cowman

In it together: Community organisation is a key to resilience

What enabled Lanqaya to make the move to the higher location? The level of collective decision-making required to move a community of around a hundred people together is not insignificant. The decision to move was not an arbitrary one taken by authorities, far removed from their reality - people here are active decision-makers in their own future.

In Lanqaya, people use old methods of community organisation to take these decisions. The community has an *alcalde communal* - literally ‘community mayor’ - a position in which a man is elected to the position of leader for a period of one or two years. It is his job to carry out the decisions that the community take collectively. The backbone of this system is the regular community meetings.

These decision-making processes are not just at community level: they are mirrored in several ‘levels’ of autonomous organisation. The ‘ayllu’, or district, is a system of organisation between communities. Lanqaya belongs to the *ayllu* Chiru, made up of 16 communities. This system allows districts to make democratic decisions for that area.

A Lanqaya man explained to us: “in the ayllu they meet like we do in Lanqaya, once a month. Then seven allyus make up a kind of *subalcaldía*, local council, here called Qhayana, and they also meet. The *subalcaldía* then belongs to the municipality of San Pedro de Buena Vista.” At the municipal level, the community system begins to merge with the government system.

It is undoubtedly this democratic structure which gave Lanqaya the ability to make the collective decision to move location. This community organisation is the backbone of resilience, allowing Lanqaya to discuss and make decisions on other aspects of their lives: what crops to sow, where to get water, and conflict management. It also allows them to manage access to one of the most important of resources for resilience: land.

A land title is held collectively for the area of Lanqaya, but within that, access to land is managed by the community. The land is divided into plots belonging to families, which were “inherited from our *abuelos*, grandparents.”

In order to solve the problem of larger families not having enough land to feed everyone, those with smaller families will loan land in return for a share of the crop. It is forbidden to sell any land; a customary law that is respected. Even though the land has boundaries, everyone helps each other with the heavy work of soil preparation and harvesting. This system makes sure everyone has access to land without recourse to monetary exchange.



Some of the fields in Lanqaya. Photo: Sian Cowman

People manage their money collectively, too. Many years ago, an NGO gave seed funds for co-operative banks to several communities in the area, of which Lanqaya is the only one to have maintained theirs. The bank has an elected board, which provides low-interest loans when people are stretched financially by expenses like school supplies. It is a major boost to resilience: if the roof blows off someone’s home, or they lose sheep to disease, they have access to a loan that will not be prohibitive to pay back. And if someone cannot pay, the community may well

accept sheep or chuño in payment.

One notable exception to this egalitarian approach to organisation in Lanqaya is that women don’t participate nearly as much as the men. There has never been a woman community leader. But in the last three years in Lanqaya, the women have organised their own group. Although with the many demands on their time one woman told us “we can’t all go to meetings all the time, because we have to look after the animals and the children.”

Learning to adapt: what North and South can teach each other

Many people and communities in the global North are practising [resilience strategies](#) that exist in Lanqaya, such as increasing crop diversity, and integrating livestock into the growing system. They also employ some techniques that could be useful here in Bolivia, such as soil conservation, agro-forestry, and innovative ways of increasing soil fertility.

But Northern communities often lack the horizontal decision-making structures and customary laws, designed by the people themselves, which can assist in implementing these practical resilience strategies. The communal organisation in Lanqaya provides a method for sustainable and equitable management of resources. The process also means that Lanqaya can take collective decisions such as their recent move towards agro-ecology, and that everyone in the community will respect the decision taken. An important part of the community’s ability to make these

decisions lies in the strength of cultural identity, and sense of place. This also gives people the ability and motivation to deal with conflict when it arises.

A stark difference between Northern communities seeking to be resilient and the example of Lanqaya is that of choice: Lanqaya creates its resilience in order to survive. And while its strong community organisation allows for sustainable resource management, when communities are mostly operating at a subsistence level it can be difficult to make investments to strengthen resilience. For example, a native tree nursery in Lanqaya could replace trees used for firewood, but the resources to establish one are simply not there.

The impressive capacity of Lanqaya's people to deal with change doesn't mean they are endlessly adaptable. The community's survival up to now has depended on its move to higher slopes. The next phase is crucial: the frost is needed for making chuño, and there's nowhere higher and colder left to move nearby. The possible future loss of chuño is a serious one for Andean communities, and being able to grow a staple crop with similar



One of the abandoned homesteads on the lower slopes. Photo: Sian Cowman

storage capacity will be make or break for their survival. In Lanqaya, the recent opportunity to diversify crops due to the warmer temperatures on the lower slopes will be key for survival.

Innovative practical land management techniques, or assistance in small-scale infrastructure- like the irrigation system being installed in Lanqaya - are and can be useful transfers from North to South. What is more, our technology and global connectedness, while sometimes detrimental, can be used to build bridges between communities facing change on both sides of the equator.

We weren't the only ones who thought of this during our stay. In the last part of the climate change workshop, we showed photos far removed from Lanqaya's reality: factory farms, endless traffic jams, coal-fired power plants, and large-scale deforestation, to explain the causes of the changes in the local climate.

The response from one man summed it up perfectly: "The truth is we don't pollute a lot; in other countries they pollute more, and in those countries some people are thinking what can they do to change; well we should write a note and send it on the internet, we'll tell them 'let's not pollute so much' and show them how."

By Sian Cowman



This resource forms part of the Democracy Center's work on climate resilience. See [this page](#) for all of the materials available, including this [video](#) on seed resilience and this [photo-documentary](#) on resilience, climate change and gender.

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