2.6 Community seed reserves
Enhancing sovereignty and resilience in Central America

Mario Roberto Fuentes López and Sergio Romeo Alonzo Recinos

Introduction

Many important staple crops have been domesticated in Central America, such as maize (Zea mays), beans (Phaseolus vulgaris), squash (Cucurbita spp.), peppers (Capsicum spp.) and many fruit species, including pawpaw (Carica papaya), avocado (Persea americana), custard apple (Annona reticulata), guayaba (Psidium spp.) and naseberry (Pouteria sapota). Maize and beans form the basis of the diet of much of the population. The crops provide 60% of the proteins and 70% of the daily energy needed by the region’s rural population.

As a result of a combination of geographical factors (e.g. its location at the confluence of several ocean currents and the effects of periodic climatic oscillations – El Niño/La Niña), the Central American region is prone to extreme and unpredictable climatic events. Their effect on the society and economy of the region is aggravated by a number of economic and social factors (e.g. the low levels of social development and high degree of inequality). The ability of the population to adapt to the impacts of climate change is made more difficult by these socio-economic factors. As a result, the agricultural sector in Central America suffers significant economic loss due to extreme climatic events. For example, 49% of the losses caused by Hurricane Mitch alone were concentrated in the agricultural sector. It is estimated that in times of drought, losses to agriculture can amount to 60%. In Mexico, droughts represent 80% of all the agricultural catastrophes that occurred between 1995 and 2003 (Cifuentes Jara, 2010). In this highly unpredictable environment, the goal of achieving food security is a daunting task that needs multiple and collective efforts.

The Collaborative Programme on Participatory Plant Breeding in Mesoamerica (Programa Colaborativo de Fitomejoramiento Participativo en Mesoamérica; PPBMA), which was set up in 2000, is one such regional effort. The programme is being implemented in the form of national projects in Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Cuba, with financial support currently being provided by the Development Fund, Norway. We focus on working with small-scale farmers to maintain, characterize and improve varieties of maize, beans, sorghum (Sorghum bicolor) and other crops. We are currently concentrating on the management, conservation and development of agrobiodiversity through participatory plant breeding (PPB). The main goal of the programme is to contribute to achieving sustainable food security. Our principal strategy is to encourage the participation of farmers in
breeding (varietal selection, evaluation and seed production) and crop management, thereby contributing to the conservation and utilization of germplasm. We facilitate the sharing of knowledge and the development of skills at regional level, aiming to increase the capabilities of farming communities and stakeholders in a context of adaptation to climate change. Alonzo et al. (Chapter 5.8) provide insights into our PPB programme. Within the programme we aim to increase the resilience and sovereignty of farming communities in the management of their varieties, and ensure their seed security in times of change. In this context, we support the establishment and implementation of community seed reserves (CSRs) in the region.

Local mechanisms to cope with change

CSRs are set up as mechanisms for increasing local seed and varietal security during emergency periods that often follow catastrophic events such as floods, droughts and hurricanes. They are established in accessible areas of the communities with the aim of promoting the conservation, multiplication and distribution of seed stocks of portfolio crop varieties under the custodianship of a local committee. They can be immediately accessed and utilized in times of emergency, while in normal conditions they are used strategically as seed stock for supporting production. The CSRs supply communities with the tools necessary for responding to emergency situations, ensuring the continuation of the production processes while guaranteeing food and seed security.

The key steps towards establishing a CSR

**Step 1: Assessing vulnerability and risk in a participatory manner**

First, we analyse the impacts of extreme climatic events on local crop production and food security. The community identifies and prioritizes their problems. We use this crucial information for the design and development of the operational plan. We then identify the most vulnerable areas and communities, by mapping farmer and stakeholder perceptions on extreme events. We use available secondary information to triangulate and conclude the information gathered for the participatory assessment of vulnerability and risk.

**Step 2: Designing the CSR**

For this next step, we organize a series of consultative meetings with local authorities, farmers’ groups and other relevant stakeholders. These meetings serve to share and discuss the results of the assessment. We discuss the objectives and operational strategies of the CSR, and provide the community and stakeholders with the opportunity to prioritize options for locations, crops, varieties and potential seed suppliers. We use the discussion to estimate the amount of seed to be produced and supplied, and thereby define the size of the CSR.
Step 3: Mobilizing local organizations and farmers’ groups

The success of a CSR is directly related to the group responsible within the community for its management. In our project, we experienced several variations in the institutional structure. The CSR can be associated with pre-existing groups that have a good track record. It can also be set up in association with a new group that either represents the community or is associated with local government. We consider it crucial that the group members, or organizations themselves, are engaged in seed production and have the capacity to join in PPB following the establishment of the CSRs.

Step 4: Establishing a CSR committee

We support the establishment of a committee that takes responsibility for maintaining and sustaining the CSR. In addition, the committee establishes the criteria for seed quality, identifies seed suppliers, negotiates conditions for selling and buying seed, and makes sure the system performs well.

Step 5: Identifying seed producers

Within each community, we identify individual farmers who are already known and recognized for quality seed production; these farmers are then invited to become associated with the CSR. We enhance the farmers’ capabilities to ensure that the CSR only stores seed of a high quality, in terms of germination, vigour and varietal identity.

Step 6: Estimating the size of the CSR

It is important that the community is aware of the number of available varieties that are strategic for overcoming extreme climatic conditions. Other important information that the community must be aware of is the seed production data of each identified variety; this is to ensure sufficient seed is available for events following extreme climatic conditions. Such data refer to planting and harvesting time, and to the most favourable period for producing an adequate quantity of quality seed. We ensure that each community knows the number of households that requires access to seed of a particular variety, and ensure that the committee is capable of planning the production of an adequate volume of seed of each variety, and of calculating the space and resources required for seed processing and storage.

