

## INTRODUCTION

Agricultural biodiversity has been on a steady decline for the last century at both the species and variety level with the rise of international agricultural commodity markets and the food industry. Neglected and underutilized species and the local varieties of commodity crops have been particularly marginalized in such a process. Diversity can represent a great potential source of income especially in those areas where conventional markets and value chains are not succeeding. **Native chili peppers in their centre of origin in Bolivia and Peru have great potential for high-value product differentiation in urban niche markets and income generation for the poor.**

## APPROACH

A GIZ funded project, coordinated by Bioversity International, with participation of three German Universities and several partner organizations from Peru and Bolivia, has been **combining innovative germplasm- selection and characterization methods with participatory market research, new product development, value- chain assessment and upgrading. This was facilitated and guided by collective action methods through multi-stakeholder innovation platforms** in order to demonstrate how chili pepper, farmers' income and livelihoods can be enhanced by exploiting native diversity that is currently underutilized.

## OUTPUTS

Research was carried out in the areas of diversity conservation and characterization, cultivation, postharvest, processing, new product development, marketing and value chains, achieving the following outputs as tools to enhance the value chain of native chilies in Bolivia and Peru:

**Diversity conservation:** One of the largest and most diverse collection of cultivated chili diversity has been assembled, rescued and conserved in national genebanks in Peru (aprox. 700 accessions) and Bolivia (aprox. 400 acc.). Taxonomic, agromorphological, molecular, biochemical and sensorial characterization plus the systematic screening for commercially valuable traits that meet current national and international market opportunities have been undertaken.

**Cultivation:** Field trials to evaluate cultivation and production processes as well as organic management practices were carried out and guides on Good Organic Agriculture Practices have been developed and published in Bolivia and in Peru.

**Postharvest:** Two state of the art Tunnel Type Solar Driers have been imported from Germany and installed in Bolivia and Peru. Evaluation of drying procedures and postharvest practices have been carried out. A Manual for the installation and one for the use of the solar dryers in both countries have been published. Another manual for the application of HACCP and drying procedures for native chilies in Bolivia and Peru have been published.

**Processing:** Capacity development on good processing and manufacturing practices has been provided for producer associations and small enterprises in Bolivia and Peru. New and innovative products based on the native chili diversity have been developed in Bolivia and Peru together with the private sector in the framework of the innovation platforms.

**Market and value chain:** National and international studies on value chains, market opportunities and consumer preferences for native chilies in Bolivia, Peru, the E.U. and U.S.A. were carried out. Results on value chain bottlenecks and upgrading strategies in Bolivia and Peru and a guide on market opportunities for native chilies in Peru were published.

## OUTCOMES

### Commercial

- Commercial agreements between 3 private companies and a farmers association in Ucayali, Peru
- Establishment of commercial agreements between a project partner and a private company to sell wild native chilies collected by local communities in Bolivia at a fair price.
- Development of at least 28 different types of commercial products through joint collaboration among private companies and farmer's associations in Bolivia and Peru that have been launched in national food fairs and are currently being sold in supermarkets in both countries.

**Farmers' and other value chain actors' income and livelihood options have been enhanced through the sustainable use & conservation of native chili pepper diversity in Bolivia and Peru**

### INNOVATIONS:

#### Institutional

- An organic farmers' association in Peru, has been trained in and is implementing and applying Good Organic Agricultural Practices developed by the project.
- The Institute for Food Technology (ITA) in Bolivia, after developing commercial innovations, has now engaged in production at commercial scale as well.

The National Agricultural Research Institute of Peru has developed and is currently implementing procedures to grant access to the native chili germplasm conserved in the National *Capsicum* Genebank.

Native chilies have been included in the Development Plans of the Regional Government of Piura Department. This will enable producers, producer associations and other actors working with native chilies, to request formal support from GIZ bi-lateral funds in the future.

#### Technological

- The introduction of a tunnel type solar dryers by Hohenheim University in Bolivia and in Peru and the application of HACCP has changed traditional practices in target communities which are now using good drying procedures obtaining safe and high quality products ready for commercialization in national and international markets.
- Wuppertal University set up and trained a sensory panel that identified a set of flavor descriptors. The methodology will be transferred to Peru and Bolivia and applied to chilies and other native agrobiodiversity products.
- Wuppertal University developed a new non destructive methodology to determine colour and capsaicinoids; a gas chromatography method to analyse sugars (fructose, glucose, saccharine); and the use of HPLC with photodiodes to analyse the specific content of the flavonoids (quercetin, luteolin, kaempferol, apigenin) in dry *Capsicum* samples.

