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**STAFF APPRAISAL REPORT**

**INDIA**

**KERALA SOCIAL FORESTRY PROJECT**

**July 11, 1984**

**General Agriculture Division  
South Asia Projects Department**

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## BASIC DATA

### CURRENCY EQUIVALENT

US\$1.00 = IRs. 11

IRs. 1.00 = US\$0.09

### WEIGHTS AND MEASURES

The metric system has been used.

### PRINCIPAL ABBREVIATIONS AND ACRONYMS USED

ACF	Assistant Conservator of Forests
ACCF	Additional Chief Conservator of Forests
CCF	Chief Conservator of Forests
CF	Conservator of Forests
CPCRI	Central Plantation Crops Research Institute
DEA	Department of Economic Affairs, GOI
DCF	Deputy Conservator of Forests
FD	Forest Department
GOI	Government of India
GOK	Government of Kerala
ICB	International Competitive Bidding
IDA	International Development Association
KAU	Kerala Agricultural University
km <sup>2</sup>	square kilometers
KFRI	Kerala Forest Research Institute
LCB	Local Competitive Bidding
LPG	liquified petroleum gas
MAF	Minister of Agriculture and Forests
MAI	Mean Annual Increment
m <sup>3</sup>	cubic meters
MEO	Monitoring and Evaluation Office
PEO	Publicity and Extension Office
RFO	Range Forest Officer
SFW	Social Forestry Wing
SCF	Standard Conversion Factor
T&V	Training and Visit System

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INDIA

KERALA SOCIAL FORESTRY PROJECT

CREDIT AND PROJECT SUMMARY

Borrower: India, acting by its President.

Beneficiary: Government of Kerala (GOK).

Amount: SDR 30.6 million  
(US\$31.8 million equivalent)

Terms: Standard

On-lending Terms: From the Government of India (GOI) to the Government of Kerala as part of Central assistance to States for development projects on terms and conditions applicable at the time. GOI would bear the foreign exchange risk.

Project Description: The project would increase supplies of fuelwood, small timber and poles through the establishment of about 85,000 ha of plantations. It would also execute a pilot program for producing medicinal plants and strengthen the institutional capabilities through provision for training of existing personnel; additional staff; investment in research and additional vehicles and equipment. A wood balance study would also be undertaken. The project faces no major risks. However, wastage of seedlings could occur if the Social Forestry Wing's capacity for distribution is overstretched. The risk would be minimized by an undertaking that GOK would not expand the seedling distribution program without prior consultation with the Association. Since it is intended to use the existing agricultural extension service instead of expanding the extension service of the Department of Forestry, the new approach entails a risk regarding effective coordination. However, GOK has finalized arrangements satisfactory to IDA to ensure effective coordination between the Department of Agriculture and Forestry Department with regard to providing forestry extension services. Furthermore, insect damage could occur on Ailanthus trees. However, effective insecticides are available and extension advice would focus on the potential problem.

Estimated Cost 1/:

	(US\$ millions)		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
A. Organization and Management	14.4	0.8	15.2
B. Plantation Activities			
Seedling Production	12.9	1.5	14.4
Large Block Plantations	6.4	0.0	6.4
Small Block Plantations	0.4	-	0.4
Strip Plantations	0.8	-	0.8
Tribal Fuelwood Plantations	0.8	-	0.8
Tribal Medicinal Pilot Scheme	0.1	-	0.1
Plantation Protection	<u>0.3</u>	<u>-</u>	<u>0.3</u>
Sub-total Plantation Activities	21.7	1.5	23.2
C. Extension and Publicity	0.3	0.1	0.4
D. Training	2.1	0.4	2.5
E. Research and Studies	<u>0.1</u>	<u>-</u>	<u>0.1</u>
Total Baseline Costs	38.6	2.8	41.4
Physical Contingencies	2.4	0.2	2.6
Price Contingencies	<u>9.8</u>	<u>0.7</u>	<u>10.5</u>
Total Project Cost	50.8	3.7	54.5
	=====	=====	=====

Financing Plan:

	(US\$ millions)		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
GOI/GOK	22.7	-	22.7
IDA	<u>28.1</u>	<u>3.7</u>	<u>31.8</u>
Total	50.8	3.7	54.5
	=====	=====	=====

Estimated Disbursements

	(US\$ millions)						
	<u>FY85</u>	<u>FY86</u>	<u>FY87</u>	<u>FY88</u>	<u>FY89</u>	<u>FY90</u>	<u>FY91</u>
Annual	2.6	4.6	4.7	5.8	6.0	6.3	1.8
Cumulative	2.6	7.2	11.9	17.7	23.7	30.0	31.8

Rate of Return: About 26%.

Appraisal Report: No. 5036-IN, dated July 11, 1984.

1/ Includes taxes and duties of US\$1.5 million equivalent.

## INDIA

### KERALA SOCIAL FORESTRY PROJECT

#### I. INTRODUCTION

1.01 Kerala has the highest population density in India, at 654 persons per km<sup>2</sup>. Although forest lands officially cover 11,239 km<sup>2</sup> in the state, the high population means that over two thousand persons depend on each km<sup>2</sup> for fuelwood and other wood products. Furthermore, the pressure on existing forest land has intensified as large tracts of forests have been converted to other uses.

1.02 The poorer urban and rural populations have been particularly affected, as pressures grow on existing wood products. In rural areas, where nearly 90% of landholdings are under one hectare, the rural poor are faced with the problem of inadequate fuel supply. The fuel sources available to be gathered per family have become constrained. Rural families could have turned to purchase of more fuelwood, but the rapid price rises which have accompanied constrained fuelwood availability have limited that option. The situation only promises to become more critical as productive forest land declines and population continues growing.

1.03 Whereas the rural poor can at least supplement some fuel needs with agricultural wastes, the urban poor are more dependent on fuelwood and cannot afford to pay for costlier alternatives such as gas.

1.04 Government of Kerala (GOK) has become concerned about the growing pressure on wood products, and has attempted in the last two years to help alleviate the situation through a program of social forestry. Initial results revealed considerable potential in particular for farmers to plant trees on their own field boundaries and unproductive agricultural land. The Forest Department Social Forestry Wing achieved a distribution of about 100 million (M) seedlings in two years, in addition to planting 4418 hectares (ha) of government land. This success in distribution suggested the potential for not only substantial production of wood products through social forestry, but also for an important source of income for farmers.

1.05 But the seedlings survival and growth rates have been inadequate, although they could be raised through better nursery and extension techniques. A more fundamental issue is the need to strengthen and provide additional support for the Social Forestry Wing and related institutions. To begin with, the Social Forestry Wing has attempted to serve large numbers of geographically dispersed farmers through centralized management of seedling production and distribution, and extension systems, when such systems are operated more efficiently on a decentralized level.

1.06 In order to help strengthen its institutional capacity for high quality distribution and plantation programs in social forestry, and to further economic and environmental objectives, GOK has requested IDA assistance in a social forestry project. This report is based on the

findings of an IDA appraisal mission which visited India in January/February 1984, comprised of O. Baykal, H. Stier, L. Muller and M. Crawford (IDA).

## II. BACKGROUND

### A. Forestry in India

2.01 India has a population of some 722 M with a growth rate of about 2% per annum. Per capita income is US\$240 (1980) per annum and is increasing at an annual rate of about 1.4%. Seventy per cent of the population is engaged in agriculture which accounts for about 45% of GNP. India's forest reserve land covers 23% of total land area or about 75 M ha, but only about 50% of this designated land is tree covered.

2.02 One of the serious problems facing India today is the degradation and depletion of its forests which is causing considerable harm to the environment. In some cases the damage has been so severe that there is little hope of natural restoration. Forests have been diminished through uncontrolled lopping and felling of trees for fuel and fodder. Similarly, overgrazing has taken its toll on young trees and grasslands, further removing the groundcover necessary to hold and replenish the topsoil.

2.03 Demands for fuelwood, fodder and green manure will increase over the next decades as the population continues to grow. Pressures on existing farmland and the tendency to encroach on forest areas will also rise. Unless the decline in forests and other tree resources is stemmed, the shortage of fuelwood and tree products will become increasingly critical.

2.04 A study by the National Council of Applied Economic Research estimated total fuelwood consumption in 1978/79 at 95 M tons (125 M m<sup>3</sup>) or 62 M tons of coal replacement equivalent. Of this, one third was in the form of logs, the rest in twigs and branches. In addition, 71 M tons of cowdung were burnt (22 M tons coal replacement equivalent). For industrial wood, the demand has been estimated at about 27 M m<sup>3</sup> in 1980 and 65 M m<sup>3</sup> in 2000. For fuelwood, the estimated demand in the year 2000 would be 200 M m<sup>3</sup> without considering any substitution of dung with fuelwood. If 50% of the energy consumed by dung burning were substituted by fuelwood the total fuelwood demand would be about 230 M m<sup>3</sup>. The total annual wood demand for the year 2000 is therefore likely to be nearly 300 M m<sup>3</sup>, equivalent to some 20-30 M ha of mature plantation.

2.05 The Government of India (GOI) realizes that a strong planting program would not only generate resources and protect the environment but, importantly, would provide a source of income to beneficiaries, including small farmers and tribals. Over the years, the Government has taken an increasingly active role in forestry. Recently, two major developments

have taken place. First, GOI has founded Forest Development Corporations aimed at expanding the funding available for forest development and plantation. Second, it has expressed a greater interest in social forestry. 1/ To meet future fuelwood needs, a Fuelwood Commission Report of 1980 recommended a five fold increase in the current level of social forestry planting. This has been reflected in the country's Fifth (1974-79) and Sixth (1980-85) Plans which devoted, respectively, 49% and 78% of forestry allocations to social forestry. The rural afforestation program has included a number of schemes to assist State Governments. The "Social Forestry/Rural Fuelwood Plantations" program, which has a Sixth Five Year Plan allocation of Rs 1,000 M, provides for 50% GOI financing of plantation costs, emphasizing plantations in districts with severe fuelwood shortages. Similar assistance is also provided by GOI for social forestry plantations established under the National Rural Employment Program, the Minimum Needs Program and the Drought Prone Area Program. As for external financial assistance, the total Government project investments now being contemplated amount to Rs 6,000 M over a period of five years, and would result in an estimated 2 M ha afforestation by the late 1980s.2/

2.06 GOI has recognized that the protection-oriented approach to forestry to date has been inadequate to achieve the desired growth of its forest resources. In order to provide special encouragement to social forestry and involve the population more closely in forestry development, the National Commission on Agriculture (1976) recommended that each State Forest Department establish a special wing to develop social forestry. It is expected that some 1.93 M ha of social forestry plantations would be established under the auspices of these newly created wings by the end of 1988, representing a total government investment of Rs. 5950 M (US\$540 M).

2.07 Of the present India-wide tree planting of some 2 billion seedlings annually, about 50% are planted through farm forestry (where seedlings are planted by farmers on their own property). The rest are planted by the forest departments in commercial plantations (30%) and social forestry plantations (20%). Government plantation establishment costs on Forest Department administered forest land are about five times higher than those of farmers planting on their own land.

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1/ Planting of trees on farmland, wastelands, and other areas outside Government owned forest reserves.

2/ Besides the Bank-financed efforts described in paragraphs 2.09-2.10, the states of Madhya Pradesh and Maharashtra (USAID-assisted), Tamil Nadu and Orissa (SIDA), and Andhra Pradesh (CIDA) are now implementing projects. The Government intends to bring all remaining states under external assistance in the future.

## B. The Bank's Involvement in Indian Forestry

2.08 A 1978 Bank forestry sector report, "India Forestry Prospects", summarized India's needs as follows:

"India has two major tasks to accomplish over the next quarter of a century: first, to develop its farm forestry program to supply fuelwood, fodder and farm timber in rural areas, and second, to improve the productivity of its forests to supply the growing needs of the domestic wood products industry (particularly pulp and paper). Encompassing both priorities is the vital role environmental forestry plays in soil and water conservation; this will need much more investment than it has been given in the past."

2.09 The Bank has financed five social forestry projects in India, one of which includes two states: Uttar Pradesh Social Forestry (Cr. 925-IN of June 1978) for US\$23 M; Gujarat Community Forestry (Cr. 961-IN of April 1980) for US\$37 M; West Bengal Social Forestry (Cr. 1178-IN of February 1982) for US\$29 M; Jammu & Kashmir and Haryana Social Forestry (Cr. 1276-IN of September 1982) for US\$33 M; and Karnataka Social Forestry (Cr. 1432-IN of February 1984) for US\$27 M. The recent mid-term reviews of the Uttar Pradesh and Gujarat Social Forestry projects, and supervision of the social forestry projects generally, have shown good overall progress in implementation.

2.10 The relative emphasis on different types of plantation components has changed in Bank-financed social forestry (see Annex 2), as well as social forestry generally in India. Farm forestry has grown; besides being less expensive than planting on government land, it yields higher and more direct benefits to farmers, since farmers take all produce/revenues (Government need not recover costs of plantation establishment and maintenance). Furthermore, farm forestry components have far exceeded appraisal targets. To support farm forestry activities, social forestry projects have built in, or later added, provisions for a study of the supply and demand for wood and wood products, recognizing that planting strategies will have to adjust to future demand and prices, for instance to a situation where the (presently lucrative) pole market has become more balanced. The projects also provide for improved extension, linked now to the Training and Visit System of agricultural extension where it exists, in order to introduce new techniques and help farmers upgrade their current agroforestry practices.

2.11 As for social forestry components other than farm forestry, road/canal side plantations, rehabilitation of degraded forests and community forests are generally progressing well. Components involving new approaches, for instance sand dune fixation and wetland/alkali land planting, have taken a little longer to develop. The self-help village woodlot

schemes in some projects represent one type of component where results have lagged behind expectations. One cause is the limited ability of village administrations to raise funds for development works. Farmers have exhibited increasing interest in taking greater responsibility for nursery operations and some states are already implementing small nursery schemes, for instance the arrangement by the Forest Department in Gujarat to buy back seedlings produced in small "kissan" nurseries.

2.12 Two new, national level projects are currently under preparation, one on National Social Forestry, designed to introduce afforestation programs in states not yet participating in substantial social forestry programs, and to strengthen the administration and support by GOI for social forestry. It also includes states with follow-on social forestry programs. The other national level effort is the Forestry Education, Training and Research project, designed to improve forestry research and to make professional education and inservice training more responsive to current forestry needs. These projects are consistent with the Government of India's recently announced intentions to increase social forestry emphasis and expenditures from the 1980-81 level of about 2.1% of the total budget, to a new level of at least 5%.

### C. Agriculture and Forestry in Kerala

#### Agriculture

2.13 Kerala, in Southern India, is one of the country's smallest states. It has 14 administrative districts (see Map), and covers 38,663 km<sup>2</sup> of: lowlands, characterized by flat, sandy tracts and backwaters; midlands, comprising small hills and valleys with a variety of streams and rivers; and highlands, containing heavily forested mountains. The state generally enjoys good sunlight, fertile soils, a plentiful network of water resources, and good rainfall from both the May-August southwest and September-October northeast monsoons.

2.14 The climate in Kerala is sub-tropical, with a temperature range of 20-35° C year round. The State encompasses seven climatic zones forestry-wise: (a) the wide coastal belt, where coconut predominates; (b) backwater areas, which have been in part reclaimed and planted with coconut or other crops; (c) southern midlands, which feature rubber, coconut and tapioca as major crops; (d) southern highlands, where some forest land is newly settled (in part encroached) and devoted largely to annual crops; (e) northern highlands, where tree crop farming is important; (f) lateritic soil areas in the North, which support extensive farming and cashew plantation; and (g) mid-west rain shadow area. The existing agroforestry orientation in Kerala is strong; besides commercially grown tree crops such as coconut and rubber, other trees complement important agricultural crops -- for instance, those which provide support for pepper vines or shade for cocoa, cardamom and coffee. In addition,

private farmers grow trees like Ailanthus for sale to matchbox/splint and packing case manufacturers, Casuarina for sale as poles, and other species for fuelwood and timber production.

### Current Forest Conditions

2.15 Natural and plantation (e.g., teak) forests cover 11,239 km<sup>2</sup>, or 29% of the state's land according to official figures. <sup>1/</sup> The forest types can broadly be grouped as tropical evergreen or rain forests; mixed deciduous or monsoon forests; and subtropical or temperate evergreen forests.

2.16 Working plans cover almost all of Kerala's reserved forests. Evergreen forest is managed under a selection system, and deciduous and mixed deciduous under clearfelling systems followed by artificial regeneration. As a result, 146,900 ha of manmade forest have been established, comprising 52% teak, 21% eucalyptus, 16% softwoods, and 11% miscellaneous species.

2.17 In the available natural, manmade and vested (nationalized), forests, growing stock comprises 167 M m<sup>3</sup> of wood, with the following anticipated utilization: 53% fuelwood, 11% plywood, 2% matchwood, 2% pulpwood and 32% other industrial wood. Annual recorded production from these forests includes 0.5 M m<sup>3</sup> timber, 0.3 M m<sup>3</sup> fuelwood, and 1.3 M poles.

### Forests in the State Economy

2.18 The share of value added by forestry and logging in Kerala's Net Domestic Product is estimated at about 2%, or about Rs. 0.8 B in 1981-82. The sector has shown no growth in volume terms during the 1970s and to date. Kerala also has an important forest based industrial sector for which only partial data is available. There are three pulp and paper mills with a combined input capacity of some 500,000 tpa of wood and bamboos. The newest of these factories, with an input capacity of 250,000 tpa of wood has just started production. It is one of India's largest newsprint mills, which with an annual output capacity of 80,000 tons will add about 50% to India's existing newsprint capacity, helping substitute for the half of newsprint volume now imported. It is roughly estimated that there are some 1000 sawmills, 350 plywood and veneer mills, more than 100 matchbox factories and numerous furniture workshops and other small

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<sup>1/</sup> As paragraphs 2.22-2.24 elaborate further, a good deal of forest land has been lost or is unavailable for plantation. It is estimated that 20-25% of forest land has been converted to other land use during the last 40 year period.

scale wood industries. It is estimated that wood-based industries account for 0.5% of value added in Kerala's Net Domestic Product, corresponding to some Rs. 0.2 B in 1981-82. Employment in the forestry sector is estimated at about 55,000 and in identifiable forest based industries at some 25,000 workers, in total less than two per cent of the labor force.

2.19 Aside from employment by commercial enterprises, wood production provides an important source of income to those farmers who grow trees privately (often on waste land or along field boundaries on the holdings) and sell the wood for poles, timber, matchboxes, etc. Interest in private planting has been running high as evidenced by the ability of a small social forestry organization to distribute a large number of seedlings to private farmers already (paragraph 2.32). Trees grown for cash also provide an important benefit for the farmers because of the branches, twigs and other secondary materials which can be used for fuelwood.

2.20 According to the National Council of Applied Economic Research, non-commercial fuels (logs, twigs, wood shavings, sawdust, charcoal and crop wastes) form the largest part of Kerala's total fuel consumption. In rural areas, twigs and logs comprise the bulk of total consumption (about, the 42% and 17% respectively), while agricultural wastes account for about 30%. Rural commercial fuels include kerosene, electricity and LPG (about 7%, 3% and .5% respectively). The most striking difference in total urban consumption is the 56% share comprised by logs, with predictably lesser quantities of twigs (7%) and crop wastes (7%) than in rural areas. Commercial fuels account for more than twice the consumption in urban as in rural areas, including kerosene (6%), LPG (7%), and electricity (9%). Dung cake is used almost not at all in the state.

2.21 However, the supply of firewood has become constrained (as detailed in the next section), and the increasing difficulty in satisfying local demand for firewood - as well as other wood products such as timber and poles - is reflected in their recent rapid price increases. Moreover, the market for wood does not fully represent the current situation, since non-commercial consumption constitutes an important factor in wood use. The poor have been particularly affected in increased difficulty in obtaining fuelwood, since they traditionally collect it in the vicinity of their villages and cannot afford to pay market prices for fuelwood or substitutes. It is estimated that the rural poor, with a per capita income of less than US\$100, collect almost 90% of their firewood needs and purchase only 10%. This situation is likely to continue, because there are few industrial or other non-agricultural sources of employment; therefore the poor living in rural areas (and 71% of the total population is rural) will continue to depend on fuelwood. The provision of additional fuelwood could help bridge a consumption gap which otherwise promises to widen increasingly, and the poor would benefit in particular. In addition, farmers' sale of surplus fuelwood, poles and timber from their trees would provide them with an additional source of income.

### Factors in Decline of Forests

2.22 Forested areas available for exploitation have declined for several reasons, and have not been replanted at an adequate rate. First, population pressures have led to deforestation. Landholdings tend to be quite small (90% of them are under 1 ha), and Kerala has the highest population density in India. 1/ However natural sources of fuel, such as private trees and agricultural waste, have not increased at the same rate as population. These factors have precipitated an increased rate of illegal lopping and felling of trees on forest reserves. For the time being, there is little hope of this situation rectifying itself as rural population pressures continue.

