Sumaq Kausay and *Ayllu*: Quechua values and worldviews for conservation and sustainable development in the Chalakuy Maize Park, Lares, Peru

Case study for the project 'Indigenous biocultural heritage for sustainable development'

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Abbreviations and acronyms

Asociación ANDES	Association for Nature and Sustainable Development
BCHT	Biocultural heritage territory
FFS	Farmer Field Schools
FPIC	Free, prior and informed consent
IIED	International Institute for Environment and Development
MINAM	Peru Ministry of Environment
NGO	Nongovernmental organisation
PAR	Participatory action research
PI	Principal investigator
RQ	Research question
SD=HS	Sowing Diversity=Harvesting Security project
SDG	Sustainable Development Goal [of the United Nations]
TEK	Traditional ecological knowledge
UNDRIPs	UN Declaration of the Rights of Indigenous Peoples

Executive summary

Biocultural Heritage Territories (BCHTs) are mosaics of land uses, deeply linked to traditional knowledge systems embedded in cultural traditions. The Andean Potato Park in Cusco, Peru is perhaps the best-known example of a BCHT, where Indigenous knowledge and practices effectively combine food production with sustainable development, biodiversity conservation and ecosystem protection.

This study was conducted as part of the 'Indigenous biocultural heritage for sustainable development' project (2018–2021), funded by the Sustainable Development Programme of the British Academy. The project explored how Indigenous Peoples' worldviews, wellbeing concepts, cultural values and customary laws promote or hinder biodiversity conservation and sustainable development. This case study, coordinated by the Indigenous NGO Asociación ANDES working closely with Indigenous community researchers, contributed to an ongoing decolonising action research process with Quechua Peoples in the Chalakuy Maize Park, in Lares, Cusco, Peru. It explored the interconnections between culture and biodiversity, and how biocultural heritage contributes to Sustainable Development Goal 2 'End Hunger'.

Conducted with four Quechua communities near the market town of Lares, this study was guided by the Andean concept of *Sumaq Kausay* (harmonious existence/wellbeing). The Lares worldview, encapsulated by the notion of *Ayllu*, seeks to balance the needs and aspirations of people, nature and the sacred. Balance between these three communities or *Ayllus* is necessary to achieve holistic wellbeing (ie the wellbeing of all three *Ayllus*). Traditional knowledge of agroecology dominates agricultural practices in the communities, which sustain about 90 maize and 400 potato varieties. Mountain gods give natural signs to guide farming activities and play a role in governance. High-altitude mountain lakes, forests and rivers are also considered sacred. Wildlife is strictly protected in these sacred sites. The Lares Indigenous Peoples have a community-based governance system which emphasises participation and deliberation, operates in service to the collective, and is often led by women.

Barter markets overseen by women and guided by Andean values such as reciprocity play an important role in ensuring nutritious diets and maintaining Andean values, ecological knowledge and agrobiodiversity. While each community varies in relation to the altitudinal zone they inhabit and the crops and livestock they produce, inhabitants all come together to trade with family and friends in barter markets. Quechua values of reciprocity, balance, and solidarity with nature and in society have ensured that communities maintain biodiverse, resilient agroecological farming systems. Strengthening these values has ensured food security and health during the COVID-19 pandemic.

The study found no evidence of cultural values and practices or traditional knowledge that hinder sustainability or equity. Quechua worldviews, wellbeing concepts, cultural values and belief systems are still very strong in the Lares region, even among the youth. However, modern/western values are starting to influence Indigenous culture and cosmovision, partly due to mining promoted by national neoliberal policies, which is a key threat to biocultural heritage. In addition, companies are promoting cheap industrialised foods in rural Andean communities, often with government support, contributing to reduced interest in farming and increased malnutrition. But there is no government support for barter markets.

The Potato Park model has proved highly replicable in the Lares region, where communities share a very similar Quechua culture, political context, challenges and opportunities. To protect Peru's rich biocultural heritage, this report recommends integrating biocultural heritage and BCHTs into national sustainable development policy, and the recognition of BCHTs as agrobiodiversity zones. Policies should be introduced that protect barter markets, given their multiple benefits for local economies, biodiversity, nutritious diets, health, women and culture. Intercultural knowledge dialogue between different stakeholders must be ensured, with the increased participation of Indigenous Peoples and the integration of local and traditional knowledge into existing government policies, schemes, planning and research. There must be a biocultural approach to sustainable development in Lares, ensuring biocultural heritage is adequately recognised by national authorities and creating awareness of the real value of Indigenous knowledge for biodiversity conservation, livelihoods and climate adaptation.

1. Introduction and project objectives

Although Indigenous Peoples have been living sustainably for generations, few studies have explored the role of different elements of cultural heritage, and their links with biodiversity, in promoting sustainable development. This study was conducted as part of the project 'Indigenous biocultural heritage for sustainable development' (2018–2021), funded by the Sustainable Development Programme of the British Academy. The project involved case studies in China, India, Peru and Kenya, and had two main objectives:

- To catalyse the establishment of collectively managed biocultural heritage territories (BCHTs) for sustainable development, and
- To enhance understanding of the role of biocultural heritage in addressing the Sustainable Development Goals (SDGs) among policymakers, researchers and practitioners.

The project explored how Indigenous Peoples' worldviews, wellbeing concepts, cultural values and customary laws promote or hinder sustainable development, and how these are perceived by different actors within communities. Using case studies of the Mijikenda in Kenya, Quechua in Peru, Naxi-Moso in China, and Lepcha and Limbu in India, the project examined how different elements of biological and cultural heritage are interconnected in landscapes, and how this contributes to sustainable development, including achieving Sustainable Development Goal 2 'Zero Hunger'. Through decolonising action research, the project sought to contribute to community-led processes to establish BCHTs, building on the Quechua Potato Park in Peru.

In Peru, the study contributed to an ongoing decolonising action research process with Quechua Indigenous Peoples in the 'Parque Chalakuy de Maiz' or 'Chalakuy Maize Park',[1] in Lares, Cusco Region, Southern Peruvian Andes. The study was coordinated by the Indigenous NGO Asociación ANDES (Association for Nature and Sustainable Development), working closely with Indigenous community researchers from the Chalakuy Maize Park.

Seed exchange in a barter market in Lares town. Credit: Asociación ANDES

[1] 'Chalakuy' means 'barter' in Quechua.

2. Community context and biocultural heritage

Peru is an incredibly diverse country in terms of geographic and climatic zones, ecosystems, ethnic groups, languages, plant and animal species. It is an important cradle of civilisation and centre of origin and domestication of food crops beginning over 7,000 years ago (Argumedo and Stenner, 2018). Farmers in the Andes mountains have successfully adapted to extreme geographic and climatic conditions over millennia, including the cyclical and often devastating impacts of El Niño, bringing important food crops such as potatoes, quinoa and other highly nutritious high-altitude crops to the world.

The potato is thought to have first been domesticated 8,000 years ago near Lake Titicaca, at 3,800 metres above sea level, on the border between Bolivia and Peru. Hunter-gatherer communities who had lived there for at least 7,000 years started domesticating wild potato plants that grew in abundance around the lake. According to Inca mythology, the creator, *Viracocha*, took the sun, the moon and the stars out of Lake Titicaca. They also created agriculture by sending their two sons to the world/earth to study and classify the plants that were growing there. They taught people to sow seeds and use crops so that they were never short of food.[2]

The District of Lares, Calca Province, Cusco Region, where this case study is situated, ranges in altitude from 2,000 to 4,500 metres above sea level. The existence of diverse ecological and climatic zones supports a wide variety of wild and cultivated species. An ANDES baseline study in the Chalakuy Maize Park communities in 2016 indicated that 95% of the Lares population lives in rural areas, and 98% work in agriculture (although many also work in other sectors) (ANDES, 2016a). The average farm plot size is 1.5 hectares, and smallholder agriculture constitutes the largest component of the local economy.

While about 25% of Peruvians speak Quechua as a first language, almost everyone in the communities of Lares speaks Quechua. The region maintains not only the language of the Inca ancestors, but also their resilient traditional food systems featuring high levels of wild and domesticated species diversity and rich traditional knowledge. In the communities of Lares, Inca science defines land-use categories for different altitudinal zones. Such biodiversity and knowledge contributes to local and global food security and resilience.

