

RURAL DEVELOPMENT FORESTRY NETWORK

From 'Tree-haters' to Tree-farmers: Promoting Farm Forestry in the Dominican Republic

Frans Geilfus

For additional information on the Zambrana-Chacuey Project, contact:

ENDA-CARIBE

Apartado Postal 3370

Santo Domingo, Dominican Republic

Fax: +1 809 541 3259

E-mail: enda.caribe@codetel.net.do

ISSN 0968-2627 (formerly Social Forestry Network ISSN 0951-1857)

From 'Tree-haters' to Tree-farmers: Promoting Farm Forestry in the Dominican Republic

Frans Geilfus

Summary

This paper describes how the attitudes of farmers to farm forestry in the Dominican Republic have gone through a major change over the last 20 years, in large part due to the success of the innovative Zambrana project supported by an NGO called ENDA-Caribe. It shows that under certain conditions (for example the absence of an economically lucrative alternative use of farmland, and increasing on-farm labour scarcity), market incentives without significant subsidies can be sufficient to cause widespread tree management among small farmers.

The project adopted a flexible and participatory approach to technology development in which farmers were given maximum flexibility to choose between different species and technology options. The project also tailored its approach to considering farmer decision-making criteria, especially taking account of the relative scarcity of labour and land.

An important part of the strategy has been the use of 'social incentives': this revolves around the encouragement of respected and older farmers to develop their existing interest in trees, and so further enhance their position of respect in the community. The release of this farmer experimenter potential, and a breakthrough in terms of overcoming a harvesting regulatory constraint, has led to widespread adoption of tree-management practices.

At current prices, it appears that farm forestry offers an economically attractive alternative to annual cropping options, especially for the increasing number of families concentrating on off-farm income earning opportunities. In the longer term, one of the main preoccupations is that the success of the project could saturate the market, especially since one species, *Acacia mangium*, has dominated. Another concern is that larger-scale producers will gain a competitive edge over small

farmers. Other challenges include developing the administrative capacity of the grass-roots organisation to take over the project from the NGO, and dealing with the equity and gender impacts of tree-planting activities.

Introduction

Until recently the farmer-forest relationship in the Dominican Republic was evolving towards increasing conflict in the face of a growing scarcity of the resource and the control measures imposed by the authorities. In the last 60 years it has become a story of distrust, repression and injustice, made worse by inadequate legislation and a bias by the forestry authority against farmers.

With a relatively small area (48,000 sq km), and a fast-rising population, the Dominican Republic has seen its forest reserves shrink in the last few decades. The process has been exacerbated by a highly skewed land distribution, forcing small farmers on to marginal lands or into the cities.

Since the 1970s, efforts to reverse deforestation trends have focussed on the hillside farmer, who has been viewed as largely ignorant or fatalistic as regards environmental degradation, and in need of education in order to evolve from a 'tree-hater' to a more rational 'tree-lover'. This vision ignored the historical, socio-political and economic background of the farmer-forest relationship.

A pilot experience initiated in 1984 and using a participatory approach has demonstrated how ready small farmers can be to turn to farm forestry, given an adequate focus on their own strategies and perception of incentives (both economic and social). The experience, which has been described by Rocheleau (1994) as, 'By almost any standard measure a resounding success', shows the potential of farm forestry to substantially improve income and security levels of small farmers; on the other hand, it raises questions about how external interventions might address the equity issues associated with the development of a new cash crop.

The History of the Farmer-forest Relationship in the Dominican Republic

As elsewhere, small farmers have borne the brunt of the blame for deforestation and soil erosion due to their 'backward' slash-and-burn agricultural practices. A review of the history of land use and agricultural systems in the country shows that the supposed negative impacts of slash-and-burn have been used to justify the progressive alienation of farmers from resources which they used to access without restrictions (Geilfus, 1994).

Timber extraction began seriously in the nineteenth century. It failed to result in the kind of timber industry that might have allowed the country to capitalize on its considerable forest resources, but facilitated the colonization of mountainous areas. Once the lowland forest area was exhausted, logging moved further inland, and the environmental effects of timber harvests and hillside farming began to be felt; as early as 1922 the severity of deforestation was confirmed by foreign observers: 'that country will suffer the same fate (as Puerto Rico): many devastated areas and a scarcity of wood for even the most humble of domestic uses' (Durland, 1922). From 1910 onwards, farmers were obliged to get permission before clearing.

