

Making the most of underutilised crops

Spreading risk is an essential means to reduce vulnerability, especially for already vulnerable people. Increasing the use of underutilised crops is one of the better buffers to help farmers diversify, and sustain, nutritional, environmental and financial security in times of change.

Hannah Jaenicke and Nick Pasiecznik

Whereas it would seem common sense to “not put all your eggs into one basket”, we have witnessed the absolute opposite in recent decades: agricultural intensification. Although net food production has increased, over 50% of the carbohydrate and protein needs of the world’s human population are met by only three plants: maize, rice and wheat. This has also triggered an ever-increasing reliance on external inputs to keep up with pest and disease outbreaks. Similarly, improved crop varieties need increased water and fertilizer. These problems are being aggravated by climate change, with significant effects on rural livelihoods. Droughts and floods will increase in frequency and intensity. Changing temperatures will allow pests, diseases and other invasive species to thrive in new areas.

One means to achieve increased resilience to shocks and change is by increasing the production, use and marketing of underutilised species on farms. Of special importance are indigenous plants with traditional uses and cultural links with local people. By diversifying farming systems, the food, medicines, fibres, fodder or other products they yield offset demands for imported, unavailable or unaffordable alternatives.

People are already using a number of coping strategies to alleviate periodic hunger. A look at these can teach us where positive

impacts will most likely occur. For example, farmers grow or use crops which are more tolerant to environmental extremes, use a variety of plants for balanced nutrition and to spread the harvesting times of cultivated or wild-harvested plants, and make use of important, keystone tree species which provide a range of products. The three strategies summarised here were presented during an international symposium in early 2008.

1. Use more tolerant species

Bambara groundnut (*Vigna subterranea*) is a drought tolerant legume from West and Central Africa. It used to be grown extensively in sub-Saharan Africa as a nutritional complement to cereals, before the cultivation of peanuts took over traditional growing areas. Farmers had problems with low and/or unpredictable yields, the long time needed for processing and cooking, and the cultural perception that it was a “woman’s crop”. All these factors limited its production and use. Using a multi-partner, multi-location system, a team led by the University of Nottingham is using an array of approaches to test the suitability of bambara groundnut in new environments. In addition, they are establishing a breeding programme to develop better-yielding cultivars. The programme, which started in 1988, is seeing results. Bambara groundnut is regaining acceptance in sub-Saharan Africa, as well as being accepted and integrated in farming systems in drought-prone areas of India.

Breadfruit (*Artocarpus altilis*) is a staple in the Pacific. It is eaten occasionally elsewhere where it grows, and it compares well with rice for a range of nutrients from calcium to vitamin C. On most Pacific islands, plants have to be adapted to the thin calcareous soils and must be tolerant to frequent exposure to salt spray. Although breadfruit is a key resource, its productivity and even its survival, is limited by conditions of drought and increasing salinity. In contrast, plants specifically adapted to such conditions are pandanus (*Pandanus tectorius*), giant swamp taro (*Cyrtosperma merkusii*) and coconut (*Cocos nucifera*). Pandanus fruits contain high levels of beta-carotene, and normal consumption of especially the orange-fleshed varieties can satisfy a person’s vitamin A requirements. Giant swamp taro has a beta-carotene content so high that a normal daily intake of four cups a day provides more than half of the estimated vitamin A requirement. Zinc and calcium contents are high enough to satisfy 50-100% of the recommended daily intakes of these nutrients. In addition, iron content is twice as high as that of banana or breadfruit.

2. Spread the harvest

In rural Kenya, 60-80% of the population lacks adequate amounts of food for two to five months a year. Whereas experts recommend a daily intake of about 200 g of fruit, in Kenya this can be as low as 20 g per day, even though the country has many indigenous plants producing fruit. A recent study identified 57 indigenous fruit species in Mwingi District and showed that wild fruits form a very important safety net for rural Kenyans during the months of food shortage. In particular, children consumed significant amounts of fruit – far more than adults. Efforts are now being taken to encourage families to grow some of these wild species within their home gardens. This will increase the availability of fresh fruits and improve the family’s nutritional security.