Barter markets take place once a week in Lares town and in several smaller communities. These markets enable the exchange of foods, seeds and information from different altitudes to provide for balanced nutrition. The use of barter to secure nutritious food is particularly important for Indigenous women, who have little education and few opportunities for employment to generate income, but are responsible for much of the agricultural work (ANDES, 2016a).

This study was conducted with four Quechua communities near the small market town of Lares, that have established the Chalakuy Maize Park: Ccachin, Choquecancha, Rosaspata and Pampacorral. These communities have one of the highest levels of maize diversity found in Peru (about 95 different varieties), and cultivate more than 400 varieties of native potato at higher elevations where potato wild relatives also grow (Swiderska and Stenner, 2020). The communities also grow quinoa, beans, marrows and turnips — using traditional agroecological practices, mainly for subsistence and barter. They also sustain rich wildlife, which is protected in each community in sacred mountains and high-altitude sacred lakes. The communities have a total land area of about 50,000 hectares and a total population of about 2,800 — but about 50% of the land is not farmed due to steep slopes and rocky mountains.

The Andean concept of *Sumaq Kausay* (harmonious existence/wellbeing) is guiding participatory research and the establishment of the Chalakuy Maize Park biocultural heritage territory (BCHT) in these four communities in Lares. This work is supported by the NGO ANDES (Peru), and builds on the successful Potato Park BCHT in Pisaq district (also in Calca Province, Cusco Region). *Sumaq Kausay* is based on an ideal of balance among three closely connected *Ayllus* (communities or realms) (see Figure 1). *Runa Ayllu* refers to humans and domesticated crops and animals; *Sallqa Ayllu* is made up of wild species and spaces; and *Auki Ayllu* represents the sacred, including mountains, sacred sites,

[2] See: http://www.fao.org/potato-2008/es/lapapa/origenes.html

customary laws and ethics. The concept of *Sumaq Kausay* thus enshrines economic, environmental and social sustainable development goals, with an approach based on principles such as reciprocity, complementarity, and balance.

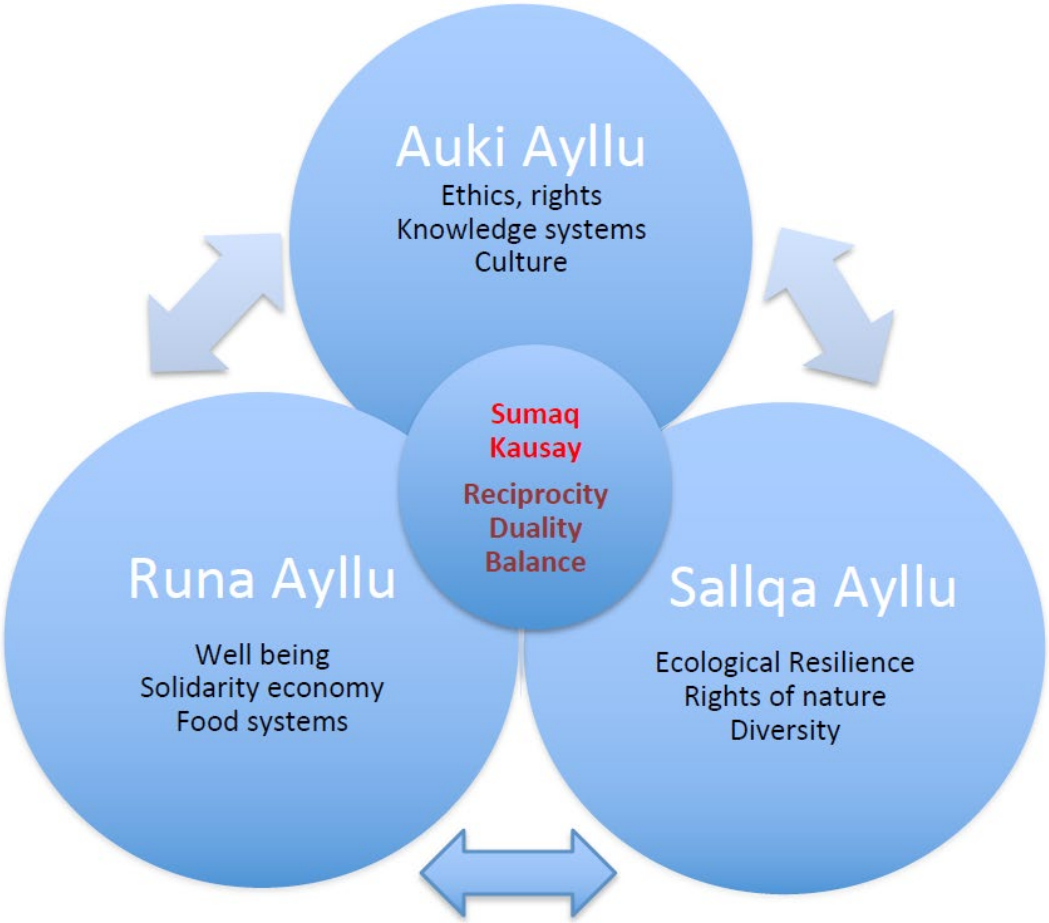

Figure 1: The Ayllu system in biocultural territories. Source: Asociación ANDES.

Threats to biocultural heritage in the Peruvian Andes

Smallholder and Indigenous farmers' food and seed systems in the Peruvian Andes face multiple challenges. Climate change is having dramatic impacts in high mountain areas where temperatures are rising faster than average. Increasing temperatures, loss of glaciers, changing rainfall patterns, and increases in the frequency of extreme events are evident to farmers in the Andes and have been well-documented by scientists. With increased temperatures, pests and diseases are moving up in altitude, forcing potato cultivation to also move upwards, as has been documented in the Potato Park (Sayre, Stenner and Argumedo, 2017).

The challenges related to climate change are exacerbated by socioeconomic and political factors. Extractive industries such as mining and logging are very prevalent in the Andes, leading to widespread habitat destruction and fragmentation, contamination and land grabbing. While Indigenous communities have collective land rights under Peruvian law, they do not hold rights to the underground resources, limiting protections of their lands and livelihoods.

In Peru, promotion of industrial agriculture has led to habitat destruction, as well as biodiversity loss and genetic erosion of important food crops. Globalised market forces, and food and seed policies have been promoting modernisation and transformation away from traditional and biodiverse smallholder systems, endangering local and global food security and the wellbeing and resilience of smallholder and

Indigenous farmers. Even though most large-scale commercial agriculture is concentrated in the coastal region of Peru, national neoliberal policy frameworks allow global dynamics to also affect agriculture and food systems in Andean regions. For example, in Lares, some quinoa and amaranthus varieties have been lost, and ANDES is trying to reintroduce these.

Objectives of the Chalakuy Maize Park and work done to date

Asociación ANDES and Quechua community researchers from the Potato Park have been working with communities in Lares since 2008 to establish the Chalakuy Maize Park and to develop related biocultural products and services. Through the establishment of this biocultural territory, ANDES hopes to strengthen Indigenous territorialities and governance, protect biocultural heritage rights, and support sustainable livelihoods and biocultural heritage in the Peruvian Andes. BCHTs establish a territorial approach based on pre-colonial principles for land management, and aim to promote conservation, culture and education, sustainable livelihoods, and decentralised governance.

A Chalakuy Maize Park Association has been formed linking the four communities for collective governance of the biocultural territory; and the Association is applying for legal recognition as an agrobiodiversity zone. Artisanal weather monitoring stations have been established in the park; and an electronic application ('YupanApp') has been developed to facilitate community-led research using tablets and smart phones (Swiderska and Stenner, 2020). The 'Sowing Diversity, Harvesting Security' project funded by Oxfam Novib (2015–2019), supported research, learning exchanges, and capacity-building activities in the four communities. The project explored agrobiodiversity and wild food plants for nutrition (neglected and underutilised species, or NUS), working with local community researchers (traditional knowledge experts). Currently, ANDES is conducting research replicating a 2001 study on barter markets in Lares (by Neus Marti), to show changes in participation in barter markets and in the quantity and diversity of agricultural products exchanged over the past 20 years. Capacity building on Andean agriculture and on development of biocultural products is also under way in the communities.

