

# ***RURAL DEVELOPMENT FORESTRY NETWORK***

THE POLITICAL AND SOCIO-ECONOMIC FACTORS  
CAUSING FOREST DEGRADATION IN THE  
DOMINICAN REPUBLIC

*Helmut Dotzauer*

This paper is drawn from chapters 3 and 6 of a doctoral thesis, 'Socio-Economic Impacts of Natural Pine Forest Management (*Pinus Occidentalis SW*) on Forest Dwellers in the Dominican Republic'.

**Helmut Dotzauer** is an adviser with the ISA/GTZ Project, Departamento de Recursos Naturales, c/o Instituto Superior de Agricultura, Apto 166, La Herradura, Santiago de los Caballeros, Dominican Republic. Fax: 1 809 582 6626.

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## INTRODUCTION

This paper was written in order to trace the range of issues which have led to forest degradation in the Dominican republic. Many of them are typical of a variety of Latin American countries, including anti-rural macroeconomic policies, inequitable land distribution, outdated forest policy and law, and a shortage of trained forestry professionals. Together, they present a picture of the diversity of changes that will be required if the forests of Latin America are to survive.

### **The History of Deforestation in the 20th Century**

FAO's forest inventory, carried out in 1973, revealed that in the Dominican Republic, primeval forest originally covered about 99% of the country. At the beginning of the 20th century 85% of that original 99% forest cover was still left.

It would seem that the acceleration of deforestation started in the late 1930s. In the 28 years from 1909 to 1937 only a further 12% of the forest was lost, whereas in the following 30 years to 1967, nearly 50% of the area left in 1937 was cleared. It is thought that the increasing number of sawmills caused the severe loss observed, together with an improving road network. Between 1930 and 1967, when the closure of all sawmills was ordered, the number of sawmills in the country rose from 20 to 178.

In the centuries after the discovery of the island, the export of lowland broad-leaf species, especially *Swietenia mahogani*, was the country's main source of income. However, until the early 1930s the value of timber importations exceeded the export value by up to 80% because the national timber industry was not able to cope with the country's growing timber demand (FAO, 1948). The situation was reversed in the 1930s, and by 1946 the import of timber was virtually nil (FAO, 1948).

The building of roads, and the decline of the lowland broad-leaf forests led to an increasing exploitation of the country's pine forests in the mountainous areas for export.

In the period from 1940 to 1946 the export volume of pine timber exceeded that of all broadleaf species nearly eight-fold and its value was six times that of broadleaf species (FAO, 1948). In 1964 pine production peaked with a volume of 92,000 m<sup>3</sup> of timber harvested (Russo, 1987).

However, while there was only insignificant pine timber exploitation until the early 1930s, pine forest destruction began in the remote mountainous areas as early as the 1880s. Eggers (1888) and Woodward (1910), both quoted in Darrow (1990), reported that they had observed slash and burn agriculture in the Cordillera Central (the main pine forest area) and a government team found that the Rio Yaque del Norte watershed, one of the most isolated in the Cordillera Central, has been extensively deforested by migrant farmers (Darrow, 1990). After the closure of all sawmills in 1967 slash and burn agriculture became the main cause of deforestation in the country's

mountainous areas, not least because the families who had earned a living in the sawmill industry had to find another source of income and many stayed on in the mountains and turned to shifting cultivation (Moya, 1988).

A recent study on land use changes in the western part of the Dominican Republic, which covers 56% of the national territory, shows very clearly the connection between agricultural land use and deforestation (Russel, 1988). The study used LANDSAT images from 1972/73, 1979 and 1985/86 in order to investigate the changes which occurred in this period for 14 years. To date it is the only study which uses comparable results over a long period of time. It should also be noted that all the country's natural pine forests lie within the area studied.

The data show an accelerating loss of forest (most recently 36,143 hectares per year) over the period, with deforested areas usually converted to agriculture and livestock production, particularly the latter. Unfortunately the study does not distinguish between broadleaf and pine forests, thus making it impossible to calculate the individual deforestation rate for either forest type. It was estimated that in 1986 only 11.4% of the country was covered with forests (FAO, 1987).

