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"AGROFORESTRY" AND ITS APPROPRIATENESS FOR DOMINICA

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ABSTRACT

Despite constraints, agroforestry in Dominica is both desirable and needed. Education and guidance can win farmers over to the longterm benefits of sustainable agroforestry rather than the shortterm gains and potentially destructive practices of monoculture. Longterm benefits include control of soil erosion and protection of watershed and catchment areas, all of which are of particular importance in Dominica's rugged terrain.

INTRODUCTION

Agroforestry as Baumer (1990) describes it is a collective term for systems and technologies of land use where perennial woody plants, trees, shrubs, bushes, and pasture land are deliberately cultivated on ground otherwise used for crops and/or stock rearing in a temporal or spatial arrangement. Here we find interactions at once ecological and economic between woody plants and components of the system.

The forests of the world are shrinking daily due to intense pressure by people seeking food, fiber, energy, shelter, and land for settlement. Attitudes of farmers demonstrate resistance to change. Farmers prefer small changes in their farming methods. Agroforestry systems provide impressive demonstrations of how trees can be used on farms in highly productive and beneficial ways. On the strength of this and amidst high hopes agroforestry projects have been started in many countries.

Irrespective of the type of project that it involves, agroforestry is the management of trees within the farming environment (Kerkoff, 1990). It is an important new hope for the Third World where farmers can, by integrating tree-growing with crop and livestock production, attempt a solution to a variety of combined problems including poor agricultural productivity, increasing wood shortage, and environmental degradation.

BACKGROUND OF AGROFORESTRY IN DOMINICA

Agroforestry is not a new concept in Dominica. It was practiced and is still prevalent among some of the remaining large estates. Felicité, an estate in the southeastern portion of Dominica, had as its agroforestry components galba (Calophyllum calaba), cashew tree (Anacardium occidentale) intercropped with bananas and groundcover crops including dasheen, (Colocasia sp.) and tannia (Xanthosoma sp.). The galba tree served as the forest tree, supplying shade to crops, providing timber, fuel, serving as wind breaks, wood for furniture, and dwelling houses' hurricane support. In addition, it served as an excellent alley cropping tree.

At Shawford Estate multicropping systems were used. The fruit tree, mango (*Mangifera indica*) served as a windbreak, a cash generating tree crop, for shade, and for firewood. Mango was cropped with citrus and ground cover crops such as dasheen (*Colocasia*) and tannia (*Xanthosoma*). Other fields on the estate were intercropped with mango, coconuts, and herbaceous crops like sweet potatoes.

Up to this time information was available and some enlightened farmers did in fact practice a form of agroforestry using *Gliricidia* sp. as boundaries to other property. The trees were planted as living fences, intercropped with cocoa, coconuts, and citrus. The usual groundcover were the traditional root crops, tannia and dasheen. Fodder was supplied for stock by *Gliricidia*, and for the purposes of prevention of soil erosion, use was made of vetiver grass to reduce runoff and to provide straw as a cash crop to the handicraft industry.

When smaller landholdings first became common the small farmer was unaware of the need to practice soil conservation, was involved in monoculture, and believed there would be an unlimited amount of cultivable land. This attitude soon allowed carelessness to prevail.

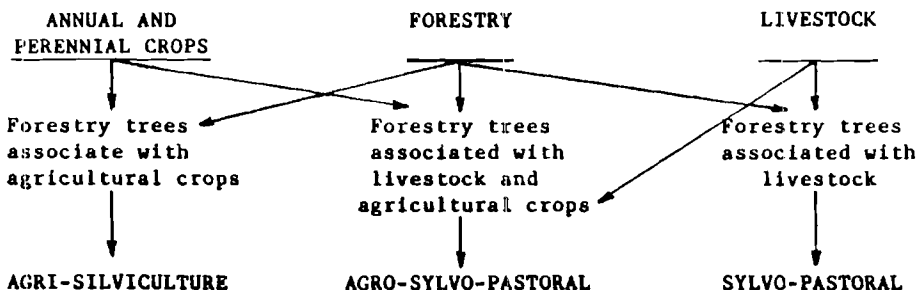
In the present day, due to population pressure and an increase in the number of tenant farmers, land suitable for agriculture has become scarce and the need for agroforestry systems and techniques for sustainable agriculture has arrived. These techniques have become available to the average farmer willing to utilize to the utmost extent the opportunity afforded to him to maximize cash returns on his otherwise-limited acreage.