Two Quechua women from the Chalakuy Maize Park in Lares hold different varieties of maize.
Credit: Tammy Stenner/ANDES

3. Objectives of the Peru study

The research carried out in Lares, Peru aimed to further support the establishment and strengthening of the emerging 'Chalakuy Maize Park' BCHT through decolonising action research. Under this project, ANDES has explored methods and tools for an effective scaling-out of the biocultural innovations that form the basis of the Potato Park, applying lessons learned from the Potato Park experience. The Potato Park BCHT model supports the development of innovations that can help to improve food production, seed security and nutrition, empower women, and increase climate resilience. The approach supports resilient and biodiverse agricultural systems by applying research methodologies that integrate traditional knowledge and science.

The exchange of experiences and knowledge among the Potato Park communities, scientists and policymakers has supported the development of local, national and international policies to protect the rights of Indigenous Peoples, traditional agricultural and food systems, and the rights of Mother Earth, '*la Pacha Mama'*. The Potato Park has been recognised as an agrobiodiversity zone, providing additional protection (for example against mining). Similarly, this study in Lares sought to shape policies and their implementation. Specifically, it aimed to:

- Foster more inclusive, intersectoral, holistic and culturally centred approaches and strategies for rural development, by promoting recognition of the Chalakuy Maize Park under the new law of agrobiodiversity zones, promoting conservation-based agriculture and food sovereignty
- Provide evidence and multi-sectoral analysis to spark a more culturally centred approach to the SDGs
- Implement the UN Declaration of the Rights of Indigenous Peoples (UNDRIPs), especially in relation to collective rights to lands, territories and natural resources; discrimination; self-determination, self-governance and autonomy; maintenance and dignity of Indigenous culture, language and spirituality; intercultural education, biocultural heritage and Indigenous knowledge — through the Chalakuy Maize Park and decolonising research; and
- Promote interdisciplinary collaborations between culture, biodiversity, rural development and agriculture actors, and to promote interdisciplinary concepts and tools (such as *Sumaq Kausay* and *Ayllu*) that can help integrate culture in decision making for development and conservation.

A group of women engage in project discussions in the Lares landscape. Credit: Enrique Granados/ANDES

4. Research approach, methods and tools

The study addressed six key research questions (RQs) that were developed with research partners from the four countries (Peru, India, China and Kenya) at a project planning workshop in London in January 2019. The research questions were adapted to the local context in Peru with the community researchers. Each of the six questions represent a key component of a BCHT:

1. **Ethnicity:** How are particular ethnic groups connected to the landscape historically?
2. **Worldviews, cultural values, wellbeing:**
    - 2.1 How do Indigenous worldviews about wellbeing, cultural values and customary laws promote or hinder sustainable and equitable development?
    - 2.2 To what extent are these recognised or applied by different generations and genders, or ethnic, religious, class/caste and economic groups? Which drivers are influencing cultural change (for example, religion, education)?
3. **Governance:** What kind of traditional governance system exists? How can it be strengthened for sustainable management of the local landscape?
4. **Biocultural systems:** What are the main elements of the biocultural system and how are they interconnected and inter-related?
5. **Livelihoods:** How does the local biocultural system influence the local livelihoods system? How to shape/strengthen a biocultural economy?
6. **Biocultural heritage and SDG 2:** How does the biocultural system contribute to achieving the SDG 2 targets — maintaining genetic diversity, ensuring sustainability and resilience, ending hunger and malnutrition, and doubling productivity?

The study used the decolonising action research approach developed by ANDES and the Potato Park communities, which has generated multiple sustainable development impacts (for biodiversity, food security, livelihoods, climate resilience) and strong local ownership and self-sustainability in the Potato Park (ANDES, 2016a; Swiderska et al., 2020). The Potato Park approach has been adapted to the Lares context with the Chalakuy Maize Park community researchers with support of ANDES since 2008, including through the Sowing Diversity=Harvesting Security project. To collect information needed for communal characterisation, the approach uses biocultural methods, Farmer Field Schools, focus groups, interviews and desk research. Biocultural methods are a simple participatory tool that aim to promote the leadership of Indigenous Peoples in their conservation and development processes. It is based on Indigenous ways of understanding the world, which includes different types of Indigenous knowledge, cosmovisions, and classifications of *Pacha Mama* (Mother Earth/Nature).

The work of ANDES aims to empower rural women and men so that they can better understand agrobiodiversity and its components and their relationships with it. The approach aims to promote a dignified life in accordance with Indigenous values, the defence of their rights, and empowerment in decision making for the management, sustainable use and conservation of agrobiodiversity. It seeks to empower Indigenous researchers and communities by recognising the value of Indigenous knowledge, and to strengthen capacity for research and understanding of external threats and opportunities. Priority is given to decolonising and Indigenous research methods and tools that support Indigenous practices and promote intergenerational knowledge transmission (Swiderska and Stenner, 2020). These methods and tools are reinforced with participatory action research (PAR) methods and tools (see Table 1 below).

Table 1: Research methods and tools

Decolonising methods	Indigenous research methods	Participatory action research methods
• Critical approaches; challenge hegemonic colonial discourse • Challenge ideology that serves the interests of the few against the wellbeing of the many • Be forces for change in everyday activities • Privilege and revalue Indigenous ways of knowing and doing • Hand over control of actions and decisions that affect Indigenous Peoples to Indigenous Peoples • Explicitly address issues of power and rights • Create local capacity	• Participation in community meetings and assemblies • Discussion with community leaders or authorities • Prior and informed consent • Identification of community researchers (*técnicos*) and other experts in the community • Capacity building of community researchers and experts; assistantships • Coordination between community researchers and experts	• Biocultural diagnostic (for example participatory mapping and related discussions) • Inventory and selection of biocultural innovations (for example through interviews) • Learning exchanges between communities • Experimentation (for example Participatory plant breeding) • Methodological workshops (to select methods and tools, using traditional knowledge) • Biocultural festivals (exhibition of seeds, biocultural products, innovations) • Audio-visual materials • Radio programmes
Decolonising tools	**Indigenous research tools**	**Participatory research tools**
• Follow community protocols • Use Indigenous conceptual frameworks, values, guiding principles • Use oral and visual tools (conceptual graphics, video, music, drama) • Power/ knowledge relations analysis	• Stories, legends, songs, riddles • Use of conceptual graphics • Indigenous theatre, music • *Yupana* (ranking) • 'Talking maps' (for example elders talking about landscapes)	• Testimonies (for example storytelling) • Sociodramas (acting out problems) • Participant animation exercises • Video, photography • Maps/GIS • Reports of exchanges, workshops and meetings • Timelines, transect walks • Web and cloud-based tools

The research methodology was designed respecting the Indigenous worldview and its focus on interlinked biological and cultural heritage. This was done by ensuring the active engagement of the Chalakuy Maize Park communities in the design, implementation and evaluation of the research. Their participation aimed to empower participants and local institutions by allowing their involvement as facilitators throughout the process. Three main strategies enhanced the participation of the communities:

- Leading the process from the local ANDES office in Lares. In order to enhance trusting relationships with the participating communities, much of the work was done in the Lares office
- Integrating local people in the research team as local technicians (ie Indigenous community researchers). Local technicians were elected by community assemblies in each participating community to be researchers and facilitators
- Mixing professional and cultural profiles in the work team. The team that led the process was constituted to ensure interdisciplinarity and interculturality. It comprised experts from ANDES, including a project manager, a research assistant, a field coordinator, and local community researchers from the Potato Park and the Chalakuy Maize Park, to allow a knowledge dialogue.

A free, prior and informed consent (FPIC) process was conducted at the start of the project, considering that the free consent of rural communities is the cornerstone of respecting their biocultural rights and protocols; and to empower the beneficiary population so that they may become active stakeholders of their own development. Natural resources are an integral part of the territories of Indigenous Peoples. The UN Declaration on the Rights of Indigenous Peoples, adopted in 2007 by the UN General Assembly, lists the biocultural rights of Indigenous Peoples, with respect to their land and forests, stating in Article 32.2 that: *"States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed*

consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources." To conduct the FPIC process, the proposed study was presented to the four community assemblies (councils) in March 2019, allowing each community to shape the study objectives and design, and to place conditions (or deny consent).

