



# Seeds of adaptation

## Climate change, crop diversification and the role of women farmers

 Women farmers around the world are taking the lead in putting crop and varietal conservation and diversification strategies into practice as a way to strengthen local climate change adaptation capacities.

### Key messages

- Women farmers play key roles in local seed systems although they are often overlooked by researchers and development personnel, policies and programs.
- Climate change is putting pressure on farmers' seed and food production systems, often resulting in different impacts on women and men.
- Crop and varietal conservation and diversification can be effective adaptation strategies to respond to changing farming conditions and increased uncertainty.
- Women are at the forefront of implementing such new strategies, but more attention and support are needed from research and development agencies and from practitioners.

### The problem

Farmers' own seed systems are at the heart of food security. These systems are currently under stress due to political, social, economic and environmental changes. Women farmers play key roles in these systems. However, they are often overlooked by researchers and development personnel, policies and programs.

### Context

Almost everywhere, local seed systems – from selection, to storage, production, distribution and exchange – are under stress. Agricultural modernization (for example, substitution of local varieties with hybrids), privatization of natural resources and the strong concentration and expansion of corporate power in the life science industries (including the seed industry) are contributing to a decline in collective local management of plant genetic resources for both conservation and sustainable use. Many farming households have become more individualized in terms of decision-making and use of knowledge, labor, capital and seeds.

Traditional seed exchange relationships are becoming weaker in many areas or are disappearing altogether. Large-scale rural-to-urban migration is contributing

to a decline in farming or changing its nature radically. In some countries, this trend is leading to the feminization of agriculture, resulting in heavier workloads for women. Climate change, in the form of longer-term changes in temperature and precipitation and the increased occurrence of extreme weather events, is putting additional pressure on farmers' seed and food production systems, often with different impacts on women and men. Diversity of local varieties, in both number and area cover, is on the decline in many countries. Future impacts of climate change are expected to become more pronounced in many parts of the world, forcing farmers to change their practices and search for information about crops and varieties better adapted to new weather dynamics.

Crop and varietal diversification can be an effective adaptation strategy to respond to changing farming conditions. Women farmers around the world are taking the lead in putting this strategy into practice and, in the process, they are reorienting farming knowledge, practices and the social relationships of agricultural production. The following two examples illustrate this.

## Evidence and experience

### Crop and rice diversification in Bhutan

Pema lives with her parents, husband and daughter, aged four, in a traditional Bhutanese farmhouse in the village of Tsento, Shari, in the fertile Paro valley of the central western part of Bhutan. There are about 50 households in the village, arranged in the dispersed manner common in the country. Despite this dispersion, agriculture continues to depend on cooperation among villagers throughout the year. Pema explains:

*"Right now is the rice transplanting season. Transplanting is done by teams of women. First, the men plow the land which is flooded before transplanting. Neighbors work together to finish the work on time, going from the field or fields of one household to the field of another. Nowadays, most of the household[s] cultivate a variety that*

*was introduced in the area about 10 years ago. It is named 'Nepali'. It yields well and responds effectively to increased fertilizer use. Two other varieties can be found, as well, named 'Paro China' and 'Chadanath 1'. Before, we used to grow two traditional red rice varieties 'Kuchum' and 'Raynam', but these were affected by disease and decreasing yields. With government support, we changed our varieties. 'Nepali' is a good variety."*

### Experimenting for adaptation

Pema and other farmers in the village are interested in growing new rice varieties, especially ones that adapt well to the changing environmental conditions. In recent years, they have been experimenting with new varieties introduced by breeders at the government's Renewable Natural Resource Research and Development Centre. This is the first time the farmers, together with researchers, have tested these new varieties. The varieties are supposed to do well at higher altitudes, respond better to drier conditions and have good disease resistance. Farmers hope that one or more of the new varieties will produce good results. Bioversity International has offered training to breeders in the use of new research tools and techniques that allow the identification of promising plant genetic resources adapted to the changing climate.

Apart from rice for household consumption, Pema grows potatoes as her main cash crop. She also has a garden with several vegetables, herbs and spices, such as beans, cabbage, spinach, broccoli, turnips, pumpkins, rapeseed, onions, mint and some maize. In addition, she has a small field with oats (which are increasingly used for fodder, replacing the more drought- and disease-prone wheat), several fields with various types of chili peppers (for home consumption and for the market), and an orchard with apples and peaches. Pema is the first farmer in the locality to have a greenhouse. She has been selected by the Agricultural Extension Centre to cultivate vegetables in the greenhouse because of her willingness to collaborate on new projects. She has planted tomatoes, cucumber, chilies, climbing beans, salad and amaranth, among others. If the greenhouse is successful, it will give her more diverse produce throughout the year and she will be able to sell some of the harvest at the market.

