

10 Bhutan

The Bumthang community seed bank

Asta Tamang and Gaylong Dukpa

History and purpose of the community seed bank

Bhutanese farmers save their seeds in traditional ways and share them in and between communities. In Bumthang (one of 20 administrative districts, or dzongkhag, in Bhutan), farmers grow crops that are adapted to high altitudes, such as buckwheat, a traditional staple crop that is strongly associated with the Bumthang culture. However, despite the importance of bitter buckwheat, sweet buckwheat and barley in terms of food security and culture, in the late 1970s these crops were declining, largely due to the promotion of potato production by the Food Corporation of Bhutan. Nowadays, rice has completely replaced buckwheat as a staple crop.

In an effort to maintain agro-biodiversity and resilience in the farming system, the National Biodiversity Centre (NBC) organized workshops for farmers in the province in 2009. NBC staff observed that knowledge of diversity in the communities was limited. The idea of conservation was new to Bumthang farmers; they knew nothing about community seed banks in Bhutan or in the region. In 2009, after a study visit to Nepal by an assistant dzongkhag agricultural officer to observe on-farm conservation initiatives, the idea of a community seed bank, based on strong cooperation among farmers and support from the NBC, was born.

To avoid future conflict regarding ownership of land, precautions were taken to establish the seed bank on government property with the approval of the governor of the dzongkhag. An existing storehouse was renovated and converted into a 'treasure house': the Bumthang community seed bank in the town of Chamkhar in the district of Choekhor. Once the structure was sound, agricultural extension officials collected germplasm of cereals and vegetables from all areas of Bumthang. The seed samples collected from the field were processed to reduce the moisture level and then put into earthenware pots for short- to medium-term storage (Plate 3). The community seed bank was formally inaugurated by the minister of agriculture and forests on 17 December 2011, the National Day of Bhutan.

The community seed bank was established in recognition of the importance of agricultural biodiversity for national food security, agricultural resilience and

sustainable development in the face of such emerging challenges as global warming and climate change. The seed bank houses the seeds of traditional varieties collected from the fields of farmers who are still cultivating them. Its main purposes are to:

- maintain the existing genetic diversity of Bumthang;
- restore the lost genetic diversity of Choekhor buckwheat;
- increase/enhance genetic diversity in the field so as to build resilience to climate change;
- improve the accessibility and availability of diverse genetic resources in Bumthang;
- enhance and promote the use of local varieties through improved cultivation to add value and make them commercially attractive;
- preserve traditional food culture and practices related to local varieties.

Management, operations and support

The key supporters of the community seed bank include the community; the district agricultural officer and his staff, who coordinate activities at the dzongkhag level; the Bumthang dzongkhag administration; the NBC, which offers technical and financial support (and initial coordination); and the Integrated Livestock and Crop Conservation Project (of the United Nations Development Programme's Global Environment Facility), which provided financial support through the NBC. Currently, the Dzongkhag Agricultural Sector manages the community seed bank, which is still in the initial stages of building up its collections, assisted by the Bumthang Buckwheat Group. The Bumthang Buckwheat Group is registered with the Department of Agriculture, Marketing and Cooperatives under the Ministry of Agriculture and Forests. Currently, this group has nine active members, eight of whom are women. The dzongkhag and NBC are in the process of developing guidelines and a framework for the management and operations of the community seed bank, which may also be useful to other community seed banks in the country.

Initially, in 2011, information associated with germplasm was scant. Now, seed samples that were collected in 2011 are being replaced with fresh seeds from the same locations. As the seeds are replaced, associated information provided by farmers is being documented. Farmers are able to describe how the variety performs under drought conditions, whether it is resistant to disease and the length of time it takes to mature. This valuable information will be useful to other farmers as well as to breeders in their search for useful traits. A start has been made with germplasm samples of cereals and vegetables. The size of the seed samples is 1–5kg for cereals and 0.2–0.5kg for vegetable crops.

The community seed bank carries out the following activities:

- maintains the existing crop diversity of Bumthang;
- restores the threatened crop diversity of Choekhor (particularly buckwheat);

- increases and enhances genetic diversity in farmers' fields to build resilience and adapt to climate change;
- improves the accessibility and availability of diverse seeds to needy farmers in Bumthang;
- enhances and promotes the use of local varieties through improved cultivation to increase the value and marketability of crops;
- preserves the traditional food culture and practices associated with local crops;
- showcases the seed diversity of Bumthang.

The major costs involved in setting up the community seed bank included renovation of the building, purchase of containers to hold germplasm, an entrance gate and fencing. This material and work was supported by NBC through the Integrated Livestock and Crop Conservation Project. Setting up of the seed bank also required the collection of germplasm and associated information and labeling and proper documentation by agriculture extension officials coordinated by the Dzongkhag Agricultural Office. Labour was provided freely by buckwheat farmers.