This FPIC process built on an earlier FPIC process conducted as part of a larger project (Sowing Diversity=Harvesting Security), which established the close working relationship between ANDES and the Lares communities and developed the overall approach, methods and tools. The SD=HS project conducted a nutrition and NUS baseline study in the four project communities, and paid special attention to ensuring FPIC. This process involved reporting on the project and its benefits at community meetings, obtaining the approval of the communities' authorities, and providing adequate time for the community members to decide autonomously. From that came a document of joint commitment.

The SD=HS project trained local community researchers from the four communities to lead and facilitate decolonising action research processes, including through Farmer Field Schools centred on traditional knowledge. For the current project, local community researchers took part in further research co-design and training workshops. The training sought to ensure the reliability of the results and their ability to independently carry out research, and included a focus on ANDES' code of ethics, facilitation and biocultural research methods and Farmer Field Schools, and awareness of relevant national and international policies.

The main activities carried out under this project were as follows:

- In June 2019, the project's principal investigator (PI) at IIED visited the Lares communities to better understand the study context and the ANDES-Potato Park-Maize Park decolonising action research methods and tools. Participatory mapping, participatory transects and Indigenous matrix ranking exercises (*Yupana*) were conducted as part of this process involving the four communities. A workshop was held at the ANDES office in Cusco, bringing together community researchers from the Potato Park and the Chalakuy Maize Park for a horizontal learning exchange on Indigenous research methods and tools. The PI then visited the study sites in India, China and Kenya to share insights and lessons on the approach, methods and tools used in Peru, which have been vital for establishing the successful Potato Park BCHT.
- In September and October 2019, interviews were conducted with policymakers, including Gabriel Quijandria, the Vice Minister of Environment (MINAM), the head of the Directorate for Biodiversity of the MINAM, the head of the National Program on Globally Important Agricultural Heritage Systems (GIAHS), and with members of the Peruvian Network for the Environment (Red Ambiental Peruana) and local NGOs in Cusco and Lares. These interviews explored how recognition of the Chalakuy Maize Park as an agrobiodiversity zone can strengthen customary governance systems in the Lares communities (RQ 3). In addition, ANDES and the Lares communities participated in a policy roundtable for Lares Valley, organised by local Lares authorities.
- The project aims and expected results were also discussed in September 2019 as part of the weekly staff meetings of ANDES field staff and '*TecnicosLlocales*' (community researchers) of the Chalakuy Maize Park. They particularly focused on the potential benefits for participants and the wider communities, and how the study linked to other current and previous research.
- The research questions were reviewed and translated to the Quechua language, and key concepts were linked to similar concepts in Andean cosmovision.
- From October 2019 to February 2020, project staff carried out literature reviews and facilitated Farmer Field Schools in the four communities on RQ 2, 3, 4, 5 to compile data on worldviews, cultural values and wellbeing, governance, biocultural systems and livelihoods. The project also drew on previous research in Lares to address the RQs.
- The Potato Park and Chalakuy Maize Park organised an exchange of experiences in the Potato Park on February 26, 2020, focusing on the *Ayllu*, governance and sustainable livelihoods (RQs 2, 3, 4 and 5). This was followed up with a reflection workshop at the ANDES office to share and analyse results of the data collection through Farmer Field Schools during the previous months.

Project workshop in Lares. Credit: Tammy Stenner/ANDES

The emergence of the COVID-19 pandemic — and particularly the worsening conditions in the region in late February 2020 — had a dramatic effect on the implementation of project activities. The implementation of martial law and measures taken by Indigenous communities meant that work was at a standstill for several months. In July 2020, some restrictions were temporarily lifted, but were reintroduced by the beginning of August. Indigenous Peoples have maintained tight control of access to their communities since early March. However, the results were shared digitally, through webinars involving livestreamed interaction with the communities. For example, representatives of the Chalakuy Maize Park of Lares and their colleagues in the Potato Park shared research results through an international webinar organised by the Tapestry of Alternatives and ANDES on 31 July.

Farmer Field Schools (FFS) are a key research tool used in the Chalakuy Maize Park. They bring together participants from different generations and promote the sharing of traditional knowledge and linking of traditional knowledge and science. With support from ANDES, FFS have helped the communities to address growing climate-related challenges, such as '*Rancha*' (potato blight) and frost, and are valued by communities because they promote their own traditional knowledge. The FFS initiated under the SD=HS project have been institutionalised by each community and meet monthly.

To address the research questions with wide representation from the participating communities, focus group discussions were held as part of each of eight FFS functioning in the four communities of the Chalakuy Maize Park. Average participation in the monthly FFS was 174 community members in eight communities/hamlets. Field staff and consultants from ANDES work with the *Tecnicos Locales* to facilitate each FFS session. From October 2019 to February 2020, monthly FFS sessions were held to explore the project's research questions, sometimes as an independent session, and at times in conjunction with other ongoing research. Some key themes necessarily overlap, since the *Ayllu* system provides the broad conceptual framework and *Sumaq Kausay* the guiding vision for the work of ANDES and the Chalakuy Maize Park.

The monthly FFS sessions addressed the research questions using open-ended questions in Quechua, PAR methods and traditional knowledge-based tools such as the *Yupana* (matrix ranking), conceptual graphics, participatory mapping, photo and video recording, and seasonal calendars. Specific research activities carried out include:

- Analysis of the key elements of the *Ayllu* system in the local context

- Identification of key threats to the local biocultural system
- Characterisation of the various agroecological zones and identification of the altitudinal zones with important wild and cultivated species
- Strengthening of Andean agroecological practices based on traditional knowledge
- Identification of core values guiding barter markets and exploration of the role of strong local food systems in the fight against hunger, malnutrition, anaemia and for maintaining local food sovereignty.
- Mapping of community organisations and governance structures, and
- Strengthening relations with local governments, organisations, and barter market user groups.

Due to the COVID-19 pandemic and related restrictions, it was not possible to fully explore RQ 6 on SDG 2 'End Hunger'. However, the project gained insights and lessons on how cultural values and Indigenous food systems ensured food security and resilience despite COVID-19 through virtual meetings and webinars with the communities.

'*Papa Maucau'* — Quechua women tending to a crop of potatoes against a mountain backdrop. Credit: Enrique Granados/ANDES

5. Results

RQ 1. Ethnicity: How are the communities connected to the landscape historically?

Located in the district of Calca, province of Urubamba, Cusco, the Lares people are descendants from an ancient matriarchal society, 'Laris', which in the local language means 'all our relatives on our mother's side.'[3] The 'Laris' were a sub-group of the Quechua. These Quechua peoples that populate the 744.67 kilometres-squared high mountain district of Lares still keep a strong matriarchal tradition, maintaining strong women's leadership in the governance of their communities and in the values expressed in their strong reverence of *Pacha Mama* (Mother Earth) and of female mountain deities.

The Lares communities are farmers who live in a valley between imposing snow-capped mountains dotted with glacial lagoons and warm ravines, where people continue to practise a ritualistic farming tradition. This includes the cultivation of Andean grains and tubers, herding llamas and alpacas, and making weavings. The mountain ecosystem maintains a rich and varied native flora and fauna in its three distinct ecological/altitudinal zones. Traditional knowledge of the mountain ecosystem is central to all productive and economic activities, and bartering — through barter markets dominated by women — is the main form of economic exchange of goods and services.

This strong relationship with the land has nurtured a worldview that focuses on a holistic understanding of the whole, where everything and everyone is related. The Lares peoples' existence and experiences operate in a state of relatedness where spiritual values, customary law and institutions reinforce this connectedness. The Lares peoples' identity comes from their connections with the mountains and their belief that *Pacha Mama* (ie. the land) is sacred and that time is non-linear but cyclical in nature.

