

## 16 Costa Rica

### Unión de Semilleros del Sur

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#### **Rescue, conservation and production of quality bean and maize seed**

In the early 1990s, small farmer associations began to form in the Brunca Region in southern Costa Rica in response to the need to improve marketing opportunities by eliminating or reducing intermediaries and to organize seed-storage facilities that would allow the farmers to sell large volumes to packagers and industries. During this same period, research evolved from the traditional approach, where plant breeding is done by researchers and varieties are delivered to farmers, to a participatory scheme, where farmers are involved in the breeding process (Hocdé et al., 2000).

The need for bean producers in the Brunca Region to have access to high-quality seed of local varieties and, later, of varieties released through the participatory process led to the creation of local seed production units in Costa Rica. Previously, the only source of certified seed was the national production council (Consejo Nacional de Producción, CNP), regulated by the Seed Law (ONS, 1981, 2005), which did not allow the inclusion of local varieties. In addition, the main objective of the CNP is to supply seed of nationally grown varieties, not the local varieties developed through participatory plant breeding.

Local seed production started in 1995 with the widely disseminated variety Sacapobres (free from poverty), which matures early (Araya and Hernández, 2006) and produces high yields (Morales, 1994; Mora, 1995). The regional programme for agronomic research on basic grains (Programa Regional de Reforzamiento a la Investigación Agronómica sobre Granos en Centroamérica) supported this initiative (Silva and Hernández, 1996). In 2000, the participatory plant breeding effort, which integrated farmers' criteria and knowledge with that of breeders and other stakeholders, strengthened bean research in Costa Rica (Hocdé et al., 1999).

At the time, there was no organization responsible for seed production and no guidelines to regulate the process (Araya et al., 2010). In 2004, the Costa Rican bean research and technology transfer programme (Programa de Investigación y Transferencia de Tecnología Agropecuaria en Frijol, PITTA Frijol) was established with the collaboration of the Ministry of Agriculture

and Livestock, the National Institute of Agricultural Technology Innovation and Transfer, the University of Costa Rica, the CNP, the National Seed Office and the National University. PITTA Frijol introduced a quality control protocol for local bean seed production (Araya and Hernández, 2007), and set up technical committees for participatory plant breeding and seed production (Elizondo et al., 2013). A protocol for postharvest seed handling was developed later (Araya et al., 2013c).

The Unión de Semilleros del Sur (union of southern seed producers) was formed in 2010 when regulations were established for its operation (Araya et al., 2013a). Research committees of four producer organizations, including 754 members, make up the union. In 2011, the name of these committees was changed from research to technical committees because their activities included local seed production in addition to participatory research.

### **Technical committees and operations**

Members of the technical committees are appointed by the board of directors of each member organization; the boards also establish an administrative, logistic and economic strategy to support the committees. In addition to the PITTA Frijol support team, the technical committees include a coordinator and a secretary; a treasurer is named when the organization does not have an administrator; and sometimes a promoter or extension agent is needed, depending on the purpose of the committee (Araya et al., 2013b). These committees plan seed production for a minimum period of two years, based on demand and logistic and financial capacity. They also arrange for planting areas, set dates, select plots and designate farmers responsible for seed production. Seed producers receive training and are assigned varieties to propagate based on soil fertility and humidity on their land. The committees help out with the procedures required to register seed producers and their seed production lots, for both internal control and to obtain an official record. In terms of research, they also define the bean ideotype and evaluate and select materials to be released and registered as varieties.

In each seed production cycle, one of the main activities is recording information provided by each producer in a database that includes an entry number, inputs provided, audit records, records of seed received, quality analysis results and production costs. Supervision of plots is based on local production protocols defined by members in a participatory way (Araya and Hernández, 2007). Each seed producer harvests and delivers clean and dried (13 per cent maximum moisture content) seed to the local association. The technical committee audits the three stages: seed delivery, quality analysis (moisture content, inert matter, varietal mixture, discoloured seed, seed damaged by fungi or insects, mechanical injuries, wrinkles, pre-germination and contaminating seed of other crops or weeds) and seed conditioning. A form is filled out for each stage.