2.23 Second, formerly productive forest land has been utilized for other purposes. Individual conversion of forests to farmland, often through illegal encroachment, has been taking a steady toll. In addition, under "Grow More Food" and other government schemes, large tracts of forest land were taken over. Hydroelectric and irrigation works have caused some forest areas to be submerged, and others to be restricted as protected catchment land. Finally, about 18% of forests are not available for production of fuelwood and other wood products because they have been converted to wildlife sanctuaries, protected areas and national parks.

2.24 Third, the growing stock available for production annually will decrease further, since Government recently decided as an environmental measure to stop clearfelling operations. The implications in the long run are even larger since this measure will reduce the land available for plantation establishment.

2.25 Livestock have posed less of a problem to plantation protection than in other states. In densely populated, intensively cultivated areas, animals tend to be tied and stall-fed. Still, there are areas where livestock browsing has hurt trees, especially in the first years of growth.

2.26 In the long run, the Kerala Government will have to deal with conservation of forest resources in the broader context of alleviating population pressures and promoting alternative sources of employment to agriculture. At this time, however, the most immediate aid to forests will come through more effective forest policy, better utilization of

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1/ Kerala's population density runs as high as 1,248 per km<sup>2</sup> in the coastal district of Alleppy; it becomes difficult in such highly populated areas to distinguish between "densely settled rural" versus "urban" areas.

existing and new government plantations, and expanded area for tree plantation achieved principally through farm forestry.

#### D. Forest Policy and Organization in Kerala

##### Forest Policy

2.27 In the areas which eventually became Kerala in 1952 (Travancore, Cochin and parts of the old Madras State) forests were protected by strict laws, with a limited quantity of teak, rosewood and ebony being exported. In recent decades, the kind of deforestation described in the previous section began to increase. Realizing in recent years the danger of forest degradation, GOK has devoted increasing funds to social forestry and has established regulations for protection. Under the Fourth Plan (1969-74) GOK's social forestry expenditure was Rs 353,000; under the Fifth Plan (1974-79), Rs 4,510,000, and under the current Sixth Plan (1980-85) Rs 19,750,000. Still, the proportion of the total state public sector allocation devoted to forestry in the Sixth Plan was only 1.21%. 1/

2.28 GOK has reduced the area available for clearfelling every year, in an attempt to protect existing forests and wildlife. But there is no systematic way of determining the balance between production and protection interests, with the result that imbalances could easily occur among them. GOK needs to establish a planning capacity in the Forest Department capable of designing and implementing resource studies, assessing market demand, and integrating the resultant production policy with the protection policy.

##### Forest Organization

2.29 One official, the Minister of Agriculture and Forests (MAF) administers both the agriculture and forestry sectors. Recently, the positions of Secretary for Forests and the Agriculture Production Commissioner were merged, which means that agriculture and forestry activities should become more closely integrated and coordinated.

2.30 The Forest Department has four Chief Conservators of Forests (CCF) and one Additional Chief Conservator, 1/ each of whom is directly responsible to the Secretary/Forests. Traditionally, the CCFs and ACCF have been allocated some staff and resources for their exclusive use, but have

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1/ "Plan Development Programs in Forestry Sector, 1951-85", Government of India, Ministry of Agriculture; September 1981.

1/ These include the CCF/Development, CCF/Social Forestry, CCF/Administration, CCF/Vigilance and ACCF/Wildlife.

had to share many others including personnel, administration, statistical and even some field staff. Two Forestry Training Schools have provided a basic training course for Foresters and Rangers.

2.31 In 1982, GOK initiated a separate social forestry program in the Forest Department. On May 26, 1983, GOK issued a government order sanctioning 20 additional staff for social forestry, and stating that these plus the 74 existing staff sanctioned would work solely for the newly established Social Forestry Wing (SFW). At appraisal, a small headquarters staff and very limited field staff occupied Social Forestry staff positions; all staff included, the total numbers of sanctioned/filled positions included: 32/30 in headquarters, 5/3 in Extension, and 134/99 Field Staff (see Organizational Chart 1).

2.32 The Social Forestry Wing has already distributed a large number of seedlings and carried out plantations in its first two years. Funding for social forestry has mainly been provided by two Centrally Sponsored schemes, the National Rural Employment Program and the Rural Fuelwood Scheme. In 1982 and 1983, SFW distributed 103 M seedlings for farm forestry, and planted 4,418 ha of land (degraded forests, block plantations, strips plantations and plots in tribal areas).

2.33 The results have indicated institutional weaknesses. Because the magnitude of seedling distribution to farmers exceeded the level of assistance which Forestry extension could provide on how to care for seedlings, survival rates have been low (36% according to a Forest Department survey), and wastage has occurred. This has stemmed from a variety of factors, such as poor nursery techniques, and improper care and wrong placement of seedlings. As for government plantations, survival rates have been good, but aftercare has been inadequate due to limited funds. Protection against damage and livestock has been inadequate in some instances. All this indicates that the Social Forestry Wing has been operating at a level beyond its organizational capacity, in terms of manpower and other resources, as well as in terms of know-how in nursery operations and support from research and extension.

2.34 Regarding structure down to the village level, Forest Department organization corresponds fairly closely to general State organization. The Social Forestry Wing now breaks its operations into 14 districts, comparable to the State's 14 administrative Revenue Districts. For local government administration, villages are grouped under panchayats, which undertake a wide variety of both compulsory and discretionary duties. Although they have yet to become very involved in forestry activities, panchayats have helped the Social Forestry Wing with the distribution of seedlings.

2.35 Voluntary organizations are active in Kerala, consistent with the high level of social welfare interest in the state. Many of them have

collaborated with the Social Forestry Wing in the distribution of seedlings and extension of advice on planting to farmers. Such organizations include: schools and colleges, especially those with forestry clubs; libraries; sports clubs; student organizations such as the National Service Scheme and National Cadet Corps; KANFED, a program for increasing literacy; Sastra Sahitya Parishath, a group promoting science and literature; service clubs; and religious organizations.

2.36 In 1981, the state adopted the training and visit (T&V) system of agricultural extension, which provides for extension worker visits to farmers on a regular fortnightly basis. Although the current system of agricultural extension has dealt primarily with recommendations and assistance for crops, it could deal satisfactorily with dissemination of forestry information, which tends to be relatively uncomplicated.

### III. THE PROJECT

#### A. Overview

3.01 The project would cover the development of social forestry throughout the state of Kerala, and would have the following objectives:

- to increase farmers' incomes and self-sufficiency in wood products through their plantation of trees, making special efforts to involve tribal people;
- to increase production of fuelwood, small timber and poles by establishing plantations on available government lands; along railroads, canal banks, roadsides and coastal belts; and on the grounds of educational and other institutions;
- to reduce the effects of water and wind erosion, and lessen pressure on existing forests;
- to strengthen the existing Social Forestry Wing of the Forest Department and related institutions, and their capability to conduct a statewide social forestry program which would yield benefits in the longterm.

#### B. Detailed Features

3.02 The project would consist of the following components:

- A. Plantation, over six years, of approximately 85,000 ha, including:

1. Farm forestry through distribution of about 340M seedlings (the plantation equivalent of about 69,000 ha) to private farmers and institutions; 1/
  2. Block plantations on government land totalling 12,000 ha, on degraded natural forest reserves, failed teak plantations and unproductive grasslands;
  3. Strip plantations totalling 2,000 ha, along canal banks, railroads, roadsides and coastal belts; and
  4. Special plantation schemes for tribal people, totalling some 2,100 ha;
- B. Establishment/improvement of small family operated nurseries and larger nurseries serving departmental plantations;
- C. An intensive program of extension and publicity, strengthening the linkages between social forestry and agricultural extension;
- D. Training for Social Forestry Wing staff, voluntary and other interested organizations, and farmers; strengthening of selected institutions for social forestry training;
- E. Research activities including: development of recommendations to be transmitted to farmers by extension, and evaluation of planting programs; carrying out of forestry-related research studies and a wood supply and demand study; and
- F. Institutional development of the Social Forestry Wing, in addition to the strengthening of extension and training mentioned above; improving the capability of small farmers and schools to handle nursery work; and increasing the role of voluntary organizations and rural communities in social forestry. This component is covered in Section IV of this report on "Organization and Management."
- G. Monitoring and Evaluation of the project, to be carried out in accordance with guidelines for Monitoring and Evaluation developed by GOI and IDA.

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1/ As table 6.01 shows, trees planted individually in farm forestry have higher yields; hence, the "yield" equivalent of seedlings distributed would be about 129,000 ha.

Plantation Program

3.03 The plantation program would have the following phasing, with farm forestry shown in hectare equivalents:

Table 3.03: PHASING OF PLANTATION PROGRAM

<u>Plantation Category</u>	<u>84/85- Year 1</u>	<u>85/86- Year 2</u>	<u>86/87- Year 3</u>	<u>87/88- Year 4</u>	<u>88/89- Year 5</u>	<u>89/90- Year 6</u>	<u>Total</u>
A-Farm forestry	5,100	8,100	10,200	12,200	15,400	18,200	69,200
B-Plantations on government land							
Large blocks	600	1,200	1,800	2,200	2,600	2,600	11,000
Small blocks	50	100	150	200	250	250	1,000
Strip plantations	50	100	200	400	500	750	2,000
Tribal-fuelwood	100	200	300	400	500	500	2,000
Tribal-medicinal	5	10	15	20	25	25	100
Annual totals	5,905	9,710	12,665	15,420	19,275	22,325	85,300

The above table represents the best estimate of a balanced program, given existing information on social forestry. The project would maintain flexibility so that, as SFW gains more experience and studies more intensively the supply and demand for wood, the proportion of planting could be shifted among the above plantation categories. SFW, GOI and Bank staff would assess whether to do so during a mid-term review to be conducted after completion of the third year's planting (paragraph 4.06), or during the course of supervision missions should the situation warrant. Annex 1 shows the types of trees to be planted, their potential utilization, and their distribution by Government plantation model and agroclimatic zone. In addition to producing fuelwood, trees are currently sold by farmers for various purposes, for instance: Ailanthus for production of matchbox/splint and packing cases; Casuarina for fuelwood and poles; and Eucalyptus for pulpwood. Plantation levels have been matched to levels of institutional support in social forestry; GOK would inform IDA of plans to add any social forestry plantation above the levels outlined at appraisal (Agreed Minutes).

3.04 Farm Forestry (69,200 ha equivalent representing 81% of total tree planting program). Farm forestry would comprise by far the largest part of the program, because it yields the highest benefits to the farmers, and yet costs the least (about one fifth the cost per hectare of plantation of government land). It also gives the farmer greater control over choice of species/product and product utilization. The only direct costs for farm forestry would be seedling production, which are noted in paragraph 3.15 under "Nurseries".

3.05 The Social Forestry Wing (SFW) would distribute approximately 340 M seedlings over a six year period to all sizes of farmers and, to a limited extent, to private institutions. The component would aim at broad participation, particularly among small farmers who previously lacked information and access to tree planting. A large network of small family- and school-operated nurseries (see paragraphs 3.15-3.17) would facilitate this effort.

3.06 Farm forestry recommendations would be geared to the existing agricultural situation, taking into account the intensive cultivation of crops and tree crops in many areas. Species selection and placement would complement individual cultivation patterns. SFW extension efforts to farmers would be reinforced by agricultural extension, as described in paragraph 3.22.

3.07 A limited number of seedlings -- 3,500 Casuarina and 500 for other species -- would be distributed to each farmer free of charge. These numbers are based on the plantation-area equivalent for free distribution which has been established by GOI and the Bank in previous social forestry projects. 1/ For numbers above those levels, SFW would assess a charge which would recover direct costs of production. Assurances on these distribution policies were obtained during negotiations, as were assurances that Forest Department nurseries shall maintain registers on the number of seedlings distributed to each family, and that the Social Forestry Wing shall conduct field reviews during each planting season to ascertain that wastage of seedlings is being minimized.

3.08 Block Plantations on Government Land (12,000 ha representing 14% of total planting program; 11,000 ha would be in large blocks, and another 1,000 ha would be in small blocks of land belonging to various state government institutions). Although more costly to establish and maintain than farm forestry, block plantations and planting along canal/railway/roadside/ coastal strips are economically justified, as they produce additional fuelwood and poles on otherwise unproductive land, generate considerable employment, and help conserve land. The fuelwood would be distributed with a view to improving its access to the poorer population.

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1/ Calculations indicate a much larger per capita distribution for Casuarina because it would be planted on wastelands where few crops besides scattered (often degraded) cashew trees exist; hence Casuarina could be planted in block areas and with much denser spacing than other species. Thus, on a hectare basis, the planting of Casuarina and other species would be roughly equivalent using the above free distribution numbers.

3.09 SFW would establish plantations, mainly for fuelwood production and, to a limited extent, for poles for house construction. Products would not include pulpwood, since another division of the Forest Department already covers that activity. SFW staff would supervise the planting, maintenance, felling and distribution of products from block plantations, employing labor from nearby panchayats. After establishment, adjacent villagers would be allowed to cut grass for fodder and to collect fallen twigs, under SFW supervision. Forest Assistants and daily wage laborers would be employed to help protect these plantations against illicit use, fire and other hazards.

3.10 The direct baseline costs for block plantations would be: seedling production, noted in paragraph 3.19 under "Nurseries"; large block plantation establishment and maintenance, US\$ 6.4 M; and small block plantation establishment and maintenance, US\$ 0.45 M (detailed in Annex 3, Table 3). GOK would recover direct costs of plantation after felling, through selling produce as described in para 6.06. SFW would investigate the relative costs of various types of fencing for these and strip plantations, using the lowest cost method which suffices for protection, including no fencing when that is possible.

3.11 Strip Plantations (2,000 ha representing 2% of total planting program). Along coastal, railway, roadside and canal strips, SFW would establish plantations, emphasizing fuelwood production. Because the cost of previous roadside plantations was higher than other strip plantations, it was agreed at Negotiations that roadside strip plantations would be included so long as they use the same models and have the same economic costs as other strip plantations SFW supervision and provisions for villager collection of by-products would be the same as under block plantations (paragraph 3.10). Establishment and maintenance of the strip plantations would account for US\$0.8 M of direct baseline costs in the project (detailed in Annex 3, Table 3).

3.12 In all areas, SFW staff would make a prior assessment of current land use, in order to design strip plantations which would minimize conflicts with local practices (e.g., open grazing land, points requiring passage from one area to another, spaces used for recreation or rites, etc.).

3.13 Involvement of Tribals (2,100 ha representing 3% of total planting program; this would include plantation of 2,000 ha for fuelwood, and establishment of a special medicinal plants pilot program on another 100 ha of forest land, with plants placed under existing trees). Consistent with GOK policy of extending special assistance, SFW would involve tribals in four types of activities. First, it would employ tribals to work on Government plantations, attempting over time to improve tribals' agroforestry skills and transfer increasing responsibilities to them.

Second, it would establish plantations to produce fuelwood adjacent to tribal communities. All fuelwood and other tree products raised would go to these communities, including the landless. The establishment and cultivation techniques would be the same as those used for Eucalyptus grandis on block plantations. Third, SFW would set up a limited number of small nurseries run by tribals, especially family members who stay at home. Tribal plantation establishment and maintenance costs would amount to US\$ 0.8 M of baseline costs (detailed in Annex 3).

3.14 Fourth, there would be a pilot program for cultivation of medicinal plants on 100 ha of forest land, designed in part to foster forest protection, and to further the economic development of the tribal people. Since techniques in this area are not well developed and remain to be tested, these activities would be kept on a pilot scale. There is a large number of small bushy plants, flowers and tubers which tribal populations traditionally gather from forests, and use or sell locally for medicinal purposes. Kerala law has granted exclusive rights to tribals to deal with these plants. A majority of the medicinal plants grow in forests, which is how the Forest Department/Social Forestry Wing became involved. Recently, a branch of the Forest Research Institute at Trichur has been carrying out studies on indigenous medicinal plants. It reports that, besides local usage of these plants, pharmaceutical companies have generated a growing demand for medicinal plant extracts. Under the project, SFW would help tribals to cultivate and market those plants, and to take over increasing responsibility for running the operation. The pilot medicinal scheme would cost US\$0.1 M in baseline costs for establishment of plots (detailed in Annex 3).

#### Nurseries and Seedling Distribution

3.15 The project would place special emphasis on the establishment/improvement of a large number of small nurseries operated on family holdings and to a limited extent on school grounds, providing an average of 80,000-110,000 seedlings per annum on about one tenth of a hectare of land, and capable of being handled by a landholder and two family members. These small nurseries would have several advantages: easier access to farmers, and hence reduced seedling distribution costs; source of income for farm families employed to operate them; gradually reduced nursery costs to SFW as farmers take increasing responsibility; and use as natural points for extension of recommendations to farmers. Already SFW has been operating about 100 such small nurseries. In the first year of the project 472 small nurseries are planned, increasing to 1,055 by the fifth year. The baseline costs of nursery preparation, cultivation and distribution of seedlings for farm forestry would amount to US\$ 10.9 M as detailed in Annex 3, Table 3. SFW would supply small nurseries with seed, polyethelene bags, and other materials.

3.16 The small nurseries scheme would provide nursery operators and their family members assisting in the nursery with new skills. It might be that some farmers, as in other states, would be interested to continue with nursery activities and to take increasing responsibilities. Thusfar, SFW has not focussed on developing individual longerterm nurseries for several reasons: by rotating small nursery sites, it feels that a larger number of farmers have access to seedling distribution; small farmers may be unwilling to use their land for nurseries if other more attractive agricultural alternatives present themselves; and small farmers do not yet exhibit skills for growing good quality seedlings. However, given the promising experience with small nurseries in social forestry schemes elsewhere in India (paragraph 2.11), an expanded role for small farmers in Kerala social forestry nurseries has been encouraged. The project provides for close supervision of small nurseries by Foresters (paragraph 4.04), so nursery development could be guided closely and the quality of seedlings monitored carefully.

3.17 At discussions during negotiations, it was decided that no firm scheme for privatization of small nurseries could be drawn up for Kerala until the Social Forestry Wing acquires more experience in small nursery operations, and until the reaction of farmers has been demonstrated. But in order to ensure that nursery operations would be reassessed on a continuing basis and the role of farmers in nursery operations adjusted as suitable, SFW would conduct a regular review. It was agreed at negotiations that, along with GOI, GOK would review the small nurseries scheme every August in order to assess progress and formulate plans for its development. Upon completion of each review, GOK would promptly submit a report to the Association on the findings and conclusions of its review. In turn, each IDA supervision mission would devote special attention to the development of small nurseries and pricing matters.

3.18 The selection of nursery operators would need careful management. Candidates would be screened according to well-publicized and enforced criteria in order to avoid charges of favoritism to certain groups. SFW would issue guidelines on selection criteria, including farm-type, access to water, and farmer/school motivation. SFW would provide training for small nursery operators and other persons employed to assist them (paragraph 3.27).<sup>1/</sup> SFW trainers would run two day courses, covering the five small nurseries supervised by a given forester (see Project File, Item 7 for details). Finally, SFW would maintain good communication with the rural community on the small nurseries scheme, involving local organizations in its support.

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<sup>1/</sup> It is estimated that an average of three persons would be employed at each small nursery, for a duration matching the growing season of species involved, ranging from 6-9 months per annum.

3.19 SFW would establish larger departmental nurseries whenever the scale of operations on governmental lands warranted. It is estimated that SFW would support fifty such larger nurseries. These nurseries would produce a substantial number of seedlings for the plantations on government land, and would also produce seedlings for distribution to farmers. As for the small nurseries, they might also produce seedlings for plantation on government land, even though their emphasis would be on distribution to farmers.

3.20 Techniques in both small and large nurseries need improvement, in particular the quality of seedling production and handling, especially during storage and transport (see Project File, Item 4 for details). SFW training for small nursery employees and for foresters supervising all sizes of nurseries would include instruction on nursery techniques. SFW would explore the use of "basketing" techniques for seedlings and other innovations to make nurseries more efficient and economical. The total baseline costs of preparing nurseries, and cultivating and distributing seedlings for departmental plantations would come to US\$ 3.4 M, as shown in Annex 3, Table 3.

#### Plantation Maintenance and Protection

3.21 In the last two years, SFW did very little replanting of vacancies and weeding on its tree plantations due to limited funds. Protection, especially against livestock, was generally inadequate. Under the project, maintenance and protection would be better supported through intensified field operations and engagement of workers (34 Forest Assistants and a number of laborers) for general protection, fire watching and fighting, etc. Maintenance costs are included under the above models for departmental plantations and protection costs would come to US\$ 0.3 M, as shown in Annex 3, Table 3.

