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Farmers evaluating quinoa varieties in field plots.

Growing and marketing Andean grains

José-Luis Soto, Wilfredo Rojas and Milton Pinto

Quinua (*Chenopodium quinoa*) and cañahua (*Chenopodium pallidicaule*) are traditional grain crops in the high Andes and grow at altitudes of between 3000 - 4000 metres. They used to be the main source of nutrition for the indigenous Aymara and Quechua communities but during the last few centuries the area planted with these crops has declined dramatically. However, Andean grains still have a strategic value for people in Peru and Bolivia because of their high nutritional value. Their protein content for example is between 12 - 21% which is higher than wheat. Recently, the food industry has become interested in them because of growing consumer demand for products derived from these grains.

Bolivia is the main producer of quinoa and the area under quinoa cultivation is estimated to be 35,700 hectares. Approximately 65% is grown for own consumption and 35% is sold on the national and international markets. The area under cañahua cultivation is much smaller: between 1000 - 1500 hectares. About 85% of cañahua is grown for own consumption.

The Bolivian Foundation PROINPA is a research institution that promotes the cultivation of Andean grain crops. Its objective is to contribute to achieving food security by promoting the better conservation and use of different varieties of these crops. The foundation assists farmers obtain more benefits from quinoa and cañahua at two levels: domestic consumption and production for market.

Promising varieties

At present, farmers use a number of varieties. Many other varieties are stored at the *Banco Nacional de Granos Andinos* and are also available to farmers. In addition, PROINPA has its own improvement programme for Andean grains. It is important that farmers are aware of all the different varieties available so they can make the most appropriate choice for their situation.

In 2002, PROINPA decided to carry out a participatory evaluation exercise with farmers on a number of the varieties in the national germplasm bank's collection, as well as with promising varieties from the PROINPA's crop breeding programme. The aim was to give researchers feedback on what criteria farmers use for selecting varieties and to let farmers see the different varieties available.

In the La Paz district of Bolivia, communities were selected for this exercise on the basis of their interest in growing quinoa and cañahua and their potential to produce these crops. Five communities participated in the evaluation of quinoa, and four communities in the evaluation of cañahua varieties. Farmer field schools were set up and demonstration plots were established with a number of varieties. A number of male and female farmers participating in the Farmer Field Schools were selected to carry out the evaluations. The farmers evaluated three features: the plant at flowering stage, the harvested grains and cooking properties.

At the flowering stage, researchers found that farmers' selection criteria related to:

- plant size (preferred sizes: 90 cm for quinoa and 30 cm for cañahua);
- uniform development;
- number of side branches (lower number preferred);
- characteristics of the flowering part (big and/or well-loaded inflorescence preferred);
- ease of harvesting (in the case of cañahua upright varieties preferred);
- time of maturity (early maturity preferred).

Farmers reported that plants with these characteristics could be expected to grow well and be less vulnerable to frost and hail.

It also appeared that farmers preferred sweet quinoa varieties. These contain much lower quantities of a substance called saponins, which give a bitter flavour. Saponins are removed by repeatedly washing the grains, and this work requires much less time in the case of sweet quinoa. However, farmers recognized that sweet varieties were more prone to attack by birds.

With regard to the evaluation of the quinoa grain, the farmers prefer large grain size and a white colour, arguing that large white grains were much in demand at communal fairs and fetched a higher price. Women farmers liked the coloured grains because they provide the dyes they use for colouring wool. In the case of cañahua, male as well as female farmers preferred light-coloured grains, because these were considered best for making ground and toasted cañahua flour called "*pito*".

The cooking properties of different varieties were evaluated by preparing traditional quinoa dishes like "*p'esque*" (quinoa grains boiled in unsalted water and served with milk or cheese) and "*quispiña*" (a type of steamed bread). The farmers evaluated the cooking qualities of the grains and the flavour, colour and mildness of the dishes.

The selection of promising varieties through participatory evaluations was considered successful and it is planned to continue this in other communities in the upland plains of Bolivia.

