1. **Introduction**

Peasant subsistence agricultural practices resulting in low productivity and poor land use cause a widespread problem in tropical mountainous areas. How can peasants living in upland watersheds be motivated to practice better land use and to increase agricultural and forest productivity? In recent years, projects in several countries have demonstrated the feasibility of encouraging peasants to combine more intensive hillside agricultural and forestry practices (Jamaica, Honduras, Haiti, Thailand with FAO assistance; Honduras, Panama with AID assistance; Cauca Valley Authority in Colombia).

This presentation uses the experience of the "Integrated Watershed Management Project" of Honduras to distill some lessons that might serve in the application of agroforestry techniques. The Honduran Forest Development Corporation (COHDEFOR) assisted by FAO during five years has implemented this project since 1976 in three regions of the country.

2. **The problem**

The problem in the project areas, as in much of tropical America, is that the cultivation of steep slopes with subsistence crops causes serious erosion and degradation of soil, usually forcing farmers to leave the land fallow after only one to three years of cultivation. Thereafter they move on to clear a new plot, destroying the natural forest in the process. Cutting of fuelwood for use in the nearby cities further aggravates the problem. The combination of poor soils and techniques, scarcity of inputs and lack of soil conservation causes agricultural yields to be extremely low locking the tenant into a catastrophic cycle of poverty and further land degradation. However, many such slopes can be safely and permanently cultivated after they have been terraced, a technique widespread in Asia but rare in Latin America. Intensifying cultivation on terraced land also frees less productive areas for
reforestation for producing fuelwood and other forest products.

3. **Description of the project**

Details of the project are described in the technical publications listed in the bibliography. The working procedure related to agroforestry, that evolved during the project, is summarized as follows:

3.1 **Selection of communities**

Communities are ranked in order of priority using such criteria as availability of suitable land, access, peasant organization and interest.

3.2 **Motivation of peasants**

Social workers make first contacts with the peasants, explaining objectives of the project, financial benefits to the peasant, basic techniques, and use of incentives.

3.3 **Terrace construction**

Terraces are laid out by project technicians together with the farmer. Both sign a simple agreement specifying the area and the amount of subsidies (usually, food-for-work). The peasant and his family construct the terraces at their convenience and there is periodic supervision. After final inspection and approval, the project pays the subsidy.

3.4 **Agricultural extension**

Terraces are ineffective unless properly cultivated. The project emphasizes permanent and tree crops (cocoa, coffee, fruit) and multiple cropping of the traditional corn, beans, and cassava, often intercropped with the trees. The new techniques are applied on demonstration plots on the peasant's own land where they have been shown to boost income substantially, as compared to traditional methods. Community nurseries are created to produce crop and forest trees.

3.5 **Reforestation**

Contact with the peasant during terracing and cultivation paves the way for motivating reforestation of less productive land. The project emphasizes fast-growing species for fuel and intercropping to reduce costs and ensure better maintenance. Among the most commonly used species are *Gliricidia sepium*, *Tectona grandis* (Teak), *Leucaena leucocephala*. They are expected to be harvested for fuel after six years and will coppice.

3.6 **Forest protection**

Protection of the natural forest against clearing for agriculture and cutting of fuelwood becomes easier for several reasons.

- With intensification of agriculture there is less pressure on land.
- Relations between peasants and the government are improved.
enforcement of regulations governing land use is easier if the government offers alternatives.

fuelwood is produced on a smaller area, closer to the villages.

These positive effects on the natural forest illustrate one of the many advantages of integrating forestry and agricultural activities in a single project.

4. Analysis of agroforestry aspects

The objective of this presentation is to analyze some of the more salient agroforestry related aspects of the project in order to point out possible solutions to problems common to agroforestry activities. In other words, what went wrong, and what went right?

4.1 Analysis of the technical aspects of agroforestry

4.1.1 Types of terraces

Hillside ditches, which require about 80 man-days/ha to construct, were the most appropriate type of soil conservation structure on slopes from 15% to 50%. Because of their high cost, bench terraces were justified only in the rare cases where irrigation was available.