#### Extension and Publicity

3.22 Given the broad scope of the farm forestry component and the fact that farmers would be responsible for the planting and care of about 340 million seedlings, extension and publicity activities would play an important role in project success. On the field extension side, the Social Forestry Wing would have a relatively small but trained cadre of Rangers and Foresters to take responsibility for farm forestry promotion at key distribution and meeting points. As for follow-up with individual farmers, the existing agricultural extension system (with nearly 2,000 Village Level Workers making fortnightly visits) would lend valuable assistance in reinforcing messages on tree planting to farmers. SFW and Agricultural Extension staff have agreed to coordinate social forestry activities, in line with similar trends in other States with Bank-financed projects in both social forestry and the Training and Visit system of

agricultural extension (see Project File, Item 6). After formulating recommendations together with the Social Forestry Technical Committee, SFW field-level supervisors would attend selected monthly meetings held by agricultural extension subdivisional officers to plan recommendations for the following month. Subsequently, at fortnightly training sessions, the Village Level Extension Workers would learn and practice those recommendations and pass them on to farmers during their field visits.

3.23 Besides field extension, SFW would sponsor a variety of other extension and publicity activities: (i) special promotion by voluntary organizations, as has been practiced during the last two years; (ii) SFW/Extension and Publicity Office (EPO) publication and distribution of materials encouraging tree plantation, explaining how to select species, and describing and illustrating techniques for planting and care; (iii) SFW/EPO announcements and information carried by radio, newspapers and other news media; (iv) SFW/EPO talks or demonstrations at public gatherings and at arranged meetings in central locations such as local schools; (v) organization of farmer/community rallies and meetings, or participation in other gatherings such as Panchayat meetings or fairs; and (vi) tours by publicity vans. The high literacy rate in Kerala should prove an advantage in extension.

3.24 The project provides for consultant assistance to help prepare an information program and to advise on these various forms of publicity. The training component would support the development of publicity and training materials (paragraph 3.29). Because the project would avoid building a large forestry field staff for extension, the costs of extension would be lower than in previous Bank-financed social forestry projects. Total extension baseline costs would come to US\$ 0.3M, as outlined in Annex 3, Table 5 and would cover mainly publicity materials, vehicles, equipment and incremental staff salaries.

### Training

3.25 Besides improving staff skills, the project would permanently increase the capacity of the Forestry Training Schools and Social Forestry Wing to handle the training program in social forestry (See Project File, Item 7 for details). The project would furnish immediate orientation training for staff in social forestry techniques and extension. Also, a permanent training program in social forestry for staff, voluntary organizations, farmers and other concerned parties would be developed. Furthermore, the project provides other Forest Department branches with replacement training for staff transferred into Social Forestry from those branches. The total baseline costs for training would be US\$ 2.5M, as shown in Annex 3, Table 6. Training costs include mainly renovation and equipping of the two Forestry Training Institutes which would be used for

social forestry training, salaries of incremental staff, consultant assistance, replacement training for staff transferred into SFW from elsewhere in the FD and study tours.

3.26 SFW has already taken the first step by putting its existing Foresters through an initial one-week orientation. The remaining orientation courses to be furnished as soon as possible are: (i) intensive training for senior managers, for Forestry School and other instructors, and for field-level supervisors involved in formulating recommendations for agricultural extension; (ii) selective technical upgrading of Rangers and Foresters, improving their existing skills as well as teaching new techniques; and (iii) basic one-month training for newly recruited Foresters, with first priority for those outside recruits lacking forestry background. The faculty of Kerala Agricultural University (KAU), who handled the first orientation sessions, would prepare curricula and conduct this program of orientation; sessions would take place on the campuses of the four KAU institutes, which have appropriate facilities.

3.27 The permanent training program would include five types of courses: (i) technical refresher courses, conducted on the basis of staff needs and new techniques as they emerge; (ii) supplementary three-month schooling for Foresters during slack field periods (eventually each Forester would undergo a year's cumulative training, equal to standard training now given Foresters); (iii) study tours (local and foreign) for Social Forestry staff, including visits to social forestry programs in other States, study tours abroad to sites of specific relevance for Kerala social forestry, and participation in specialized social forestry courses and seminars; (iv) specially designed sessions for voluntary groups, monitoring and evaluation data gatherers, and other parties involved in social forestry; and (v) farmer training, especially for those operating family nurseries.

3.28 The Forestry Training Schools at Walayar and, especially, Arippa possess minimal facilities and capacity at present to accommodate the training program envisioned. The project would expand existing facilities and staff over the next year, so that these schools can take on a large proportion of training of field staff. Renovation of deteriorated buildings and provision of basic facilities is essential for the schools to function effectively; lecture halls, staff quarters, dining/kitchen facilities (Arippa) and a seminar room (Arippa) would be constructed within the first year of the project (i.e., by July 1985) so that social forestry training could begin there as scheduled in the second year. Tender documents including detailed plans for the first year civil works would be submitted for review by IDA staff in the New Delhi Office and contracts are expected to be let by November 30, 1984.

3.29 An ACF would head the Training Office in Trivandrum Headquarters, and would coordinate and evaluate the social forestry project activities

at the Forestry Training Schools, Kerala Agricultural University and other participating institutions. Two rangers would assist in this work and also help conduct certain training such as courses for operators of small nurseries. The project would provide for consultant assistance in the development of training, curricula and teaching materials (paragraph 5.01) during the first three years of the project. Training, extension and publicity materials would be prepared in the Headquarters, in collaboration with the Extension and Publicity Office. One key publication would be a Working Manual; a consultant would assist in preparation of and ongoing additions to the Manual. The Manual would have a looseleaf form, with sections produced on a continual basis according to priority need for technical, extension and other information. It would comprise a main text for staff training, in addition to serving as an operational handbook for field staff.

### Research and Studies

3.30 Research is critical to improving current practices, developing new approaches to social forestry and assessing plantation results. The CCF/Social Forestry would formulate the research plan, but he would need to maintain close ties with the research establishment to help monitor and upgrade the technical quality of trees being planted. For this purpose, a Technical Committee has been formed, consisting of representatives from Social Forestry, Central Plantation Crops Research Institute (CPCRI), Kerala Forestry Research Institute (KFRI), Kerala Agricultural University and any other institution deemed necessary. During the first four years of the project, consultant assistance would be provided to assist the CCF/Social Forestry in formulating the research program, and in advising the Technical Committee on subjects for discussion and possible research studies. The baseline costs for research and studies in this project would be US\$ 0.15M (see Annex 3, Table 7 for details) and would cover mainly the wood supply and demand study and other studies, research monitoring, and consultancy assistance.

3.31 The research program would continue the ongoing assessment of planting techniques, survival and growth rates, etc. The Technical Committee would help develop technical criteria to be used in studies conducted by Social Forestry Monitoring and Evaluation staff. Consultant assistance would be used to help analyze the results, drawing on the Technical Committee members and staff of their institutions as appropriate.

3.32 The program would also continue development of specific well-tested recommendations to be disseminated by Social Forestry extension and by the Village Level Workers in agricultural extension. There are certain basic recommendations which are ready to go to farmers now, for instance points regarding correct planting of seedlings. Additional points would come out of research monitoring of plantation results

(paragraph 3.30). However, technical information has yet to be improved in several areas, especially those noted below.

3.33 To fill in these gaps, the program would develop and execute specific research projects. Under the guidance of the CCF/Social Forestry, the Technical Committee would identify study subjects and prepare terms of reference for the projects. Recommended areas of research include: (i) genetic improvement of species currently grown; (ii) tree management; (iii) species and provenance trials; (iv) nursery-related research on seed selection and treatment, type and size of seedling containers, fertilizers, insecticides and fungicide applications, watering frequency, and growth periods; (v) plantation establishment, including planting time, watering and fertilizer application; and (vi) underplanting and intercropping. The Technical Committee would review the research proposals received from various institutions and individuals, and would make recommendations to SFW every six months (in January and July) regarding which proposals to fund and for how much. SFW would make the final decisions on funding involved, executioner, and operational requirements, and then would sign letters-of-understanding with the individual or institution conducting the study (see Project File Item 10 for sample letter of understanding).

3.34 No reliable and comprehensive information exists on the supply and consumption of wood and wood-based products in Kerala. To assure the longterm marketability of wood products and secure a continued interest of farmers in tree-planting, a comprehensive study of wood supply and demand patterns is required early during project implementation. Terms of reference for the study have been prepared (See Project File, Item 8) and a preliminary study was submitted by GOK during negotiations. It was agreed that GOK would complete and submit for IDA review the wood supply and demand study by December 31, 1985.

#### IV. ORGANIZATION AND MANAGEMENT

4.01 The project would help strengthen the capacity of the Forest Department's Social Forestry Wing (SFW) and related institutions to administer the statewide program of social forestry over the longterm. Institutional development would occur within SFW, in SFW's relationships with agricultural extension and research (as mentioned in preceding Section III), in enhanced roles for small nursery operators, in the capabilities of the Forestry Training Schools (as also noted in Section III), and in the participation of voluntary organizations and the rural community.

4.02 Strengthening of the SFW would consist of improved organization, better trained staff, and necessary increases in staff and resources. Given the focus on field operations in this project, it is considered

particularly important for field work that SFW have staff who are exclusively devoted to social forestry and equipped with their own vehicles, rather than having to share resources on an ad hoc basis with other forestry operations as now happens. Field operations would be more decentralized than is now the case, with operations divided between a Northern and a Southern Circle (See Organizational Charts 2 and 3). The two Circles would contain, at full development, 14 districts (corresponding to the 14 revenue districts) each headed by a Deputy/Assistant Conservator managing farm forestry activities as well as departmental plantations. The positions required to be sanctioned by negotiations were not only sanctioned, but all were filled except for the two posts of Regional Conservators of Forest. Assurances were obtained at negotiations that the posts of Regional Conservators of Forests would be filled by December 31, 1984; in addition it was agreed that the two Social Forestry Circles as well as the following positions would be maintained: Conservator for Training, Extension and Publicity, Conservator for Planning and Programming, Deputy Conservator of Forests for Monitoring and Evaluation, Finance Officer, and the 14 districts Deputy Conservators of Forests.

4.03 The prime lines of responsibility for execution of the IDA-financed project would be as follows. The Secretary/Forests would have overall responsibility. The Chief Conservator of Forests/Social Forestry would have responsibility for activities of the Social Forestry Wing, reporting directly to the Secretary/Forests. For field operations, a Regional Conservator would head each of the two regional Social Forestry Circles; each Regional Conservator would direct the Deputy Conservators of Forests (DCFs) heading up the districts in his Circle. Since regular, in depth supervision of Rangers and Foresters would be important, especially for farm forestry, the Regional Conservators would ensure that DCFs and Rangers spend a major portion of their time in visits to farmers, nurseries, villages and voluntary organizations.

4.04 Farm forestry, at full operation, would be supported by about 1,055 family nurseries; one Forester would supervise every five nurseries, and one Ranger would supervise every five Foresters. On the departmental plantations side, the ratio of Rangers to Foresters would be similar to that in farm forestry. IDA supervision missions would review staffing levels to ascertain that the numbers of field staff are appropriate to supervision required; according to the current proposal, total social forestry Rangers and Foresters would comprise 30% of the total Forest Department staff at that level.

4.05 In the headquarters of the Chief Conservator of Forests/Social Forestry at Trivandrum, there would be four support divisions (besides the CCF's personal staff): Training, Extension and Publicity; Planning and Programming; Monitoring and Evaluation; and Finance (see Organizational Chart 2).

4.06 A Monitoring and Evaluation Office (MEO) would be established, to be supervised by the DCF for Monitoring and Evaluation. MEO would have the following main duties and functions:

- (a) to implement and operate a monitoring system in accordance with the "Operational Guideline to the Monitoring and Evaluation of Social Forestry in India" formulated by GOI and IDA;
- (b) to establish, in cooperation with Planning and Programming, clearly defined objectives and targets for program implementation against which progress could be monitored;
- (c) to institute a system of regular reporting to the Government of India which would permit progress in different States to be reliably compared and permit aggregation for all India;
- (d) to collect relevant information for evaluation through a standard system of surveys and studies, and to analyze, interpret and report the findings to management;
- (e) to plan and implement special studies on problems or issues which are not covered by the routine sample surveys and reports;
- (f) to undertake, on an ad hoc basis, reviews and studies in order to solve urgent problems for management.

In addition to the above activities, MEO would assist the CCF/Social Forestry in conducting a Mid-term Review after the third year's planting season, together with GOI and IDA. At negotiations, assurances were obtained that such a review would be completed by March 31, 1987, and submitted to IDA for review.

4.07 The project would provide sufficient field staff to collect information, and an adequate field staff for analysis, report writing etc.; this staff would be built up during the course of the project, as MEO capacity was established and the plantation program grew. Staffing would be consistent with the "Guidelines for Social Forestry" mentioned in paragraph 4.06. SFW would minimize its past practice of hiring university students and other daily wage workers on a per study basis, since this precludes building an experienced and professional monitoring and evaluation staff. MEO would collaborate with the Training Office in designing training courses for its field data gatherers and other staff (paragraph 3.27).

4.08 The Conservator for Training, Extension and Publicity and his ACF, Extension and Publicity would be responsible for Social Forestry extension. Since the relationship with agricultural extension is important to

achieving farm forestry goals, the Conservator and ACF would meet at least every three months with the head of Agricultural Extension and key senior staff from SFW and Agricultural Extension involved in coordination between the two institutions. Meetings between the Social Forestry Wing and Agricultural Extension had already begun by the time of negotiations. The Regional Conservators would ensure that the appropriate staff attend Agricultural Extension's monthly meetings conducted at the sub-district levels at which extension recommendations are formulated (especially DCFs), and selected fortnightly training meetings at which Village Extension Workers are taught about recommendations to disseminate in their next two week cycle of visits to farmers (especially Rangers, who would provide appropriate technical input at these meetings on forestry recommendations).

4.09 The Training Coordinator in SFW Headquarters would guide social forestry training activities in the Forestry Training Schools, Kerala Agricultural University, and any other entities involved in project-related training. Under the supervision of the CCF/SFW, the Training Coordinator would supervise the allocation of funds to the entities for training, and monitor their progress in complying with the work program for social forestry training.

4.10 The DCF in charge of a given district would normally arrange for participation of voluntary groups in that district, since the groups prefer to select individual sites for their involvement in social forestry. At the training session for each volunteer group, the forester(s) designated for the area involved would attend to establish a working relationship. DCFs would also arrange the participation of rural groups in the district programs.

4.11 A Finance Officer deputed from the Accountant General's Office would handle SFW's finances and accounting. The Accountant General of Kerala and SFW have already set up a system of accounts which will be compatible with SFW's needs as well as GOI's and IDA's. The revised system includes amendments in schedules for non-cash transactions, accounting procedures for withdrawals from IDA, and a "project balance sheet".

4.12 As of March 1984, a Steering Committee was constituted for Social Forestry in Kerala, and has already held meetings. The Committee consists of the Commissioner for Economic Development (Chairman), Agriculture Production Commissioner, Special Secretary to Government/Agriculture, the Secretaries to Government for Planning and Public Works, the Secretary to Government Finance/ Expenditure, Chief Conservator of Forests/Development, Chief Conservator of Forests/ Social Forestry, Chief Engineer/Irrigation, and Director of Agriculture.

V. COST ESTIMATES, FINANCING, PROCUREMENT AND DISBURSEMENT

A. Project Cost Estimates

5.01 Project costs, including contingencies, are estimated at Rs 599.1 million (US\$54.5 million), of which Rs 40.1 million (US\$3.7 million) or 6.8% would be foreign exchange. Duties and taxes are estimated at Rs 16.7 million, equivalent to 2.8% of total project costs. Cost estimates are based on January 1984 prices projected to July 1984. Table 5.01 below summarizes project costs; details are provided in Annex 3, pages 1-7. The project includes local consultant assistance in training, publicity, and research .

5.02 Physical contingencies (US\$2.6 M) amount to 6.2% of base costs and were estimated using the following rates: (a) civil works 10%; (b) plantation establishment 5%; (c) vehicles, equipment, and furniture 10%; (d) operation and maintenance 5%; and (e) staffing 5%. Price contingencies, (25.4% of base costs) were based on the inflation rates below. These rates are expected to apply because of the amount of civil works and the upward trend of wages in Kerala because of strong unionization.

<u>Inflation Rates</u>	FY:	<u>84/85</u>	<u>85/86</u>	<u>86/87</u>	<u>87/88</u>	<u>88/89</u>	<u>89/90</u>
Local	:	8	7	7	7	6	6
International:		4.75	8.25	9	9	8.63	7.13

**Table 5.01: PROJECT COST SUMMARY**

INDIA KERALA SOCIAL FORESTRY PROJECT PROJECT COST SUMMARY <sup>1/</sup>								
	(Rupees Million)			(US\$ Million)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
A. ORGANIZATION AND MANAGEMENT	158.3	8.6	166.9	14.4	0.8	15.2	5	37
B. PLANTATION ACTIVITIES								
SEEDLING PRODUCTION	141.6	15.8	157.4	12.9	1.4	14.3	10	35
LARGE BLOCK PLANTATIONS	70.0	0.5	70.5	6.4	0.0	6.4	1	15
SMALL BLOCK PLANTATIONS	4.9	0.0	5.0	0.4	0.0	0.5	1	1
STRIP PLANTATIONS	8.7	0.1	8.8	0.8	0.0	0.8	1	2
TRIBAL FUELWOOD PLANTATIONS	9.0	0.1	9.1	0.8	0.0	0.8	1	2
TRIBAL MEDICINAL PILOT SCHEME	0.6	0.0	0.6	0.1	0.0	0.1	4	0
PLANTATION PROTECTION	3.8	0.0	3.8	0.3	0.0	0.3	1	1
Sub-Total PLANTATION ACTIVITIES	238.6	16.6	255.3	21.7	1.5	23.2	7	56
C. EXTENSION AND PUBLICITY	2.8	1.0	3.8	0.3	0.1	0.3	26	1
D. TRAINING	23.5	4.0	27.5	2.1	0.4	2.5	14	6
E. RESEARCH AND STUDIES	1.7	-	1.7	0.2	-	0.2	-	0
Total BASELINE COSTS	425.0	30.2	455.2	38.6	2.7	41.4	7	100
Physical Contingencies	26.4	1.9	28.4	2.4	0.2	2.6	7	6
Price Contingencies	107.7	7.9	115.6	9.8	0.7	10.5	7	25
Total PROJECT COSTS	559.1	40.1	599.1	50.8	3.6	54.5	7	132

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<sup>1/</sup> Differences due to computer rounding

## B. Proposed Financing

5.03 An IDA credit of US\$31.8 M, equivalent to about 60% of total project costs, net of taxes and duties, is proposed. GOK would supply the remaining US\$22.7 M, to be allocated under its Fifth and Sixth Plans. The proposed IDA credit would be made to GOI on standard terms and conditions. GOI would channel the proceeds to GOK in accordance with GOI's terms and conditions for development assistance to constituent States.

5.04 Retroactive financing of up to US\$1.0 M would be provided to cover the following expenditures incurred after March 31, 1984: nursery development, advance soil works for plantations, procurement of essential vehicles and equipment, incremental staff employed on the 1984 planting operation, and consulting services.

## C. Procurement

5.05 Civil works (US\$10.8 M) would be small and scattered, both geographically and over time, consisting mainly of simple housing, office and training facilities which would not be of interest to international bidders. Therefore contracts would be let after competitive bidding advertised locally according to government procedures which are satisfactory to IDA. The local contracting industry in India is well developed and adequate competition should be offered. However, if due to the small size of the individual contracts, (below the equivalent of us\$50,000) no responsive bids or no bids at all are received, force account work would be utilized.

5.06 Vehicles, equipment and furniture (US\$1.8 M). Most vehicles (US\$1.1 M) would be purchased in the first two years, except for motorcycles and mopeds for staff recruited in subsequent years. As adequate maintenance and availability of spare parts would be of paramount importance, this would necessitate purchase of locally made vehicles of types already used by government departments. Thus, procurement would be under local competitive bidding according to government procedures which are acceptable to IDA. Imported research and other technical equipment (US\$0.2 M) would be specialized, often proprietary, and required in small quantities and, therefore, would not be suitable for international competitive bidding. These items and other equipment, materials and furniture would be bulked, whenever appropriate to facilitate purchase and procured through local competitive bidding except when individual contracts are valued at less than US\$20,000 in which case prudent shopping would be used which involves comparing prices from no less than three independent foreign or local suppliers. In cases of proprietary and highly specialized items, such as seeds requiring special qualities, and books, direct purchase would be used.