During the Trujillo dictatorship (1930-1961), large-scale businesses moved into the remaining forest areas, removing people where necessary, and denying neighbouring farmers the *de facto* or customary access to the forest products and agricultural land they had previously enjoyed. Logging resulted in eviction, as many companies managed to transform felling rights into land ownership. Farmers were forced to move into the higher watershed areas to find cultivable land and by 1947 many watersheds were completely deforested (Luna, 1984).

The fall of the Trujillo regime in 1961 was characterised by extreme tensions; thousands of farmers and landless labourers, along with opportunistic land-grabbers, saw their opportunity, and the 1962-65 period witnessed mass invasions of former concessions: the so-called 'timber harvest' had a big effect on the remaining forest (Antonini *et al*, 1975). In order to assert their land claims, squatters indiscriminately cut the forest for slash-and-burn farming and pasture establishment. Estate holders extended their pastures in the same way: by 1971, 200,000 hectares of state land had been occupied (without title) by 31,000 farms. At this stage the state moved in with a heavier hand to control land use.

Forest Legislation and the Small Farmer

The first forestry laws were introduced under Trujillo in 1945, and seemed to be enforced mainly against small farmers; bitter memories of this period are still vivid among the older farmers. The Balaguer Administration which followed the 1965 revolution introduced both a highly restrictive forest legislation and a palliative land reform programme, which did not significantly modify the agrarian structure. The latter remained characterised by a high degree of dualism: large estates and plantations dominated the plains, and the majority of small and medium farmers competed with ranchers for the hillside land.

The 1967 forest legislation hit the farm economy hard. Conscious of the value of mahogany and other timber species, farmers had long maintained trees on their land as a form of savings to be liquidated in cases of emergency: as W.D.Harland wrote in 1922, 'Every farm, both large and small, ... is protecting the young trees with the hope that they will bring a profit to their owners'. The new legislation, which was enforced by a military-led Forestry Service, aimed to stem deforestation through a total control of the use of forest products. No forest tree, for example, could be cut without a permit, with the result that under-paid and poorly trained forestry agents soon came to be seen by farmers as agents of oppression. Corruption meant that any farmer could be jailed for cutting trees, even on his own property, and had to pay fines to be freed, and bribes to keep the wood for his own use.

Fuelwood and timber shortages worsened, small cottage industries like countryside carpentry shops closed, and traditional housing began to deteriorate. Even bush-fallowing and charcoal production by small farmers, cutting and pollarding of shade trees in coffee and cocoa plantations, and the renewal of decaying fruit trees could be a source of harassment. Meanwhile, more powerful stakeholders got away with large-scale deforestation.

Thus a new generation grew up with a negative attitude to forest resources: trees in farmland were seen as a potential source of trouble, seedlings as a nuisance, and the planting of forest trees a foolish idea. Farmers had a widespread mistrust of forestry; having anything to do with trees ran the risk of attracting state intervention and losing their land rights.

Reforestation as a ‘Civic Duty’: the Failure of Top-down Approaches to Meet Farmer Needs and Strategies

These policies resulted in the loss of virtually all the sizable natural forest areas by the 1980s, save in the most inaccessible mountain areas classified as national parks. Timber and fuel were getting scarce and expensive; all timber extraction was semi- clandestine and tainted with corruption; and poor farmers involved in charcoal production in the semi-arid areas were increasingly subject to harassment.

At the end of the 1970s, reforestation became an official concern. Large donor-funded projects and civic awareness campaigns were launched, and 1982 was christened the ‘year of reforestation’. Within the prevailing legal and policy framework, reforestation meant planting for protection, not production. The cutting of trees was stigmatised as an anti-social activity, and reforestation hailed as a civic duty. The few voices advocating legal reform to create incentives for commercial plantations were at first received with suspicion, as it was felt that any relaxing of the law would result in even more deforestation.

The first serious attempts at policy reform were made in 1982, after the creation of the National Technical Commission on Forestry (CONTATEF). An incentive law was approved, intended to attract investors, especially owners of large, underused tracts of land, to plant trees as timber or fuelwood plantations. Feasibility studies were undertaken showing that large fuelwood plantations would be extremely profitable. Fortunately for more marginal operators, like those relying on charcoal production, this initiative proved ineffective.

