

# 11 Bolivia

## Community seed banks in the Lake Titicaca area

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### **Establishment of quinoa and cañihua ex-situ collections**

In Bolivia, the first efforts to establish a germplasm collection of quinoa and other Andean crops date back to the 1960s. The first quinoa germplasm bank was originally managed by the Patacamaya Experimental Station and later by the national quinoa programme of the Instituto Boliviano de Tecnología Agropecuaria, which operated until 1998. With the closure of the institute, the Patacamaya Experimental Station began to report to the prefecture of La Paz. During this process, the germplasm collection received no economic support and, as there was no clear policy on quinoa management and conservation, this work was discontinued (Rojas et al., 2010). Finally, the authorities decided that the Fundación para la Promoción e Investigación de Productos Andinos (PROINPA; foundation for promotion of and research into Andean products), established in 1998, should manage the conservation of quinoa and cañihua in the germplasm bank (Rojas et al., 2010).

Consolidation of the National Andean Grains Bank was achieved over 12 years (1998–2010), during which PROINPA managed the collection of these two crops. Conservation standards were improved, documentation was modernized and primary information was generated and used in various fields, from plant breeding to agro-industry. These achievements have been possible through collaborative projects that established links between the bank and various users: professors, scientists, technicians and rural communities doing in-situ conservation (Rojas et al., 2010). Management protocols were developed and adapted for each ex-situ conservation stage (Jaramillo and Baena, 2000). During the utilization phase, interaction with communities increased to promote the direct use of germplasm. Thus, in-situ conservation efforts were progressively included until both ex-situ and in-situ components were integrated in recognition of how the advantages of one component make up for disadvantages of the other.

### **In-situ conservation: from quinoa and cañihua to agro-biodiversity**

In the area around Lake Titicaca, in-situ conservation of quinoa and cañihua started in 2001. Studies of the number of varieties of both crops being grown

under traditional management systems (Rojas et al., 2003, 2004) showed a decrease in diversity compared with the range of varieties conserved in the germplasm bank. Case studies illustrated what internal and external factors were influencing farmer families to continue or discontinue planting and conserving quinoa and cañihua varieties (Alanoca et al., 2004; Flores et al., 2004).

At this point, farmers expressed an interest in getting to know and recovering the diversity of varieties and traditional knowledge that existed in their communities. Thus, in the 2004–2005 growing season, work was initiated to study annual patterns and characteristics of a range of crops and varieties and document associated traditional knowledge.

### **Linking ex-situ and in-situ conservation**

The process included annual participatory evaluation of local quinoa and cañihua varieties, as well as material from the germplasm bank. Sharing of knowledge related to agro-biodiversity was promoted among families in six communities bordering on Lake Titicaca. At fairs held between 2002 and 2004, the various uses of quinoa and cañihua were exhibited; later, between 2005 and 2010, exhibits were related to the diversity of seeds, their uses and handicrafts (Pinto et al., 2010). Farmers were encouraged to visit the National Andean Grains Bank, and, in turn, its staff attended several rural and urban fairs.

These activities created opportunities to inform the community about the role of the National Andean Grains Bank, and the importance of conserving seed and diverse varieties and crops was explained to farmers. The farmers not only agreed to have their varieties included in the bank's collection, but they also proposed that families migrating out of the region leave their genetic material with the bank, so that it would be available if they returned. Community seed banks were then established in an effort to connect ex-situ and in-situ conservation.

### **Establishing community seed banks**

The process had two stages: 'quinoa and cañihua community banks' and 'agro-biodiversity community banks'. The first was supported by the Sistema Nacional de Recursos Genéticos para la Alimentación y la Agricultura (SINARGEAA, national system of genetic resources for food and agriculture), and work was carried out from 2005 to 2008 (Pinto et al., 2006, 2007).

Quinoa and cañihua demonstration plots were established in 13 communities located in the Bolivian altiplano and in the inter-Andean valleys, using accessions identified and selected during the earlier characterization and evaluation process. The purpose was to promote the direct use of germplasm and, thus, involve farmers and use their criteria in participatory selection processes. Native community authorities participated in and endorsed the process. Quinoa seed banks were established at Antarani (Pacajes) and Patarani (Ingavi) and cañihua banks were set up in Coromata Media (Omasuyos) and Rosapata (Ingavi).

During the first year, farmers carried out participatory variety selection; in the second and third years, an expert was assigned to take care of all cropping activities: planting, harvesting and storing local and selected varieties.

The quinoa and cañihua community seed banks were in operation as long as SINARGEAA existed, but were not officially registered, as these efforts, which took place during structural and political changes in the country, were viewed as pilot projects. Community seed banks were turned into seed multiplication facilities for teaching and places where both farmers and experts could exchange knowledge on management and use of different varieties.

However, this three-year process was never supported, adopted or recognized by local authorities who changed from year to year – a critical factor affecting operation of the seed banks. Activities were carried out on the initiative of families and specific functions and tasks were not defined. However, the families in charge started distributing seed to farmers interested in a specific quinoa or cañihua variety.