## **UNDERLYING CAUSES OF DEFORESTATION**

### **General Economic Policy**

The macro-economic policy of the Dominican Republic has been characterized as anti-rural (Morell, 1988). In order to achieve urban and industrial development, rural resources (agriculture and forestry) were capitalized and invested in the physical and technological infrastructure of urban areas. There has never been any investment in forestry or forests.

The concentration on urban development is very clearly shown by the distribution of available grants. Yunén (1985) points out that in the first six months of 1982 more than 80% of all grants were given to projects in the country's capital Santo Domingo and a further 9.7% were received by businesses in the country's second largest city Santiago. A further 6.5% went to other cities of the regions and only 3% were spent in rural areas. From 1966 until 1982, the two largest cities, Santo Domingo and Santiago, received an average 83.8% of all finance assigned.

Rural people live in a situation in which employment, income, health care and education are all lacking, and may have their effect upon deforestation.

### **The Socio-Economic Situation in Rural Areas**

#### **(i) Demographic pressure**

The total population of the Dominican Republic increased from 3 million in 1960 to more than 7 million in 1990. In this period of 30 years the population in the urban areas more than quadrupled while the rural population rose by only 33.6%.

However, while the percentage of the population living in rural areas declined, the absolute number of people in rural areas rose from 2.1 to 2.8 millions. This creates demographic pressure on the forest resources, because of the limited access to agricultural land.

### **(ii) Income situation in rural areas**

The income of families living in rural areas is lower than that of families living in urban areas. Data for 1976/77 show that the average income in urban areas was 331 Pesos, 86% higher than the 177 Pesos average income received by rural families. The data also show that 40% of the rural families had an income below the absolute poverty line (Rodríguez, 1987), and more than 64% of them had an income exceeded by their expenditure.

This situation of unequal distribution of income is seen as one of the principal causes of the poor living conditions existing in rural areas and finds its direct expression in poor housing, poor education and malnutrition. Apart from land distribution, it is the most important reason why, between 1950 and 1980, more than 1.3 million people abandoned their land and migrated into urban areas (Rodríguez, 1987).

Limited employment and low incomes, along with demographic pressure, contribute to deforestation because people searching for a living have to choose whether to migrate or to turn to agricultural activities on the only land available, the remaining forest resource. This increases the number of landless farmers in the country's mountainous areas who are blamed as the main culprits for the destruction of the forest resources.

### **(iii) 'Landless' farmers**

'Landless' farmers are a special socio-economic group whose members are amongst the poorest in the Dominican Republic. All persons working in the agricultural sector, with an annual income of 20% or less of the official poverty line, are regarded as belonging to this group no matter whether they possess land or not (Rodríguez, 1987).

The reason that large numbers of farmers belong to the 'landless' category is because of the country's land distribution pattern. The largest landholders, with farms of more than 1,000 ha (0.04% of farms), had 22.5% of total land area in their possession. Farms with over 50 ha (1.8%) owned 55.2% of the agricultural land. But over 81% of the farms had less than 5.0 ha of land at their disposal, and worked only a total of 12.2% of the land currently used for agriculture.

Thus a growing number of rural families have to share decreasing land resources, because of an increasing concentration of agricultural land in the hands of the few. Every year, declining living conditions cause a stream of people to leave the rural area or invade the country's last remaining forest resources.

Over the period from 1971 to 1981, the number of farms with less than 5.0 ha increased by 4.7%, while the area used by this group decreased. Average farm size decreased by a third over the decade, from 1.5 ha to 1.0 ha. At the same time, landholders with over 1,000 ha increased their average farm sizes by 27.8% from 1971 to 1981. It is estimated that most of the farmers with land below two hectares live as shifting cultivators in the country's mountain ranges (Rodríguez, 1987).

Land concentration goes with very unequal income distribution. About 300,000 farmers with farm sizes less than 50 ha had an average annual gross income of 895 Pesos in 1975, while farmers with farms of 50 ha had an average annual gross income of 64,000 Pesos, exceeding the income of small landholders by 71 times (OAS, 1982).

