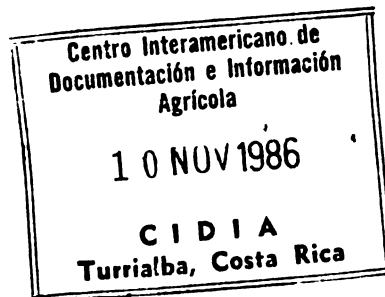


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**PROMOTION OF TREE PLANTING ON SMALL FARMS IN THE AREA OF  
ACOSTA-PURISCAL, COSTA RICA**



John Beer

Prepared for the planning workshop "Planting Trees with Small Farmers", organized by the Pan American Development Foundation (PADF), Port-au-Prince, Haiti, August 1985.

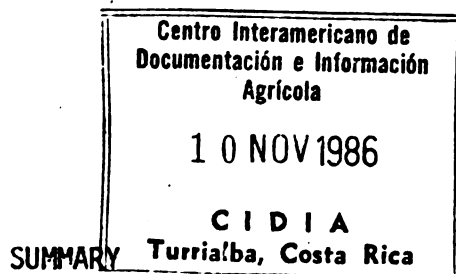
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**CENTRO AGRONÓMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA, CATIE**

Natural Renewable Resources Department

Turrialba, Costa Rica, 1985

BEER, J.\* Promotion of tree planting on small farms in the areas of Acosta-Puriscal, Costa Rica. Turrialba, Costa Rica, CATIE, 1985. 9 p. (Mimeogr.)



During 1984 and 1985 the CATIE-GTZ agroforestry project established 8-10 farm nurseries in the area of Acosta and Puriscal, Costa Rica, in response to requests from small farmers who wished to produce a diverse mixture of fruit and timber trees. Based on this experience four check lists were prepared on: selection of nursery sites and farmers; choice of species; choice of out-planting sites; supervision. The important ingredients of success as such a programme are: motivation of the farmers through field days and demonstrations; determination of the farmers objectives, needs and preferences; selection of multiple-purpose species; frequent regular supervision; and the anticipation of future out-planting site and silvicultural limitations.

#### RESUMEN

Durante 1984 y 1985 el Proyecto Agroforestal CATIE/GTZ estableció 8-10 viveros familiares en las zonas de Acosta y Puriscal, Costa Rica. Estos viveros fueron pedidos por pequeños finqueros quienes quisieron producir una mezcla diversa de árboles frutales y maderables. En base a esta experiencia cuatro listas de aspectos para considerar cuando montar un programa de viveros familiares fueron preparadas sobre los temas: selección de finqueros y sitios para viveros; selección de especies; selección de sitios para sembrar árboles; supervisión. Los ingredientes más importantes para el éxito de tal tipo de programa son: motivación de los finqueros por medio de días de campo y demostración; determinación de los objetivos, necesidades y preferencias de los finqueros; selección de especies de uso múltiple, visitas de supervisión frecuente y regular; la previsión de limitaciones silviculturales y sobre sitios disponibles para la siembra de los árboles.

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Promotion of Tree Planting on Small Farms in the area of Acosta-Puriscal,  
Costa Rica.\*

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1. Introduction

During 1984 and 1985 an agroforestry project of the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) funded by the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) established 8-10 tree nurseries on small coffee farms in the area of Acosta Puriscal, Costa Rica. The farm owners managed these nurseries under supervision by project assistants, who were in turn directed by a Peace Corps Volunteer and the Dirección General Forestal (DGF) project counterpart. Specific details on the species, nursery inputs, cost etc. are given in a report prepared by the latter.\*\* This activity of the CATIE-GTZ project was a direct consequence of a field day, held at CATIE in October 1982, for 60 farmers who had cooperated with the project. After seeing the CATIE germplasm collection and forestry seedbank, many of the farmers requested seed of varieties of known crops, and of new tree and crop species.

Subsequently, project assistants visited all the farmers to note preferred species and project staff included some others such as potential cash crop alternatives to coffee (e.g. Bixa orellana). Based on previous contact with this group of 60 farmers, strategically located farms, whose owners were known to be responsible and motivated, were invited to form the nuclei of communal groups for each village nursery. In fact only the owners of the nursery sites continued to look after the nurseries. The activity was originally organized as a service for the farmers who had helped the CATIE-GTZ Project and it was not foreseen as a research or development study. Thus it was principally directed by the farmers.

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\*\*Jiménez, R. Viveros familiares: producción de árboles para pequeños finqueros. Turrialba, Costa Rica. CATIE. (In preparation).

wishes. Whatever success it had must in large part be due to this background. This also explains how we came to be involved in the propagation of fruit trees like Citrus spp. which require relatively sophisticated techniques like grafting.