## Constraints to success

The villagers face several problems. Pema says:

*"A major problem we have is wild boars. They come from the forest during the night and invade our fields. They dig up the potatoes and empty a field in one 'haul'. We have to stay overnight in the fields to chase them away, but it is not easy. One of my potato fields was invaded some days ago; the boar devoured all the potato seeds. When the maize is ripening, they will return. They also like rice and oats. That is why all our rice fields are fenced."*

Another major problem is drought. Pema observes:

*"Drought is affecting us in a severe way. For the rice, we still have irrigation water, but the reduced inflow has already caused some tensions between households that depend on the same source. The drought could cause the non-flowering of the potatoes and thus their loss. That would be a serious setback for me. The vegetables, oat[s] and maize are also suffering. I hope the rains will come soon."*

## Crop and variety conservation in South Africa

South Africa's Department of Agriculture, Forestry and Fisheries (DAFF), through the Directorate Genetic Resources and in collaboration with Bioversity International, has initiated a national community seedbank strategy to support local smallholder communities in efforts to revive and improve their traditional seed-saving practices. It aims to promote food security, sustainable agriculture and conservation of the country's agricultural biodiversity at the local and national levels. This is especially important in areas where farming systems are subsistence oriented, deeply connected to local food culture and situated in complex, risk-prone low-input environments. In a community seedbank, local varieties are collected and the related indigenous knowledge documented. Then, they are stored, multiplied and shared. A community seedbank represents a simple community-based solution for improving access to, and availability of, plant genetic resources and safeguarding these in case of adversity.

## Farming in Gumbu

Two pilot community seedbanks have been set up so far: one in Gumbu village of Limpopo Province in the northeast and one in the Sterkspruit district of Eastern Cape province in the southeast. Gumbu is a remote dryland village situated about 150 km from Mutale town near the border with Zimbabwe. It has poor market access and is far away from government agencies and services. Farming in Gumbu is largely practiced by women. Some of the men look after the livestock in areas surrounding the village, but many have migrated out in search of paid work. The main food crops are maize, white sorghum, calabash, cowpea, pumpkin and melon. These crops are mostly used for household consumption. Women also cultivate a variety of vegetables, such as cabbage, squash, onion, sweet potato, tomato and chili. These crops are mostly sold at the market. Crop varietal diversity at farm level is not very high, but some farmers maintain rare varieties. However, some traditional varieties have disappeared from the village. Seed exchange mostly takes place within the family and with fellow church members.

## Women running the show

The Gumbu village community seed bank is managed and operated by a group of 40 women farmers. The women farmers of Gumbu contend that the community seed bank will allow them to maintain a range of different crop species and varieties inherited from their parents. Maintaining crop diversity not only supports their households in terms of food supply, but also gives them satisfaction and allows them to earn some extra cash. They expressed that exchange of seeds among farmers of different communities and cultures will help to stop the loss of crop diversity that is occurring in the area. The women farmers running the community seedbank are giving priority to nutritious crops that taste good and are easy to combine with traditional dishes. In terms of agronomy, they are doing everything possible to maintain crops and varieties that require few inputs, are drought-, pest- and disease-resistant, and have a short growing cycle and long-term storage quality.

## Recommendations

The examples of Bhutan and South Africa illustrate the key role of women farmers in local climate change adaptation efforts and how these efforts in turn are changing local agro-ecological and socioeconomic landscapes. Yet, research and development programs and projects pay insufficient attention to the successes and challenges of such farmers' efforts. More attention and support is needed to:

- encourage the safeguarding and improvement of local plant species and varieties maintained by smallholder farmers and their communities, recognizing the central role of women;
- value and reward farmers' collective efforts to safeguard and improve agricultural biodiversity and associated cultural values and knowledge;
- support farmers technically and financially to organize themselves and strengthen their organizational capacity, taking into consideration the leadership role of women.

### Further reading

#### Bhutan

<http://www.biodiversityinternational.org/news/detail/rural-bhutanese-farmer-pema-faces-climate-change-with-a-cornucopia-of-agricultural-biodiversity/>

#### South Africa

<http://www.biodiversityinternational.org/news/detail/seed-savers-of-gumbu/>

<http://www.biodiversityinternational.org/news/detail/rural-bhutanese-farmer-pema-faces-climate-change-with-a-cornucopia-of-agricultural-biodiversity/>

<http://www.biodiversityinternational.org/news/detail/supporting-community-seedbanks-in-south-africa/>

<http://www.biodiversityinternational.org/news/detail/powerful-crops-empowering-farmers-through-community-seed-banks-in-south-africa/>

<http://www.biodiversityinternational.org/e-library/publications/detail/savouring-diversity-first-steps-in-implementing-a-strategy-to-support-community-seedbanks-in-south-africas-smallholder-farming-areas/>

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### Photo by

Aulia Erlangga for Center for International Forestry Research (CIFOR)

A tea picker from Cianjen, within the boundaries of Mount Halimun Salak National Park in West Java, collecting tea leaves in a basket.

This brief is number 1 in a set of Gender Climate Briefs.  
See the full set here: [CIFOR.org/gender-climate](http://CIFOR.org/gender-climate)



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