Another effect resulting directly from further land concentration is that more and more of the small farmers are in search of 'new' land resources. The only land available is marginal land in the mountains. Rodríguez (1987) shows that on these marginal sites the profitability is not only very low but also becomes negative for nearly all crops in the third year of production. The response is a shift to a new plot, which normally involves clearing this plot of the trees growing on it.

Thus the cultivation of marginal land and the demographic pressure lead to shorter fallows, and marginal sites cannot recuperate before they are used again. Erosion sets in and in the end the land becomes unsuitable for any type of vegetation cover since not even forest species can colonize the eroded sites, and the land loses its economic and ecological value.

The precarious income situation which the majority of small farmers live in does not reflect the social and economic importance they play in the national economy at all. Small farmers not only employ a high average number of labourers per hectare but also produce most of the basic subsistence crops (about 60%) consumed in the Dominican Republic (Gutiérrez-San Martín, 1988).

Over 77% of the workforce employed in the agricultural sector was employed by farmers with 5 ha or less of land, while the largest landholders absorbed only 1.8% of the total work force. Farmers with less than 5 ha employed on average 0.33 labourers per hectare, while farmers with more than 50 ha employed on average only 0.0017 labourers per hectare. This demonstrates clearly the importance of small farms for the employment sector in rural areas.

#### **(iv) Land tenure**

The distribution pattern of land in the Dominican Republic, with a polarization into poor peasants and large landowners, is typical for most Central American and Caribbean countries.

Closely related to land distribution is the question of land tenure. Badenhop (1970) found in a survey carried out in 1968 that 49% of farmers worked on land which was not their own. In 1980 nearly 30% of the farmer families did not possess any land at all and just 50% of the families who had land also owned it. The rest were tenants or share-croppers or they simply occupied public land (Rodríguez, 1987).

Not having a legal land title had two important implications; firstly the uncertainty of how long a farmer can use the land he lives on restrains him from investing time or money into the land in order to increase productivity or to install erosion control measures. Any improvement made to the land makes it more likely that the 'rightful' owner (state or private) will remove the squatter in order to benefit from the value added to the land. Secondly, even if a squatter wants to invest, he cannot get credit because of the legal title which is required from the banks as a security measure (El Siglo, 29.11.1991). This leaves the farmer in a vicious circle he cannot escape from, and which will force him sooner or later to abandon the land because of the erosion which washes

off the fertile topsoils.

**(v) The housing situation in rural areas**

The precarious income situation was also mirrored by the poor housing found in rural areas in 1981. The majority of houses in rural areas (46.9%) had only two rooms, shared by an average family of seven members. Houses are not built of durable materials and often have an earth floor (ONE, 1989).

**(vi) Public services in rural areas**

Public services in rural areas: water, electricity and health services, are very poor. Landless farmers living in the remote areas of the mountains are almost completely cut off from these services, and those living near larger towns and cities are only a little better off.

Poor sanitary facilities and poor water supply, together with malnutrition, are seen to be the main causes for the health problems and a higher mortality rate in rural areas (Rodríguez, 1987). No data about existing health services have been published since 1970.

**(vii) Nutrition in rural areas**

The effect of low income levels is reflected in the poor nutritional status of the rural population. No families having an income below 108 Pesos in 1976 were able to satisfy their daily nutritional needs (Rodríguez, 1987). This group was able to meet only 82% of its daily calorie requirements and 81% of its protein needs. A survey conducted in 1980 found that 40% of the rural population suffered from malnutrition because of a decreasing consumption of basic food (OAS, 1980).

The socio-economic profile of the rural population (few employment opportunities, low income and uncertainty of tenure) shows the causes which lead to deforestation and the problems forestry will have to address.

**THE ECONOMIC IMPORTANCE OF FOREST RESOURCES**

The depletion of the country's forest resources is not only an ecological loss but it is in the end also an economic one. It is an economic loss in terms of timber and its value and also in terms of the forest resources' contribution to other economic sectors. The Central Bank of the Dominican Republic estimated that the forest sector's contribution to the country's GDP was between 0.4 and 0.6% p.a. in the years from 1977 - 1981. From 1981 forestry's contribution to the GDP was combined with fisheries and the two were reckoned to contribute an average of only 0.7% to the country's GDP between 1981 and 1986 (SEA, 1986).