5.07 Plantation activities (US\$31.4 M) would be scattered over large areas throughout the state and would be carried out under Forest Department force account. Consultant services (US\$0.1 M) would be procured in accordance with IDA guidelines.

5.08 For the procurement in paragraphs 5.05-5.07 above, all contracts over US\$150,000 would be subject to IDA's prior review.

D. Disbursements

5.09 Disbursements under the project would be completed by December 31, 1991, about 9 months after project completion (Annex 4). The six and three-quarter year disbursement period compares with about 10 years for the typical forestry and fishery subsector project in the South Asia region. The difference is justified by the experience from other IDA financed social forestry projects in India which have proved to be quicker disbursing than other projects in the subsector (see Project File, Item 11). In particular, civil works and the small volume of procurements would be done early during project implementation and most funds would be disbursed against plantation activities which experience has shown move more quickly.

5.10 Disbursement of the proposed US\$31.8 M Credit would be as follows:

<u>Category</u>	<u>Credit Allocation (US\$ '000)</u>	<u>% of Expenditures to be financed</u>
1. Civil works including architects' fees but excluding land purchase	5,400	50%
2. Vehicles, equipment, furniture, books, materials	900	100% of foreign expenditures, 100% of local expenditures (ex-factory cost) and 70% of local expenditures for other items procured locally
3. Plantation activities including nursery establishment, seedling production and, plantation establishment and maintenance	18,400	60%

4. Consultancies, studies, foreign and local study tours, training	1,700	100%
5. Incremental staff salaries	3,400	60%
6. Unallocated	<u>2,000</u> 31,800	

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5.11 Disbursements against expenditures for the following items would be against statements of expenditures certified by the CCF/Social Forestry, the documentation for which would not be submitted to IDA for review but would be retained by the project authorities and made available to IDA review missions for their inspection: (a) plantation costs, local and overseas training costs; (b) payments under civil works contracts not exceeding Rs 300,000 and those carried out under force account; (c) locally procured vehicles, equipment and furniture costing Rs 150,000 or less, (d) research, studies and local consultant costs. Disbursement against all other items, excluding the above, would be contingent upon full and satisfactory documentation. All disbursement applications would be submitted to IDA through the Department of Economic Affairs (DEA) of GOI. Assurances covering the foregoing were obtained during negotiations.

#### E. Accounts and Audit

5.12 The Forest Department's Social Forestry Wing, at headquarters and throughout its field offices, would maintain separate project accounts in a readily identifiable form to enable them to be audited independently from overall accounts in a timely manner. The Chief Conservator of Social Forestry would be responsible for the consolidation of the accounts. The project accounts, in addition to normal government cash based entries, would record non-cash transactions (e.g. procurement under procedure III). For easy identification and monitoring, the classification of development expenditure would be similar to that discussed with IDA during appraisal. The principal format of such accounts has been agreed with the Accountant General in Kerala and GOK. GOK has designed such accounts and introduced the new accounting system. Assurances were obtained at negotiations that separate project accounts would be maintained by FD/SFW. Such accounts and statements of expenditure would be submitted for independent audit within 4 months of the fiscal year end and that audited statements would be made available to IDA not later than 6 months after the end of such year. The audit report would include a statement verifying that funds reimbursed by IDA against statements of expenditure had been used for the purposes of the project.

VI. PRODUCTION, MARKETING, FINANCIAL RESULTS AND COST RECOVERY

A. Yields and Production

6.01 Projected yields and production of the principal species to be planted are summarized in Table 6.01 below. It should be noted that wood yields for farm forestry are expected to be higher than for departmental plantations because many trees would be planted individually, or with wide spacing between trees crops, and therefore they would grow faster. In calculating the total yields from farm forestry plantations, an initial mortality/waste rate of 40% has been anticipated.

Table 6.01: PER HECTARE YIELDS OF MAJOR SPECIES TO BE PLANTED UNDER PROJECT

	MEAN ANNUAL INCREMENT (MAI)		
	farm forestry m <sup>3</sup> /ha/yr	public lands m <sup>3</sup> /ha/yr	total: metric tons/ha/year
<i>Ailanthus malabaricum</i>	15	-	6.9
<i>Eucalyptus grandis</i>	15	15	6.9
<i>Eucalyptus tereticornis</i> , midcountry	15	12	6.9 (7.2*)
<i>Eucalyptus tereticornis</i> , dryzone	15	10	6.0 (6.9*)
<i>Acacia auriculaformis</i> , midcountry	15	12	6.0 (6.9*)
<i>Acacia auriculaformis</i> , dryzone	15	10	6.9 (7.2*)
<i>Acacia auriculaformis</i> , coastal	15	15	6.9
<i>Casuarina</i> (300 poles and 46m <sup>3</sup> fuelwood per ha over 15 yrs.)	11.5	11.5	6.9
<i>Leucaena</i> , <i>albizzia</i> and others interplanted	15	<u>1</u> / <sub>1</sub>	6.9
<i>Grevillia</i>	10	-	6.0

\*Indicates when farm forestry figure is higher than that for public land

1/ Same estimated average yields as the major species with which they would be interplanted.

6.02 For farm forestry the main output is expected to be: timber and peelers (28%), poles (48%), and fuelwood (24%). A large proportion of *Ailanthus* is likely to be sold to matcbox/splint and packing case manufacturers. The utilization of produce would be somewhat flexible; for instance, trees originally envisioned for pole production could be cut and

sold as fuelwood if the farmer so decided.<sup>1/</sup> Fuelwood would be the main output of plantations established on state property as well as those established near tribal areas. On government land, only Casuarina would be managed for other purposes, i.e., pole production. In farm forestry as well as departmental plantations, leaf fodder could be obtained from Leucaena, Ailanthus and Neem; also, grass, deadwood, twigs and other matter would be collected by farmers for fuel and fodder during growth and at felling. Only the material devoted to fuelwood and other wood production has been included in the calculation of economic/financial viability of the project.

6.03 Based on the estimated MAI, the incremental production of wood under the proposed project is estimated to be as follows:

Table 6.02: ESTIMATED INCREMENTAL PRODUCTION (M m3)

Product	Source		Total
	Farm Forestry	Public Lands	
Fuelwood (including lop & top)--	7.7	4.2	11.9
Timber and peelers	13.9	-	13.9
Poles	19.5	4.5	24.0
Total production	41.1	8.7	49.8

#### B. Marketing of Produce

6.04 It is anticipated that a considerable proportion of the farm forestry produce would be marketed in the form of timber, peelers and poles. Farmers would also sell some wood as fuel; branches and fragments of wood matter would probably be consumed by farm families themselves. On the other hand, a major proportion of produce from government lands would be marketed as fuelwood.

<sup>1/</sup> The project has not accounted for the possible sale by private farmers of some wood to pulp and newsprint mills (described in paragraph 2.18), because the mills are in the process of establishing capacity. However, given the large potential demand of the mills and the attractive prices they would offer, it would not be surprising if private farmers entered that market and local brokers took initiative for wood transport to mills.

6.05 There would be no marketing constraint to the incremental production of wood because of the rapidly increasing shortages for fuelwood and wood products and the existence of a marketing infrastructure. Poles from government lands would be sold through current auction practices or marketed from sales depots following standard FD procedures. The existing system for marketing would provide an outlet for wood to be sold for poles or wood from farmers' own lands, and to be transported to urban and semi-urban areas where it is in demand. Information on the longterm marketability of wood products still needs improvement, which is why the wood supply and demand study (paragraph 3.34) would be conducted.

6.06 In marketing the fuelwood produced on public lands, GOK would distribute the wood to Forestry Department depots and other sites located throughout the state. For the most part, the wood would be marketed nearby the plantations where it was grown, thereby saving on transportation costs. Distribution would follow the method used presently by "fair price stores", which were created by GOK to sell basic commodities to the poor at concessional prices. These fair price stores have heretofore dealt essentially with consumption goods such as rice, selling them to ration card holders. <sup>1/</sup> The ration-card system has been utilized for some time and works fairly efficiently. Assurances were obtained at negotiations that principles governing the sale of fuelwood from the Forest Department's lands would be finalized by June 30, 1986, in consultation with the Association. It was understood that in finalizing arrangement for sale of fuelwood GOK would take into account, inter alia, the financial implications for the Government of Kerala, the consumers' ability to pay and the administrative feasibility of these arrangements.

### C. Financial Results and Cost Recovery

6.07 Financial Results for Government. For plantations on public land, which account for about one-quarter of seedling production, GOK would recover its investment through the sale of fuelwood and poles produced there. Poles would be sold at their market prices, and fuelwood would be sold at concessionary prices (paragraph 6.06). If the Government priced the stumpage value of fuelwood at about 30% of its estimated market value, it would break even in terms of costs incurred and benefits derived from its plantations. If the Government priced the stumpage value at 50% of the estimated market rate, it would earn a 4% rate of return on its investments.

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<sup>1/</sup> GOK distributes public ration cards which entitle the bearer to a certain level of discounts and benefits, based on the bearer's financial status.

6.08 As for farm forestry, the operation of family and school-operated nurseries would help reduce the costs of seedling distribution through reduced transportation costs. Already the total cost of plantation is low, since farm forestry costs about one fifth the amount for plantation on government land, and farm forestry constitutes over four fifths of the project.

6.09 Financial results for farmers. Since farmers are expected to sell a large proportion of their produce (rather than consume it directly), the financial returns to farmers would be very attractive. They would pay no charges for seedlings up to the distribution limit, and only a nominal at cost charge for the rest. Maintenance costs would be negligible in the case of trees planted individually. For Casuarina trees planted in blocks, farmers would have to supply protection, but the financial costs to the farmer would be minimal.

6.10 Annex 5 shows the financial cost and benefit streams under the project.

## VII. BENEFITS, JUSTIFICATION AND RISKS

### A. Benefits

7.01 The direct beneficiaries of the proposed project would be those farmers planting trees. The "Land Use Survey" for social forestry conducted by GOK showed at least 50% of Kerala's approximately 3.5 M farm families wish to plant trees; GOK expects that the number would be expanded by extension and publicity. Other beneficiaries would be the rural and semi-urban population in Kerala who depend heavily on forest produce such as firewood, small timber, and poles for their everyday living. The rural poor, including landless laborers, small and marginal farmers, members of tribal groups and of other disadvantaged communities, would be particularly benefitted by the additional output generated by the project and by part of the output from plantations on public land that would be distributed to them at cost price.

### Institutional Development

7.02 In the longrun, institutional development would constitute the most important benefit generated by the project, because it would enable Kerala to sustain increased economic and environmental achievements under social forestry. In addition to strengthening SFW and related institutions, the project would create a network of small nurseries gradually taken over by farmers and schools. Most of the farmers selected would be small holders. Beyond benefitting the small nursery operators with an additional personal livelihood, this scheme would help the gradual transfer of skills and responsibilities to them.

### Production Impact

7.03 The emphasis of more than 80% of project-financed activities on farm forestry, combined with intensive extension and publicity support to farmers for good quality agroforestry methods, would increase the direct benefits to farmers from social forestry. Since farmers would sell a large proportion of their produce, and would take 100% of the revenues from these sales, the increases in production would generate substantial income for farmers. Keeping in mind that 90% of Kerala farmers own less than one ha of land, and that seedling distribution would aim at reaching all farmers in targetted areas, the large majority of beneficiaries would be small farmers.

7.04 Since the production of fuelwood and poles on departmental plantations would be distributed principally through a special scheme to ration card holders (paragraph 6.06), it would provide needed access for the poor -- particularly the landless -- to wood products. Adjacent populations would also gather twigs and other small matter for fuel and grass for fodder from departmental plantations, thus providing another benefit.

### Conservation

7.05 Pressures on existing forestland have mounted in recent years, and would continue to do so if fuelwood shortages were allowed to become even more acute. The project would help diffuse those pressures, while at the same time helping restore trees to many areas now subject to erosion because of poor growing conditions for crops or careless cultivation techniques. In backwater areas, plantation of trees would help reclaim agricultural land.

### Employment Generation

7.06 Unemployment in Kerala has been running above 10%, with the proportion of persons in lower education levels growing over the last ten years. The project would generate employment primarily for lower educated persons. The 550 new jobs created in social forestry operations would include nearly 200 Foresters, 34 Forest Assistants, and many others connected with field operations. More importantly, the 1055 small nurseries ultimately established would provide employment for approximately 3,000 farmers and school staff; ultimately, many of the nurseries would comprise a new source of income to farmers taking them over. Finally, the project-financed plantations would generate 9 million laborer-days of work on establishment and maintenance during project operations.

## B. Justification

7.07 The loss of forest land, coupled with increasing population pressures on available wood resources, is quickly carrying Kerala to a critical point in terms of wood shortages. Already the poor are feeling the brunt of the situation. The project would help head off more serious problems threatening the state in the immediate future.

7.08 Besides just alleviating wood shortages, the project would positively stimulate the economy by providing increased incomes for those planting trees, additional sources of livelihood for over 1000 small nursery operator groups, and easier access to fuelwood for the poor, including the landless. The 26% estimated economic rate of return is conservative, in view of the fact that over 80% of plantation would occur under farm forestry, where costs are low and income high for farmers.

7.09 Experience in ongoing Bank-financed social forestry projects, and the last two years of social forestry operations in Kerala, has shown substantial farmer interest in planting trees. The main problem now is to improve seedling quality, recommendations to farmers, and aftercare of seedlings, and this is symptomatic of the need to strengthen institutions. The project would play an important role in supporting the institutional development of social forestry in Kerala.

## C. Economic Analysis

7.10 Economic Rate of Return. The economic rate of return of the project is 26%. The rates of return of the component plantations range from 33% for farm forestry, which is the most economic and also the largest project component, to 15% for departmental strip plantations which is still well above the opportunity cost of capital assumed to be 12%. Details are given below:

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Table 7.01: ECONOMIC RATE OF RETURN

	<u>Percent</u>
Farm Forestry	33
Departmental Plantations	
Large Block Plantations	26
Institutional Plantations	17
Strip Plantations	15
Tribal Plantations	25
Total Project	26

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7.11 The component rates of return have been calculated on the basis of direct costs only. Overheads (37% of costs) were included only in calculating the return of the total project. No benefits have been included for the pilot tribal program for cultivation of medicinal plants (0.2% of costs) because of the speculative nature of its results. All values are in 1984 constant prices. The economic analysis has been made in border rupees, with international prices converted to rupees at the exchange rate of US\$1 = Rs 11. Local costs, including labor, have been converted to border rupees by applying a standard conversion factor of 0.8. The financial cost for labor (46% of costs) has been taken as Rs 20 per man-day which is fixed statutorily in the Minimum Wages Act; there is a strong upward push on wages through the influence of unionization. Because of this and because of the high un- and under-employment in Kerala the cost of labor has been adjusted by a factor of 0.6 to reflect its real value. Traded goods and services have been valued on the basis of their c.i.f. import cost. Although tree planting by farmers is supposed to be on unutilized land where it is not in competition with other crops this may not always be the case. Therefore an opportunity cost for land has been included for farm forestry in the base case (para 7.12). Departmental plantations are on waste land and no land value has been imputed. Prices and conversion factors used are shown in Annex 5, Table 1.

#### D. Sensitivity Analysis

7.12 As summarized in the table below, the economic rate of return shows little sensitivity to changes in most variables. For example, wood prices or yields would have to fall an unlikely 73% before the rate of return of the project would fall below the opportunity cost of capital of 12% assumed for India, or total project costs would have to increase by over 278% for this to happen. The true average opportunity cost of land is difficult to estimate since farmers may plant trees under varying conditions. However, even if the opportunity cost of land is valued at the price charged by farmers for renting land for Forest Department nurseries, the project rate of return remains satisfactory at 17%. In the hypothetical situation that the markets for poles and small timber were to be saturated and all the project wood output had to be sold as firewood, the project rate of return would still be 14%, above the opportunity cost of capital. Of the individual plantation models, only departmental strip plantations show any greater sensitivity to changes in project cost and benefits. As a result, roadside plantations due to their high fencing costs did not meet the economic investment criteria and were excluded from the project.

Table 7.02: SENSITIVITY ANALYSIS

	<u>Switching Values 1/</u>
<u>Total Project</u>	
Total benefits, prices or yields	-73%
Total costs	278%
<u>Farm Forestry</u>	
Total benefits, prices or yields	-81%
Total costs	438%
<u>Dept. Block Plantations</u>	
Total benefits, prices or yields	-69%
Total costs	223%
<u>Institutional Plantations</u>	
Total benefits, prices or yields	-38%
Total costs	62%
<u>Dept. Strip Plantations</u>	
Total benefits, prices or yields	-15%
Total costs	17%
<u>Tribal Plantations</u>	
Total benefits, prices or yields	-61%
Total costs	159%

Economic Rate of Return

Total Project:

<u>Base Case</u>	<u>26%</u>
Total benefits, wood prices or yields	
down 10%	25%
down 50%	18%
lagged 1 year	23%
lagged 5 years	17%
Total Costs	
up 50%	21%
Cost of farm forestry land equal rental value	17%
All wood sold as firewood	16%
Labor priced at financial costs	23%

1/ Opportunity cost of capital = 12%

### E. Project Risks

7.13 The project faces no major risks that might endanger its overall viability. The Forest Department has sufficient capacity and experience to implement the departmental plantation program. In the past, lack of funds has resulted in neglect of the weeding of young plantations so necessary for satisfactory yields. The project provides necessary finance for weeding and also for protection against forest fires which can cause serious damage. In farm forestry the levels of seedling distribution under the project would not exceed levels already attained in the 1982 and 1983 programs. Therefore, farmer acceptance would be no problem. There will always be some wastage of seedlings but the risk for such losses would increase if other seedling distribution programs in Kerala were to be superimposed on the IDA project and create an oversupply of planting stock or overextend the staff and other resources available for the production and distribution of seedlings and for extension advice to farmers. It was understood at negotiations that GOK would consult with the Association with regard to any new social forestry programs over and above the project-financed activities and other social forestry activities for which budgetary provision has already been made.

7.14 Compared to other social forestry projects in India, the extension staff employed by the Forest Department for social forestry has been kept at a minimum. Instead the project would use the existing agricultural extension service to give advice on proper tree planting and maintenance techniques. This new approach necessarily involves certain risks. To minimize risks and promote effective coordination and cooperation between the Agricultural Extension Service and the Forest Department, which both report to the same secretary, a Government Order was issued by GOK (April 21, 1984) stipulating the plan and schedule for coordination at various levels of organization.

7.15 Certain occurrences of insect damage on Ailanthus trees, which are included in the farm forestry program, have been observed. Insecticides are, however, available and extension messages under the project would include advice on how to deal with the problem.

7.16 Since it has been assumed that farmers under the project would plant a large proportion of trees for sale as poles, timber, etc., there is also a theoretical risk of market saturation. Given the already apparent shortage of wood, this risk is considered as remote. But even if all the wood produced under the project were sold as fuelwood, including the large number of poles grown with Casuarina, the rate of return would still be above the opportunity cost for capital (paragraph 7.12). The

wood supply and demand study to be carried out under the project would help to provide the data necessary to effectively quantify and monitor the situation.

#### VIII. RECOMMENDATIONS

8.01 During negotiations, the following assurances were obtained:

- (a) Beginning in the 1985-86 planting season, up to 3500 Casuarina seedlings (including replacement for losses) per family and up to 500 seedlings for all other species per family shall be distributed free of charge by GOK; GOK shall assess a charge for seedlings in excess of that limit at the actual cost of production. In addition, Forest Department nurseries shall maintain registers on the number of seedlings distributed to each family, and the Social Forestry Wing shall conduct reviews during each planting season to ascertain that wastage of seedlings is being minimized (paragraph 3.07);
- (b) GOI and GOK would review the nurseries scheme every August in order to assess progress and formulate plans for its development, and submit a report to IDA (paragraph 3.17);
- (c) GOK would complete and submit for IDA review the wood supply and demand study by December 31, 1985 (paragraph 3.34);
- (d) GOK would fill the posts of the two Regional Conservators of Forests by December 31, 1984; in addition, it was agreed that the two Social Forestry Circles as well as the following positions would be maintained: Conservator for Training, Extension and Publicity, Conservator for Planning and Programming, Deputy Conservator for Forests for Monitoring and Evaluation, Finance Officer, and the 14 district Deputy Conservators of Forests (paragraph 4.02);
- (e) GOK would undertake a joint Mid-term Review of project implementation promptly after completion of the third year's planting program, and not later than March 31, 1987 (paragraph 4.06);
- (f) GOK would provide for annual auditing of expenditures and submission of an auditing report to IDA immediately after the end of each fiscal year (paragraph 5.12);
- (g) GOK would finalize arrangements governing the sale of fuelwood from the Forest Department's lands by June 30, 1986 (paragraph 6.06), and in finalizing arrangements it was understood that

GOK would take into account inter alia, the financial implications for the Government of Kerala, the consumers' ability to pay, and the administrative feasibility of these arrangements (paragraph 6.07); and

- (h) GOK would consult with IDA with regard to any new social forestry programs over and above project-financed activities and other social forestry activities for which budgetary provision has already been made (paragraph 7.13).