The research area is in one of the most densely populated agricultural regions of Costa Rica where nearly all farms are privately owned. Altitudes range from 800-1200 metres above sea level with life zones of tropical moist forest-premontane belt transition and premontane wet forest\*. Annual total rainfall varies between 1300-3500mm/year with a distinct dry season from December to May. Mean monthly temperatures range between 19.5° and 22.5°C. There is little flat land, and slopes vary between 30 and 80%. The area was chosen after being declared a national emergency zone due to the excessive erosion which occurs principally in pasture land.

For logistical reasons, only 10 sites were chosen, distributed over the project area of 23,000 ha. Apart from the location of suitable farmers, selection criteria included availability of water and central locality for a group of farmers who had requested plants. A secure water supply was critical since the nursery stage was planned for the dry season (December-April), in order to have planting stock ready for the beginning of the wet season (May-June). An aspect we did not check adequately was the availability of sufficient suitable sites for out-planting of the trees, and on the possible labour limitations caused by conflicting work needs for existing crops. Thus a few farmers produced an excess of seedlings of some species. There were also delays in out-planting of certain species which were not ready until September-October, when the coffee harvest had already begun. One farmer produced far too many plants in the hope of making a commercial gain from his nursery. Although the project attempted to stop such exploitation, it is not necessarily undesirable to promote the establishment of decentralized commercial nurseries. It has not, as yet, been possible to organize communal groups and nearly all seedlings were planted on the same farm where they were produced.

The area still has many trees but nearly all are in agro-forestry combinations. Only 2% of the primary forest remains, with secondary forest and woody

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\*HOLDRIDGE, L.R. Life zone ecology. San José, Costa Rica. Tropical Science 1976. 207 p.

regeneration covering approximately 11% of the area. National awareness of the need for tree planting is relatively high but the small farmers of the zone (i.e. those with less than 4 ha.) can not afford to reforest significant proportions of their farms. Thus most tree seedlings were established in combination with crops or pasture, and not in pure stands.

The following notes are suggestions of criteria and factors that need to be considered when promoting decentralized tree nurseries and tree planting on small tropical farms. These notes are certainly not complete and readers should also consult available literature (Annex 1) before attempting such a programme.

## **2. Selection of nursery sites and farmers**

- i)** The motivation should come from the farmer. One way to achieve this is to take a group of potential cooperators to an experimental station where they can see alternative crops and trees, and a functioning nursery. Subsequently fix a day when farmers can come to the nursery to be trained on basic techniques such as soil sterilization. This will help indicate which farmers have sufficient motivation to carry through a 3-6 month nursery programme.
- ii)** Select farmers in central locations, from which they can supply neighbours.
- iii)** Limit the number of nurseries to ensure that weekly supervision visits are possible.

## **3. Choice of species**

- i)** Identification of objectives of the farmers in order to select, with them, species. For example initially it is not good to promote fodder trees if the farmers do not see this as a present need.
- ii)** Request farmers' opinion on preferred species and consider native species.

- iii)** Select several rather than one species to reduce the risk factor from disease etc.
- iv)** Select species already tested in the region, which have a good growth rate and which are tolerant of the site conditions.
- v)** Include fruit trees. However this may complicate supervision due to the need to teach complex techniques, such as grafting, for some species. With highly motivated farmers this is an advantage as their gain from learning new techniques will increase their interest to care for their nursery. But it implies a longer term commitment (12 months or more).
- vi)** Use of natural regeneration (e.g. Cedrela odorata/Cordia alliodora/Psidium guajava).  
In these cases we need to promote simple management techniques that will increase productivity of the tree component, without reducing productivity of any associated crops e.g. thinning and transplanting to get even tree distributions in combined systems such as shaded coffee or cacao plantations.
- vii)** If timber production is desired, the species should be capable of naturally producing straight stems, with little forking, in open grown conditions (without silviculture). Species which require future silviculture such as pruning (e.g. Cedrela odorata) are not ideal, unless a long term extension programme can be guaranteed.
- viii)** Use of species which root from large stakes. The advantages can be numerous but a main one is the avoidance of browsing by cattle and herbicide damage. The technique is easy to promote for fence lines, which are the most under-utilized area on Acosta-Puriscal farms (e.g. Gliricidia sepium, Spondias purpurea).
- ix)** Forage trees are justifiable as a dry season fodder reserve (given pre-dry season pruning to avoid deciduousness of sprouts). They are not an

alternative to pastures for annual biomass production, but rather a high quality forage supplement (Gliricidia sepium, Calliandra calothyrsus, Erythrina poeppigiana).

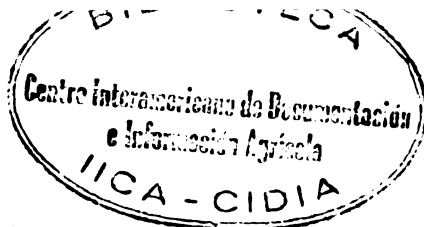
- x) Check with local extension service to avoid a clash of recommendations.