However, Morell (1988) points out that these estimates take only a very small part of the forest's direct contribution into account. Economic performance is underestimated because the great

majority of forest products are not traded on the official market (eg fuelwood, charcoal, illegal timber trade and illegally operating carpenter shops) and are therefore not included in the country's official economic statistics. The official statistics consider only the value of imported timber and the products derived from it.

Morell (1988) has estimated the true value of the forest resources actual economic contribution, both directly and indirectly. He estimates that the forests generate about five per cent of GDP, exceeding the official estimates tenfold. However, it must be realized that this performance is achieved through exploitation of the forests, that is to say without any reinvestment at all, leading first to exhaustion of the resources and ultimately resulting in their destruction.

At present the forestry sector provides direct employment for about 2,100 people and the timber processing industry employs another 4,350 people (ONE, 1989). If the forestry sector is to satisfy the country's timber demand in the year 2000 it has been calculated by CRIES (1984) that, based on plantations with fast-growing species, 288,000 ha of plantations would be needed with an estimated rotation time of 15 years. That would have meant that from 1985 on, more than 19,000 would have had to be established each year. The employment this would have created was estimated to be in the order of 5,600, which would have increased direct employment in forestry to about 7,700. However, nothing was done, and the situation is such that at present the value of imported timber reaches 100 million US-Dollars.

Furthermore, it is estimated that about 600 small carpenter shops exist in the country of which nothing is known at all, neither about the number of employees nor about the volume or value of the timber processed nor the source of the timber. It is, however, suspected that most of the timber comes from illegal cutting of the remaining pine forests.

The importance of the forests as a source for energy supply is clearly shown. The total value of energy supplied directly through fuelwood and charcoal and indirectly through hydropower, contributes 40% of the total value of 318 million pesos generated by forest resources.

The value of fuelwood is of special interest, as the main energy source for about 80% of the rural population. Though it is collected not bought, its commercial value in 1984 was estimated at 21.87 million pesos and this therefore represents a direct contribution to the income of the rural population of the forest sector.

While the value of forest resources for the production of hydroelectric power is lower, the forests also potentially protect the dams against siltation and therefore help to maximize the life of power stations worth more than 1,000 million pesos. Current deforestation levels have already led to a siltation rate which has halved the economic life of the existing power stations from 40 to 20 years (Hartshorn *et al*, 1981). This puts in jeopardy the government's plan to become more independent of oil imports.

The impact of deforestation of watersheds on irrigation agriculture, energy and potable water can be noticed already. Not only have a large number of small rivers dried up but also some of the main river system water flows have decreased by between 23 and 35% over a period of 20 years (Pérez, 1985 quoted in Morell, 1988).

Despite the fact that such key factors for economic development as energy, food production and water supply depend totally on water from watershed areas, there are no protection and rehabilitation schemes for these areas. None of the country's large dam projects have ever included components for the management of the catchment areas of these dams. The institutions responsible for dams, Dominican Electricity Cooperation and the National Institute for Hydraulic Resources, have no responsibility for watershed management (Hartshorn *et al*, 1981; Morell, 1988). The General Forestry Directorate, which does, receives no resources to accomplish the task (Reynoso, Dotzauer *et al*, 1988).

Another important but indirect contribution of the forest resources to the country's economy is via agriculture. Shifting cultivation is estimated to supply about half of the country's food production (ONAPLAN, 1985).

## **AGRICULTURAL POLICY**

### **Land Use**

Agriculture plays an important role in the country's economic activities. In 1987 about 30% of the whole country was under crops and 43% used as pasture — a total of 73% (Statistisches Bundesamt, 1990). Not all of this land is well-suited for agricultural use, however. For instance, it was estimated by Hartshorn *et al* (1981) that over 70% of the steep slopes, not suitable for annual crops, are being cultivated.

