– International Fund for Agricultural Development –

– Identifying and sharing innovation in Western and Central Africa –

– Domestication of local tree species –

I. Context

1. Name of the innovation
Domestication of local tree species

2. Country – Region
Cameroon, Democratic Republic of the Congo, Equatorial Guinea, Gabon and Nigeria

3. Organization
International Centre for Research in Agroforestry (ICRAF)

4. Who is the innovator?
Farmers and ICRAF

5. Actors involved
ICRAF in partnership with national agricultural research systems and NGOs from the five participating countries

6. Starting date
2000

7. Type of innovation
Technological and knowledge-sharing

II. Key concepts

8. Summary
The innovation is based on domestication practices already instinctively being used by small farmers, who draw benefits from tree crops in favourable agroecological conditions. The two main innovations are:
1. *The propagation frame:* an inexpensive technology consisting of covering a wooden frame (3 m long by 1 m wide) with transparent plastic. The box contains a water table covering three layers of gravel, stones and sand. The last substratum could be replaced by decomposed sawdust or a mixture of equal parts of sand and sawdust. All this provides a better environment for the formation of roots from the cuttings under the frame. This simple technology is well suited to rural zones inasmuch as it does not need sophisticated materials, running water or electricity. The propagator can be made totally with local materials and the technology is easily transferred to the farmers.
2. *Vegetative multiplication techniques:* seedling cultivation techniques not using sexual methods but vegetative multiplication methods such as cuttings, marcotting and grafting. Plants reproduce sexually through pollination (with the male pollen fertilizing the female ovule) to provide seeds, with each seed growing into a new plant. Vegetative multiplication is widely used in horticulture and has the advantages of reproducing plants that fruit early and of perpetuating genetically controlled characteristics.

9. What problems does this innovation seek to solve?
- Involvement of farmers in growing local, high-market-value tree species
- Diversification of farmers' sources of income by incorporating high-market-value tree species into the various farming systems
- Production of selected seedlings that fruit early
- Lack of seed of certain high-market-value tree species
- Initiation of farmers into elementary techniques of plant nurseries
- Farmers' contribution to biodiversity conservation by incorporating improved species into the various farming systems
- Contribution to farmers' food and nutritional security through the domestication of domestic fruit trees
- Involvement of local people in the regeneration of forest ecosystems through the use of vegetative multiplication techniques

10. Factors for successful replication
The techniques developed under the projects are very effective, simple and well suited to rural contexts. They constitute a type of inexpensive technology, developed entirely on the basis of local materials and easily replicated in many countries with different ecosystems; for example, non-mist propagators are successfully used in forest zones as well as savannah and dry zones. Lastly, there are immense, very promising possibilities of replicating the project inasmuch as the techniques developed can be easily adapted in other rural areas.

11. Main results
- Enhancement of local culture and traditional practices and increase in knowledge and techniques of tree growing
- Strengthening of the ties between farmers and local formal and informal institutions
- The move from gathering to tree growing helps to safeguard forest ecosystems and allows permanent agroforestry systems (for example multi-storey systems) to replace slash-and-burn agriculture, which damages the environment
- Establishment of a system that respects the environment by encouraging water conservation and combating soil erosion
- The sale of fruit, nuts and medicinal bark is a source of considerable income

12. Target group(s)
- Poor farmers located in inaccessible zones
- Women (traditionally responsible for providing the major portion of household food and more involved than men in selling non-wood forest products)
- Jobless young people living in villages
- The poor sectors of the population, by focusing on plant species that are both nutritious and capable of providing income

13. Difficulties encountered
- Major variations in the natural characteristics of trees from region to region
- Lack and often inadequate training of farmers in tree growing (especially in layering)
- Bad transport conditions, poor state of roads and insufficient means of transport, making market access difficult
- Farmers' inadequate knowledge of marketing channels for their produce
- Poor knowledge of methods for processing, preserving and storing produce
- Tendency to see research organizations such as ICRAF as creators of jobs in rural areas
- Absence of land ownership rights for some of the poorest sectors of the rural population

14. Financial aspects
ICRAF was financed by IFAD, the United Kingdom Department for International Development (DFID), the United States Agency for International Development (USAID), the Netherlands Directorate General for International Cooperation (DGIS) and the European Union to carry out this work

III. Technical aspects

15. Vegetative multiplication techniques:
- *Propagation by cuttings* is a technique consisting of placing young leafy nodes in a very moist environment (propagation frame) in order to foster the appearance of roots. The use of a hormone can speed up rooting, but some species do not require any rooting hormone.
- *Layering* consists of stimulating the appearance of roots on a branch or a section of a stem still attached to the mother plant. It is important to ensure an environment that is favourable for the appearance of roots. When the roots have formed, the rooted section is detached from the plant and transferred to a re-education environment before being planted out in a field. This approach reduces the production time for *Dacryodes edulis* (*safou* or African plum) and *Cola acuminata* (cola) to 3 years from the 7 to 15 years these species need to bear fruit in the normal way.
- *Grafting* is a specialized propagation technique in which the young shoots or buds of a plant are attached to a plant that acts as the rootstock.

IV. Further information

16. Key contacts

Name	Organization	E-mail
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17. Internet link(s)
- IFAD :
www.ifad.org/grants/tags/456.htm
- ICRAF :
www.worldagroforestrycentre.org/sea/Products/Training/Materials/lecture%20notes/LecNotes-Eng/6%20TreeD-LN.pdf
www.worldagroforestrycentre.org/AR2003/downloads/2pager_Theme_TreesAndMarkets.pdf
- FAO
www.fao.org/docrep/w3735e/w3735e20.htm

18. Key document(s)
Tchoundjeu, Z., Asaah, E.K., Anegbeh, P., Degrande, A., Mbile, P., Facheux, C., Tsobeng, A., Atangana, A.R., Ngo-Mpeck, M.L. and Simons, A.J. 2006. Putting participatory domestication into practice in west and central Africa. *Forests, Trees and Livelihoods*, 16:53–69.

Schreckenberg, K., Leakey, R.R.B. and Tchoundjeu, Z. 2001. Opportunities and constraints faced by resource poor farmers in investing in the planting and improvement of indigenous trees for income generation. *European Tropical Forestry Research Network Newsletter* 32:53-55.