8.02 With the above assurances obtained, the proposed project would be suitable for an IDA credit of \$31.8 million to GOI on standard IDA terms.

## INDIA

## ANNEX 1

KERALA SOCIAL FORESTRY PROJECT: SPECIES INFORMATION

A. Recommended Species	<u>Utilization of Species</u>						<u>Suggested Species by Plantation Model</u>							<u>Agroclimatic Zones 1/</u>							<u>Characteristics</u>					
	Fuel	Poles	Timber	Fodder	Pulp	Other	Casu- aria	Euc. arandis	Euc. tri- sona	dry zone	strip plan.	small block	tribal fuelwood	1	2	3	4	5	6	7	Rotation	Density ha	Seedling Type			
																							bare-root	containerd.	Other	
Acacia ariculiformis	x				x		x		x	x	x	x		x	x	x				x	x	6-8	4500			x
Ailanthus malabaricum	x	x	x	x	x			x			x			x	x	x						10-15	2500	x		x
Albizzia mollucana	x		x			x									x	x	x	x				8-10	2500			x
Azadirachta indica	x		x	x	x				x	x	x									x		15	2500			x
Casuarina equisetifolia	x						x		x	x	x			x		x				x	x	115	10000	x		x
Erithriana	x	x	x														x	x								x
Eucalyptus citriodora	x	x	x		x	x		x	x	x	x		x	x	x	x	x	x	x	x		15	2500			x
Eucalyptus grandis	x	x	x		x			x									x	x				6-8	2500			x
Eucalyptus tereticornis	x			x			x	x			x			x	x	x				x	x	8-10	2500			x
Gliricidia sepium	x	x	x			x								x	x	x	x	x	x	x						x
Graevilla robusta	x	x	x			x											x	x				15-25	2800	x		x
Leucania leucocephala	x			x	x	x		x			x		x	x	x	x	x	x				4-8	5000			x
Swietenia mahoe	x	x	x					x	x	x	x			x	x	x				x		30-50	2500			x
Macaranga robusta	x				x			x						x	x	x						15				x
Tamarindus indica	x	x	x			x								x	x	x						20-50	2500			
Tectona grandis	x	x	x					x	x		x			x			x	x								

1/ Zones: 1) Coastal belt, 2) backwater areas, 3) southern midlands 4) southern highlands,  
5) northern highlands, 6) lateritic soils, 7) mid-east rain shadow.

INDIAKERALA SOCIAL FORESTRY PROJECTComparative Figures on Social Forestry Project

A. <u>Plantation Type</u> <u>(% distribution)</u>	<u>Kerala</u>	<u>Uttar Pradesh</u>	<u>Gujarat</u>	<u>West Bengal</u>	<u>JAK</u>	<u>Haryana</u>	<u>Karnataka</u>
Farm Forestry	81%	8%	10%	56%	43%	45%	80%
Block/deg. forests	14%	26%	26%	16%	39%	-	13%
Strip plantations	2%	51%	32%	22%	2.2%	14%	4%
Village woodlots	-	6%	31%	6%	11.3%	18%	-
Other	3%	9%	1%	-	4.5	23%	3%
B. <u>Costs</u> <u>(% total base cost)</u>							
Plantation & nurseries	56.0%	30.5%	60.8%	69.3%	60.2	62%	63.4%
Research	.5%	.8%	.7%	.1%	.1	.2%	.2%
Training	6.0%	2.9	1.5%	1.8%	4.5%	1.8%	1.7%
Organization & Management	37%	41.9	35.6%	28.4%	31.6%	34.1%	34.7%
Other	1.5%	23.9%	1.4%	.4%	3.6%	1.9%	-
Total Project Costs (100%)	\$54.5M	\$46.5M	\$76.0M	\$43.5M	\$27.9	\$39.2M	\$56.6M

INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Project Components by Year  
(Rupees Million)

	Base Costs						Total	
	1984	1985	1986	1987	1988	1989	(US\$ Rupees Million)	
A. ORGANIZATION AND MANAGEMENT	45.30	38.62	29.62	25.40	14.88	13.10	166.92	15.17
B. PLANTATION ACTIVITIES								
SEEDLING PRODUCTION	12.79	18.00	23.24	29.00	35.39	39.00	157.43	14.31
LARGE BLOCK PLANTATIONS	9.15	6.52	10.25	13.03	15.47	16.11	70.53	6.41
SMALL BLOCK PLANTATIONS	0.19	0.46	0.72	0.99	1.26	1.34	4.96	0.45
STRIP PLANTATIONS	0.18	0.42	0.85	1.70	2.34	3.36	8.85	0.80
TRIBAL FUELWOOD PLANTATIONS	0.37	0.92	1.47	1.76	2.22	2.31	9.06	0.82
TRIBAL MEDICINAL PILOT SCHEME	0.03	0.06	0.09	0.12	0.16	0.16	0.62	0.06
PLANTATION PROTECTION	0.33	0.45	0.64	0.87	1.39	0.15	3.82	0.35
Sub-Total PLANTATION ACTIVITIES	23.03	26.83	37.27	47.47	58.23	62.43	255.26	23.21
C. EXTENSION AND PUBLICITY	1.41	0.70	0.45	0.45	0.42	0.42	3.84	0.35
D. TRAINING	9.30	10.63	2.32	1.81	1.71	1.71	27.47	2.50
E. RESEARCH AND STUDIES	0.39	0.39	0.23	0.23	0.23	0.23	1.69	0.15
Total BASELINE COSTS	79.43	77.16	69.88	75.36	75.46	77.88	455.18	41.38
Physical Contingencies	6.01	5.68	4.48	4.44	3.85	3.90	28.37	2.58
Price Contingencies	3.30	9.58	14.52	22.39	29.01	36.78	115.59	10.51
Total PROJECT COSTS	89.75	92.42	88.89	102.18	108.33	118.57	599.13	54.47
Taxes	3.36	2.94	1.86	2.52	2.95	3.12	16.74	1.52
Foreign Exchange	6.17	6.32	5.47	6.53	7.28	8.30	40.07	3.64

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INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Summary Accounts by Year

	Totals Including Contingencies (Rupees Million)						
	1984	1985	1986	1987	1988	1989	Total
<b>I. INVESTMENT COSTS</b>							
A. CIVIL WORKS	37.49	37.89	24.91	17.10	1.30	-	118.69
B. VEHICLES , EQUIPMENT AND FURNITURE	9.17	6.79	1.01	1.71	1.15	0.35	20.17
C. SEEDLING PRODUCTION ( FARM FORESTRY )	11.14	17.04	21.99	28.79	38.19	45.08	162.25
D. SEEDLING PRODUCTION ( GOVERNMENTAL )	2.80	4.03	7.16	10.22	12.62	14.40	51.22
E. PLANTATION ESTABLISHMENT	4.23	8.85	14.38	19.87	25.86	26.87	100.06
F. PLANTATION MANAGEMENT	6.96	1.51	3.24	4.94	6.82	8.67	32.15
G. TRAINING	6.70	3.93	1.41	1.46	1.42	1.52	16.44
H. RESEARCH AND STUDIES	0.48	0.51	0.35	0.31	0.33	0.35	2.33
<b>Total INVESTMENT COSTS</b>	<b>78.97</b>	<b>80.56</b>	<b>74.45</b>	<b>84.41</b>	<b>87.70</b>	<b>97.23</b>	<b>503.32</b>
<b>II. RECURRENT COSTS</b>							
A. STAFF SALARIES	6.28	8.14	9.57	11.72	13.59	13.71	63.01
B. Vehicle Operating Costs	1.17	1.19	1.31	1.58	1.83	1.94	9.02
C. Office Operating Costs	2.29	1.66	1.89	2.22	2.57	2.73	13.36
D. Buildings Maintenance Costs	0.04	0.87	1.66	2.26	2.64	2.94	10.41
<b>Total RECURRENT COSTS</b>	<b>9.78</b>	<b>11.86</b>	<b>14.43</b>	<b>17.77</b>	<b>20.63</b>	<b>21.33</b>	<b>95.81</b>
<b>Total PROJECT COSTS</b>	<b>88.75</b>	<b>92.42</b>	<b>88.89</b>	<b>102.18</b>	<b>108.33</b>	<b>118.57</b>	<b>599.13</b>

INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Table 102. SEEDLING PRODUCTION (FARM FORESTRY)  
Detailed Cost Table

Unit	Quantity								Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)								Parameters			
																		Phy.			
	1984	1985	1986	1987	1988	1989	Total			1984	1985	1986	1987	1988	1989	Total		Cont. Rate	Fer. Exch.	Gross Tax Rate	Summary Account
<b>I. INVESTMENT COSTS</b>																					
<b>A. BAREROOTED SEEDLINGS</b>																					
<b>1. Current Year</b>																					
Labor	MILLIONS	14	23	30	36	44	54	201	66,720	1.0	1.8	2.5	3.2	4.2	5.5	18.2	0.05	0	0	SDF	
Material	MILLIONS	14	23	30	36	44	54	201	22,781,237	0.3	0.6	0.9	1.1	1.4	1.9	6.3	0.05	0.25	0.07	SDF	
Rent	MILLIONS	14	23	30	36	44	54	201	4,170	0.1	0.1	0.2	0.2	0.3	0.3	1.1	0.05	0	0	SDF	
Sub-Total Current Year										1.4	2.5	3.5	4.5	5.9	7.7	25.6					
<b>2. Following Year</b>																					
Labor	MILLIONS	23	30	36	44	54	54	241	66,720	1.7	2.3	3.0	3.9	5.2	5.5	21.6	0.05	0	0	SDF	
Material	MILLIONS	23	30	36	44	54	54	241	22,781,237	0.6	0.8	1.0	1.4	1.8	1.9	7.4	0.05	0.25	0.07	SDF	
Rent	MILLIONS	23	30	36	44	54	54	241	4,170	0.1	0.1	0.2	0.2	0.3	0.3	1.4	0.05	0	0	SDF	
Sub-Total Following Year										2.4	3.3	4.2	5.5	7.3	7.7	30.4					
Sub-Total BAREROOTED SEEDLINGS										3.8	5.8	7.8	10.1	13.2	15.4	56.0					
<b>B. CONTAINERIZED SEEDLINGS</b>																					
<b>1. Current Year</b>																					
Labor	MILLIONS	11	17	20	24	31	36	139	203,287.5	2.4	4.1	5.1	6.6	9.0	11.1	38.3	0.05	0	0	SDF	
Material	MILLIONS	11	17	20	24	31	36	139	193,640,511	2.3	3.6	4.9	6.3	8.7	10.7	36.6	0.05	0.25	0.07	SDF	
Rent	MILLIONS	11	17	20	24	31	36	139	8,340	0.1	0.2	0.2	0.3	0.4	0.5	1.6	0.05	0	0	SDF	
Sub-Total Current Year										4.9	8.1	10.2	13.1	18.0	22.3	76.5					
<b>2. Following Year</b>																					
Labor	MILLIONS	17	20	24	31	36	36	164	67,762.5	1.3	1.6	2.0	2.8	3.5	3.7	14.9	0.05	0	0	SDF	
Material	MILLIONS	17	20	24	31	36	36	164	44,281,667	1.2	1.5	1.9	2.7	3.3	3.6	14.2	0.05	0.25	0.07	SDF	
Rent	MILLIONS	17	20	24	31	36	36	164	3,127.5	0.1	0.1	0.1	0.1	0.2	0.2	0.7	0.05	0	0	SDF	
Sub-Total Following Year										2.5	3.2	4.1	5.6	7.0	7.4	29.8					
Sub-Total CONTAINERIZED SEEDLINGS										7.4	11.2	14.2	18.7	25.0	29.7	106.3					
Total INVESTMENT COSTS										11.1	17.0	22.0	28.8	38.2	45.1	162.2					
Total										11.1	17.0	22.0	28.8	38.2	45.1	162.2					

INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Table 112. SEEDLING PRODUCTION (DEPARTMENTAL)  
Detailed Cost Table

Unit	Quantity								Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)								Parameters			
	1984	1985	1986	1987	1988	1989	Total	1984		1985	1986	1987	1988	1989	Total	Phy.	Cont.	For.	Gross	Summary	
	Rate	Exch.	Tax	Rate	Account																
<b>I. INVESTMENT COSTS</b>																					
<b>A. BARERootED SEEDLINGS</b>																					
<b>1. Current Year</b>																					
Labor	Millions	2	2.3	3.6	3.9	3.9	3.9	19.6	66,720	0.1	0.2	0.3	0.3	0.4	0.4	1.7	0.05	0	0	S86	
Materials	Millions	2	2.3	3.6	3.9	3.9	3.9	19.6	22,781,237	0.0	0.1	0.1	0.1	0.1	0.1	0.6	0.05	0.25	0.07	S86	
Rent	Millions	2	2.3	3.6	3.9	3.9	3.9	19.6	4,170	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	S86	
Sub-Total Current Year										0.2	0.3	0.4	0.5	0.5	0.6	2.5					
<b>2. Following Year</b>																					
Labor	Millions	2.3	3.6	3.9	3.9	3.9	3.9	21.5	66,720	0.2	0.3	0.3	0.3	0.4	0.4	1.9	0.05	0	0	S86	
Materials	Millions	2.3	3.6	3.9	3.9	3.9	3.9	21.5	22,781,237	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.05	0.25	0.07	S86	
Rent	Millions	2	2.3	3.6	3.9	3.9	3.9	19.6	4,170	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	S86	
Sub-Total Following Year										0.2	0.4	0.5	0.5	0.5	0.6	2.7					
Sub-Total BARERootED SEEDLINGS										0.4	0.6	0.9	1.0	1.0	1.1	5.1					
<b>B. CONTAINERIZED SEEDLINGS</b>																					
<b>1. Current Year</b>																					
Labor	Millions	3.9	4.4	8.3	12.1	14.5	16.1	59.3	293,287.5	0.9	1.0	2.1	3.3	4.2	5.0	16.5	0.05	0	0	S86	
Material	Millions	3.9	4.4	8.3	12.1	14.5	16.1	59.3	193,640,511	0.8	1.0	2.0	3.2	4.1	4.8	15.8	0.05	0.25	0.07	S86	
Rent	Millions	3.9	4.4	8.3	12.1	14.1	16.1	58.9	8,340	0.0	0.0	0.1	0.1	0.2	0.2	0.7	0.05	0	0	S86	
Sub-Total Current Year										1.7	2.1	4.2	6.6	8.4	10.0	33.0					
<b>2. Following Year</b>																					
Labor	Millions	4.4	8.3	12.1	14.5	16.1	16.1	71.5	67,762.5	0.3	0.7	1.0	1.3	1.6	1.7	6.6	0.05	0	0	S86	
Material	Millions	4.4	8.3	12.1	14.5	16.1	16.1	71.5	64,201,667	0.3	0.6	1.0	1.3	1.5	1.6	6.2	0.05	0.25	0.07	S86	
Rent	Millions	4.4	8.3	12.1	14.5	16.1	16.1	71.5	3,127.5	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.05	0	0	S86	
Sub-Total Following Year										0.6	1.3	2.1	2.6	3.1	3.3	13.1					
Sub-Total CONTAINERIZED SEEDLINGS										2.4	3.4	6.3	9.2	11.6	13.3	46.1					
Total INVESTMENT COSTS										2.8	4.0	7.2	10.2	12.6	14.4	51.2					
Total										2.8	4.0	7.2	10.2	12.6	14.4	51.2					

INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Table 101. PROJECT ORGANIZATION AND MANAGEMENT  
Detailed Cost Table

Unit	Quantity							Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)							Parameters				
	1984	1985	1986	1987	1988	1989	Total		1984	1985	1986	1987	1988	1989	Total	Phy.	Cont.	Fur.	Gross	Summary
	Rate	Rate	Rate	Rate	Rate	Rate	Rate		Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate
<b>1. INVESTMENT COSTS</b>																				
<b>6. CIVIL WORKS</b>																				
<b>1. Buildings and Housing - Residential</b>																				
CCF Quarters	-	1	-	-	-	-	1	359,214	-	0.4	-	-	-	-	0.4	0.1	0.05	0	CMK	
CF Quarters	2	2	-	-	-	-	4	359,214	0.8	0.9	-	-	-	-	1.7	0.1	0.05	0	CMK	
DCF Quarters	1	5	2	4	-	-	19	359,214	1.2	2.2	3.3	2.0	-	8.8	0.1	0.05	0	CMK		
ACF Quarters	3	4	5	3	-	-	15	234,270	0.8	1.2	1.5	1.0	-	4.5	0.1	0.05	0	CMK		
RANGE OFFICERS	25	15	9	-	-	-	49	203,268.27	5.0	3.7	3.4	-	-	12.0	0.1	0.05	0	CMK		
Forest Guards	16	4	4	2	8	-	34	108,409.744	2.0	0.5	0.6	0.3	1.3	-	4.7	0.1	0.05	0	CMK	
Sub-Total Buildings and Housing - Residential									10.6	9.0	7.8	3.3	1.3	-	32.0					
<b>2. Buildings and Housing - Non-Residential</b>																				
Social Forestry HQ	0.5	0.5	-	-	-	-	1	1,249,440	0.7	0.8	-	-	-	-	1.5	0.1	0.05	0	CMK	
Circle HQ (CF)	1	1	-	-	-	-	2	624,720	0.7	0.8	-	-	-	-	1.5	0.1	0.05	0	CMK	
District HQ (DFD)	7	7	-	-	-	-	14	416,480	3.3	3.6	-	-	-	-	6.9	0.1	0.05	0	CMK	
Range Offices	25	13	9	-	-	-	47	52,040	1.5	0.8	0.6	-	-	-	2.9	0.1	0.05	0	CMK	
Garages	22	18	14	-	-	-	54	54,704.872	1.4	1.2	1.0	-	-	-	3.6	0.1	0.05	0	CMK	
Forester Store cum Residence	70	63	53	52	-	-	238	104,120	8.3	8.1	7.3	7.6	-	-	31.3	0.1	0.05	0	CMK	
Sub-Total Buildings and Housing - Non-Residential									15.9	15.2	8.9	7.6	-	-	47.6					
<b>3. Land Acquisition</b>																				
Residential DCF	3	5	6	4	-	-	18	208,240	0.7	1.3	1.6	1.2	-	-	4.8	0.1	0.05	0	CMK	
Residential ACF	2	3	2	2	-	-	9	208,240	0.5	0.8	0.5	0.6	-	-	2.4	0.1	0.05	0	CMK	
Non-Residential Ranger	14	10	10	-	-	-	34	104,120	1.7	1.3	1.4	-	-	-	4.3	0.1	0.05	0	CMK	
Non-Residential Forester	50	40	40	40	-	-	170	78,090	5.2	3.8	4.1	4.4	-	-	17.5	0.1	0.05	0	CMK	
Sub-Total Land Acquisition									8.0	7.2	7.7	6.2	-	-	29.0					
Sub-Total CIVIL WORKS									34.6	31.3	24.4	17.1	1.3	-	108.7					
<b>8. VEHICLES</b>																				
<b>1. Headquarters</b>																				
Car	3	-	-	-	-	-	3	82,805.714	0.3	-	-	-	-	-	0.3	0.1	0.2	0.3	VEF	
Minibus	1	-	-	-	-	-	1	135,260.714	0.2	-	-	-	-	-	0.2	0.1	0.2	0.3	VEF	
Trailer	1	1	-	-	-	-	2	25,981.25	0.0	0.0	-	-	-	-	0.1	0.1	0.1	0.2	VEF	
Sub-Total Headquarters									0.5	0.0	-	-	-	-	0.5					
<b>2. Regional Offices</b>																				
Car	2	-	-	-	-	-	2	82,805.714	0.2	-	-	-	-	-	0.2	0.1	0.2	0.3	VEF	
2WD Jeep	4	2	-	-	-	-	6	87,981.071	0.4	0.2	-	-	-	-	0.6	0.1	0.2	0.3	VEF	
Truck	3	3	-	-	-	-	6	134,329.286	0.5	0.5	-	-	-	-	1.0	0.1	0.2	0.3	VEF	
Trailer	4	2	-	-	-	-	6	75,876.786	0.1	0.1	-	-	-	-	0.2	0.1	0.2	0.3	VEF	
Tank with Pump	3	3	-	-	-	-	6	25,876.786	0.1	0.1	-	-	-	-	0.2	0.1	0.2	0.3	VEF	
Minibus	2	-	-	-	-	-	2	135,260.714	0.4	-	-	-	-	-	0.4	0.1	0.2	0.3	VEF	
Sub-Total Regional Offices									1.6	0.9	-	-	-	-	2.5					
<b>3. District Offices</b>																				
2WD Jeep	14	14	-	-	-	-	28	87,981.071	1.4	1.5	-	-	-	-	2.9	0.1	0.2	0.3	VEF	
Trailer	14	14	-	-	-	-	28	25,981.25	0.4	0.4	-	-	-	-	0.9	0.1	0.1	0.2	VEF	
Small Tank	6	10	-	-	-	-	16	10,330.714	0.1	0.1	-	-	-	-	0.2	0.1	0.2	0.3	VEF	
Sub-Total District Offices									1.9	2.1	-	-	-	-	4.0					
<b>4. Range Offices</b>																				
Motorcycles	21	5	5	8	8	-	47	16,624.533	0.4	0.1	0.1	0.2	0.2	-	1.0	0.1	0.1	0.25	VEF	
Sub-Total Range Offices									0.4	0.1	0.1	0.2	0.2	-	1.0					
<b>5. Field Staff</b>																				
Motorcycles	20	5	2	11	8	-	46	16,624.533	0.4	0.1	0.0	0.3	0.2	-	1.0	0.1	0.1	0.25	VEF	
Hopeds	82	20	4	47	29	-	182	6,213.4	0.6	0.2	0.0	0.4	0.3	-	1.4	0.1	0.2	0.25	VEF	
Boats	1	1	-	-	-	-	2	103,936.747	0.1	0.1	-	-	-	-	0.2	0.1	0.1	0.17	VEF	
Sub-Total Field Staff									1.1	0.4	0.1	0.7	0.5	-	2.7					
Sub-Total VEHICLES									5.5	3.5	0.2	0.9	0.7	-	10.6					