RQ 2. Worldviews, values, wellbeing:

2.1 How do Indigenous worldviews about wellbeing, cultural values and customary laws promote or hinder sustainable and equitable development?

The Lares worldview is encapsulated in the notion of the *Ayllu*, a traditional landscape organisation concept that seeks to balance the needs and aspirations of people (*Runa*), nature (*Sallq'a*) and the sacred (*Auki*). The goal is to achieve a balance, or *Sumaq Kausay* (*Buen Vivir*), which represents an alternative model of wellbeing and development. It promotes community- and solidarity-centred forms of production, accumulation, and redistribution in harmony with nature, and supports the construction of a society where differences are respected within a framework of equality, justice and dignity. All species and entities living on Mother Earth have spirits and must live well with the earth and other spirits. This approach provides an enabling environment for collaboration and creative solutions, ideas and knowledge to support self-determined development with rights for nature.

The customary laws that govern the Quechua people and their relationship to the land are not written, but they can be found in action in all events of their daily lives. Quechua customary law emanates from and reflects the *Ayllu* system. The principles of duality, reciprocity, and balance/equilibrium, outlined below, reflect natural links between the *Ayllu* and *Sumaq Kausay*. Just as the *Ayllu* is the provider of wealth and benefits of all kinds, it is customary law that dictates the equitable distribution of those benefits among community members. Building on research in the Potato Park (Walshe and Argumedo, 2016), these principles were further explored and validated through the research with the Chalakuy Maize Park communities:

***Yanantin* (duality)** reflects the idea that the cosmos is divided into two opposite but complementary halves. This can be seen in the division of labour between men and women, which, while differentiated, does not denote superiority or subservience, but mutual interdependence. It can also be seen in the perception towards rights and obligations, where both are necessary to maintain harmony between rights and obligations, both of which should be met to achieve harmony and maintain equilibrium.

***Ayninakuy* (reciprocity)** indicates that what is received must be paid back in equal measure. All the elements of nature, including human beings give and receive, contributing to the common good and harmony of the world. *Ayni* is the mechanism by which the principle of reciprocity finds expression,

[3] Municipalidad Distrital de Lares (District Municipality of Lares) – https://munilares.com/resena-historica/

among people and elements of the natural world. This principle can be seen in the exchange of seeds between communities, distribution of agricultural fields and agricultural work, or in the offerings the farmers make to *Pacha Mama* (Mother Earth) and the *Apus* (mountain deities).

***Chaninchay* (equilibrium)** refers to proportion and harmony within communities and with nature, and the spiritual world. The principle reflects the idea of equitable distribution of benefits, contributions according to needs, abilities, responsibilities and effort.

In relation to biocultural research and knowledge creation, the principles of *Yachay*, *Llankay*, and *Munay* are of special importance, as they reflect and value diverse ways of learning and knowing according to Andean cosmovision (ANDES, 2019):

***Yachay* (learning, wisdom, knowledge)** is understood as knowledge that is processed by the mind. The type of knowledge is learned through activities of reflection, discussion and analysis, and can include scientific knowledge and traditional knowledge.

***Ruway* (or *Llankay*) (work, creativity, use of physical energy**) deals with practical learning, such as learning the skills related to agriculture, crafts, and food preparation.

***Munay* (love between people, and between society and nature)** refers to social connections that are made within research and learning processes, and also includes intuition, desire, and the capacity to think and feel with the heart.

These values are at the core of traditional Andean cosmovision and they continue to guide the daily lives of the Quechua people of Lares. Traditional knowledge of ecology and agriculture also dominate agricultural practices in the area. This includes the use of long fallow periods, sowing and harvesting according to biocultural indicators such as plant and animal behaviour, and reading the night skies. Despite children attending school full time, intergenerational transfer of traditional knowledge continues as children work with their parents in agricultural work after school and during holidays.

2.2 To what extent are these recognised or applied by different generations, genders, ethnic, religious, class/caste and economic groups (for example, those migrating for work)? Which drivers are influencing cultural change (for example, religion, education)?

Sumac Kausay is a cultural and social practice that is not static but adaptable to changes in conditions and is continuously evolving in response to events occurring in the Quechua mountain environment. The core values it embodies are still transmitted orally from one generation to another through cultural traditions, and are therefore practised by the majority of the Lares society, including different generations, genders and social classes. The holistic Andean cosmovision reflected in the *Sumac Kausay* and *Ayllu* concepts is still dominant in the Peruvian Andes and particularly strong in areas like Lares which is fairly remote and has not seen much foreign tourism (despite having natural hot springs). People still practice *Ayni* (reciprocity) in the farming system, for example through labour exchange, produce barter and seed exchange.

However, even in Lares, modern/western life and religion are starting to influence Indigenous culture and cosmovision. For example, not everyone believes in both one God (Christianity) and the *Apus* (mountain gods, river and animal spirits). One reason for this is that fewer people want to farm because food is cheap; rice and noodles can now be bought in Lares and cost a little less than producing food (for example, maize and potatoes fetch low prices). But rice and noodles are also less nutritious, contributing to chronic malnutrition and anaemia in children. Companies are promoting cheap industrialised foods in rural Andean communities, often with government support. However, there is no government support for barter markets, which are key for sustaining agrobiodiversity, nutrition and traditional ecological knowledge and values but are undermined by industrialised foods. Customary law principles are still used for the management of scarce resources. For example, by water allocation committees to promote equity and balance, especially in mid-altitude zones where there is less water. But nowadays farmers are more interested in their own *Chacras* (farms) and think less about management at landscape level than they did previously. As one of the Potato Park community technicians said at the workshop on Indigenous research methods in Cusco, “the objective of the Potato Park is to form a collective to look after the landscape”.

National policies and programmes largely promote neoliberal agendas that favour extractive industries over maintaining sustainable farming — this can increase jobs and income in rural areas but also influences peoples' worldviews. Even national climate change and ecosystem-based adaptation policies and programmes threaten traditional knowledge, as when municipalities like Lares request funds from the national government there are strict rules attached which require the use of science in implementation, thus weakening traditional knowledge and customary laws for resource governance.

RQ 3. Governance: What kind of traditional governance system exists? How can it be strengthened for sustainable management of the local landscape?

The Lares Indigenous Peoples have a community-based governance system which emphasises participation and deliberation, operates in service to the collective, and is often led by women. The community governance systems act as an agent of political-economic development and livelihood enhancement, helping community members to navigate through trends and pressures in production, exchange, and redistribution. The Lares governance system operates in internal coherence to other Indigenous institutions. Strengthening this system requires legislation combining recognition of Indigenous Peoples' collective rights with institutional guarantees for gender equality that amplify Indigenous women's livelihoods strategies, including bartering of food, which allows them to maintain the deep connection of their food systems with the mountain landscape.

A governing board has been established for collective governance of the Chalakuy Maize Park, made up of the four community leaders/presidents. They meet regularly to share information about what they are doing, including with ANDES. The community presidents consult and represent their community and channel information from the governing board to the community "so there is a kind of '*Ayni*' or reciprocity" (Juan Victor Oblitas Chasin, local technician, Ccachin community) or two-way information flow. "The *tecnicos* (community researchers) are very important, they support the community presidents" (Juan Victor Oblitas Chasin). The governing board was established in 2014 through an agreement with the four presidents — the board rotates every two years as the elected presidents rotate. This institution, the Chalakuy Maize Park Association, is applying for legal recognition as an agrobiodiversity zone. There is a need to map the sacred sites in each community, as well as the main agro-ecological zones and the rules attached to inform the governance rules (for example, which site needs to be protected or not visited), and to identify customary laws for collective landscape governance.

There are irrigation committees in Lares — created by and using statutory law, as well as customary laws — which are key for maintaining customary laws. These can be used to identify customary laws and principles that are still in use for the governance of natural resources in Lares, that could be used as principles for collective governance of the Chalakuy Maize Park landscape (including water, pasture and communal land). The customary principles once agreed by the four communities can be used to create a constitution for the Chalakuy Maize Park Association that represents the four community authorities, for collective governance of the landscape. Such a customary law-based constitution would prevent the fragmentation of land or pressure on communal land and resources if the population increases (whereas statutory law would not). The Potato Park Association's Inter-Community Agreement includes customary laws for sustainable and equitable natural resource management, as well as relevant international legal provisions that protect Indigenous Peoples' rights (ILO Convention 169, the Right to Food, FAO Treaty provisions on Farmers' Rights).

