

Symposium 2: Domestication of agroforestry tree crops

Impact of participatory tree domestication on farmer livelihoods in West and Central Africa

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Abstract

Research on participatory domestication of indigenous trees in West and Central Africa started in 1998 with the objective of increasing incomes of rural communities and the resilience of their livelihoods by cultivating indigenous trees and developing strategies for marketing the produce. Over the years, a low-cost technology, well-adapted to local communities was developed and the capacities of technicians from NGOs, extension services and community-based organizations to cope with tree domestication and marketing were strengthened. Ten years later, surveys were conducted in the Centre and North-West Provinces of Cameroon to assess impact of participatory tree domestication on farmer livelihoods. Farmers practicing tree domestication were asked to describe its benefits to tree cultivation on their farms, household income, health and human capacity development, and the constraints they face in its practice. Reasons why some farmers discontinued their tree domestication and others preferred not to adopt were also investigated. The majority of adopters realize that tree domestication can bring quick results, either through sales of nursery plants or through early fruiting plants. Overall, household revenue derived from tree domestication varies with areas. In some income was quite low while in others the study showed several cases where tree domestication has permitted farmers to send their children to secondary school and upgrade their habitat, investments they could not afford without the innovation. Health benefits from tree domestication include increased fruit consumption and use of medicinal plants, both through more awareness and increased availability on farm. Probably the most direct felt impact of tree domestication is capacity development. Knowledge not only related to trees, but also on group dynamics, conflict resolution and financial management, has turned adopters into veritable resource persons in their communities and beyond. The study also revealed that successful models are the main driver for the diffusion of tree domestication. Farmers who discontinued the innovation and non-adopters admit doing so because they lack tangible signs of impact. On the contrary, in sites where tree domestication results are unmistakably visible, more farmers are encouraged to take up the innovation, resulting in turn into greater impact.

Smallholder Production of Agroforestry Germplasm: Experiences and lessons from Brazil, Costa Rica, Mexico and Peru

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Introduction Over the last 20 years or so, interest has grown in promoting smallholder germplasm production as a mechanism for simultaneously securing a series of benefits. We describe a number of initiatives of this sort in Latin America. We then evaluate their performance in terms of four potential benefits of smallholder germplasm production (although we recognize that not all the initiatives had these explicitly aims). We then discuss these in order to identify lessons of relevance to future activities of this sort.

The four initiatives:

Brazil: Seed production by the Parakanã indigenous community

Type of activity: component of a private sector development programme.

Implementing agencies and location of activities: Tucuruí Municipality, Pará State, Brazil.

Principal purpose of activity: generation of income; value-adding to discourage felling.

Nature of community seed production activities: Collection, sale of seed of six tree species.

Impacts (germplasm sale) and current status: In 2005, income from seed sales was approximately R\$7000 (c.\$2800 at 2005 exchange rates, i.e. \$4.45 / community member).

Central America and the Caribbean: the Forest Tree Seed Project (PROSEFOR)

Type of activity: externally funded development project (1992-2001) (Denmark)

Implementing agencies and location of activities: CATIE, National Seed Banks or forest authorities (Costa Rica, the Dominican Republic, Guatemala, Honduras, Nicaragua, Panama, and El Salvador), Danish Forest Tree Seed Centre.

Principal purpose of activity: increase supply of and demand for quality forest tree seed.

Nature of smallholder seed production component: The project established 308 approved seed sources of 78 species, many located on private land. Seed was to be marketed through the national seed banks, and regionally/internationally through CATIE seed bank, with proceeds (less costs) returned to the seed stand owners.

Impacts (germplasm sale) and current status: By 1999, annual demand for seed from the seed banks had reached 31,317 kg. Total receipts were \$832,000. However, of this total, 32% were of Honduran pine seed, sourced primarily from state forests. Of the remainder, \$216,000 was from sales of teak and gmelina from Costa Rica, the great majority derived from smallholder plantings. The seed banks continue to market a wide range of species.

Mexico (Yucatán): Conservation and use of big-leaf mahogany (*Swietenia macrophylla*) and Spanish cedar (*Cedrela odorata*)

Type of activity: externally funded (USA Foreign Agricultural Service) research and development project (1999-2002).

Implementing agencies and location of activities: ICRAF, CATIE, INIFAP; Quintana Roo, Mexico (seed collections also in other states, Central American countries).