At this time farmers were thought to be unaware of the value of trees. Social and educational incentives were therefore seen as being more important than economic ones. There was a lot of preaching on the civic values of reforestation for the sake of the next generations. In a paternalistic fashion, this was accompanied by the establishment of large and costly state-run nurseries to distribute free seedlings among the rural population. Other material incentives were also tried, some projects even going so far as to plant trees on farmers’ land at no cost to the owner. Most farmers showed no interest in trees once the incentives were withdrawn, in keeping with experience elsewhere (Pretty, 1995).

By 1986, only 8,000 hectares had been reforested by the state (Dotzauer, 1993). The rising frustration with government actions coincided with the development of non-governmental organisations (NGOs), favoured by a more democratic political context from 1979. Among the many NGO initiatives, the Zambrana-Chacuey project has proved to be one of the most successful.

The Zambrana-Chacuey Agroforestry Project: Viewing the Issues through the Eyes of the Farmers

In 1984, an NGO called ENDA-Caribe launched a pilot project using participatory methods in the Zambrana-Chacuey area of the Sánchez Ramírez Province, to be implemented with the local Farmers' Federation. The project area, including 12,000 inhabitants, is composed of rolling hills and sandy alluvial terraces. The climate is hot and humid, with about 2,000 mm annual rainfall. Population density is about 90 per sq km, but since large chunks of land belong to ranches and plantations, the density rises to around 200 in small farmer areas, considered high in view of the poor soil fertility. Most land under cultivation had been all but exhausted due to continuous intensive use (especially for tobacco) during the previous 30 years. Farmers in the Farmer Federation had an average landholding of 1.25 ha per family, while those with more land generally grew coffee and cocoa.

ENDA-Caribe began amidst an agricultural crisis, with low prices, decreasing yields and rising costs; this proved to be a ripe moment for researching livelihood alternatives (Geilfus, 1994). Work was based on the premise that farmers were aware of the value of trees and the need was rather to find the right combination of incentives to meet household strategies and re-validate trees as components of the farming system and its cash economy. The strategy departed from the traditional 'reforestation' focus by researching the potential of trees to alleviate bottlenecks and optimise the use of scarce land and labour resources, an approach relatively new at the time (see Raintree, 1991).

The project wanted to ensure that all types of farmers in the community would benefit, so a strategy of maximum diversity in terms of technical options was adopted, involving a 'basket of alternatives' or 'menu' approach as opposed to fixed technical packages. Community nurseries were set up using voluntary labour and without external incentives except for basic infrastructure and tools.

The success of the nurseries was found to depend mainly on the quality of local leadership. The project identified potential agricultural leaders, who were often older and somewhat low-profile members of the community, for on-farm trials. The research methodology was designed with a view to the diffusion of agricultural knowledge, as opposed to top-down ‘demonstration plots’ with unsustainable levels of external inputs.

The project also used the concept of ‘social incentives’ to promote community participation (see Box 1, overleaf). These ‘social incentives’ result from a process of confidence building and stem from a long-term involvement with community concerns and daily life. It is argued here that they provide the critical breakthrough that can enable market incentives to fuel mass-adoption.

Exploring Livelihood Niches through Participatory Technology Development

Farmers willing to establish experimental plantations received support to implement a process similar to what is now called ‘Participatory Technology Development’. Three main strategies were explored for the introduction of tree farming:

- **Farm forestry** with timber production; the possibility of economic returns was not stressed at first since there were major legal problems in the harvesting and sale of trees. The tree plot system and line planting was seen as an alternative for farms with severe land shortage and/or small areas unsuitable for agriculture.
- **Multiple-use agroforestry** in the form of alley cropping and contour line planting, emphasising soil conservation and improvement.
- Diversification and enrichment of **homegardens**, which are the most common agroforestry system in the area, and the one about which the greatest level of local tree knowledge exists. This strategy, in which women were closely involved, consisted of the introduction and screening of nearly a hundred species of fruit trees and spices from all over the tropics.