In each of the four Lares communities, mountain gods play a key role in governance; they are seen as 'rulers' as the wildlife they sustain imparts signs for farmers (biocultural indicators) so they know when to plant, harvest and so on (see section below for details). This is similar to the Potato Park, where all three *Ayllus* play a role in governance, not just humans. The Potato Park governance system is composed of the Potato Park Association, Community Authorities, and Authorities in each *Ayllu* — humans have copied from the *Apus* (*Auki Ayllu*).

RQ 4. Biocultural systems: What are the main elements of the biocultural system and how are they interconnected and interrelated?

The Lares biocultural system is encapsulated in the *Ayllu* concept, which classifies its elements in three *Ayllus* or realms:

- *Runa Ayllu*: the human and domesticated realm (plants, animals and so on);
- *Sallka Ayllu*: wild animals, plants, lakes, streams and so on (all elements outside human control); and
- *Auki Ayllu*: the sacred and the ancestors (for example mountain gods).

These three communities are interconnected though *Ayni* (reciprocity), which expresses the deep connections and interdependence of the elements of the whole, where human beings are not the most important in the world. In this holistic view of community (*Ayllu* – see Figure 2), the natural world, the realm of humans, and the sacred realm are interconnected and interdependent, and balance among these three realms. This is achieved through *Ayni* or sacred reciprocity, and is necessary to achieve harmony and wellbeing (*Sumaq Kausay*). It also highlights Indigenous Peoples' deep respect for nature, upon which traditional knowledge is constructed.

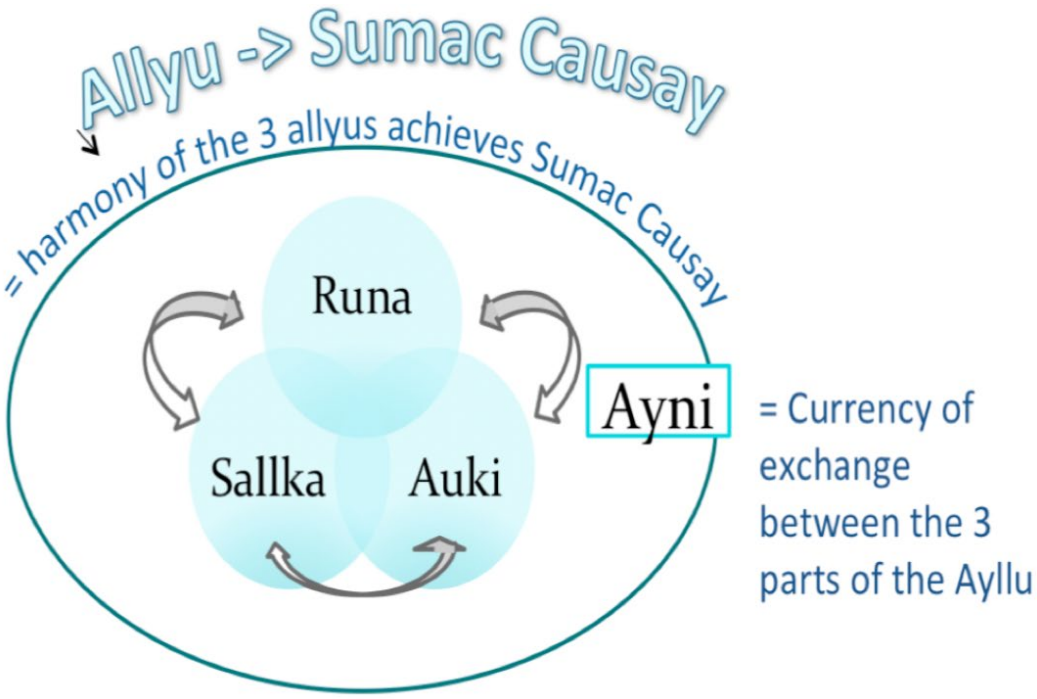

Figure 2: The Ayllu system. Source: Asociación ANDES

In a participatory mapping exercise involving community researchers (50% of whom are women) from the four Lares communities, guided by the *Ayllu* concept, each community identified the following key elements of biocultural heritage: the *Apus* (mountain Gods) and many wild Andean animals (for example pumas, squirrels, condor, berado gazelle, fox, bears and partridge) and wild plants; sacred lakes and rivers; sacred sites including pre-Inca archaeological sites (controlled by government); forest patches; pastureland and diverse crops. The community presentations of the resulting maps identified clear links between mountains, lakes, animals and spiritual/sacred values. They also have "*Machu*" which is pre-Inca traditional knowledge relating to the land.

In Choquecancha, the rocky mountain tops are sacred and the community has "quite a bit of relation with them" — they have sacred male and female *Apus*, sacred male and female lakes and special wild areas near these *Apus*, and lakes that are protected as sacred sites. Pampacorral has two *Apus* with snow and lakes: "we have *Pantaecoya* (flowering plant) that shows us if there will be frost or rain. It is

very important to work with the three *Ayllus* because they show us changes in climate and help in local governance — it is very important to observe the indicators" (Valentina Avilés Tapara, local technician, Pampacorral). In Rosaspata, there are four *Apus*, which are very important and are visited by the community. "We have a sacred lake which we can't interfere with much" — water comes from the lakes.

Ccachin has two snowy mountain gods which "nurture us — we blow coca leaves there for our animals and for the harvest. We sometimes give food to bears as they eat other animals (livestock). We have a '*Laguna Negra'* (black lake) which is sacred; and a red lake, a sacred site where animals and people disappear — that lake is alive so we don't go near it much as it is very wild. We have an *Apus* with a relation with an '*Incanto*' ('enchantment') — a very sacred place for humans. We talk amongst people, but the *Apus* also communicate with each other — they also meet. In the areas of the *Apus*, all the wild animals are sacred. Sacred sites have biocultural indicators. We have to respect the sacred sites as they are wild" (Juan Victor Oblitas Chasin, local technician, Ccachin).

Quechua traditional knowledge in the Lares Valley represents a unique body of local and ancestral landscape-ecological knowledge relating to different altitudinal zones. This underpins the capacity of Quechua communities to adapt to the impacts of climate change (for example, increased pests and diseases, drought, soil degradation). It includes different types of traditional ecological knowledge (TEK):

1. Knowledge about the ecological classification of different altitude zones and their inter-relationships:
    - Rupa: highland rainforest between 400 and 1,000 metres above sea level (the tropical zone below the Lares communities)
    - Quechua: composed of big valleys divided by a river fed by rains (between 1,000 and 3,500 metres above sea level)
    - Suni or Jalca: the upper area at 3,500 to 4,000 metres above sea level
    - Puna: montane grasslands and shrublands biome
    - Janca: the frozen heights where the condor lives.

These five ecological zones coincide with the units of the agro-climatic map of Peru. Apart from geology, all the factors of the hierarchical model used in western landscape ecology (climate, relief, water, soil, vegetation and fauna) are included in the Indigenous classification of the landscape, although not necessarily in the same hierarchical order.

2. Knowledge about agroecological farming practices (for example mixed cropping), sustainable land use (crop rotation, fallows) and sustainable resource management practices (water, soil, pasture).
3. Knowledge about agrobiodiversity and unique local crops — the conditions that determine their growth, climate change impacts, and properties/uses for resilience, food, nutrition, medicine, rituals and so on.
4. Weather forecasting knowledge using astronomy and nature-based signs: Quechua TEK also plays a critical role in shaping cultural identity and includes ecological and social values which promote sustainable and inclusive development.

However, Quechua traditional knowledge and land-use practices in the Lares Valley are threatened by dramatic changes in climate that are forcing farmers to change cropping patterns and pose significant challenges for traditional production systems. Soil warming is causing pest and disease infestations, particularly for potatoes, which means that potatoes and agricultural lands are moving upwards into the upper grazing zones. In the Potato Park, the lower planting line for potatoes has shifted up by about 200 metres in the last 30 years to above 4,000 metres above sea level, where there is limited cultivatable land, putting some potato varieties and associated traditional knowledge at risk of extinction (ANDES, 2016b).