C. EQUIPMENT																			
Typewriters	14	14	-	-	-	-	32	7,772.75	0.1	0.2	-	-	-	-	0.3	0.1	0.1	0.25	VEF
Photocopiers	1	-	-	-	-	-	1	127,042.5	0.1	-	-	-	-	-	0.1	0.1	0.45	0.35	VEF
Calculators	30	20	-	-	-	-	50	3,357.75	0.1	0.1	-	-	-	-	0.1	0.2	0.45	0.35	VEF
Computer	1	-	-	-	-	-	1	304,750	0.3	-	-	-	-	-	0.3	0.1	0.45	0.35	VEF
<b>Sub-Total EQUIPMENT</b>									<b>0.7</b>	<b>0.2</b>					<b>1.0</b>				
B. FURNITURE																			
1. Headquarters																			
CCF	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Jr. Superintendent	-	1	2	-	-	-	3	6,774.25	-	0.0	0.4	-	-	-	0.0	0.1	0	0.12	VEF
UD Clerk	-	3	3	-	-	-	6	4,170	-	0.0	0.0	-	-	-	0.0	0.1	0	0.12	VEF
UD Typist	-	1	1	-	-	-	2	2,241.375	-	0.0	0.0	-	-	-	0.0	0.1	0	0.12	VEF
LD Typist	-	1	1	-	-	-	2	2,241.375	-	0.0	0.0	-	-	-	0.0	0.1	0	0.12	VEF
Confidential Asst.	-	1	-	-	-	-	1	2,241.375	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Driver	-	1	-	-	-	-	1	521.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Attender	-	2	-	-	-	-	2	521.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
CF (Monitoring and Evaluation)	-	1	-	-	-	-	1	17,201.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
ICF	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
NRE Economist	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Jr. Director of Statistics	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Asst. Statisticians	-	2	-	-	-	-	2	6,984.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Social Forestry Asst.	-	1	1	-	-	-	2	4,587	-	0.0	0.0	-	-	-	0.0	0.1	0	0.12	VEF
Computer Programmer	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Comptroller	-	2	-	-	-	-	2	4,587	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Steno-Typist	-	1	-	-	-	-	1	4,775.5	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
LD Typist	-	1	-	-	-	-	1	2,241.375	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Attender	-	1	-	-	-	-	1	521.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
UD Clerk	-	1	-	-	-	-	1	4,170	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
LD Clerk	-	1	-	-	-	-	1	4,170	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
CF (Planning and Programs)	-	1	-	-	-	-	1	17,201.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
ICF	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
LD Typist	-	1	-	-	-	-	1	2,241.375	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
LD Clerk	-	1	1	-	-	-	2	4,170	-	0.0	0.0	-	-	-	0.0	0.1	0	0.12	VEF
Driver	-	1	-	-	-	-	1	521.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Finance Officer	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Sr. Superintendent	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Jr. Superintendent	-	2	-	-	-	-	2	6,774.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
UD Clerk	-	1	-	-	-	-	1	4,170	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
LD Clerk	-	1	-	-	-	-	1	4,170	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
UD Typist	-	1	-	-	-	-	1	2,241.375	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
LD Typist	-	1	-	-	-	-	1	2,241.375	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Administrative Asst.	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
<b>Sub-Total Headquarters</b>									<b>-</b>	<b>0.3</b>	<b>0.1</b>				<b>0.3</b>				
2. Regional Offices																			
CF	1	-	-	-	-	-	1	17,201.25	0.0	-	-	-	-	-	0.0	0.1	0	0.12	VEF
ICF	2	2	-	-	-	-	4	7,818.75	0.0	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Administrative Asst.	1	1	-	-	-	-	2	7,818.75	0.0	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Jr. Superintendent	2	2	-	-	-	-	4	6,774.25	0.0	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
NRE Field Supervisors	-	2	-	-	-	-	2	6,984.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
NRE Field Investigators	-	10	-	-	-	-	10	521.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Social Forestry Asst.	2	2	-	-	-	-	4	4,587	0.0	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Head Accountant	1	1	-	-	-	-	2	6,774.25	0.0	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
UD Clerk	1	-	2	-	-	-	3	4,170	0.0	-	0.0	-	-	-	0.0	0.1	0	0.12	VEF
Steno-Typist	1	1	2	-	-	-	4	4,775.5	0.0	0.0	0.0	-	-	-	0.0	0.1	0	0.12	VEF
Driver	4	2	-	-	-	-	6	521.25	0.0	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Project Mechanic	1	1	-	-	-	-	2	521.25	0.0	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Attender	4	-	2	-	-	-	6	521.25	0.0	-	0.0	-	-	-	0.0	0.1	0	0.12	VEF
<b>Sub-Total Regional Offices</b>									<b>0.1</b>	<b>0.1</b>	<b>0.0</b>				<b>0.2</b>				
3. District Offices																			
ICF	7	7	-	-	-	-	14	7,818.75	0.1	0.1	-	-	-	-	0.1	0.1	0	0.12	VEF
ACF	7	7	-	-	-	-	14	7,818.75	0.1	0.1	-	-	-	-	0.1	0.1	0	0.12	VEF
Jr. Superintendent	7	7	-	-	-	-	14	6,774.25	0.1	0.1	-	-	-	-	0.1	0.1	0	0.12	VEF
Head Accountant	7	7	-	-	-	-	14	6,774.25	0.1	0.1	-	-	-	-	0.1	0.1	0	0.12	VEF
Social Forestry Asst.	13	3	6	6	-	-	28	4,587	0.1	0.0	0.0	0.0	-	-	0.2	0.1	0	0.12	VEF
Steno-Typist	13	3	6	6	-	-	28	4,775.5	0.1	0.0	0.0	0.0	-	-	0.2	0.1	0	0.12	VEF
Driver	21	7	-	-	-	-	28	521.25	0.0	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Attender	42	-	-	-	-	-	42	521.25	0.0	-	-	-	-	-	0.0	0.1	0	0.12	VEF
<b>Sub-Total District Offices</b>									<b>0.4</b>	<b>0.3</b>	<b>0.1</b>	<b>0.1</b>			<b>0.9</b>				
4. Range Offices																			
Range Officer	21	3	5	8	8	-	47	6,984.75	0.2	0.0	0.0	0.1	0.1	-	0.4	0.1	0	0.12	VEF
UD Clerk	4	3	2	1	5	-	17	4,170	0.0	0.0	0.0	0.0	0.0	-	0.1	0.1	0	0.12	VEF
LD Clerk	13	2	3	7	3	-	30	4,170	0.1	0.0	0.0	0.0	0.0	-	0.2	0.1	0	0.12	VEF
Attender	13	15	15	24	24	-	71	521.25	0.0	0.0	0.0	0.0	0.0	-	0.1	0.1	0	0.12	VEF
<b>Sub-Total Range Offices</b>									<b>0.3</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.2</b>		<b>0.7</b>				
5. FIELD STAFF																			
Forester	70	43	53	52	-	-	220	4,347.225	0.3	0.3	0.3	0.3	-	-	1.3	0.1	0	0.12	VEF
<b>Sub-Total FIELD STAFF</b>									<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>			<b>1.3</b>				
<b>Sub-Total FURNITURE</b>									<b>1.1</b>	<b>1.1</b>	<b>0.5</b>	<b>0.5</b>	<b>0.2</b>		<b>3.4</b>				
<b>Total INVESTMENT COSTS</b>									<b>42.0</b>	<b>36.1</b>	<b>25.1</b>	<b>18.5</b>	<b>2.1</b>		<b>121.8</b>				



INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Table 103. LARGE BLOCK PLANTATIONS  
Detailed Cost Table

Unit	Quantities								Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)								Parameters			
	1984	1985	1986	1987	1988	1989	Total	1984		1985	1986	1987	1988	1989	Total	Phy. Rate	For. Exch.	Gross Tax Rate	Summary Account		
	HECT	HECT	HECT	HECT	HECT	HECT	HECT	HECT		HECT	HECT	HECT	HECT	HECT	HECT	HECT	HECT	HECT	HECT		
<b>I. INVESTMENT COSTS</b>																					
<b>A. PLANTATION ESTABLISHMENT</b>																					
<b>1. Casuarina Plantations</b>																					
Labor	100	200	300	300	300	300	1,500	2,160.7	0.3	0.7	1.1	1.2	1.3	1.3	5.9	0.05	0	0	PLTES		
Materials	100	200	300	300	300	300	1,500	103.351	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0.25	0.07	PLTES		
Transport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTES		
Sub-Total Casuarina Plantations									0.3	0.7	1.2	1.2	1.3	1.4	6.2						
<b>2. E. grandis Plantations</b>																					
Labor	200	400	600	800	1,000	1,000	4,000	5,108.25	1.1	2.4	3.8	5.5	7.3	7.7	27.9	0.05	0	0	PLTES		
Materials	200	400	600	800	1,000	1,000	4,000	103.351	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.05	0.25	0.07	PLTES		
Transport	200	400	600	800	1,000	1,000	4,000	77.798	0.0	0.0	0.1	0.1	0.1	0.1	0.4	0.05	0.2	0	PLTES		
Sub-Total E. grandis Plantations									1.2	2.5	4.0	5.7	7.6	8.0	28.9						
<b>3. E. tereticornis/A. auriculiformis Plantations</b>																					
Labor	200	400	600	800	1,000	1,000	4,000	3,545.35	0.8	1.7	2.7	3.8	5.1	5.4	19.5	0.05	0	0	PLTES		
Materials	200	400	600	800	1,000	1,000	4,000	103.351	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.05	0.25	0.07	PLTES		
Transport	200	400	600	800	1,000	1,000	4,000	77.798	0.0	0.0	0.1	0.1	0.1	0.1	0.4	0.05	0.2	0	PLTES		
Sub-Total E. tereticornis/A. auriculiformis Plantations									0.8	1.8	2.8	4.0	5.4	5.7	20.3						
<b>4. Dry Zone Plantations</b>																					
Labor	100	200	300	300	300	300	1,500	6,421.8	0.7	1.5	2.4	2.6	2.8	2.9	12.9	0.05	0	0	PLTES		
Materials	100	200	300	300	300	300	1,500	103.351	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0.25	0.07	PLTES		
Transport	100	200	300	300	300	300	1,500	93.257	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0.2	0	PLTES		
Sub-Total Dry Zone Plantations									0.7	1.6	2.5	2.7	2.8	3.0	13.3						
Sub-Total PLANTATION ESTABLISHMENT									3.0	6.5	10.5	13.6	17.1	18.1	68.8						
<b>B. PLANTATION MANAGEMENT</b>																					
<b>1. Casuarina Plantations</b>																					
Labor	-	100	200	300	300	300	1,200	1,501.2	-	0.2	0.4	0.4	0.4	0.7	2.5	0.05	0	0	PLTM		
Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTM		
Transport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTM		
Sub-Total Casuarina Plantations									-	0.2	0.4	0.4	0.4	0.7	2.5						
<b>2. E. grandis Plantations</b>																					
Labor	-	200	400	600	800	1,000	3,000	1,563.75	-	0.4	0.8	1.3	1.8	2.4	6.4	0.05	0	0	PLTM		
Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTM		
Transport	-	200	400	600	800	1,000	3,000	23,038	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.2	0	PLTM		
Sub-Total E. grandis Plantations									-	0.4	0.8	1.3	1.8	2.4	6.7						
<b>3. E. tereticornis/A. auriculiformis Plantations</b>																					
Labor	-	200	400	600	800	1,000	3,000	1,584.6	-	0.4	0.8	1.3	1.8	2.4	6.7	0.05	0	0	PLTM		
Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTM		
Transport	-	200	400	600	800	1,000	3,000	28,007	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.2	0	PLTM		
Sub-Total E. tereticornis/A. auriculiformis Plantations									-	0.4	0.8	1.3	1.8	2.4	6.8						
<b>4. Dry Zone Plantations</b>																					
Labor	-	100	200	300	300	300	1,200	1,709.7	-	0.2	0.4	0.7	0.7	0.8	2.8	0.05	0	0	PLTM		
Material	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTM		
Transport	-	100	200	300	300	300	1,200	28,007	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.2	0	PLTM		
Sub-Total Dry Zone Plantations									-	0.2	0.4	0.7	0.7	0.8	2.9						
<b>5. Existing Young Plantations</b>																					
Labor	3,950	-	-	-	-	-	3,950	1,584.6	6.8	-	-	-	-	-	6.8	0.05	0	0	PLTM		
Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTM		
Transport	3,950	-	-	-	-	-	3,950	28,007	0.1	-	-	-	-	-	0.1	0.05	0.2	0	PLTM		
Sub-Total Existing Young Plantations									7.0	-	-	-	-	-	7.0						
Sub-Total PLANTATION MANAGEMENT									7.0	1.1	2.4	3.9	5.1	6.3	25.8						
Total INVESTMENT COSTS									10.0	7.6	12.9	17.5	22.1	24.4	94.6						
Total									10.0	7.6	12.9	17.5	22.1	24.4	94.6						

**INDIA**  
**KERALA SOCIAL FORESTRY PROJECT**  
**Table 104. SMALL BLOCK PLANTATIONS**  
**Detailed Cost Table**

Unit	Quantity							Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)							Parameters			
	1984	1985	1986	1987	1988	1989	Total		1984	1985	1986	1987	1988	1989	Total	Phy.	Cont. For.	Gross	Summary
	Rate	Exch.	Tax Rate	Account	Rate	Exch.	Tax Rate		Account	Rate	Exch.	Tax Rate	Account	Rate	Exch.	Tax Rate	Account	Rate	Exch.
<b>I. INVESTMENT COSTS</b>																			
<b>A. PLANTATION ESTABLISHMENT</b>																			
Labor	50	100	150	200	250	250	1,000	3,545.35	0.2	0.4	0.7	1.0	1.3	1.4	4.9	0.05	0	0	PLTES
Materials	50	100	150	200	250	250	1,000	103.531	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.25	0.07	PLTES
Transport	50	100	150	200	250	250	1,000	77.798	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.2	0	PLTES
<b>Sub-Total PLANTATION ESTABLISHMENT</b>									0.2	0.4	0.7	1.0	1.3	1.4	5.1				
<b>B. PLANTATION MANAGEMENT</b>																			
Labor	-	50	100	150	200	250	750	1,584.6	-	0.1	0.2	0.3	0.5	0.6	1.7	0.05	0	0	PLTM
Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTM
Transport	-	50	100	150	200	250	750	28.007	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.2	0	PLTM
<b>Sub-Total PLANTATION MANAGEMENT</b>									-	0.1	0.2	0.3	0.5	0.6	1.7				
<b>Total INVESTMENT COSTS</b>									0.2	0.5	0.9	1.3	1.8	2.0	6.8				
<b>Total</b>									0.2	0.5	0.9	1.3	1.8	2.0	6.8				

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KERALA SOCIAL FORESTRY PROJECT  
Table 105. STRIP PLANTATIONS  
Detailed Cost Table

Unit	Quantity							Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)							Parameters			
	1984	1985	1986	1987	1988	1989	Total		1984	1985	1986	1987	1988	1989	Total	Phy.	Cont. For.	Gross	Summary
	Rate	Exch.	Tax	Rate	Account														
<b>I. INVESTMENT COSTS</b>																			
<b>A. PLANTATION ESTABLISHMENT</b>																			
Labor	50	100	200	400	500	750	2,000	3,294.3	0.2	0.4	0.8	1.8	2.4	3.7	9.3	0.05	0	0	PLTES
Materials	50	100	200	400	500	750	2,000	103.531	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.05	0.25	0.07	PLTES
Transport	50	100	200	400	500	750	2,000	140.036	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.05	0.2	0	PLTES
Sub-Total PLANTATION ESTABLISHMENT									0.2	0.4	0.9	1.9	2.5	4.0	10.0				
<b>B. PLANTATION MANAGEMENT</b>																			
Labor	-	50	100	200	400	500	1,250	1,376.1	-	0.1	0.2	0.4	0.8	1.0	2.5	0.05	0	0	PLTH
Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTH
Transport	-	50	100	200	400	500	1,250	40.455	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.2	0	PLTH
Sub-Total PLANTATION MANAGEMENT									-	0.1	0.2	0.4	0.8	1.1	2.5				
<b>Total INVESTMENT COSTS</b>									0.2	0.5	1.1	2.3	3.3	5.1	12.5				
<b>Total</b>									0.2	0.5	1.1	2.3	3.3	5.1	12.5				

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KERALA SOCIAL FORESTRY PROJECT  
Table 106. TRIBAL FUELWOOD PLANTATIONS  
Detailed Cost Table

Unit	Quantity							Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)							Parameters			
	1984	1985	1986	1987	1988	1989	Total		1984	1985	1986	1987	1988	1989	Total	Phy.	Cont. For.	Gross Exch.	Summary Tax Rate Account
	----	----	----	----	----	----	-----		----	----	----	----	----	----	-----	----	----	-----	-----
<b>I. INVESTMENT COSTS</b>																			
<b>A. PLANTATION ESTABLISHMENT</b>																			
Labor	100	200	300	400	500	500	2,000	3,565.35	0.4	0.8	1.3	1.9	2.6	2.7	9.7	0.05	0	0	PLTES
Materials	100	200	300	400	500	500	2,000	103.551	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.05	0.25	0.07	PLTES
Transport	100	200	300	400	500	500	2,000	77.798	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.05	0.2	0	PLTES
Sub-Total PLANTATION ESTABLISHMENT									0.4	0.9	1.4	2.0	2.7	2.8	10.2				
<b>B. PLANTATION MANAGEMENT</b>																			
Labor	-	100	200	150	200	250	900	1,709.7	-	0.2	0.4	0.3	0.5	0.6	2.1	0.05	0	0	PLTM
Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	PLTM
Transport	-	100	200	150	200	250	900	28.007	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.2	0	PLTM
Sub-Total PLANTATION MANAGEMENT									-	0.2	0.4	0.4	0.5	0.7	2.1				
<b>Total INVESTMENT COSTS</b>									<b>0.4</b>	<b>1.1</b>	<b>1.8</b>	<b>2.4</b>	<b>3.2</b>	<b>3.5</b>	<b>12.4</b>				
<b>Total</b>									<b>0.4</b>	<b>1.1</b>	<b>1.8</b>	<b>2.4</b>	<b>3.2</b>	<b>3.5</b>	<b>12.4</b>				

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KERALA SOCIAL FORESTRY PROJECT  
Table 107. TRIBAL MEDICINAL PILOT SCHEME  
Detailed Cost Table

Unit	Quantity							Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)							Parameters				
	1984	1985	1986	1987	1988	1989	Total		1984	1985	1986	1987	1988	1989	Total	Phy.	Cont.	For.	Gross	Summary
	Rate	Exch.	Tax	Rate	Account	Rate	Exch.		Tax	Rate	Account	Rate	Exch.	Tax	Rate	Account				
<b>I. INVESTMENT COSTS</b>																				
<b>A. PLANTATION ESTABLISHMENT</b>																				
Labor	5	10	15	20	25	25	100	5,129.1	0.0	0.1	0.1	0.1	0.2	0.2	0.7	0.05	0	0	0	PLTES
Materials	5	10	15	20	25	25	100	1,119.352	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0.25	0.07	0.07	PLTES
Transport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0	0	0	PLTES
<b>Sub-Total PLANTATION ESTABLISHMENT</b>								0.0 0.1 0.1 0.2 0.2 0.2 0.9												
<b>Total INVESTMENT COSTS</b>								0.0 0.1 0.1 0.2 0.2 0.2 0.9												
<b>Total</b>								0.0 0.1 0.1 0.2 0.2 0.2 0.9												

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KERALA SOCIAL FORESTRY PROJECT  
Table 108. PLANTATION PROTECTION  
Detailed Cost Table

Unit	Quantity							Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)							Parameters				
	1984	1985	1986	1987	1988	1989	Total		1984	1985	1986	1987	1988	1989	Total	Phy. Cont. For. Rate Exch.	Gross Tax Rate	Summary Account		
<b>I. INVESTMENT COSTS</b>																				
<b>A. PLANTATION ESTABLISHMENT</b>																				
All Plantations /a /b	ha	4,755	6,365	8,830	12,050	20,050	-	52,050	62.55	0.3	0.5	0.7	1.0	1.8	-	4.3	0.05	0	0	PLTES
Fencins /c	meters	1,500	3,000	4,600	6,000	7,200	7,800	30,100	18.739	0.0	0.1	0.1	0.2	0.2	0.2	0.8	0.05	0.05	0.1	PLTES
Sub-Total PLANTATION ESTABLISHMENT										0.4	0.5	0.8	1.2	2.0	0.2	5.1				
Total INVESTMENT COSTS										0.4	0.5	0.8	1.2	2.0	0.2	5.1				
Total										0.4	0.5	0.8	1.2	2.0	0.2	5.1				

/a Including young plantations at the beginning of the project @ Rs 3950 per ha.  
/b @ 3 mandays/ha/year.  
/c Assumes 200 meters per ha.

