

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

offer hope for tribal communities

Learning to cultivate and harvest lac has offered a new income opportunity and a more diverse farming system for this tribal farmer.

the existing agricultural situation in marginal locations in tribal areas. Therefore, an alternative strategy has been proposed: domesticating non-timber forest products as a major effort towards diversifying farming systems. The innovativeness in this approach is to focus on underutilised indigenous wild trees which have economic potential.

Promising but underutilised trees

Wild underutilised NTFP trees are domesticated by integrating them into existing farming systems. All NTFP trees are highly stress tolerant. They are hardy and establish well, with minimum care, on the neglected areas of farms. With technical advisory support and a strong sense of ownership for the trees planted on the farm, the farmers are expected to harvest the trees sustainably, thus ensuring long-term additional livelihood support. In the long run, there should be a gradual shift towards harvesting of NTFP from privately owned trees, resulting in reduced harvesting pressure on forests.

The BAIF field teams and the participating farmers together identify promising trees for domestication. The following attributes are given special attention:

- high tolerance to drought and high summer temperatures;
- ability to survive on marginal soils;
- suitability for direct seed sowing or simple nursery techniques;
- resistance to browsing by stray cattle and goats;
- highly threatened status in natural forests due to overexploitation;
- the local population is familiar with the trees and their use, so that adoption is easy.

Three of the trees selected as priorities for domestication are described here:

The gum karaya tree, *Sterculia urens*

The karaya is found in tropical dry deciduous forests in India. It prefers unusual and stress prone habitats, occupying hilltops, rocky crevices, or eroded slopes. It needs very little water, and will grow on the poorest of stony soils. The karaya tree yields a valuable gum – tapping these trees was a major livelihood activity for tribal communities in central India. At present, it is one of the most threatened NTFP trees in India due to overexploitation. It is nearly extinct in many areas where it was abundant in the past. Recently, several Indian states have banned trading this gum, in an attempt to halt the rapidly declining number of natural stands. However, in the process they are depriving traditional gum collectors of a source of livelihood.

The strong resilience capacity of this tree can be used to the farmer's advantage. A well developed tree can generate about 500 rupees (around US\$ 10) annually from gum harvesting from the tenth year onwards. With about 25 mature karaya trees per hectare on his farm, a farmer has access to an additional income of about 12 500 rupees (around US\$ 255) which is hardly influenced by an adverse climate. BAIF started propagating the tree through stem cuttings, but there are few large trees surviving locally. So we shifted to seed propagation. The fresh seed, harvested in April, germinates well and is fit for direct sowing. The radicle of the emerging seed quickly swells into a tuber and gives the fresh seedling strong drought tolerance.

In the July 2008 season, about 75 000 karaya seedlings were established on the farm bunds of tribal farmers. This number will increase in 2009. After about 10 years, the privately owned trees will be harvested by non-destructive methods of harvesting to ensure sustainability of production.

The flame of the forest tree, *Butea monosperma*

This is another exceptionally hardy tree which grows naturally in secondary forests and on neglected areas. It is extremely drought tolerant and resistant to grazing by all animals. Its compact size and tolerance to frequent heavy pruning makes it an ideal tree for agroforestry. The tree is best propagated through direct seed sowing of single seeded pods which are available in abundance in April. If planted in a single dense line along farm bunds, it is effective as a host tree for cultivation of the Indian lac insect, *Laccifer lacca*. Lac is the resinous secretion of a tiny insect that grows on a variety of trees known as lac host plants. Harvesting of natural lac is a traditional livelihood activity of the tribal communities, but is now overexploited and threatened. Cultivating lac needs technical but simple skills. The RCTD is ensuring that new lac farmers have these skills, through on-farm trainings. Five to six years after planting, the tree is ready for inoculation by lac insects, and needs very little maintenance till the gestation period. A grown tree can yield lac worth 50 rupees (approximately one US dollar) in a year. BAIF suggests planting at a density of about 300 trees on the bunds of one hectare. Domesticating this wild tree has the potential to generate additional annual income of about 15 000 rupees, or just over US\$ 300.

This tree needs little labour and is a truly multipurpose tree yielding firewood, manure, commercial lac and gum. The *Butea* plantation programme started on a trial scale in July 2007. It was possible to quickly scale it up in July 2008 to ensure the planting of about 120 000 seedlings across central India. Due to its easy establishment, the programme is expected to grow and spread quite fast in the near future.

The baubinia tree, *Bauhinia purpuria*

This tree is occasionally found in the urban areas of South Asia as an ornamental tree. In the remote tribal areas, its leaves are a popular green vegetable. In the forests, it occurs as a scattered tree. However, compared to the demand for vegetables, the trees are few and overexploited. In April, the tree puts forth fresh leaves that are plucked as vegetables. Removing too many leaves weakens the tree. Every tribal family is being encouraged to plant two or three *Bauhinia* trees in their own backyard gardens. During July 2008, about 5000 seedlings were raised in nurseries and given to about 5000 families. This small initiative will be scaled up in 2009. It is expected that the newly planted family-owned trees will be ready for use as a vegetable after about five years. The trees have a special role in human nutrition as the green vegetable is available during the dry summer season when other cultivated vegetables are not available in rural markets.

In addition to generating livelihoods and building resilience back into degraded farming systems, this BAIF initiative will also encourage *ex situ* conservation of many threatened Indian tree species. ■

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