Large landholders, who own the most fertile part of the land under agricultural use, produce most of the country's export crops (mainly sugar cane and tropical fruits). However, they dedicate only 6% of their land to domestic food production, while middle-sized and small producers dedicate 40% of their land to it (OAS, 1982). Up to 40% of national maize production, 50% of bean, potato and manioc production and 75% of peanut production comes from shifting cultivators on marginal sites (Morell, 1988; Rodríguez, 1987).

In the Dominican Republic there is, at present, no clear land use policy which would provide guidelines for institutions involved in land-use planning. This leads to forests being cleared for agricultural settlement, and to loans being given for agricultural production in protected areas and national parks (Reynoso, 1988 unpublished; COE, 1988). For instance, in the western part of the Dominican Republic (Russel, 1988) the land used for agriculture and pasture increased between 1972/73 and 1985/86 by 378,100 hectares. Ninety-eight per cent of this area came from converted forests, the rest from unspecified other land resources.

Most credit goes to large farmers, and small farmers get little help with either credit or extension advice, despite the paramount importance of their production for the production of the food consumed nationally.

### **Agrarian Reform**

Since 1962 there have been many attempts to reform the agrarian structure of the Dominican

Republic in order to improve the situation of the rural poor. However, by 1985 just 64,000 families had benefited from agrarian reform (Gutiérrez-San Martín, 1988). About 14% of state-owned land was redistributed in this process, benefiting mainly landless farmers.

Reform did not have the designed effect, however. The reform settlements produce less per unit than the national average, the issuing of land title has been a very slow process and land reform has failed to stop further land concentration (OAS, 1982; Gutierrez-San Martin, 1988).

Those who benefitted from land reform were also expected to form collective reform settlements, which many were reluctant to do. In fact, military force had to be used in order to establish some of the settlements. Unlike family plots, such settlements have been constrained by administrative problems and low farmer incentive, even while providing a structure which makes it easier to offer the financial and technical support needed.

Where settlers were allowed to reorganize themselves so that they would be individually responsible for their plots while applications for loans and purchase of inputs would be handled collectively, productivity rose sharply and reached average national production levels.

However, it cannot be expected, as pointed out by Ceara (1986), that all the peasants, forced into the mountains in search of land, can be relocated and can benefit from agrarian reform. For those people, other solutions have to be found.

It has to be seen to what extent forestry, in whatever form, can play a role in improving the socio-economic situation of those people who will stay in the forest areas and what alternatives it can offer to the destructive practices on which the people depend at present.

## **FOREST POLICY AND LAW**

Until the late 19th century no action was taken to regulate the use of the country's biological resources. The importance of the forest resources was first recognized in the late 19th century and in 1884 decree No. 2295 was issued. It banned, under penalty, clearing practices near river beds and springs and demanded that every farmer kept 5% of his farm under forest cover. This decree is still in effect.

Since 1884 more than 126 laws, decrees, resolutions and regulations have been issued in order to regulate and/or protect the country's biological resources. However, the vast majority of these legal acts do not promote the rational development and use of the natural resources but stimulate illegal actions because of their prohibitive character (Reynoso, Dotzauer *et al*, 1988). Furthermore, as FAO (1986) points out in its study for the country's Tropical Forest Action Plan, the legal situation concerning the country's forest resources is both immensely complex and lacks clear definition, which makes it impossible to define a precise and efficient forest policy.

In 1962 a law for the conservation of forest and fruit trees was introduced. The law includes ecological, economic and institutional components. At the same time the law created the General Forestry Directorate (DGF) and defined its role in national forest management. However, only the forest protection aspects of this law had been implemented, which made harvesting of trees very difficult because permission from the headquarters of the DGF had to be obtained, even if

only a single fruit tree was to be cut.

Faced with ever-increasing deforestation, the Government enacted a law in 1967 which closed all existing sawmills, prohibited any further tree harvesting and put a tax on imported wood (UEPA, 1989).