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KERALA SOCIAL FORESTRY PROJECT  
Table 109. EXTENSION AND PUBLICITY  
Detailed Cost Table

Unit	Quantity							Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)							Parameters			
	1984	1985	1986	1987	1988	1989	Total		1984	1985	1986	1987	1988	1989	Total	Phy. Cont. Rate	For Exch.	Gross Tax Rate	Summary Account
	----	----	----	----	----	----	-----		----	----	----	----	----	----	-----	----	----	----	-----
<b>I. INVESTMENT COSTS</b>																			
<b>A. VEHICLES</b>																			
2WD Jeep	1	-	-	-	-	-	1	88,170.5	0.1	-	-	-	-	-	0.1	0.1	0.2	0	VEF
Publicity Vans	3	-	-	-	-	-	3	155,975	0.5	-	-	-	-	-	0.5	0.1	0.2	0	VEF
Sub-Total VEHICLES									0.6	-	-	-	-	-	0.6				
<b>B. EQUIPMENT</b>																			
Audio-Visual	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	0.1	0.1	0.2	0.35	VEF
Cassette Player and Slide Projector	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	0.1	0.1	0.45	0.35	VEF
Generator	8	-	-	-	-	-	8	25,412.5	0.2	-	-	-	-	-	0.2	0.1	0.45	0.35	VEF
Fans	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.2	0.2	0.8	0.1	0.5	0.35	VEF
Camera and Accessories	-	-	-	-	-	-	-	-	0.8	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.45	0.35	VEF
Public Address System	14	-	-	-	-	-	14	10,145	0.2	-	-	-	-	-	0.2	0.1	0.45	0.35	VEF
Video Camera	1	-	-	-	-	-	1	30,495	0.0	-	-	-	-	-	0.0	0.1	0.45	0.35	VEF
VCR and Monitor	1	-	-	-	-	-	1	30,495	0.0	-	-	-	-	-	0.0	0.1	0.45	0.35	VEF
Sub-Total EQUIPMENT									0.6	0.4	0.2	0.2	0.2	0.2	1.8				
<b>C. FURNITURE</b>																			
ACF	-	1	-	-	-	-	1	7,818.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Public Relations Officer	-	1	-	-	-	-	1	6,984.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Artist/Photographer	-	1	-	-	-	-	1	7,506	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Draftsman	-	1	-	-	-	-	1	6,984.75	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Projectionist	-	1	-	-	-	-	1	4,170	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Steno-Typist	-	1	-	-	-	-	1	4,795.5	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
LD Clerk	-	1	-	-	-	-	1	4,170	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Attender	-	1	-	-	-	-	1	521.25	-	0.0	-	-	-	-	0.0	0.1	0	0.12	VEF
Driver	-	4	4	4	4	4	20	521.25	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0	0.12	VEF
Sub-Total FURNITURE									-	0.1	0.0	0.0	0.0	0.0	0.1				
<b>D. CONSULTANT</b>																			
Publicity Consultant, Lump Sum	1	1	1	1	-	-	4	26,062.5	0.0	0.0	0.0	0.0	-	-	0.1	0.05	0	0	SAL
Sub-Total CONSULTANT									0.0	0.0	0.0	0.0	-	-	0.1				
Total INVESTMENT COSTS									1.3	0.5	0.2	0.2	0.2	0.2	2.6				
<b>II. RECURRENT COSTS</b>																			
<b>A. STAFF SALARIES</b>																			
ACF	1	1	1	1	1	1	6	25,020	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0	0	SAL
Public Relations Officer	1	1	1	1	1	1	6	10,868.043	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Artist/Photographer	1	1	1	1	1	1	6	17,201.25	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Draftsman	1	1	1	1	1	1	6	14,575	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Projectionist	1	1	1	1	1	1	6	10,946.25	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Steno-Typist	1	1	1	1	1	1	6	15,637.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
LD Clerk	1	1	1	1	1	1	6	9,903.75	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Attender	1	1	1	1	1	1	6	9,382.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Driver	4	4	4	4	4	4	24	9,382.5	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.05	0	0	SAL
Sub-Total STAFF SALARIES									0.2	0.2	0.2	0.2	0.2	0.2	1.2				
<b>B. TRAVEL ALLOWANCES</b>																			
ACF	1	1	1	1	1	1	6	10,425	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Public Relations Officer	1	1	1	1	1	1	6	10,425	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0	0	SAL
Sub-Total TRAVEL ALLOWANCES									0.0	0.0	0.0	0.0	0.0	0.0	0.1				
<b>C. Vehicle Operating Costs</b>																			
2WD Jeep	1	1	1	1	1	1	6	51,800	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.05	0.2	0.2	VENOP
Publicity Vans	3	3	3	3	3	3	18	25,900	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.05	0.2	0.2	VENOP
Sub-Total Vehicle Operating Costs									0.1	0.2	0.2	0.2	0.2	0.2	1.0				
Total RECURRENT COSTS									0.3	0.3	0.4	0.4	0.4	0.4	2.3				
Total									1.6	0.8	0.6	0.6	0.6	0.7	4.9				

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BENGAJI SOCIAL FORESTRY PROJECT  
Table 1D. TRAINING  
Detailed Cost Table

Item	Quantity				Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)				Parameters				
	1984	1985	1986	1987		1988	1989	1990	1991	1992	1993	1994	Cont. Rate	Per. Each
<b>I. INVESTMENT COSTS</b>														
<b>A. CIVIL WORKS</b>														
Lecturer Hall	3	-	-	-	416+480	1+4	-	-	-	1+4	0.1	0.05	0	DKK
Sealmer Room	1	-	-	-	312+360	6+4	-	-	-	6+4	0.1	0.05	0	DKK
Reading Room	1	-	-	-	416+480	6+5	-	-	-	6+5	0.1	0.05	0	DKK
Library	1	-	-	-	416+480	6+5	-	-	-	6+5	0.1	0.05	0	DKK
ACS	2	-	-	-	234+270	0.5	-	-	-	0.5	0.1	0.05	0	DKK
Rooms and Instructors	5	-	-	-	184+225	1+2	-	-	-	1+2	0.1	0.05	0	DKK
Foresters	2	-	-	-	108+146+174	0.3	-	-	-	0.3	0.1	0.05	0	DKK
Others I	10	-	-	-	101+117	1+7	-	-	-	1+7	1.2	0.1	0.05	0
Others II	10	-	-	-	93+788	1+7	-	-	-	1+7	1.2	0.1	0.05	0
Visitors Dormitory	1	-	-	-	520+680	0+6	-	-	-	0+6	0.1	0.05	0	DKK
Dining Hall plus kitchen	1	-	-	-	416+480	0+5	-	-	-	0+5	0.1	0.05	0	DKK
Canteen Facilities	1	-	-	-	42+472	0+1	-	-	-	0+1	0.1	0.05	0	DKK
Store	1	-	-	-	286+240	0+3	-	-	-	0+3	0.1	0.05	0	DKK
Social Foresters' Mess	1	-	-	-	312+360	0+4	-	-	-	0+4	0.1	0.05	0	DKK
Garages	3	-	-	-	187+326	0+4	-	-	-	0+4	0.1	0.05	0	DKK
Fencing grounds, etc.	1	-	-	-	416+480	0+5	-	-	-	0+5	0.1	0.05	0	DKK
Sub-Total CIVIL WORKS						2.9	6.6	0.5	-	-	-	-	-	10.0
<b>B. VEHICLES</b>														
Minibus	1	-	-	-	155+240+714	0+2	-	-	-	0+2	0.1	0.2	0.3	VEF
Truck	1	-	-	-	134+559+286	0+2	-	-	-	0+2	0.1	0.2	0.3	VEF
2WD Jeep	1	-	-	-	87+181+671	0+1	-	-	-	0+1	0.1	0.2	0.3	VEF
Sub-Total VEHICLES						0+4	-	-	-	0+4	-	-	-	-
<b>C. EQUIPMENT</b>														
Photocopier	1	-	-	-	152+425	0+2	-	-	-	0+2	0.1	0.45	0.35	VEF
Duplicator	2	-	-	-	5+682.5	0+0	-	-	-	0+0	0.1	0.45	0.35	VEF
Microcomputer/Lab Equipment	1	-	-	-	-	0+1	-	-	-	0+1	0.1	0.45	0.35	VEF
Projector/Slides	1	-	-	-	-	0+2	-	-	-	0+2	0.1	0.45	0.35	VEF
Slide Projector/Slides	1	-	-	-	-	0+1	-	-	-	0+1	0.1	0.45	0.35	VEF
Public Address System	1	-	-	-	25+112.5	0+0	-	-	-	0+0	0.1	0.45	0.35	VEF
VCR/Monitor/Radio	1	-	-	-	-	0+1	-	-	-	0+1	0.1	0.45	0.35	VEF
Refrigerator/Freezer Facility	1	-	-	-	-	0+1	-	-	-	0+1	0.1	0.45	0.35	VEF
Kitchen Equipment	1	-	-	-	-	0+1	-	-	-	0+1	0.1	0.45	0.35	VEF
Fan/Buc. Electrical Equipment	1	-	-	-	-	0+1	-	-	-	0+1	0.1	0.45	0.35	VEF
Telephone Installations, etc.	1	-	-	-	-	0+1	-	-	-	0+1	0.1	0.45	0.35	VEF
Textbooks	1	-	-	-	81+589+681	0+1	0.1	0.1	0.1	0.3	0.7	0.1	0.2	0.35
Teaching materials	1	-	-	-	5+182+155	0+0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.12
Library/Reference Books	1	-	-	-	50+193+182	0+1	-	-	-	0+1	0.1	0.1	0.8	0.12
Sub-Total EQUIPMENT						0+2	1.2	0.1	0.1	0.1	0.1	0.1	0.8	0.12
<b>D. FURNITURE</b>														
Training Coordinator	1	-	-	-	7+811.75	0+0	-	-	-	0+0	0.1	0	0	VEF
Instructors	3	-	-	-	4+881.25	0+0	-	-	-	0+0	0.1	0	0	VEF
LD Clerk	2	-	-	-	4+170	0+0	-	-	-	0+0	0.1	0	0	VEF
LD Typist	2	-	-	-	2+281.25	0+0	-	-	-	0+0	0.1	0	0	VEF
Stamp-List	1	-	-	-	4+775.5	0+0	-	-	-	0+0	0.1	0	0	VEF
Librarian	1	-	-	-	4+587	0+0	-	-	-	0+0	0.1	0	0	VEF
Practitioner/Storekeeper	2	-	-	-	5+1+25	0+0	-	-	-	0+0	0.1	0	0	VEF
Driver	2	-	-	-	5+1+25	0+0	-	-	-	0+0	0.1	0	0	VEF
Attendees	4	-	-	-	5+1+25	0+0	-	-	-	0+0	0.1	0	0	VEF
Attendees	4	-	-	-	5+1+25	0+0	-	-	-	0+0	0.1	0	0	VEF
Range Officer	2	-	-	-	4+881.25	0+0	-	-	-	0+0	0.1	0	0	VEF
Foresters	2	-	-	-	4+147.25	0+0	-	-	-	0+0	0.1	0	0	VEF
LD Typist	2	-	-	-	4+181.25	0+0	-	-	-	0+0	0.1	0	0	VEF
LD Clerk	1	-	-	-	4+170	0+0	-	-	-	0+0	0.1	0	0	VEF
Driver	1	-	-	-	5+1+25	0+0	0.0	0.0	0.0	0.0	0.1	0	0	VEF
Student Furniture	1	-	-	-	208+580	0+3	-	-	-	0+3	0.1	0	0	VEF
Sub-Total FURNITURE						1+7	1+4	1+5	1+5	1+4	1+5	0+4	0+2	0+0
<b>E. TRAINING PROGRAMS</b>														
<b>1. Basic Training</b>														
Training of Trainers and Officers	1	1	1	1	41+700	0+0	0+0	0+1	-	-	0+1	0+05	0	TRG
Basic Extension	1	2	2	1	10+250	0+1	0+2	0+3	0+3	0+2	1+2	0+05	0	TRG
Supplementary Training of Foresters	1	1	1	1	10+120	0+1	0+1	0+1	0+2	0+1	0+1	0+05	0	TRG
Short-Term Training	1	1	1	1	6+1325	0+1	0+1	0+1	0+1	0+1	0+4	0+05	0	TRG
Unspecified Training	1	1	1	1	5+125	0+1	0+1	0+1	0+1	0+1	0+4	0+05	0	TRG
Study Tours (Domestic)	1	1	1	1	200+300	0+2	0+2	0+3	0+3	0+3	1+4	0+05	0	TRG
Study Tours (International)	1	1	1	1	428+575	0+5	0+5	0+4	0+4	0+7	3+4	0+05	0+9	0
Training Consultants	1	1	1	1	5+125	0+1	0+1	0+1	-	-	0+2	0+05	0	RES
Sub-Total Basic Training						1+7	1+4	1+5	1+5	1+4	1+5	0+4	0+2	0+0
<b>2. Replacement Training</b>														
BCF/AFD	38	38	-	-	32+160+188	1+4	1+5	-	-	-	2+8	0+05	0	TRG
Range Officer	54	54	-	-	18+475+786	1+1	1+2	-	-	-	2+3	0+05	0	TRG
Forester	238	-	-	-	28	11+111+446	3+0	-	-	-	3+0	0+05	0	TRG
Forest Guards	17	-	-	-	9+781+254	0+2	-	-	-	-	0+2	0+05	0	TRG
Sub-Total Replacement Training						3+6	2+6	-	-	-	8+2	0+05	0	0
Sub-Total TRAINING PROGRAMS						6+8	4+0	1+5	1+5	1+4	1+5	16+4	0+05	0
<b>TOTAL INVESTMENT COSTS</b>														
						10+2	12+1	2+1	1+4	1+4	1+7	27+3	0+05	0

II. RECURRENT COSTS

A. STAFF SALARIES

ACF (Extension and Publicity)	-	1	1	1	1	1	5	25,020	-	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0	0	SAL
ACF (Trainings Coordinator)	-	1	1	1	1	1	5	25,020	-	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0	0	SAL
Instructor	-	3	3	3	3	3	15	17,722.5	-	0.1	0.1	0.1	0.1	0.1	0.4	0.05	0	0	SAL
Forester	-	2	2	2	2	2	10	10,946.25	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
UD Clerks	-	2	2	2	2	2	10	12,510	-	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0	0	SAL
LD Typists	-	2	2	2	2	2	10	9,903.75	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Steno-Typist	-	1	1	1	1	1	5	15,637.5	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Projectionist/Storekeeper	-	1	1	1	1	1	5	11,467.5	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Librarian	-	1	1	1	1	1	5	10,946.25	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Driver	-	2	2	2	2	2	10	9,382.5	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Attender	-	4	4	4	4	4	20	9,382.5	-	0.0	0.0	0.1	0.1	0.1	0.3	0.05	0	0	SAL
Peon	-	4	4	4	4	4	20	8,340	-	0.0	0.0	0.0	0.0	0.1	0.2	0.05	0	0	SAL
PT Sweeper	-	1	1	1	1	1	5	4,170	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0	0	SAL
Kitchen Asst.	-	1	1	1	1	1	5	8,340	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Range Officer	-	2	2	2	2	2	10	17,722.5	-	0.0	0.0	0.0	0.1	0.1	0.2	0.05	0	0	SAL
LD Typist	-	1	1	1	1	1	5	9,903.75	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
LD Clerk	-	1	1	1	1	1	5	9,903.75	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Driver	-	1	1	1	1	1	5	9,382.5	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
<b>Sub-Total STAFF SALARIES</b>										-	0.4	0.5	0.5	0.5	0.6	2.5			

B. TRAVEL ALLOWANCES

ACF	-	1	1	1	1	1	5	10,425	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Trainings Coordinator	-	1	1	1	1	1	5	10,425	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Instructor	-	3	3	3	3	3	15	2,606.25	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0	0	SAL
Range Officer	-	2	2	2	2	2	10	2,606.25	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0	0	SAL
Forester	-	2	2	2	2	2	10	1,563.75	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0	0	SAL
<b>Sub-Total TRAVEL ALLOWANCES</b>										-	0.0	0.0	0.0	0.1	0.1	0.2			

C. Vehicle Operating Costs

Minibus	1	1	1	1	1	1	6	25,990	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0.2	0.2	VENOP
Truck	1	1	1	1	1	1	6	35,224	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.05	0.2	0.2	VENOP
2WD Jeep	1	1	1	1	1	1	6	17,612	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.2	0.2	VENOP
<b>Sub-Total Vehicle Operating Costs</b>										0.1	0.1	0.1	0.1	0.1	0.1	0.6			

D. BUILDING MAINTENANCE

Lecture Hall	-	3	3	3	3	3	15	8,328,444	-	0.0	0.0	0.0	0.0	0.0	0.2	0.05	0.05	0.1	BMT
Seminar Room	-	1	1	1	1	1	5	6,246,333	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.05	0.1	BMT
Reading Room	-	1	1	1	1	1	5	8,328,444	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.05	0.1	BMT
Library	-	1	1	1	1	1	5	8,328,444	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.05	0.1	BMT
ACFs	-	2	2	2	2	2	10	4,684.75	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.05	0.1	BMT
Rangers	-	-	5	5	5	5	20	3,903,958	-	-	0.0	0.0	0.0	0.0	0.1	0.05	0.05	0.1	BMT
Others I	-	-	10	10	10	10	40	2,030,058	-	-	0.0	0.0	0.0	0.0	0.1	0.05	0.05	0.1	BMT
Others II	-	-	10	10	10	10	40	1,873.9	-	-	0.0	0.0	0.0	0.0	0.1	0.05	0.05	0.1	BMT
Visitors Dormitory	-	1	1	1	1	1	5	10,410,536	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.05	0.1	BMT
Dining Hall plus Kitchen	-	1	1	1	1	1	5	8,328,444	-	0.0	0.0	0.0	0.0	0.0	0.1	0.05	0.05	0.1	BMT
Common Facilities	-	1	1	1	1	1	5	1,249,267	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.05	0.1	BMT
Store	-	1	1	1	1	1	5	4,164,222	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.05	0.1	BMT
Social Forestry Museum	-	1	1	1	1	1	5	6,246,333	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.05	0.1	BMT
Garages	-	1	1	1	1	1	5	2,186,217	-	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.05	0.1	BMT
<b>Sub-Total BUILDING MAINTENANCE</b>										-	0.1	0.2	0.2	0.2	0.2	0.9			

Total RECURRENT COSTS

Total

	0.1	0.7	0.8	0.9	0.9	1.0	4.3
	10.3	12.8	7.9	2.4	2.5	7.6	33.6

INDIA  
 KEKALA SOCIAL FORESTRY PROJECT  
 Table 111. RESEARCH AND STUDIES  
 Detailed Cost Table