Principal purpose of activity: genetic conservation, elucidation of patterns of genetic variation, ensure access of smallholders to genetic resources, facilitation of seed production through conversion of trials to seed orchards

Nature of community seed production component: Four provenance-progeny trials on communal (*ejido*) land. Further work was done to identify, map and register a seed stand (112 trees of both cedar and mahogany).

Impacts (germplasm sale) and current status: There are two surviving trails. These are expected to produce seed within the next five years. The seed stand has not been used for collection of seed and in 2007 was damaged by a Category 5 Hurricane (Dean).

Peru (Ucayali): Participatory Domestication of Agroforestry Trees

Type of activity: multidonor (World Bank, European Union, Tinker Foundation, USAID, and others) research and development program (1995-present).

Implementing agencies and location of activities: ICRAF, INIA-Peru, PROSEMA; Ucayali Region, Peruvian Amazon.

Principal purpose of activity: genetic conservation, elucidation of patterns of genetic variation, ensure access of smallholders to genetic resources, facilitation of seed production, income generation through germplasm sales.

Nature of community seed production component: seed orchards, three species, established on multiple smallholdings. Participating farmers formed PROSEMA (The Aguaytia Valley High Quality Seed and Timber

Producers' Association) and a limited company (ECOCUSA) to commercialize their products (seed, plants, other agricultural products).

Impacts (germplasm sale) and current status: In 2008, 4.33 kg of bolaina seed were sold for a total of S/.8660 (about \$3210). In the same year, 0.9 kg of capirona was sold for S/.1550 (about \$575). In addition, S/.5500 (about \$2000) was received as advance payment for production of planting stock.

Evaluation with regard to benefits of smallholder germplasm production

Genetic conservation: Germplasm production units can only fulfil a useful genetic conservation function if the genetic resources they comprise would otherwise have been lost. In at least some degree, this was achieved in all four initiatives. However, germplasm production units clearly varied widely in their genetic conservation value.

Smallholder control of genetic resources: The initiatives were successful in this regard. However, under current legislative arrangements, full control of these resources may be lost as soon as they can be multiplied elsewhere (i.e. in the plantations established from the seed sold).

Income generation: Two of the projects have generated income for the landholders involved. There is scope for increasing income, either through increased volume of sales or higher prices. We show that the common practice of pricing seed in terms of weight seems to result in unreasonably low prices for small-seeded species. This practice is uninformative for the buyer and likely to be unremunerative for the seller. Another approach would be for germplasm producers to (also) sell planting stock.

Sustained germplasm production, facilitating smallholder tree planting: There would appear to be three principal conditions that must be fulfilled before this outcome can be achieved. First, as tree germplasm is typically bought and sold as plants rather than seed, germplasm producers would have to be producing seedlings, rather than seed. Second, the species they are producing must be those demanded by their potential smallholder clients. Third, prices must be acceptable both to buyers and sellers. As yet, it is doubtful whether all of these conditions obtain in any of the cases analyzed here.

Conclusions

The idealized concept of smallholder germplasm production is of a “win-win” intervention, whereby germplasm producers profit whilst facilitating livelihood-enhancing smallholder tree planting. The initiatives analyzed here go some way towards achieving this ideal, even though their explicit objectives were not always framed in these terms. In order to approach the “win-win” ideal more closely, a number of conditions must be met. For germplasm producers to win, they need to produce material that can be sold in sufficient quantities at high enough prices. This implies: rational pricing based on reproductive potential rather than an arbitrary attribute such as weight; possibly a bias towards large-seeded species (if seed, rather than plants, are to be produced); selection of high demand but low supply species (e.g. pau rosa), and production of plants rather than (or as well as) seeds. For smallholder tree planters to win, the right material needs to be available to them, in the form they require. This represents a challenge for smallholder germplasm producers, who may find it easier to supply industrial buyers than local smallholders.

Protecting the rights of farmers and communities while securing long term market access for producers of non-timber forest products: Experience in southern Africa

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Abstract

PhytoTrade Africa is engaged in addressing the sustainable use and commercialisation of natural products produced by indigenous plants, especially the trees of the Miombo woodlands. The approach which has been developed is to work with indigenous communities and local companies and to help them to secure long-term access to these markets through the protection of their intellectual property rights. To date specific case studies have included the following indigenous fruit trees of southern Africa:

- The African sausage tree (*Kigelia africana*)
- Baobab (*Adansonia digitata*)
- Marula (*Sclerocarya birrea* subsp. *caffra*)
- Sour plum (*Ximenia caffra* and *X. americana*)
- Mongongo (*Schinziophyton rautanenii*)