#### 4. Choice of planting areas

- i) Check the area of suitable sites on the farm where the seedlings will be planted. In Acosta-Puriscal few farmers expressed interest in pure plantations and nearly all seedlings were out-planted in combination with crops or pastures. Planting in fence lines was the most common method due to the availability of space. Thus emphasis should be given to multi-purpose species (e.g. those that give fruits as well as wood) rather than species more suitable for pure plantations (e.g. conifers).
- ii) The establishment of a few trees in pastures is not generally recommendable. Problems frequently include poor tree growth due to soil compaction and physical damage of trees by animals. Establishment of such combinations, on land presently dedicated to grazing only, generally implies high initial protection costs. Exceptions such as pine with grazing are known, but this situation is totally different since the main land use is as a forestry plantation with low animal carrying rates.
- iii) On small farms tree fertilization may be justifiable when planting. Advantages include reduction of weeding and protection costs during the susceptible establishment phase.

#### 5. Supervision

- i) Arrange weekly visits.
- ii) A fixed timetable is advisable so that the farmer has a routine and is



confident of continued support.

- iii) In general, for any demonstration unit or nursery a few good examples are better than many which have a low level of supervision.
- iv) Get the farmers together during the course of the nursery period, to exchange experiences.
- v) A general goal of the project should always be to get the farmers to do "extension" by example. Thus in this sense several decentralized small nurseries are more effective than one central unit, even if this is also managed by farmers. But one has to balance this advantage against the costs of supervising many nurseries.
- vi) The use of educational material is advisable, but may have little influence. Demonstration and involvement of farmers is the main teaching technique.
- vii) Two kinds of formulae are useful for the quantification of results and for the control of the nurseries. Formulae 1 (Annex 2) is an example of how to control assistants who have the responsibility to make weekly supervision visits. By insisting that this form is always completed, the "quality" of supervision can be improved, but this form has to be reviewed immediately by the project organizer if it is to have the required effect.
- viii) Quantification to determine costs is misleading since such experimental nurseries will inevitably have higher costs than purely commercial nurseries. However, it is worthwhile determining the relative costs of the different nurseries in a programme, in order to determine what factors increase costs.
- ix) Seed and materials should be initially provided by the organizing project and all labour by the farm owner. However, the objective is that the farmers gradually take over all costs (years 2 and 3), once they know how to obtain and use the necessary inputs (seed, agrochemicals etc.).



**Annex 1: Recommended literature for planning tree planting projects with small farmers.**

1. **AGPAOA, A. et al. Manual of Reforestation and Erosion Control for the Philippines, Eschborn, Fed. Rep. of Germany, German Agency for Technical Cooperation, 1975. 569 p.**
2. **FOOD AND AGRICULTURAL ORGANIZATION OF THE UNITED NATIONS. Forestry for Local Community Development. Rome. FAO. 1978. 144 p. (FAO Forestry Paper N°7).**
3. **GALLOWAY, G y BORGO, G. Manual de viveros forestales en la sierra Peruana. Lima, INFOR/FAO. 1983. 123 p.**
4. **\_\_\_\_\_ . Guía para el establecimiento de plantaciones forestales en la sierra Peruana, Lima Perú, INFOR/FAO, 1984, 144 p.**
5. **LEMCKERT, J. D. Instalación y manejo de viveros forestales. San José, Costa Rica. UNED. 1979. 105 p.**
6. **TSCHINKEL, H. Tree planting by small farmers in upland watersheds: experience in Central America, 1985, 14 p. (Presented at the IX World Forestry Congress, July 1-10, 1985. Mexico).**

**CATIE/GTZ AGROFORESTRY PROJECT  
NURSERY INSPECTION REGISTER**

Name of Farmer: \_\_\_\_\_ Farm code \_\_\_\_\_ Date \_\_\_\_\_

Site: \_\_\_\_\_ Assistant(s) \_\_\_\_\_

A.	SPECIES	ACTUAL NUMBER	AVERAGE HEIGHT	NUMBER LAST VISIT	MORTALITY

**B. ACTIVITIES CARRIED OUT SINCE LAST VISIT:**

**C. PROBLEMS/OBSERVATIONS**

DISEASE \_\_\_\_\_

Shade (Insufficient or excessive) \_\_\_\_\_

INSECTS \_\_\_\_\_

Nutrient Deficiency \_\_\_\_\_

FAILURE TO WATER \_\_\_\_\_

Others \_\_\_\_\_

ANIMAL DAMAGE \_\_\_\_\_

(Take a sample; preferably an entire seedling).

**D. RECOMMENDATIONS:**