Seed flows

Extension officers are involved in collecting seed samples from various districts within the county. The seeds are collected using a standard protocol provided by the NBC. Once the seeds are collected, they are cleaned and processed to scientific standards. Finally, they are stored in earthenware pots. Information about the seeds is entered into spreadsheets using a format provided by NBC. Seeds collected earlier are also being replaced and NBC is helping to fill the gaps in the collection. In the future, seed germination tests will be carried out by giving seeds to some farmers.

Dzongkhag agricultural officers and extension officials visit farmers' fields to assess the suitability of the seed for multiplication and renewal. Multiplication of the seed samples is carried out by growing each sample every alternate year so that the seed retains its viability. The routine growing of the seed samples exposes crop varieties to prevailing weather and climate conditions and helps them adjust and adapt to changes. The seed material that is returned to the bank after every growing season is expected to be more adapted to the environment, pests and disease as well as the weather. Seeds are provided on a returnable basis to interested farmers who are allowed to grow crops for themselves and return the amount of seed they borrowed. About 1,000kg of seeds of two buckwheat varieties, i.e. bitter buckwheat and sweet buckwheat, have been distributed – to eight households in 2011, 17 in 2012 and nine in 2013. The farmers most interested in this process are women.

All Bhutanese are eligible to use seeds from the community seed bank. We are not aware of any sex discrimination in the availability of its resources. However, the transfer of material and associated traditional knowledge out of

the country will be guided by the draft national Access and Benefit-sharing policy, which states that:

The access to duly registered *ex situ* collections of genetic resources for food and agriculture that fall under Annex-1 of the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA) and are under the management and control of the government as well as in the public domain shall be in *accordance* with the terms and conditions of the Multilateral System of Access and Benefit-sharing, including the conclusion of a Standard Material Transfer Agreement (SMTA) while the access to other genetic resources in *ex situ* collections in the Actualization Phase shall be based on an ABS Agreement between the user of such resources and the National Focal Point.

Ministry of Agriculture and Forests,
Royal Government of Bhutan, 2014, p10

Connections

As the community seed bank is still in the early stages of establishment, it does not have any links with other groups, other than the NBC, which is providing technical guidance and is seen as the backbone of the seed bank. However, the Buckwheat Group is involved in product development and marketing and, thus, is registered with the Department of Agriculture and Marketing Cooperatives.

Connections with the national seed system is an area that will be explored once a proper management system for the seed bank is in place. In 2009, the national gene bank conducted a first round of germplasm collection from Bumthang. There is a need to assess the gaps in the 2009 collection and obtain missing seeds for the community seed bank before depositing them in the national gene bank. In the future, two-way flow of germplasm is expected to make the community seed bank more dynamic.

Achievements and challenges

With the formation of the Buckwheat Group and community seed bank, cultivation of buckwheat has been revived in Bumthang. The value of this crop has also increased dramatically, from 35 Bhutanese ngultrum (BTN) per kilogram of buckwheat flour back in 2009 to 80 BTN/kg in November 2013 (about US\$1.34/kg). The group has managed to increase both the area under production and the yield of buckwheat and barley in Bumthang.

The community seed bank has grown rapidly in popularity. Along with the 'Buckwheat House' (a buckwheat product-processing and market outlet), it is now the most visited site and a must-see attraction for visitors to Bumthang, including farmers, students, tourists, government officials and dignitaries. Farmers visiting the community seed bank from other parts of the country have started requesting seeds. The Bumthang seed bank will serve as a case

study in the government's 11th five-year plan (July 2013 to June 2018), which includes the establishment of three more community seed banks in the country.

Although the seed bank has enjoyed some success, it faces some challenges as well. For example, buckwheat is a low-yielding crop with a poor response to chemical fertilizers. Bumthang has adopted organic farming practices, but the availability of farmyard manure is limited. It has also been difficult to change the traditional cultivation practices of farmers. Further, the dzongkhag staff are engaged in numerous tasks and do not have enough time to devote to community seed bank matters.

Efforts are being expanded to barley cultivation, and there is a plan to include Bumthap chili, as chili is an important ingredient in Bhutanese food. Later, work will be extended to include amaranth as well. With an expected increase in demand in the future, farmers will focus on seed production and distribution of locally adapted landraces.

Reference

Ministry of Agriculture and Forests, Royal Government of Bhutan (2014) *Access and Benefit Sharing Policy of Bhutan, 2014*. Thimphu, Ministry of Agriculture and Forests, Royal Government of Bhutan