Marketing

At present, quinoa and cañahua grains are sold at local markets. There the product is usually bought cheaply by informal middlemen, who sell it again for a profit. However, there is a growing demand for products made of quinoa and cañahua. The small agroindustry is demanding larger quantities of these grains, but often there is not enough good quality grain available. Frequently, the quinoa and cañahua offered by farmers contain impurities - sometimes amounting to 12 - 15% of total weight - and supplies are irregular and small. In the words of a food manufacturer: "… It is very difficult to get good produce, because of the high degree of impurities like stones, which damage the machines. Because of the impurities, the weight of the clean product is low, which means that we hardly get any profits because of the high processing costs".

PROINPA is trying to link the producers with the small but emerging agroindustrial sector in the region and to strengthen the production chain in order to increase benefits both to farmers and small-scale entrepreneurs. A project aimed at increasing the role of forgotten and underutilized species in food security and income generation of poor rural communities is being implemented with the support of the *International Plant Genetic Resources Institute* (IPGRI) and the *International Fund for Agricultural Development* (IFAD).

Food industry

In 2003, in order to achieve a direct link between small agro-industry and quinoa producers, PROINPA organized a visit by farmers in the Jalsuri community to a Bolivian company - the *Procesadora de Cereales Andina* - that processes Andean grains. Later, the company's manager visited the community and saw how the different varieties - each with its own characteristics - were being grown in the field. During both visits there was an exchange of information about quinoa growing and processing. A round table discussion between the interested parties was organized in order to define the price of the quinoa sold, place and conditions of delivery, frequency of delivery and payments. This led to the signing of a contract between the *Jalsuri Irpa Chico*, the farmers' cooperative, and *Procesadora de Cereales Andina*, in which the farmers committed themselves to increase the area of quinoa and to improve the quality of the product. *Procesadora de Cereales Andina* committed itself to buying all the produce the farmers could offer for a higher price than they would receive on the local market. PROINPA remains involved in this agreement because it offers technical assistance to the farmers to help them obtain a good quality final product.

So far 27 farmer families belonging to the Cooperative have sold high quality quinoa at prices that exceed the local market price by as much as 25% and the company is satisfied with a supply that helps it meet consumer demand for such items as quinoa flakes.This pilot experience was implemented with the active participation of farmers and processors. Future activities might focus on involving other actors in the production chain as well.

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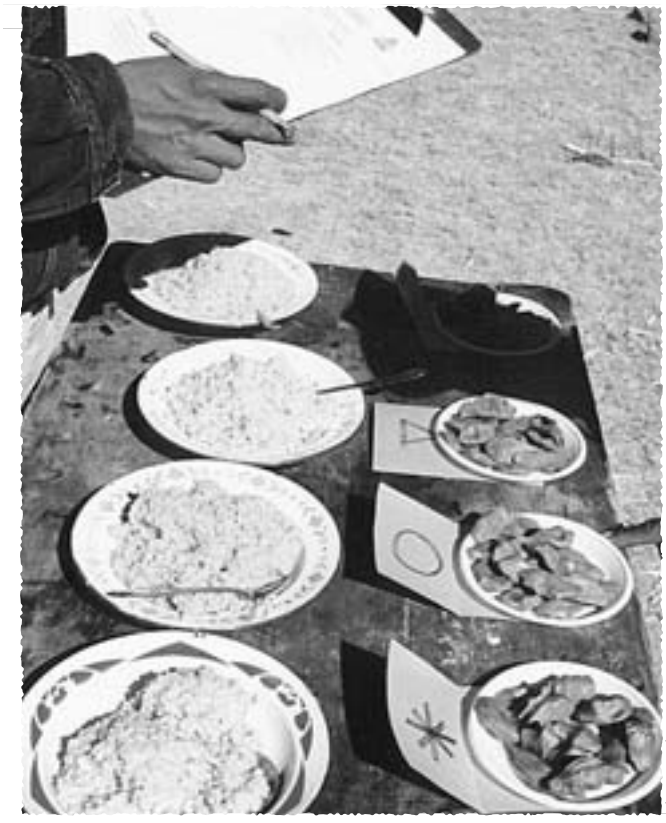

Photo: Authors

Farmers evaluate quinoa dishes.

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