Box 1

From social incentives to cash benefits: the story of Alfonso B., farmer expert

One of the most conspicuous innovators was Alfonso B., a poor and elderly farmer, father of 17 children in a village where the first experiment in community nurseries had failed. Alfonso was approached by the project because of his vast expertise and local knowledge. He volunteered to do experiments on his farm in order to motivate neighbours. The experiment turned into a whole programme by itself, as Alfonso proposed to try as many species as the project could find in a small family nursery; his reputation brought people from other areas to see 'what the old man was up to'. Since Alfonso was given no other external incentives other than seeds, technical advice and basic implements, his involvement stemmed primarily from a genuine interest and from social incentives related to his renewed prestige within his community. In terms of his livelihood strategy, he was also driven by the desire to extend and diversify his already impressive mixed garden area onto land formerly devoted to tobacco and food crops which he was losing interest in.

Within three years, Alfonso's enthusiasm helped to put the local farmer associations back on their feet. Most of the community, men and women alike, turned into enthusiastic experimenters as thousands of exotic seedlings were distributed from Alfonso's nursery. A real '*farmers botanical garden*' was established, with unheard-of species growing among cocoa and coffee groves.

The multiplication effect sent waves much farther than Zambrana itself, as the community and Alfonso's farm became the focus point for the first 'farmers' tree fair' and dozens of subsequent field days and training workshops. Agroforestry has become a stable source of revenue for Alfonso and the rest of the community, whose skills in nursery establishment and fruit tree grafting are regularly contracted by outsiders. People from projects all over the country now come to buy seeds and seedlings.

Today Alfonso B. maintains his nursery, producing second and third generation seedlings from the first adaptive trials, and enriches his botanical garden. His sons are among the main activists of the Tree Farmers Association, and he himself is involved in a programme for screening and adapting indigenous tree species for timber production, as well as gathering the traditional technical knowledge of his peers.

In five years, a network of experimenting farmers was established throughout the area. A farmer-to-farmer extension process was promoted through field days and exchange visits, and through informal communication. The technology development process resulted in the identification of some important alternatives, for example a fast-growing timber species, *Acacia mangium*. Technology diffusion was most effective where respected leaders gave their support, and the most active village became a 'pilot agroforestry community' (see Box 1). At village-based 'tree fairs', state officials were lectured to by farmers on the virtues of trees, reversing historical roles. For the first time forestry officials saw that farmers were genuinely interested, and this helped the move towards an easing of regulations.

The project has developed its understanding of how farm forestry fits into farmer livelihood strategies. It has been found that tree farming has particular advantages that can make it attractive to farmers, including:

- low input costs;
- flexible labour requirements;
- high returns to family labour;
- high profitability in comparison to annual crops;
- diversity of income sources from the third year onwards at an increasing rate until the final cutting;
- more negotiating power at the marketing stage than with annual crops.

Thirteen years since the beginning of the Zambrana project, the pattern of tree technology adoption points to a coherent farmer strategy of diversification and risk avoidance (including a shift away from risky crops like tobacco towards food production for the market) through low external input and labour-demanding activities. There has also been a growing importance of off-farm employment. Less labour-intensive tree farming has been attractive to those seeking the higher rewards of off-farm work, who might otherwise have been faced with the alternative of selling their land or leaving it idle.

The latter point reflects a wider finding that interest in trees is likely to be higher when the labour opportunity cost is high. Tree management becomes a more attractive option than more labour-intensive farming activities, as it can maximise returns to scarce family labour (Arnold and Dewees, 1997). Box 2 also explores the effect of changing resource scarcities on tree management strategies.

Box 2

A few lessons from a trial and error approach to livelihood strategies

Farmers in Zambrana-Chacuey have faced a series of resource bottlenecks: in labour (due to rising emigration of household members and involvement in off-farm activities), in capital (due to rising input costs and stagnating farmgate prices for most agricultural products, especially during the hyper-inflationary stage of the 1980s), and in land (due to the scarcity of agricultural land and its low fertility).

Farm forestry pathways were viewed cautiously during the first years both by farmers and the NGO itself, but once technical, institutional and market feasibility was evident, farmers responded to the new opportunities. In fact farmers themselves developed some new niches for farm forestry. A form of taungya combining cassava and pigeon pea with trees during the first two years is now widely used. This strategy mimicked the former association of tobacco and food crops and aims to maximise returns to land, labour and fertilizers.