Unit	Quantity							Unit Cost (Rupees)	Totals Including Contingencies (Rupees Million)							Parameters				
	1984	1985	1986	1987	1988	1989	Total		1984	1985	1986	1987	1988	1989	Total	Phy. Rate	For. Exch.	Gross Tax Rate	Summary Account	
<b>1. INVESTMENT COSTS</b>																				
A. GENERAL RESEARCH	lump sum	1	1	1	1	1	1	6	125,100	0.1	0.1	0.2	0.2	0.2	0.2	1.0	0.05	0	0	RES
B. WOOD SUPPLY AND DEMAND STUDY	lump sum	1	1	-	-	-	-	2	104,250	0.1	0.1	-	-	-	-	0.2	0.05	0	0	RES
C. M & E plus Other	lump sum	1	1	1	1	1	1	6	104,250	0.1	0.1	0.1	0.1	0.1	0.2	0.6	0.05	0	0	RES
D. FORESTRY RESEARCH CONSULTANT	lump sum	1	1	-	-	-	-	2	52,125	0.1	0.1	-	-	-	-	0.1	0.05	0	0	RES
<b>Total INVESTMENT COSTS</b>										0.4	0.5	0.3	0.3	0.3	0.3	2.1				
<b>Total</b>										0.4	0.5	0.3	0.3	0.3	0.3	2.1				

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INDIAKERALA SOCIAL FORESTRYDisbursement Schedule  
(US\$ M)

<u>Calendar Year</u>	<u>Quarter</u>	<u>IDA FY</u>	<u>Quarter</u>	<u>Disbursement</u>		<u>Z</u>
				<u>For Quarter</u>	<u>Cumulative</u>	
1984	I	FY84	III	-	-	-
	II		IV	-	-	-
	III	FY85	I	0.4	0.4	1.2
	IV		II	0.5	0.9	2.8
1985	I	FY85	III	0.8	1.7	5.3
	II		IV	0.9	2.6	8.2
	III	FY86	I	1.1	3.7	11.7
	IV		II	1.1	4.8	15.2
1986	I	FY86	III	1.2	6.0	18.9
	II		IV	1.2	7.2	22.6
	III	FY87	I	1.2	8.4	26.3
	IV		II	1.1	9.5	30.0
1987	I	FY87	III	1.2	10.7	33.7
	II		IV	1.2	11.9	37.4
	III	FY88	I	1.4	13.3	41.9
	IV		II	1.5	14.8	46.5
1988	I	FY88	III	1.4	16.2	51.0
	II		IV	1.5	17.7	55.5
	III	FY89	I	1.4	19.1	60.0
	IV		II	1.4	20.5	64.6
1989	I	FY89	III	1.6	22.1	69.5
	II		IV	1.6	23.7	74.4
	III	FY90	I	1.5	25.2	79.4
	IV		II	1.6	26.8	84.3
1990	I	FY90	III	1.6	28.4	89.3
	II		IV	1.6	30.0	94.2
	III	FY91	I	0.9	30.9	97.1
	IV		II	0.9	31.8	100.0

INDIAKERALA SOCIAL FORESTRY PROJECTPrices Used in Financial and Economic Analysis

	<u>Firewood</u> Rs/m <sup>3</sup>	<u>Small Poles</u> Rs/pole	<u>Large Poles</u> Rs/pole	<u>Small Timber</u> Rs/m <sup>3</sup>
Market Price	210	40	80	700
less felling,	18	0.35	0.80	30
less handling & transport	<u>42</u>	<u>0.80</u>	<u>1.90</u>	<u>70</u>
Financial Stumpage	150	38.85	77.30	600
approximate:	150	39	77	
Fertilizers (Rs/kg)		5		
Opportunity Cost of Land (Rs/ha/yr)		200		
Labor (Rs/man-day)		20		
Shadow wage rate applied to labor wage for economic analysis		0.6		
Standard Conversion factor applied to all prices		0.8		

note 1m<sup>3</sup>=0.6t

- 1/ 6 m long, 7.5 cm diam;  $\pi \times \left(\frac{7.5}{2}\right)^2 \times 600 \times f(f=0.7) = 0.0185\text{m}^3/\text{pole} = 55 \text{ poles/m}^3$   
or 88 poles/t
- 2/ 8 m long, 10 cm diam;  $\pi \times \left(\frac{10}{2}\right)^2 \times 800 \times f(f=0.7) = 0.0440\text{m}^3/\text{pole} = 23 \text{ poles/m}^3$   
or 37 poles/t

## INDIA

ANNEX 5  
Table 2

## KERALA SOCIAL FORESTRY PROJECT

## Financial Cost and Benefit Streams

(Rs. Million)

Years	Seedling Production				TOTAL COSTS				Benefits			Total Benefits	Net Benefits
	Organization and Management	Extension and Publicity	Training Research Studies	Total Overhead	Farm Forestry	Departmental	Plantations	TOTAL COSTS	Benefits Farm Forestry	Benefits Government Fuelwood	Benefits Government Poles		
1984 1	33.40	1.50	12.00	46.90	10.60	2.70	10.60	70.80	0.00	0.00	0.00	0.00	-70.80
85 2	30.90	0.80	12.10	43.80	15.00	3.50	9.10	71.40	0.00	0.00	0.00	0.00	-71.40
86 3	14.10	0.00	2.40	16.50	17.90	5.80	14.10	34.30	0.00	0.00	0.00	0.00	-34.30
87 4	14.30	4.00	2.40	20.70	21.80	7.60	18.70	68.80	0.00	0.00	0.00	0.00	-68.80
88 5	13.40	4.00	2.30	19.70	27.00	8.90	23.00	78.60	0.00	0.00	0.00	0.00	-78.60
89 6	12.30	4.00	2.10	18.40	29.90	9.50	23.60	81.40	0.90	0.10	0.00	1.00	-80.40
90 7	0.00	4.00	0.00	4.00	0.00	0.00	0.90	4.90	1.40	0.40	0.00	1.80	-3.10
91 8	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90	23.70	9.70	0.00	33.40	34.30
92 9	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90	40.40	18.90	0.00	59.30	58.40
93 0	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90	49.90	31.40	0.20	81.50	80.60
94 11	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90	63.60	45.70	0.40	109.70	108.80
95 12	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90	207.60	57.50	0.70	265.80	264.90
96 13	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90	290.00	62.80	0.70	361.50	360.60
97 14	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.80	290.20	8.70	0.70	299.60	298.80
98 15	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	351.60	9.40	0.70	361.70	361.00
99 16	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	428.10	9.70	1.70	439.50	438.80
2000 17	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.70	509.00	18.50	2.60	529.50	528.80
01 18	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	19.60	26.80	3.20	49.60	48.90
02 19	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	23.70	35.10	3.20	62.00	61.30
03 20	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	112.60	45.70	3.10	161.40	160.70
04 21	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	124.10	45.90	3.10	173.10	172.40
05 22	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	165.50	6.80	0.60	172.30	171.60
06 23	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	165.50	7.50	0.00	173.00	172.30
07 24	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	206.90	16.50	0.00	223.40	222.70
08 25	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	248.30	24.80	0.00	273.10	272.40
09 26	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0.00	24.80	0.00	24.80	24.20
10 27	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0.00	33.10	0.00	33.10	32.50
11 28	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0.00	41.40	0.00	41.40	40.80
12 29	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.00	41.40	0.00	41.40	40.90
13 30	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.00	2.30	0.00	2.30	1.90

INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Economic Cost and Benefit Streams  
(Rs Million)

Years	Departmental Plantation Costs											Total Costs	Total Benefits	Net Benefits
	Overhead Investments	Large Block	Small Block	Strip	Tribal Fuelwood	Tribal Medicinal	Total Plantations	Seed	Protection Incl. Farm Forestry	Farm Forestry	Opp. Cost of Land			
1984	36.83	4.50	0.09	0.69	0.19	0.02	4.96	7.44	0.24	6.50	1.50	57.37	0.00	-57.39
85	34.61	3.22	0.25	0.21	0.46	0.03	4.18	10.47	0.32	13.60	3.90	67.09	0.00	-67.09
86	13.27	5.07	0.41	0.43	0.73	0.05	6.69	13.52	0.45	18.60	7.00	58.93	0.00	-58.93
87	13.43	6.44	0.57	0.86	0.88	0.07	8.81	16.87	0.61	21.50	10.60	71.82	0.00	-71.82
88	12.45	7.65	0.73	1.18	1.11	0.08	10.75	20.59	0.80	26.80	15.00	86.39	0.00	-86.39
89	11.43	7.97	0.79	1.70	1.15	0.08	11.69	22.69	1.01	32.40	20.30	99.52	0.00	-99.52
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.10	11.30	20.30	35.70	1.40	-34.30
91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.10	0.00	20.30	24.40	28.40	4.00
92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.10	0.00	20.10	24.20	47.50	23.30
93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	19.70	23.70	82.20	58.50
94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.90	0.00	19.30	23.20	116.60	93.40
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.80	0.00	18.60	22.60	467.50	444.90
96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.60	0.00	17.40	21.00	679.90	659.90
97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.20	0.00	15.40	18.60	768.10	749.50
98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.90	0.00	13.70	16.60	982.90	966.30
99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.60	0.00	11.60	14.20	1161.00	1146.80
2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.10	0.00	9.10	11.20	1396.50	1385.30
01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	6.00	7.50	204.90	197.40
02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	5.80	7.30	242.30	235.00
03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	5.60	7.10	519.20	512.10
04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	5.30	6.70	369.90	363.20
05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	5.30	6.70	449.60	442.90
06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	5.30	6.70	450.20	443.50
07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	5.30	6.70	586.60	579.90
08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	5.30	6.70	686.20	679.50
09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	5.30	6.70	19.90	13.20
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.00	5.30	6.60	26.50	19.90
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	5.30	6.50	33.10	26.60
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.10	0.00	5.30	6.40	33.10	26.70
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	5.30	6.30	1.50	-4.50

INDIA

KERALA SOCIAL FORESTRY PROJECT

List of Materials Available in Project File  
(draft- asterisk shows sections completed)

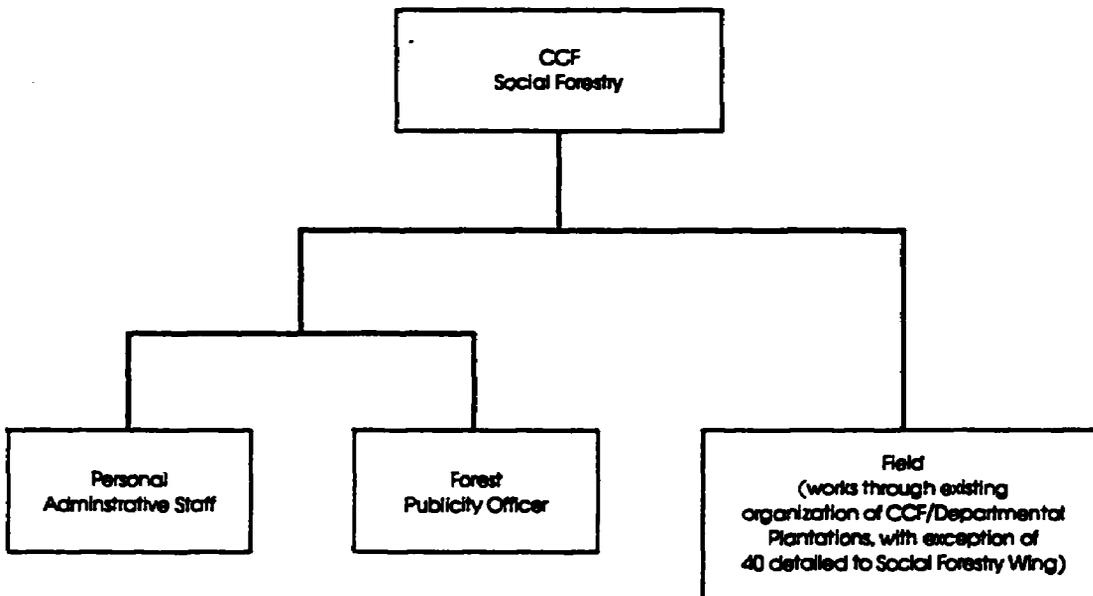
- \* 1. Social Forestry Project: Kerala Document No. I. Preparation Report prepared by Kerala Forest Department, 1983.
- \* 2. Social Forestry Project: Kerala Document No. II. Social Forestry Land Use Survey prepared by Kerala Forest Department, 1983.
- 3. Models for Plantation on Government Land, including tables
  - a. Description of species
  - b. Large block (includes 4 submodels)
  - c. Small block
  - d. Strip
  - e. Tribal fuelwood
  - f. Tribal medicinal
- 4. Nursery operations
  - a. Central nurseries
  - b. Family and school-operated nurseries
- 5. Farm forestry model
- \* 6. Agreement reached between Social Forestry and Agricultural Extension officials in Kerala
  - a. Draft proposal for working relationship between Social Forestry and Agricultural Extension.
  - b. Agreement reached between Social Forestry and Agricultural Extension
- \* 7. Draft proposal for training program in Social Forestry (Social Forestry Wing and Bank appraisal mission)
- \* 8. Wood Supply and Demand Study: draft terms-of-reference
- \* 9. Detailed project cost tables
  - a. Organization and management
  - b. Plantation
    - (i. seeding production, ii. farm forestry seeding production,
    - iii. large block model, iv. small block model,
    - v. strip plantation model, vi. tribal fuelwood,

- vii. tribal medicinal, viii. plantation protection,
- ix. plantation summary)

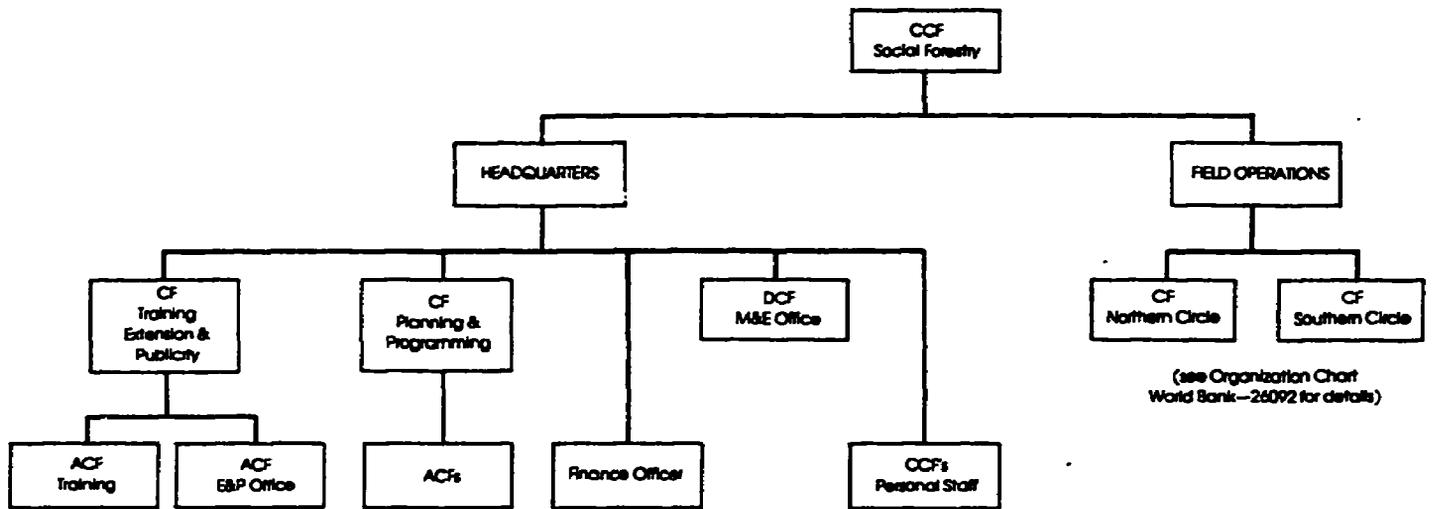
- c. Extension and Publicity
- d. Training
- e. Research and Studies

10. Sample letter of understanding between Social Forestry Wing and individual/institution conducting research study
11. Disbursement rates of proposed project and other social forestry projects.
12. Environmental aspects of social forestry in Kerala

INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Current Organization of Social Forestry Wing

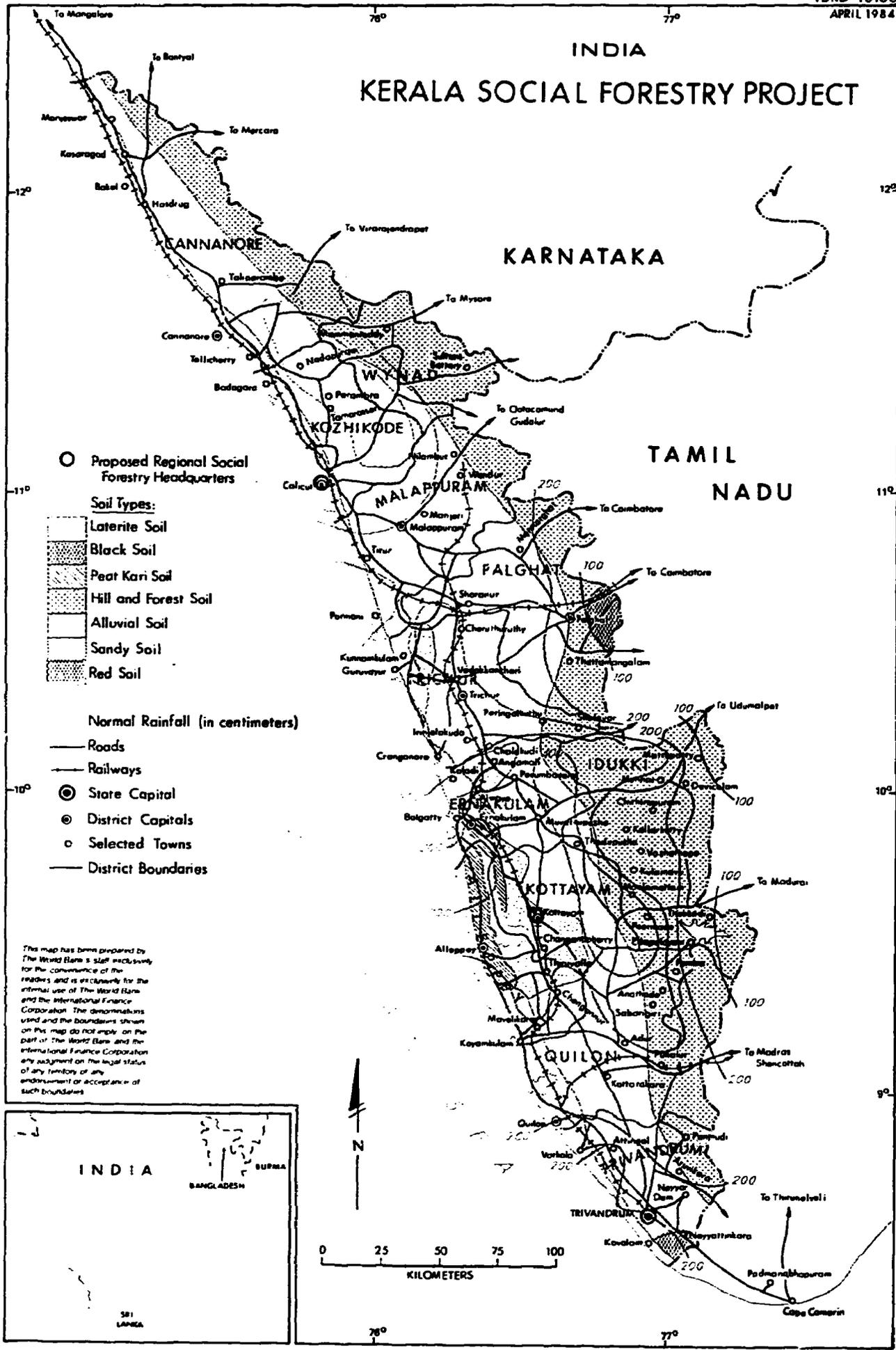


INDIA  
KERALA SOCIAL FORESTRY PROJECT  
Proposed Organization of Social Forestry Wing



# INDIA

## KERALA SOCIAL FORESTRY PROJECT



○ Proposed Regional Social Forestry Headquarters

**Soil Types:**

- ▨ Laterite Soil
- ▨ Black Soil
- ▨ Peat Kari Soil
- ▨ Hill and Forest Soil
- ▨ Alluvial Soil
- ▨ Sandy Soil
- ▨ Red Soil

**Normal Rainfall (in centimeters)**

- Roads
- Railways
- ⊙ State Capital
- ⊙ District Capitals
- Selected Towns
- District Boundaries

*This map has been prepared by The World Bank's staff exclusively for the convenience of the readers and is exclusively for the internal use of The World Bank and the International Finance Corporation. The demarcations used and the boundaries shown on this map do not imply on the part of The World Bank and the International Finance Corporation any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.*