RQ 5. Livelihoods: How does the local biocultural system influence the local livelihoods system? How to shape/strengthen a biocultural economy?

Local livelihoods are mainly subsistence oriented and are deeply connected to *Sumaq Kausay* (wellbeing) which applies to both humans and nature. This vision does not consider growth as necessary, but rather focuses on sustainably meeting individual and family needs, community needs, and the needs of the other 'children' of *Pacha Mama* (Mother Earth), ie plants and animals.

The Chalakuy Maize Park promotes a model of food sovereignty based on the ancestral practice of bartering food. The barter markets of Lares are part of a sophisticated Andean agri-food system linking communities located between 1,000 and 5,500 metres above sea level. These markets specialise in the non-monetary exchange of native crops and seeds, including tubers, grains, fruits, medicinal and ornamental plants and wild edible species produced in each of the altitude niches of the landscape (Argumedo and Pimbert, 2010).

The barter markets integrate the verticality of Andean landscape management and food systems, and are characterised by altitudinal specialisation, nutritional complementarity, and social reciprocity. Altitudinal specialisation promotes the conservation of the rich local agrobiodiversity and underutilised native species. The barter markets support the redistribution of products among the different altitudinal ranges, and to disadvantaged communities or members of society. More balanced diets are possible through exchange of vitamin-rich fruits and vegetables from the lowlands, carbohydrates from corn and Andean grains such as quinoa and kiwicha (amaranth) in the midlands, and protein from the tubers and animal products of the highlands. Social support networks and local economies are strengthened through barter markets. Unlike capitalist markets, competition and maximum gain are not the guiding principles for exchange of goods. Reciprocity is built into bartering goods, where all parties decide on a fair exchange based on multiple values. Solidarity with family and friends, increasing seed diversity and improving diet, and maintaining family and other social relations are all motivations in decision making. The Lares barter markets also maintain the use of the Quechua language and ancestral knowledge systems, and promote the local vision of wellbeing based on the Andean concept of *Sumaq Kausay*.

Currently, ANDES, the Yachay Kuychi Pluriversity[4] and the Centre for Agroecology, Water and Resilience (Coventry University) are carrying out research on the role of the barter markets as regenerative strategies in the face of global challenges such as the global health crisis and climate change. Farmer Field Schools in the Chalakuy Maize Park continue to strengthen Indigenous knowledge systems based on agroecology, solidarity and regenerative economy, and facilitating biocultural innovation to respond to crises. The communities are also keen to establish collective biocultural micro-enterprises similar to those in the Potato Park — for medicinal plants, gastronomy (a traditional restaurant), plant/NUS-based products (for example soaps, shampoos), and ecotourism (selling biocultural products and services to tourists visiting hot springs in Lares). There are further visits planned to the Potato Park for capacity building. They also want to develop an inter-community agreement (biocultural protocol) like the one in the Potato Park, so they can set aside a percentage of the revenues from micro-enterprises to invest in a communal fund, for equitable sharing among the communities and to support administration of the park. The Chalakuy Maize Park Association has recently presented an ordinance to the Municipality of Lares to recognise the *Chalayplaza* (barter market) as the biocultural heritage of the District of Lares.

RQ 6. BCH and SDG 2: How does the biocultural system contribute to achieving SDG 2, including maintaining genetic diversity, ensuring sustainability and resilience; ending hunger and malnutrition; and doubling productivity?

The *Ayllu* model has arisen from thousands of years of experience of landscape management that intimately connects culture, ecology and food, creating a rich associated knowledge system and adaptable local institutions. It is therefore deep in mindset of the majority of rural people in the Andean region and provides a framework from which new models to respond to complex current challenges can

[4] The Yachay Kuychi Pluriversity is a learning institution established by Asociación ANDES in 2018 to promote biocultural landscape management and foster resilient food systems based on traditional knowledge systems, transdisciplinary approaches, and innovative approaches to knowledge production and sharing.

be built. The *Ayllu* landscape management system, which was developed in the past to respond to the complexity and chaos of Andean ecosystems, has built-in tools, based on local principles and values, to respond to crises such as the COVID-19 pandemic. This was evident in how the four communities participating in the project managed the pandemic. These communities responded by strengthening their biodiverse local food systems and reinforcing local ancestral values and principles of solidarity, reciprocity and balance — in society and with nature. This ensured strict health protocols for all community members (not a single case of COVID-19 exists in the communities), availability of food for their families and even a surplus to donate food to migrants and other disadvantaged people. The Potato Park communities responded in the same way, and donated a ton of native potatoes to people in need in Cusco during the pandemic, based on the Indigenous principle of solidarity. Although rural communities are less exposed to COVID-19, the absence of any cases in these Quechua communities may also be linked to their biodiverse, nutrient-rich diets that can play a role in disease prevention.

The *Ayllu* model addresses the SDG 2 objectives — decreasing hunger, increasing nutrition, enhancing sustainability and resilience and maintaining genetic diversity — through a landscape and ecosystem-based approach to food production; agriculture supports the wider ecosystem. At the same time, because agriculture is diverse it supports better diets in these largely subsistence (rather than market-oriented) farming communities. Indigenous values also promote natural processing and distribution which ensures food access to weaker people in society. In contrast to global value chains, monocultures and agriculture that relies on markets and external inputs, these localised Indigenous agroecological food systems have proved highly resilient to the COVID-19 pandemic. Characterised by very high crop diversity and resilient native varieties, these Indigenous farming systems have also proved resilient to rapid climatic changes in the Andes. In the Potato Park, potato productivity has remained stable or slightly increased despite a significant increase in soil pests, thanks to ancestral knowledge and values, respectfully linked with science through equitable collaborative research (ANDES, 2016b). In the Chalakuy Maize Park, participatory transects to explore under-utilised wild foods conducted under the SD=HS project identified an iron-rich plant which is used to reduce childhood anaemia (ANDES, 2016a).

The impact of the work of the Potato Park and Chalakuy Maize Park is gaining recognition globally, and has resulted in numerous requests from organisations, communities and networks from around the world to share their experiences. Participation of these communities in the Tapestry of Alternatives international webinar and in an IIED-Kew webinar on Indigenous food systems enabled them to share evidence of the role of their pre-colonial cultural values in biodiversity conservation, food security and resilience to COVID-19 with policymakers, scientists, Indigenous Peoples and the general public (see Potato Park session in Swiderska and Ryan, 2021).

6. Analysis of the findings

All the communities of Lares are very similar in terms of cultural values and worldviews, as they are all members of the same Quechua sub-group. They share the same Andean concept of holistic wellbeing — *Sumaq Kausay* and *Ayllu* — speak the same language, wear similar clothing, have very similar spiritual belief systems, and are of similar socioeconomic status. The communities vary in relation to the altitudinal zone they inhabit, which in turn affects the landscape they inhabit, and the crops and livestock they produce. Nonetheless, inhabitants of the diverse zones all come together to trade with family and friends in the barter markets. Their Quechua worldviews and belief systems — centred around mountain gods and sacred lakes, and use of plant/animal and cosmological signs to guide agriculture — are also very similar to those of the Potato Park (about two hours' drive away from Lares).

The Potato Park model has proved highly replicable in the Cusco region where communities share very similar BCH, political context, climate challenges, and threats from extractive industries. The Lares communities have identified the need for very similar collective governance institutions, community micro-enterprises and an inter-community benefit-sharing agreement, thus validating the key components of the Potato Park. The learning processes and decolonising approach, methods and tools first developed in the Potato Park have also proved highly transferable, and their usefulness has been confirmed in the scaling-out to Lares. The conceptual framework for research in both the Potato Park and Chalakuy Maize Park has been inspired by a pre-Hispanic graphic representing the cosmology of the Incas (Figure 3), drawn by a native chronicler (ANDES, 2016b). The Potato Park experts have used this graphic, which depicts the three *Ayllus* and duality between men and women, to reinforce Inca cosmology in the Lares communities. Scaling out to Lares also enabled the Potato Park approach to be further improved, building on the experience in the Potato Park. In the Chalakuy Maize Park, particular emphasis has been placed on ensuring 50% of the community researchers were women. Employing a local community researcher from the Potato Park as a key member of the ANDES field staff for Lares facilitated the sharing of lessons learned, and the implementation of a team of local community researchers in the Lares communities.