‘Soil-conservation’ packages including leguminous shrubs and cover crops, and emphasizing alley-cropping, were widely tried. Adoption rates remained low and declined after the advisers retired from the communities. Instead, however, several of the leguminous shrubs like *Calliandra calothyrsus* and *Acacia angustissima* were more widely adopted for complementary cash-raising activities like the sale of fuelwood, charcoal, broomsticks and bee-keeping. Meanwhile alley-cropping proved to be too labour-intensive, as has been found elsewhere (Carter, 1995).

The ‘mixed-garden enrichment’ path proved popular, especially among women, and many of the exotic fruit tree species and improved varieties introduced by the Project have been diffused far beyond the Zambrana area. Some, like the abiu or amazonian star-apple (*Pouteria caimito*) and the rambután (*Nephelium lappaceum*), have an incipient market. This modest success testifies to the value that farmers place on being able to rely on a variety of secondary sources of cash and food security.

Another unexpected livelihood niche appeared among absentee and semi-absentee farmers. A growing number of people are absent for most of the year from their holdings, often with the exception of an elderly family member or some ‘poor relative’ left in charge. Forest farming and the expansion of mixed gardens have proved to be the best strategy for extracting income from their land with minimum labour and capital, while ensuring land rights at the same time. There has been a similar impact from the increasing reliance on remittances sent by family members from the US.

Another positive factor has been that thanks to the land improvement laws, tree planting gives tenure rights even without title, as the owner of the ‘improvements’ is entitled to reimbursement even when the tenure is in dispute; this explains why farm forestry has caught on even among ‘precarious’ tenants (Rocheleau *et al*, 1995).

From the Experimental to Commercial Stage: the Breakthrough of Farm Forestry 1990–1995

Despite its success in tree technology development, the project remained far from bringing real change to the socio-economic condition of the farmers. Forestry activities still did not represent a real economic livelihood alternative.

In 1988, along with other NGOs, ENDA-Caribe was able to benefit from a simplified mechanism for harvesting small forestry plantations, in which each farmer received a CONATEF plantation certificate through a ‘recognised’ intermediary NGO. The farmer was then allowed to harvest his trees without further red tape. From the wave of farmer enthusiasm for these certificates and subsequent activities it was clear that a critical regulatory or institutional constraint had been removed. It also meant that the project was able to survive an institutional crisis within both the NGO and the Farmer Federation.

Commercial harvesting began in 1990. The first farmers to sell timber from the thinnings of their plantations realised earnings equal or superior to what they could have gained from the same plots during five years of tobacco growing, and with a much lower investment of labour. This realisation gave a jumpstart to farm forestry, which soon became established as an attractive economic alternative.

Pilot farmer experimentation gave way to a formal organization of forestry promoters, elected by their community and given the responsibility of providing technical assistance to 20 farmers each. Once the promoters had gained sufficient experience to organize periodic community workshops and supervise the nurseries, the NGO was able to reduce its presence.

The success of *Acacia mangium* and other species extended to neighbouring areas, and hundreds of farmers became interested. In 1992, the Zambrana Tree Farmers Association was founded with 600 members, many of whom had derided the idea of planting trees only five years before. The so-called ‘tree-haters’ were beginning to earn a better living from trees. Annual planting rates jumped from a few thousand, to several hundred thousand trees a year (see Table 1), while at the same time the project’s technical team was being reduced in size.

Under the project’s farmer-to-farmer extension methodology, by 1995 farmer-promoters were attending some 1,100 families. They helped their neighbours establish group or family nurseries, and supervised the establishment and management of the plantations, including thinning and harvesting. Although they received no wages from the project¹, their costs were reimbursed and they were eligible for intensive training.

In 1993 the Zambrana project was further strengthened by the establishment of a small-scale communal sawmill combined with a furniture and handicraft workshop, in order to add value to local production and thus increase market incentives. Most of the NGO’s support has since concentrated on this aspect of the programme.

Table 1 Rate of annual forest tree planting in Zambrana-Chacuey, 1984-1997

Year	84	85	86	87	88	89	90	91	92	93	94	95	96
Trees planted (x 1,000)	0	2	3	9	22	59	107	142	242	319	365	na	na
Trees certified (x 1,000)					10	46	76	59	137	107	75	47	98

Source: ENDA-Caribe annual reports. Trees certified are those covered by official plantation certificates.