Fruiting calendars show when particular crops are available, and when there is need for supplemental nutrition. In Nepal, over 60% of fruits consumed are produced in family home gardens. Although there is a lot of diversity in these systems,



Photo: L.Engelberger, IFCP

Enjoying a pandanus fruit.

Underutilised trees

often containing 30-40 species, nutritional intake may still be inadequate during some months. However, targeted “diversity kits” have been developed and made available to farmers. They contain seeds, planting material and information about selected complementary species. These kits help to ensure that the home gardens can provide sufficient nutritional balance throughout the year.

3. Make more from keystone tree species

The Gruni people in northern Ghana have developed a way to deal with hunger, based around the baobab tree (*Adansonia digitata*). From January to June the availability of staple crops (sorghum, millets and groundnut) is limited, due to floods and droughts. Important ceremonies often have to be cancelled due to food shortages. During this time, apart from seeking labour in the cities, people rely on wild baobab trees. Its leaves, flowers, fruit pulp and seed are the most important products, used primarily for home consumption, but also for sale and barter. Women play a major role in collecting and processing baobab products. They consider the dry pulp in particular as a good source of household food. However, the Gruni have witnessed a marked decline in the number of baobab trees over the past 70 years. They attribute this to increased human population pressure and consequently, overharvesting. People are now being encouraged to start planting baobab trees and to develop modern processing methods to increase efficiency and reduce wastage.

Supporting the spread of underutilised species

These examples show that many people have developed and use various coping or buffering strategies. They are using several “baskets” to carry their “eggs” – or fruits and other food as the case may be. Since we know that hunger periods will occur more often and become more severe in the future, what is needed now is to encourage increased use of more underutilised species, and the planting of hitherto “wild” productive species in or near the farms. There is need to develop stronger seed supply systems and mother tree orchards. It is also necessary to support the development of processing strategies to increase shelf life and thus availability of produce through the hungry periods. Successful marketing of underutilised crop products also requires support and mentoring in business practices and the availability of credit systems.

Overall, underutilised crops provide a better buffer to reduce nutritional, environmental and financial vulnerability, and their increased use should be promoted.

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The International Centre for Underutilised Crops (ICUC) has recently merged with the Global Facilitation Unit for Underutilised Species (GFU) and operates as Crops for the Future. The mandate of Crops for the Future is the support, collection, synthesis and promotion of knowledge on neglected and underutilised species for the benefit of the poor and the environment.



Photo: Abhay Gandhe

As an example of the principles described in the previous article, tribal farmers in India are being encouraged to plant underutilised indigenous wild trees on their land. This is in response to the fact that, in recent times, farming systems in central India have become less diversified and natural resources are becoming scarcer. Tribal communities living in remote areas are especially affected. While forest products were previously a major source of income, they are now being overexploited. Promotion of underutilised species can diversify farms, preserve forests and provide opportunities for income.

Abhay Gandhe and Arun Dolke

The two main crops grown in central India are rice and cotton. While other minor millets, pulses and oilseeds are also grown, many farms have evolved to now operate as monocultures. Farming systems have become less diversified, soil and water resources have become poorer, and growing populations are putting more pressure on limited land resources. If a main crop fails, farmers suffer as they have few options to fall back on. With systems becoming more unsustainable, communities are increasingly using natural resources from surrounding forests. This can result in overexploitation and the loss of biodiversity. Farmers need additional opportunities within their existing farming systems. This is especially true for tribal farmers who inhabit more remote and marginal areas.

BAIF Development Research Foundation, in Pune, India, has established a Resource Centre for Tribal Development (RCTD) to identify and develop potential new interventions for tribal communities. Tribal farmers are indigenous communities generally living in forest fringed remote areas and practising subsistence farming on small land holdings. Collection and sale of a variety of non-timber forest products (NTFP) constitutes a major source of livelihood for tribal farmers. However, widespread poverty, degrading agriculture and the vague tenure status of wild NTFP trees is leading to their overexploitation. Crop diversification has been identified as a key measure for countering the threats of degrading farming systems. However, BAIF and RCTD realise that there are limitations to developing