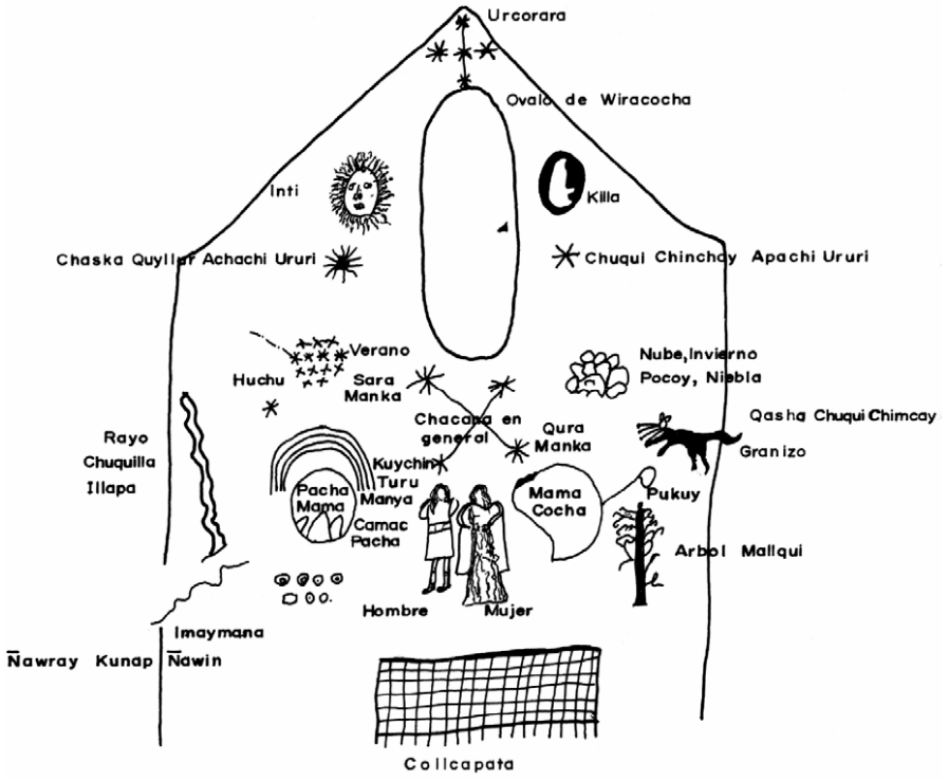

Figure 3: Santa Cruz Pachakuti conceptual graphic representing Inca cosmology. Source: Pereira (2006)

7. Conclusions and recommendations

7.1 Conclusions

The study has shown that pre-colonial Quechua worldviews, wellbeing concepts, cultural values and belief systems are still very strong in the Lares region, even among the youth. Indigenous values such as reciprocity are evident in the local economic system where barter is still an important practice. These values and worldviews are strongly rooted in spiritual beliefs relating to nature — sacred mountains, lakes, rivers, forests — and the biodiversity they contain is protected in the four Chalakuy Maize Park communities. Thus, as well as sustaining very high levels of native agrobiodiversity, they also conserve significant Andean wildlife diversity. Quechua values of reciprocity, balance and solidarity with nature and in society, have ensured that communities maintain biodiverse, resilient agroecological farming systems. Strengthening these values has ensured food security and health during the COVID-19 pandemic.

The study and previous research in Lares and the Potato Park have found no evidence of cultural values and practices or traditional knowledge that hinder sustainability and equity. The principal characteristics of Andean and Inca religion are gender parallelism and complementarity, which reflect and reinforce social organisation (see figure 1). The patriarchal model was promoted by Spanish colonists. Some might argue that oral cultures and non-monetary markets are not compatible with the global capitalist system, and therefore limit opportunities to participate in 'sustainable development'. But one can also argue that global sustainable development approaches are not always entirely sustainable or equitable, or embedded in society and identity. However, it is also clear that national government policies increasingly threaten this unique biocultural heritage — particularly through the promotion of mining and industrial foods — and that these are beginning to erode deep-seated Andean culture. The local government in Lares is opposed to mining in the region, given the negative impact it has had on community livelihoods, due to water pollution and environmental degradation.

The main conclusions can be summarised as follows:

1. Indigenous economic systems: Barter markets in the Lares area are a non-monetary biocultural system. Despite their perceived incompatibility with economic development, they provide huge economic benefits to the communities. A major challenge relates to how bartering and non-monetary exchanges are valued and recognised. Sustainable development needs to recognise and incorporate the real value of local economies, including their non-monetary redistribution systems, which are based on a dialogue with nature and not just economic schemes.

2. Local implementation of international agreements: Strategies derived from international agreements — such as UNDRIPs, the Biodiversity Convention's Article 8j on traditional knowledge, FAO provisions on Farmers' Rights — implemented at local level can ensure strong affirmation of cultural and spiritual values. It is often at this level where cultural values underline the importance of biodiversity and culture for improving human rights, livelihoods and landscapes, making implementation most tangible.

3. Local research agendas, intercultural education, and traditional knowledge: Communities' own research agendas and intercultural education have an important contribution to make for achieving sustainable development. Aligning local research agendas with local priorities, including traditional knowledge, can ensure better dialogue between Indigenous communities and government and scientific research sectors and ensure that local responses are based on sound evidence.

4. Recognition of agrobiodiversity-rich BCHTs under the national law on agrobiodiversity zones, is important to legally protect BCHTs. But such legal frameworks must recognise and support the community-led BCHT model that ensures strong local ownerships for long-term, cost-effective protection of agrobiodiversity and wildlife.

5. Knowledge and information management: Indigenous communities in Lares have a wealth of knowledge and information related to BCH that can be of great utility to promoting sustainable development in the Lares region. But this information needs to be made available to decision makers and public and private bodies, with the prior informed consent of communities.

6. Climate change and livelihoods are major cross-cutting issues affecting the Lares communities, making them highly vulnerable; climate change responses risk exacerbating this vulnerability unless they build on existing biocultural resilience strategies.

7.2 Recommendations

In order to protect Peru's rich biocultural heritage, which is crucial for achieving the SDGs and ensuring resilience to climate change and global pandemics, local and national policymakers should:

1. Integrate biocultural heritage territories into national sustainable development policy. As this study has highlighted, BCHT issues do not have exposure in national political agendas, and a strong articulation to the SDGs may provide an opportunity to construct and implement policies on biocultural heritage and sustainable development.
2. Introduce policies to support and protect barter markets, given their multiple benefits for biodiversity, nutritious diets, health, women and culture. There is a need to design, implement and/or consolidate socioecological redistribution systems to protect barter markets and other non-monetary Indigenous systems.
3. Ensure inter-cultural knowledge dialogue between communities and scientists including universities, local government and national government officials of the Ministries of Agriculture, Environment and Culture, and increased participation of Indigenous Peoples in shaping national political agendas and policies on sustainable development.
4. Consolidate a biocultural approach to sustainable development in Lares. Provide support to consolidate the Chalakuy Maize Park initiatives, and strengthen inter-community agreements to tackle collectively issues of vulnerability to climate change, biodiversity conservation, Indigenous food systems, reducing poverty, and so on.
5. Integrate local and traditional knowledge into existing local mechanisms for knowledge management, for example, by incorporating these research results into Lares municipal policy.
6. Ensure biocultural heritage is adequately recognised by national authorities and create awareness of the real value of Indigenous knowledge for family dynamics, social structure, biodiversity conservation and farming methods, especially as input for climate change adaptation measures, alternative biocultural incomes, and improving Indigenous livelihoods.

Funding agencies and international cooperation projects need to understand that long-term, sustainable protection of biocultural heritage requires new strategic models of cooperation between communities and external projects/scientists, that catalyse **processes** and social movements, rather than just funding isolated projects and creating dependence on external funding.

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