¹ Although the possibility of their being paid from timber revenues was being considered.

Financial Impacts of Farm Forestry on Farm Economies

The economic impacts of the programme were mainly felt from 1994 onwards. 1995 data show that 172 families received direct cash incomes for timber at an average of 1,755 Dominican Pesos (US\$ 135) per farmer (and about 18 trees per farmer), representing 22 % of the average annual income of poor farmers in the area. The full impact is yet to come, since these figures are from a few mature plantations. Also a 1994-1995 survey showed that 36 % of the families in the area received at least some income through the sale of poles, timber, forest seeds and nursery seedlings. Poles are mainly sold to intermediaries, although transportation is under the joint control of the NGO and forestry service.

Table 2: Undiscounted returns from *Acacia mangium* plantations in Zambrana Chacuey (per tarea or 80 trees plantation)

	<i>Investment per tarea (US\$)</i>	<i>Family labour in workdays</i>	<i>Income per tarea (US\$)</i>	<i>Source of income</i>
Nursery stage	1.60	1.2		
Planting stage	0.80	2.2		
Weeding and pruning	0.50	3.5		
First thinning	2.30	2.5	51.60	Sale of poles, charcoal
Second thinning (5-6 years)	2.40	3.5	90.60	Sale of poles, beams, fuelwood and charcoal
Final cutting (10 years)	109.50	2.5	531.90	Sale of timber, poles, fuelwood and charcoal
Total	117.10	15.6	697.10	
Net income per tarea			580.00	
Return per family workday			37.18	
Return per work-day: corn/beans			11.74	

Sources: ENDA-Caribe case studies 1995-96. Investment includes capital inputs, depreciation on tools, paid wages, transport to nearest road. Income is based on actual farmgate prices.

Table 2 presents some financial estimates based on recorded data, such as the income from the first and second thinnings. Undiscounted net farmer returns for a small 1-tarea plot (ca. 0.25 ha, or 80 *Acacia* trees) have been calculated at between \$ 465 and \$ 580 per tarea at current prices for the whole 10-year production cycle. While these figures have not been discounted to allow for time (the main cost in forestry), actual experience would appear to confirm that they compare well with the opportunity cost of labour in agricultural alternatives (see also Hernández, 1995).

The sawmill is also expected to have a considerable impact on household incomes. In 1996, the gross income from the sale of timber and by-products was nearly three million pesos (US\$ 250,000); of this 30 % was from timber and 35 % from poles. Technical problems and lack of supply have so far been limiting factors, although projections indicate a profitability threshold from 1998 onwards.

Another source of revenue is that Zambrana tree farmers have been contracted by outsiders to establish nurseries or produce bulk quantities of seedlings. A participatory workshop in the 'core' community in 1996 indicated the diversity of benefits perceived by farmers, both men and women, from the introduced trees; 10 sources of income were named (see Table 3). The home-consumption impacts are more difficult to assess but it is clear from Table 3 that families have benefited from fruit consumption and a much improved supply of fuelwood and building materials.

Environmental Impacts

The project has reversed the original trend of deforestation in the area, both through the impact of plantations and through reduced pressure on natural regeneration. The Tree Farmer Association's covenant stipulates that all members agree to meet all their timber and fuelwood needs through plantations on their own lands. Twenty per cent of families surveyed in 1995 indicated that they no longer rely on the natural forest for fuelwood. This is confirmed by evidence of recuperation of natural regeneration along streambanks and gullies in many communities.

Table 3 Participatory ranking of agroforestry benefits, Los Jobos community, July 1996

<i>Cash benefits</i>	<i>On-farm consumption and services</i>
<ul style="list-style-type: none"> • Timber • Poles • Broomsticks • Tutors for horticultural crops • Seeds • Seedlings • Charcoal • Fuelwood • Exotic fruit • Hired labour as fruit-tree grafters 	<ul style="list-style-type: none"> • Soil improvement • Fertiliser cost reduced • Fruits and juice for consumption • Housing materials • Fuelwood • Bee-keeping • Improvement of water supply • Improvement of beneficial fauna • Fodder • Mulching materials • Medicinal products • Weed suppression

Future Opportunities and Challenges

The project faces some major future challenges. The sustainability of the whole scheme, at least on the scale proposed, relies on two basic assumptions:

- that the market for timber does not become saturated due to the success of the project in promoting farm forestry in the country. Large landowners have also grown enthusiastic (large scale *Acacia mangium* plantations already exist), and economies of scale could give them a competitive edge;
- the administrative capacity of the Tree Farmers Association to manage the whole production, processing and marketing cycle. The Association is still far from being able to administer a profitable enterprise.
-

Another important problem area is equity. The sawmill is likely to favour the better-off and closer farmers. Increasingly profitable operations will also raise internal power pressures. Equity and sustainability issues require more participation and power sharing among the farmers themselves. As Kinnunen (1995) states, 'social and economic objectives should not be seen as being in opposition to each other, but a great deal of care and critical appraisal should be exercised when encouraging commercialization of social forestry, or opportunities for local community development will be missed'.

An alternative which has not been explored by the NGO or Tree Farmers Association, could be the fostering of smaller, local furniture and other wood processing workshops, using local skills and a simpler technology. This would lower costs, create local employment and help maintain expectations at reasonable levels.

Gender issues have not been prominent in the project; ENDA-Caribe has followed a 'non-interventionist' policy with community groups. Womens' groups have participated actively in the project, but only through the traditional economic roles allotted to them, as horticulture and small livestock. In farm forestry their role has been largely limited to free nursery labour (Rocheleau, 1995).

Another possible threat is the pest risk due to the dominance of *Acacia mangium*, which constitutes more than 90 % of line and block plantations. Insect pests appeared in 1988 on some trees. The project has therefore attempted to promote diversification, and set up trials of native species.

The success of farm forestry can also result in increased market vulnerability as land is withdrawn from low value agricultural production (Arnold, 1991); food security could well be affected in poorer households if there are market problems due to over-supply or lack of competitiveness with larger producers.

Conclusion

The Zambrana experience, which has been replicated in other regions, has changed small farmers' perceptions of forestry in the Dominican Republic. The success suggests a few strategic lines in terms of incentives-related policies:

- **participatory approaches** are essential for developing appropriate technical alternatives; participation requires a careful dosage of **social incentives** in order to bolster the ‘right’ kind of leadership;
- diverse and complex farm systems call for a **diversity of technological and livelihood options**;
- technical feasibility must be proven for economic incentives to work;
- **internal farmer differentiation** has to be integrated in participatory strategies if social and gender equity issues are to be tackled effectively;
- a **favourable legal and institutional environment** is necessary for farmers to respond to economic incentives;
- the **time factor** has been the enemy of many forestry projects: if donors and project managers expect quantitative results to be attained within the time horizons usually given in financial agreements, the pressure will always lead to top-down approaches; the Zambrana experience shows that a 10-12 year span, with exploratory action in the first years, is a feasible option;
- **small budgets and limited expectations are required in the initial phase**, but the administrative and political framework of most donors results in a bias towards large-scale projects with the accompanying pressure for quick and visible results to be accomplished through subsidies, external incentives and other self-defeating methods.

With respect to incentives, the project has disproved the assertion that small farmers will not take to forestry without substantial subsidies. It should be borne in mind, however, that the current attractive market conditions for timber products could decline within a few years due to the expansion of farm forestry and the incursion of large-scale producers, giving rise to more realistic conditions in which the capacity of small farmers to compete will again be put to the test.

This experience also confirms the importance – highlighted by Arnold and Dewees (1997) – of focussing on the scarcity of relative factors of production, particularly labour in this instance. It was found here that less labour-intensive agroforestry and

perennial crops can allow the household to hold on to its land base with a reduced farm labour force. Farm forestry with its high returns to labour might also represent an appropriate response to the problems faced by rainfed cropping systems since the end of the 1970s (Geilfus, 1994).