As Ramdial (1983) says, "Agroforestry as a system provides us with a major option of realizing the full potential of the land both in terms of economics and conservation."

ATTEMPTS MADE TO REINTRODUCE THE AGROFORESTRY CONCEPT IN DOMINICA

Before discussing the revitalization of agroforestry in Dominica, perhaps it would be best to demonstrate agroforestry and its various components pictorially.

Fig. 1. Possible combinations of agroforestry (Adapted from Combe and Budowski, 1979).



D. M. James, an OAS Consultant, set about to investigate the problems associated with having good agroforestry systems and techniques functional in Dominica. His initial findings (James, 1988) were (1) a need for public awareness on matters of soil conservation, and (2) there existed degradation and indiscriminate felling of trees in the forests. In addition, he found that some of the salient features necessary to make agroforestry work were lacking. These features included the need for proficient and educated extension personnel, both in the forestry and agricultural departments and the need for farmers acceptance of new techniques which would ensure better cash returns from their limited tenancies. Furthermore, he encouraged multicropping systems that would provide several of the prerequisites of farmers, namely wood, fenceposts, tree crops to provide cash crops, forest trees for windbreaks, prevention of soil erosion, practice of soil conservation, selection of sites suitable for agriculture, the preservation of rugged terrain and sloping land for use as forest buffers, and setting aside areas for regeneration of forest stock.

DEMONSTRATING THE CONCEPT

This concept was best demonstrated by James (1988) beginning by identifying three distinct types of agroforestry systems prevalent on the Castle Bruce Estate. This information was subsequently utilized for educational extension, training, and as a source of valuable information for research purposes.

Castle Bruce Estate is located on the eastern coast of Dominica in the Parish of St. David. The acreage used was 974 acres subdivided into 245 lots. The remainder of the estate was approximately 849.5 acres and represented steep forested lands and lands reserved for housing and industry. Castle Bruce cultivation at that time was about 700 acres of bananas, 20 acres of oil palms, 150 acres of limes, 50 acres of grapefruit, and 50 acres of communal pasture. The following systems were identified:

1. Agrisilvicultural. In this system woody perennials, agricultural tree crops, and forest species are combined with food and root crops. A typical combination would be Gliricidia sp. with citrus, bananas, root crops, dasheen, and tannia.

2. Silvopastoralism. Livestock is integrated with tree crops or forests. At Castle Bruce, the livestock were allowed to graze on grass under coconuts.

3. Agrosilvopastoralism. This involves the integration of agricultural crops, woody perennials and livestock. This system combined woody perennials, fruit trees, agricultural crops, and small stock in home gardens and dwelling areas of inhabitants of the estate.

Other multiple cropping systems recognized included forest tree in upper story, a middle story crop (the banana) and lower story crop of root crops.

Further work took the form of species trial plots at different locations in Dominica.

a. Macoucherie plot using Leucaena leucocephala and mahogany (Swietenia sp.) as the trial material. Result: Leucaena was recommended for fuel and was the best survivor on the western coast of Dominica.

b. Woodford Hill using white cedar (Tabebuia pallida), Eucalyptus citriodora, Leucaena sp. as trial material. Result: white cedar was most preferred for its good vegetative cover and erosion control. Eucalyptus citriodora showed potential for charcoal, windbreak, reforestation, and fuel wood.

c. Neem (Azadirachata indica) plots proved a failure for groundcover erosion control at Salisbury and the Jimmit area near Mahaut and had to be replaced. This was as a result of its low survival rate, poor growth, and lack of response.

Agroforestry Project.