4.1.2 Permanent crops

The establishment of improved fruit trees (cocoa, coffee, citrus, mango, avocado) on terraced land proved to be an excellent incentive for soil conservation. Originally the trees were produced by the project and given to the peasant on the condition that he terrace his land. This ran into chronic supply problems from the side of the project. The encouragement of community nurseries by the project for self-sufficiently and even sale of fruit trees proved more promising.

4.1.3 Annual crops

Traditional corn and beans offer very limited scope for improving peasant incomes. The other extreme of introducing vegetables new to the peasants, was too big a step. The project could not cope with the intensive extension work such relatively sophisticated crops require. Best prospects were for fruit trees and multi-cropping of corn-beans-cassava with an intermediate type of technology.

4.1.4 Reforestation

Improper cleaning of plantations was the major problem with the result that a large proportion of the plantations were lost. Part of the solution lies in more emphasis on motivation rather than a large area planted, and also on intercropping of new forest plantations with annual crops. Simple operations should be given preference, even though they might result in lower productivity. For example, planting stock in the form of cuttings (Gliricidia sepium) or "stumps" (Tectona grandis, Leucaena leucocephala) have advantage
over plants in plastic bags. Rustic species such as the first two are preferable over Eucalyptus which require more care in establishment.

4.1.5 Integration of activities

Soil conservation and agricultural extension helped open the door to reforestation and made protection of the natural forest easier. The four activities complemented each other.

4.1.6 Cost/benefit analyses

Meticulous but simple record keeping of soil conservation and reforestation costs and productivity was the basis for very useful financial analyses of these activities. The results, based on real life data, are useful for convincing administrators and farmers as well as for evolving more efficient techniques.

4.2 Analysis of the organizational aspects of agroforestry

4.2.1 Choice of an executing institution

Most governments have separate agencies for agriculture and forestry. An agroforestry project cuts across these lines and therefore faces the dilemma of either having one of the components neglected or having serious problems of coordination between agencies (or both!). The present project was attached to the forest service which was reluctant to support agricultural extension, especially in times of austerity.

4.2.2 Choice of project site

None of the three project working areas coincided with the areas of greatest interest of COHDEFOR, the executing agency thus affecting support and expansion. Great care, consultation and commitment are required in choosing sites.

4.2.3 Reliance on government personnel

The project started with the standard approach of government employees teaching peasant beneficiaries. Later progressive, especially trained peasants took over the role of the employees -- and were much more effective. Eventhough the employees are often stuck in the office because of lack of vehicles or fuel or per diem, the trained peasants who live in the villages continue to work. Projects would do well to rely more on the peasants and less on the government employees.

4.2.4 Incentives

The payment of food-for-work per day worked proved very inefficient. A change to payment per hectare terraced or reforested improved output tremendously. There is a delicate balance between paying enough incentive to stimulate a large number of peasants to try a new technique because they find it promising but not paying so much that they will do the work only for the sake of the compensation.
The lack of credit in the project was a serious obstacle to agricultural extension.

4.2.5 Control of agricultural extensionists

In contrast to terrace construction or reforestation for which the output can be easily measured and controlled, agricultural extension requires a type of quality work that cannot be easily quantified. Therefore it was difficult to control the work of the extensionists. They were more interested in establishing demonstration plots than in showing them. More emphasis on formal, practical, scheduled training of peasant groups (such as practiced in Santa Rosa de Copán, Honduras) might be more effective.

4.2.6 Relation to peasant groups

The project worked with both groups or individuals but did not actively try to form or promote groups, partly because of limitation of personnel. There are certainly abundant problems in working with groups, one of the main ones being their instability. Nevertheless, more emphasis on group support would probably have facilitated agricultural extension. Channeling incentives through groups might be one way to strengthen them.

5. Conclusion

Like most development projects this one had some successes and some failures. Much can be learned from both to help make similar agroforestry endeavours more successful.
BIBLIOGRAPHY