### **Agro-biodiversity community banks**

The second attempt to establish community seed banks has been supported since 2011 under the Project on Neglected and Underutilized Species, which is funded by the International Fund for Agricultural Development (IFAD). This project is now in the process of implementing a network of ‘custodian farmers’ and, at the same time, institutionalizing the community seed banks as part of a strategy to monitor agro-biodiversity and traditional knowledge. The focus is on agro-biodiversity and getting to know and address interspecific and intraspecific diversity of crops useful to people for food, medicine and other functions. This project is being developed in eight communities near Lake Titicaca and receives support from four partner institutions. The experience is also being shared with the communities of Cachilaya and Coromata Media under the coordination of PROINPA.

After holding meetings with local authorities, farmers and two farmers’ associations in Cachilaya and Coromata Media, custodian farmers were identified (four in Cachilaya and six in Coromata Media) and given the responsibility of conserving and using a number of crop varieties. Criteria for selecting these farmers included experience in crop management and commitment to crop diversity, in addition to being well known and respected by the community for their knowledge of ancient traditions. Potatoes were chosen as the focus because they constitute the main crop in the altiplano, followed, in order, by quinoa, cañihua and barley, which is used for feeding livestock. Seed and land were provided by the custodian farmers in each community (Plate 4).

The Instituto Nacional de Innovación Agropecuaria y Forestal (INIAF, national agricultural and forestry innovation institute), created in 2008, was invited to be part of this initiative. INIAF reports directly to the national government and is currently in charge of the national germplasm banks where

collections of Andean root crops (potato, yam, ulluco and mashua) and grains (quinoa, cañihua and amaranthus) are conserved. One of INIAF's main tasks is establishing a national genetic resources system, under which community seed banks could be registered and acknowledged. (To date, the potato seed banks in Cachilaya and Coromata Media have not been officially registered.)

At the beginning of the Neglected and Underutilized Species project (2011–2012) work focussed on ensuring that custodian farmers became familiar with the diversity of crops they managed. The potato community seed banks were established later (2012–2013) with participation by other farmers in both communities. The custodian farmers are responsible for managing the banks.

The farmers asked that issues such as seed health, soil fertility, yield and commercialization of products be included in the project. Hands-on and theoretical training was provided during 2012 and 2013 to address this request and topics included such concerns as damage caused by the Andean weevil and the potato tuberworm moth and organic fertilization. Community seed banks also serve as a place for seed multiplication and for learning and teaching, as farmers can share and practise what they have learned in training courses.

To date, no fixed rules have been established for borrowing or depositing seed in the community seed banks. Seed exchange among farmers is informal. For example, a farmer who is interested in a variety will ask for it in person from the custodian farmer. No record is made of the transaction or receipt issued.

The bank in Coromata Media holds 45 native potato varieties, while the one in Cachilaya holds 54. Over 90 per cent of these varieties are considered to be underutilized. Both men and women have access to this material. In some cases, researchers also request potato seed, especially of the varieties that exhibit favourable characteristics, such as early maturation or resistance to or tolerance of adverse biotic and abiotic factors. Researchers are looking for characteristics that allow them to breed varieties that are adapted to different climates and to climate change.

In the communities, there are marked differences between men and women in terms of knowledge of potato varieties and their uses. Men consider varieties from the productive angle, looking for those that can be sold in local markets. Women, on the other hand, think about culinary attributes, identifying varieties by their names and differentiating those that are for fresh and direct consumption from those that can be used for stored products, such as chuño or tunta (freeze-dried potatoes). However, the roles played by men and women are complementary in terms of managing agro-biodiversity, recording and documenting traditional knowledge and, especially, the activities of the community seed banks. Although no benefits have yet been derived from the establishment of the potato seed banks, both men and women farmers now know much more about the management of the main potato pests and diseases. The farmers who participated in crop-cycle activities (planting, ploughing, phytosanitary control, harvest, seed cleaning and storage) had a chance to observe the encouraging results of the management practices

and the low incidence of pest attack in the varieties kept in the community seed banks.

In addition to support from IFAD's Neglected and Underutilized Species project, community seed banks are technically and financially supported by the farmers' associations in Cachilaya and Coromata Media and by PROINPA. However, the most important factor is the moral support they receive from local authorities in both communities. Bolivia does not have a national agency to liaise with and strengthen community seed banks, nor are there local, municipal or departmental policies designed to provide support to this type of initiative. In light of this situation, meetings have been held within the framework of the IFAD project to bring together custodian farmers, experts from public institutions such as INIAF and the municipality to initiate joint actions and consolidate the seed banks. Funding from the IFAD project currently covers the maintenance costs of the potato seed banks; however, efforts are being made with farmers and municipal governments to provide for the future of these seed banks.

### **Achievements and challenges**

Finding out about the diversity of locally available native potato varieties and recording the associated knowledge aroused great interest among farmers in the Cachilaya and Coromata Media communities. Effective practices were put in place to control the main potato pests, and more seed is now available for exchange and distribution. The amount of seed borrowed by farmers has increased, as well as the availability of seed in the community seed bank.

One of the main challenges that lies ahead is the fact that community seed banks have not been recognized as local institutions benefitting farmers, and little is known about their functions and reach. In meeting this challenge, we must work with the farmers in a participatory manner. Who should be in charge of managing the community seed banks? Should it be the custodian farmers? Should this be a rotating post among community farmers? What are the direct benefits to farmers? These questions are being discussed, and we must find answers if the seed banks are to contribute effectively to conservation and use of the important genetic resources they hold.

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