In Petite Savanne an agroforestry project was designed to combat deforestation and indiscriminate felling of forest trees that could trigger soil degradation and erosion. It was designed to help farmers form a cooperative to plant more herbaceous crops for cash returns rather than relying on the single source of revenue from Bayoil. It was a concerted effort on the part of the farmers as they took upon themselves the tasks of propagating seedlings of forest trees and setting up multiple cropping systems to meet their immediate needs.

Bagatelle Agroforestry System.

The village of Bagatelle is situated in the southeastern part of Dominica near Petite Savanne. The terrain is rugged, soil degradation is rampant, firewood shortage is very visible, and land for cultivation is lacking. Attempts at a solution were afforded by acquiring the estate for resettlement. The basis of this agroforestry scheme was to incorporate an agrosilvicultural program with forest trees being planted on contour and woody perennials intercropped with food crops. This was necessary as the former method of agriculture was the slash-and-burn method.

STATUS OF AGROFORESTRY SYSTEMS IN DOMINICA

At present day, the status of agroforestry in Dominica can be considered as one of varied success. Extension education to staff of the Agricultural and Forestry sector has helped make farmers aware of soil erosion and soil conservation. Manley (1989) suggests that interest in many aspects of agroforestry also may be limited by the length of time between effort and rewarding forestry activity. This is especially true when one considers that using current methods of cultivation a small tenancy farmer can obtain a consistent cash return from his holding. He won't be willing to invest in a venture which probable holds hope for succeeding generations. Other problems encountered include the lack of

material for regeneration or propagation when requests are made. This probably goes back to the point that for any agroforestry system to be successful, sustainability must be clearly demonstrated.

CONCLUSION AND RECOMMENDATIONS

There are several constraints facing any agroforestry system attempting to be operational in Dominica. These include topography, small tenancy acreages, scarcity of cultivable agricultural lands, rugged terrain, and the length of time between effort and reward in forestry activity.

Agroforestry is a much needed and highly desirable farming technique in Dominica provided that it can be directed properly by constant guidance to farmers. Lack of suitable land almost invariably triggers the shift from a good farming system to one based on a quick and consistent cash return. This can be stated categorically for the shift of several farmers from multiple cropping systems to a monoculture for speedy returns, especially bananas. Perhaps a number of considerations should be borne in mind (1) sustainability, (2) the constant need for extension education, and (3) clarification of the possible severe effects of abandoning strict agroforestry techniques. Self actualization should play a key role where farmers can derive self-satisfaction and benefits through cash returns for their efforts. The need for public awareness is crucial since several components are necessary for any agroforestry system to work. These include the need for the protection of the watershed and catchment areas, soil erosion control, and the need for soil conservation and protection of an environment that can suffer so dramatically from imbalances.

REFERENCES

- Baumer, M. 1990. Agroforestry and Desertification. ICTA - Technical Centre for Agricultural and Rural Cooperation, Wageningen, The Netherlands.
- Combe and Budowski. 1979. Combined Agroforestry Methods. Cited in Pool, Douglas, "Agroforestry in the Caribbean", presented at the Caribbean Foresters Workshop, May 24-28, 1982.
- Gordon, A. 1956. Agriculture and Forestry Tropic. Agric. 3(3): 171-175.
- James, D.M. 1988. "Investigating the Agroforestry Potential in Dominica." Final Report OAS Dept. of Regional Development, April 1988. 63pp.
- James, D.M. 1989. "Investigating the Agroforestry Potential in Dominica, Part II." OAS Dept. of Regional Development, February 1989. 61pp.
- Kerhot, P. 1990. Agroforestry in Africa, A Survey of Project Experience. Gerald Foley and Geoffrey Barnard, (eds.). PANDS.
- Ramdial, B.S. 1983. Agrotech 83 International Seminar on New Technology in Food Production for the Eithies and Beyond, June 26-July 1, 1983. Faculty of Agric. U.W.I., St. Augustine, Trinidad.

ISAIID. 1981. Agroforestry Outreach Project in Haiti. USAID 521-0122.