Morell (1988) points out that a misconception which confuses the causes of deforestation with its manifestations, leads to the implementation of laws which do not tackle the problem but on the contrary make the situation even worse. Hence forest policy has not responded to the underlying causes which trigger deforestation (lack of economic and social development in rural areas, unequal land distribution etc.), but has tried instead to terminate the population's access to remaining forest resources.

This causes hostility on the part of land owners and forest dwellers towards the forest and naturally every effort is made to ensure that, once trees are removed, they do not grow again. Only in that way can land be retained for further use — a factor of paramount importance in a country where land is in ever-increasing shortage (Morell, 1988; UEPA, 1989). The most extreme effect of this law is that the illegal cutting and theft of timber favours the land owner, because it makes land available for agricultural use (UEPA, 1989).

Thus in rural areas where economic development is desperately needed, a forest management policy which promotes the indirect benefits of the forests (eg protection, ecological effects, etc) but not its potential direct economic benefits for the rural population, is counter-productive to its protection. The law was meant to restrict access to natural forest resources while not affecting plantation forestry. However, this was never made very clear, and landowners and private investors were uncertain whether planted trees could be harvested or not. As a result, the private sector has taken no interest in forest activities at all.

Law 290 was passed in 1985 and established specific incentives for forestry investment, the main one being a 100% tax exemption on benefits arising from forest activities. One of the shortcomings of this incentive is, however, that investors have to wait for the whole rotation before they benefit from their investments. Furthermore these incentives are directed towards capital investments and no incentives for small land owners or the landless class are included.

The credit policy is the same as that for agriculture, with high interest rates and short lending periods, which makes it unsuitable for forestry projects with low return rates and long rotation periods. Morell (1988) points out that the government's credit policy does not take into account the social benefits of forestry and is not prepared to bear part of the social costs by providing loans with low interest, and long lending periods which would make forestry projects more attractive to potential investors.

## **INSTITUTIONAL CONSTRAINTS**

Several institutions exist which are concerned with the protection and management of the natural resources, and there is some confusion about which institution takes responsibility for which part of the natural resources. There is a National Park Service, a General Forestry Directorate (DGF), a National Technical Forestry Commission (CONATEF), and a Wildlife Service.

Not only do the responsibilities of these institutions overlap but many of their assigned powers also overlap with those of other government agencies such as the Agrarian Reform Institute, the Bank of Agriculture, and the Institute for Hydraulic Resources. These institutions often implement projects which result in the exploitation of protected areas and the clearance of forest land and whose impact is often contrary to conservation and protection efforts.

These problems arise from the absence of a comprehensive Government policy towards conservation and management of the natural resources as well as a lack of mechanisms to coordinate the activities of these institutions (Reynoso, Dotzauer *et al*, 1988). The main institutions responsible for the protection and management of the forest resources are, however, DGF and CONATEF.

### **The General Forestry Directorate (DGF)**

The institution created by law in 1962 and responsible for the management and protection of national forest resources is the General Forestry Directorate (DGF), originally part of the Secretariat of State for Agriculture. It is responsible for the conservation, development and management of forest resources. The DGF assumes power for all forest land, public and private, and is authorized to define forest land and to dictate the measures needed for conservation and reforestation.

However, the DGF lacked the resources necessary to implement and enforce forest laws under the Secretariat of State for Agriculture, and was therefore transferred to the Secretariat of the Armed Forces in 1967. To date the DGF is still a wing of the Armed Forces, though since 1990 the Director has been a civilian. In 1986, the DGF had a staff of 2,055 people consisting of forest guards, timber inspectors, forest workers, administrators, agriculturalists and 42 forest officers. (DGF, 1986).

From 1982 to 1990, the DGF's budget increased from about 3.5 million to 18 million pesos. However, each year, nearly 90% of the budget went on administration, leaving little for forest activities such as reforestation and management (DGF, personal communication). This tight financial situation accounts for the small amount of reforestation work done since the institution's creation in 1962: only 7,855 ha in 24 years. Compared with the average annual deforestation rate of over 36,000 ha, reforestation efforts are insignificant. The DGF conducts very little follow-up on its plantations and the plant survival rate is estimated to be as low as 65% (Morell, 1988).