The Unión de Semilleros del Sur has two storage chambers with a total capacity of 32t for storing bean seed and germplasm of the main commercial

varieties, plus 1kg of each of the varieties that form the community's reserve. A log book is kept for recording incoming and outgoing commercial seed and germplasm. Each local variety has passport data. Seed cleaning of local varieties to be stored in the chambers is done at the University of Costa Rica's experimental station (Estación Experimental Fabio Baudrit Moreno, EEFBM) during at least three multiplication cycles. After that, seed committees are responsible for seed propagation. All varieties in the seed chambers have backup seed samples in EEFBM's germplasm bank. Each organized farmer group administers its own resources in the seed bank and storage costs are included per hundredweight of stored seed.

Seed of commercial varieties is available for direct sale to members who have access to credit provided by the farmers' associations. PITTA Frijol and the Panamerican agricultural school (Escuela Agrícola Panamericana El Zamorano) are currently using some of the local varieties in breeding efforts. The technical committee of the Guagaral farmers' association is planning to hold biodiversity fairs to share information on the genetic and organoleptic characteristics of the seed they produce.

The participation of women in the seed production process has been important. Women record all committee activities, record and update trial and seed propagation information, ensure that agreements are met and convene meetings. They also participate actively in supervising and managing seed lots. Women influence the choice of local varieties for commercial bean production for household consumption based on organoleptic characteristics.

Over the years, the technical committees have taken on the tasks of rescuing, increasing and conserving native varieties. The first initiative originated in 2010 in collaboration with the Food and Agriculture Organization's (FAO's) Seeds for Development project. Common beans (*Phaseolus vulgaris*), lima beans (*Phaseolus lunatus*) and maize were included in these collections. Collected seed was cleaned of pathogens and propagated at the Fabio Baudrit experimental station in time to make quality seed available in 2013 and start local multiplication. In parallel with the increased seed availability in Guagaral, local knowledge about seeds is increasing. In areas where a farmers' association is close to a school, children have received training in biodiversity issues, the importance of rescuing local varieties and the use of passport data for collecting seed of varieties grown in their communities.

### **Solidarity networks**

Solidarity networks were set up by the farmers' associations that make up the Unión de Semilleros del Sur to provide credit to members, obtain bank loans to invest in seed production, facilitate community access to seeds of improved and local varieties, reduce the cost of these varieties and provide storage and conditioning facilities for the grains produced. Approximately 750 families have benefitted. Information on seed production is disseminated in reports prepared by the technical committees and presented during the annual meeting

of the association. Information is also shared locally at churches, on posters, in workshops and meetings and with those who visit the association's facilities. In addition, producers organize information-sharing activities, such as field days and demonstrations. All members of the technical committees and the board of directors, as well as producers and local, regional, national and international extension agents usually participate in these activities.

PITTA Frijol provides technical support to the Unión de Semilleros del Sur by holding workshops and periodic meetings with the technical committees and by supervising seed production plots. The committees have also received training in organizational and entrepreneurial skills, local seed production and breeding of new bean varieties. Biodiversity fairs are being planned for the near future. Support to establish a fund as seed capital is being provided by the government and regional organizations, such as the Collaborative Program on Participatory Plant Breeding in Mesoamerica and FAO's Seeds for Development project.

One of the main achievements of the union is the availability of locally produced seed, which has been graded as 'authorized seed' by the National Seed Office. Evidence has shown that quality seeds result in better seedling establishment, even under drought or flood conditions and in low-fertility, clayey soils.

The main challenge faced by the Unión de Semilleros del Sur is sustainability of the seed production process and long-term conservation of germplasm – a problem because of the high relative humidity and temperatures in the areas where seed-storage chambers are located. Another challenge is improving and enlarging storage areas and finding resources to increase the seed capital.

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