Step 7: Defining CSR standards

We support the committee in developing a simple document that determines how the CSR operates, defines the responsibilities of the committee, and sets the criteria for choosing seed suppliers and distributing seed in emergency situations. The document is proposed to the community for approval and/or amendments.
Step 8: Ensuring the sustainability of the CSR

The CSR requires significant financial investments. The community itself covers the costs of planning and training, and sets aside financial resources for purchasing seed and maintaining storage silos. It must show that it is capable of continuing the training of community members in seed selection, seed quality management, seed storage, and pest and disease control. These investments and the continued strengthening of capabilities are strategic for sustaining the CSR.

Step 9: Incorporating PPB into CSR modalities

In order to enhance their adaptive capabilities to respond to the changing climatic conditions, we are currently linking the PPB programme with the CSRs. Through this linkage, we enhance the flow of new materials into CSRs, thereby contributing to the development of diverse varietal options for farmers, with the aim of increasing community resilience.

Case 1: Quilinco CSR in Cuchumatanes, Guatemala

The establishment of the Quilinco CSR in 2010 was the first step towards building our knowledge and experience in implementing such activities in the Cuchumatanes region. The region is located in the Department of Huehuetenango, in Guatemala, at an altitude of more than 2500 m above sea level (Figure 2.6.1). In order to create the Quilinco CSR, we invited four groups from four different villages to participate. They identified local varieties and shared the seed of those varieties for multiplication, inclusion in the reserve and dissemination in the community. The CSR currently has 130 accessions of maize, including native varieties, PPB improved varieties, and varieties that are still in an experimental stage. These varieties include white, yellow, pinto, red and black seeded types. The CSR also includes five varieties of common black beans (Phaseolus vulgaris) and four yellow varieties of runner beans (Phaseolus coccineus). In addition, the community included six species of aromatic herbal plants. Forty male and twenty female farmers contributed to the establishment of the CSR and are involved in running it. They were motivated to join because they are aware of the need to enhance seed security.

The fact that the CSR increases the community’s seed and varietal sovereignty, even in times of disasters, makes it a source of collective pride. The seed of those varieties that are considered important in case of extreme weather conditions is stored in the silos of the Quilinco CSR for medium-term periods. Special containers are used to maintain properly identified and documented varieties that represent the agrobiodiversity of Cuchumatanes. The committee responsible for the CSR has set up its own rules for managing and using the CSR.

Case 2: Nueva Esperanza Concepción Sur CSR, Honduras

This CSR was established in 2007, by the two local agricultural research committees (Comité de Investigación Agrícola Local; CIALs) of Nueva Esperanza and El Barro,
in the Department of Santa Barbara, Honduras (Figure 2.6.1). Farmers began to collect and identify local varieties in their communities, storing half a kilo of every local variety with the aim of retaining it for the next sowing season. Thus, they started with a strategy to avoid the potential loss of varieties due to climatic change. This CSR now maintains eight local varieties of maize, three conventionally improved maize varieties, 12 local bean varieties, six conventionally improved bean varieties, five green manure bean varieties, and some other species of local importance. It also includes two PPB improved maize varieties and eight PPB improved bean varieties. CIAL members have started to produce and sell the seed of a wide range of maize and bean varieties. Through this activity, other farmers have started to benefit from the access to and availability of good-quality seed of better-adapted (locally or through PPB) varieties.

**Lessons learned**

Over the last five years, members of the PPBMA collaborative programme in Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua have been working on the establishment and strengthening of 12 CSRs that directly benefit over 1400 farming families. These 12 CSRs also indirectly benefit up to 2000 farming families by providing them with access to seed in times of emergency. The practice of CSRs is a feasible and cost effective way of ensuring the availability of, and increasing farm-
ers’ access to, the seed of local or conventionally improved varieties, or even varieties improved through PPB in times of insecurity. CSRs are similar to community seed banks, as described and analysed in more detail by Shrestha et al. (Chapter 2.8). The CSR is a globally important practice that supports community biodiversity management (CBM), thereby contributing to the in situ on-farm conservation of plant genetic resources (PGR), while increasing food and seed security at community level. PPBMA has been able to associate conservation aspects of the CSRs with food security; they are both important assets for increasing community resilience. CSRs can be seen as community institutions that foster livelihood development in the context of CBM (Shrestha et al., Chapter 1.3), promote entrepreneurship and contribute to a robust seed system (De Boef et al., 2010), through which they are better able to respond to frequent but unpredictable climatic catastrophes.

Public gene banks regularly face constraints in relation to the availability of financial resources for the renewal of genetic material, putting the PGR maintained in the gene bank potentially at risk. Such situations do not occur when the varieties are used and stored at farm level. We took this aspect into consideration when designing the structure and operational mechanisms of the CSR. They contribute to a form of conservation through which the dynamism that is a vital component of agrobiodiversity is continued. CSRs emerge in such a way as a strategy that embraces the dynamic nature of agrobiodiversity while contributing to its maintenance, and it is this dynamic nature that motivates people to face new problems and continue to find ways to cope with them (De Boef and Thijsen, Chapter 1.8). CSRs constantly revitalize varieties, ensuring genetic variability and pooling genetic materials in ways that allow farmers to respond to the constraints caused by climate change. They ensure the production of food for poor, small-scale farming families and safeguard their control over their seed and varietal stocks.

**Note**

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