The DGF relates in an unclear way to other institutions. The budget is decided by the Technical Secretariat of the Presidency; for certain technical questions the DGF depends in an ill-defined way on CONATEF; and on policy matters the DGF must defer to the Armed Forces.

### **The National Technical Forestry Commission (CONATEF)**

Because of the weaknesses of the DGF, CONATEF was founded in 1982. Its responsibilities are to develop a national forest management plan and designate forest areas; to coordinate the activities of the institutions involved in forest activities; and to supervise activities and approve management plans.

However, the institution itself faces the major problem that its position vis-a-vis the DGF is not well-defined. Both are attached to the Technical Secretariat of the Presidency, but while CONATEF can approve forest management plans, harvesting permission has to be given by the DGF. Cases have been reported of owners of fuelwood plantations having had the plantation approved by CONATEF, but being unable to obtain permission to fell from the DGF. Such cases further increase the uncertainty as to whether planted trees can be harvested and whether investment in forestry is worthwhile.

FAO suggested a fusion of the two institutions in 1986, but predictably it is opposed by all who do not want to give up the part of the forest authority they hold at present. Because of these political difficulties, FAO's original 'Forest Action Plan' (FAP) was never implemented, and it has now been rewritten to emphasize the involvement of non-governmental organizations rather than Government. (FAO, 1990).

## **FORESTRY CAPABILITY**

### **Biological and Technical Issues**

To date very few studies have been conducted to investigate the ecology and growth dynamic of the country's tree species. The few existing silvicultural studies in the dry forests concentrate mainly on introduced fast-growing species; for indigenous species, studies scarcely exist. However, studies of the ecological requirements of these species and their growth rates are, together with forest inventories, the basis needed to devise appropriate silvicultural methods and management plans. The most comprehensive forest inventory was conducted in 1973 and is therefore out of date. None of the inventories carried out since then are sufficiently detailed to serve as a basis for management plans.

### **The Situation Concerning Forest Professionals**

The country does not have institutions which offer a complete forestry education, and therefore all professionals with a first or postgraduate degree in forestry have had to study abroad. The only institution that offers a certain amount of forest education at university level is the Instituto Superior de Agricultura (ISA). Up to 1990, 56 Agricultural engineers with a specialization in forestry administration had graduated from this institute. In 1986 the country had only 6 foresters, 3 with a BSc and 3 with an MSc, and 15 Agriculture engineers with a postgraduate degree in the management of renewable resource, forest science or environmental education. At the technical level, the country has 27 technicians educated in Honduras (FAO, 1986). The country does not, therefore, have enough professionals to devise a national forest policy, forest management plans or scientific programmes, and will have to rely for many years to come on foreign experts.

## **CONCLUSIONS**

To date the Dominican Republic has neither the biological and technical knowledge nor the human resources to manage its forest resources properly.

The underlying causes of deforestation are demographic pressure, lack of access to land resources and the country's macroeconomic policy which concentrates development in urban areas. The symptoms caused by these factors are poverty, unemployment and a growing social pressure on the remaining forest resources.

The forest sector's contribution to the country's GDP is underestimated and forestry is not included in the government's development model which concentrates on the industrial sector, tourism and the promotion of the agricultural sector, especially of livestock and rice production.

Agricultural policy leads to further destruction of forest resources by not providing adequate financial and technical aid to farmers in steeply sloping environments, and by promoting agrarian reform settlements in forested areas.

The present forest policy, insensitive to the socio-economic situation of the rural population and its relation to forest resources, promotes deforestation by its protective policy measures which exclude the forest from the country's economic processes. The consequence is that forests do not have a direct economic value to the rural population living in or near them. Thus forests become an obstacle and the clearing of forest cover makes land economically available.

The elimination of the right of tree property excludes the private sector from forest economic activities, and it therefore refrains from investing in the forest sector.

There exists neither knowledge about the socio-economic situation that forest dwellers live in and the relation between them and the forest resources nor about the potential impact forest management could have on their situation. This knowledge, however, is of paramount importance to implement forest management plans which benefit the forest dwellers and promote rural development.

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