References

- Antonini, G, Ewel, K C, Tupper, H M (1975), *Population and Energy: a systems analysis of resource utilization in the Dominican Republic*, University of Florida, University Press of Florida, Gainesville.
- Arnold, J E M (1991), 'Tree products in agroecosystems: economic and policy issues', IIED Gatekeeper Series No 28, International Institute for Environment and Development, London.
- Arnold, J E M & Dewees, P A (eds.) (1997), *Farms, Trees, and Farmers: Responses to Agricultural Intensification*, Earthscan, London.
- Carter, J (1995), 'Alley Farming: Have Resource-poor Farmers Benefitted?', Natural Resources Perspectives No 3, Overseas Development Institute, London.
- Chambers, R, Saxena, N C, Tushaar Shah (1991), *To the hands of the poor: water and trees*, Intermediate Technology Publications, London.
- Chambers, R, Leach, M, Conroy, C (1993), 'Trees as savings and security for the rural poor', IIED Gatekeeper Series No 3, International Institute for Environment and Development, London.
- de Ceara, I (1986), 'Land tenure and agroforestry in the Dominican Republic', Rural Development Forestry Network Paper 3d, Overseas Development Institute, London.
- Dotzauer, H (1993), 'The political and socio-economic factors causing forest degradation in the Dominican Republic', Rural Development Forestry

Network Paper 16d, Overseas Development Institute, London.

Durland, W D (1922), 'The forests of the Dominican Republic', *Geographical Review* Vol. 12 1922: 206-222.

Geilfus, F (1994), 'Agricultural involution in the Dominican Republic: the dynamics of peasant farm systems in a confined environment', Unpublished PhD thesis, Department of Geography, Louvain University, Belgium.

Hernández, A (1995), 'Economic and institutional analysis of agroforestry projects in the Dominican Republic', in: Current, D *et al.* (eds.) *Costs, Benefits and Farmer Adoption of Agroforestry: project experience in Central America and the Caribbean*, World Bank Environment Paper No 14, The World Bank, Washington DC.

Kinnunen, M (1995), 'Farmers' livelihoods and the social forestry programme in East Mindanao', in: Kivikkokangas-Sandgren, R *et al.* (eds) *Agroforestry and tree planting in the new rainforest economy in Mindanao, the Philippines*, University of Helsinki, FTP International Ltd, FINNIDA, FTP Publication 29, Helsinki, Finland.

Luna, J (1984), *Informes y recomendaciones para la conservación de nuestros bosques y ríos*, orig. 1945, Reed, Plan Sierra/ed, San José de las Matas.

Pretty, J N (1995), *Regenerating agriculture: policies and practice for sustainability and self-reliance*, Earthscan Publications Ltd, London.

Raintree, J B (1991), 'Socioeconomic attributes of trees and tree planting practices', Community Forestry Note 9, FAO, Rome.

Rocheleau, D, Ross, L, Morrobel, J, Hernández, R (1995), 'Forests, gardens and tree farms: gender, class and community at work in the landscapes of Zambrana-Chacuey, Dominican Republic', ECOGEN Case Study, Clark University, Worcester, MA.

Rocheleau, D, Wachira, K *et al.* (1989), 'Local knowledge for agroforestry and native plants. An example from Kenya: trials, errors and hindsight', in:

Chambers, R (ed.) *Farmer First*, Intermediate Technology Publications, London.

Serrano, M, Valerio, M, Severino, G, Geilfus, F (1997), *Desarrollo, agroforestería y participación comunitaria en Zambrana Chacuey*, ENDA Caribe, Santo Domingo.

Uphoff, N (1994), 'Local organization for supporting people-based agricultural research and extension: lessons from Gal Oya, Sri Lanka', in: Scoones, I & Thompson, J (eds.) *Beyond Farmer First*, Intermediate Technology Publications, London.

Please send comments on this paper to:

Rural Development Forestry Network
Overseas Development Institute
Portland House
Stag Place
London SW1E 5DP
United Kingdom

Comments received will be passed on to the authors and may be used in future Newsletters. Photocopies of all or part of this publication may be made providing that the source is acknowledged. The Network Coordinator would appreciate receiving details of any use of this material in training, research or programme design, implementation or evaluation. The opinions represented in Network Papers are those of the authors and do not necessarily reflect the policies of ODI.

Credits

Editors of this paper: Kate Schreckenberg & Michael Richards

Layout: Joanne Burrell

Printed by: Russell Press Ltd, Nottingham
on recycled paper

RDFN logo by Terry Hirst
used with permission of KENGO

Rural Development Forestry Network

Overseas Development Institute

Portland House

Stag Place

London SW1E 5DP

UK

Telephone: +44(0)171 393 1600

Fax: +44(0)171 393 1699

E-mail: forestry@odi.org.uk

**The Rural Development Forestry Network is funded by
the EUROPEAN COMMISSION**