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Report No. 13588

PROJECT COMPLETION REPORT

INDIA

**KERALA SOCIAL FORESTRY PROJECT
(CREDIT 1514-IN)**

OCTOBER 6, 1994

**Agriculture Operations Division
India Department
South Asia Regional Office**

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PROJECT COMPLETION REPORT
INDIA
KERALA SOCIAL FORESTRY PROJECT
(Credit 1514-IN)

CURRENCY EQUIVALENTS

Name of currency (abbreviation) = Indian Rupee (Rs.)

Currency Exchange Rate:

Appraisal Year Average (1984/85):	US\$1.00 = Rs.11.89
Intervening Year Average (1985/86-1991/92):	US\$1.00 = Rs.15.94
Completion Year Average (1992/93):	US\$1.00 = Rs.26.41

FISCAL YEAR

GOI and all States: April 1 to March 31

WEIGHTS AND MEASURES

Metric System

ABBREVIATIONS

CPCRI	Central Plantation Crops Research Institute
ERR	Economic Rate of Return
FD	Forestry Department
GOI	Government of India
GOK	Government of Kerala
KAU	Kerala Agricultural University
KFRI	Kerala Forest Research Institute
KSFP	Kerala Social Forestry Project
M & E	Monitoring and Evaluation
MTR	Mid-Term Review
NGO	Non-Government Organization
SAR	Staff Appraisal Report
SFW	Social Forestry Wing
WB	World Bank

THE WORLD BANK
Washington, D.C. 20433
U.S.A.

Office of Director-General
Operations Evaluation

October 6, 1994

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

Subject: Project Completion Report on India
Kerala Social Forestry Project (Credit 1514-IN)

Attached is the Project Completion Report on India: Kerala Social Forestry Project (Credit 1514-IN), approved in 1984. Parts I and II were prepared by the South Asia Regional Office and Part II was prepared by the Borrower.

The project was the sixth in a series of ten Bank-supported social forestry projects in India. The main objectives of the project were to increase farmers' incomes and self-sufficiency in wood products; establish plantations to increase production of fuelwood, poles, and small timber; and strengthen the Social Forestry Wing of the Forest Department. The project included a component to promote production of medicinal plants and benefit tribal people.

The project satisfactorily met its main objectives: incomes have been improved; wood production has been increased; soil erosion has been reduced; and institutional capacity for social forestry in Kerala has been strengthened. Returns to plantation investment are higher than expected at appraisal because of high value wood production. These achievements were made possible because the project was implemented flexibly. The appraised project was not closely tailored to agroecological conditions in Kerala, nor to the priorities of stakeholders. The blanket approach to farm forestry adopted by Bank-supported social forestry projects in India was successfully modified during implementation. The project did not, however, benefit the tribal population significantly, and the modest targets set at appraisal for this component were reduced following the Mid-Term Review.

The quality of the PCR is satisfactory, with one exception: the weak performance of the tribal forestry component is not explained. But in this and other regards, the PCR findings of the Bank and the Borrower are consistent.

The outcome of the project is rated as satisfactory, with modest institutional development impact. Sustainability is uncertain because the future availability of financial resources to operate and maintain project components appears to be in doubt. The project may be audited.

Robert Picciotto
by H. Eberhard Köpp

Attachment

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PROJECT COMPLETION REPORT
INDIA
KERALA SOCIAL FORESTRY PROJECT
(Credit 1514-IN)

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PROJECT COMPLETION REPORT
INDIA
KERALA SOCIAL FORESTRY PROJECT
(Cr.1514-IN)

PREFACE

This is the Project Completion Report (PCR) for the Kerala Social Forestry Project for which Credit 1514-IN for SDR 30.6 million (US\$31.8 million equivalent) was approved on July 31, 1984. SDR 4.5 million was cancelled on December 5, 1991 during the funds redeployment exercise. The Credit closed on March 31, 1993, 15 months behind schedule. Final disbursement from the Credit was made on August 19, 1993 and the balance of SDR 1.3 million was cancelled.

The Preface, Evaluation Summary, and Parts I and III of this report were prepared by an FAO/World Bank Cooperative Programme mission which visited India in September/October 1993. Part II was prepared by the Government of Kerala (GOK).

Preparation of this report is based, inter alia, on the Staff Appraisal Report, the legal documents, supervision reports, correspondence between the Bank and the Borrower, internal Bank memoranda and reports, field visits and discussions with the Kerala Forestry Department and the Bank staff in New Delhi and Washington.

PROJECT COMPLETION REPORT
INDIA
KERALA SOCIAL FORESTRY PROJECT
(Credit 1514-IN)

EVALUATION SUMMARY

Objectives

1. The main objectives of the project were to increase farmers' incomes and self-sufficiency in wood products through plantation of trees, making special efforts to involve tribal people; increase fuelwood, small timber and poles by establishing plantations on land belonging to the Government and other institutions; and strengthen the Social Forestry Wing of the Forest Department and related institutions with provision for investment in extension, research and training.

Implementation Experience

2. The project was implemented over a period of eight years and four months as against the six years planned at appraisal. Total planted area surpassed the appraisal targets. Implementation of the institutional development component was slow at the start, and the targets for additional staffing and vehicles were still not met at completion. The number of private nurseries which emerged during project operations, exceeding the appraisal estimate, declined dramatically following the discontinuation of the buy-back arrangement towards the end of the project. Seedling quality improvement undertaken by the project included identification of "plus trees" for seed production and collection, and formulation of seedling grading standards. However, limited attention was given to the management of "plus trees," and seed procurement for project plantations continued to be from uncertified sources and with limited quality control. Seedling grading standards were not used in day-to-day project operations, partly because of the large scale seedling production. Plant mortality was high. Technical guidance and supervision provided for private nurseries was not up to the level recommended at appraisal, and the project initiatives did not lead to major technological improvements either in nursery operations or in plantation development and management.

3. Farm forestry has been dominated by high value timber species compared to casuarina, acacia and eucalyptus recommended at appraisal. This change in stand composition has arisen from the farmers' preference for species of commercial value. Establishment of plantations on government lands has prevented further degradation of these sites. Similarly, plantations in coastal areas have become effective shelter-belts against wind and water-induced erosion. Plantations in institutional lands have not been protected well, resulting in illicit felling and damage to growing stock. Given the high literacy rate in Kerala, the project's publicity efforts have worked well. However, the expectation that the existing agricultural extension system would provide follow-up guidance did not materialize.

4. Compared to several social forestry projects in other parts of India, the implementation of the project's research component has been successful. Training activities, however, have come to a stand-still following the termination of the project and the training facilities established under the project remain underutilized due to budgetary constraints. For the same reasons, new plantations have recorded a sharp decline after project closure and the services of almost all the

staff belonging to the Social Forestry Wing are not fully utilized. The actual cost of implementing the project was Rs.897 million - with about 50 percent increase over the appraisal estimate of Rs.599 million (US\$54.5 million).

Results

5. The project proved successful in achieving its main objectives: it has improved farmers' income earning opportunities, increased wood production, helped check water and wind erosion, and strengthened institutional capacity. It did not, however, benefit the tribal population significantly. The expected returns from plantation investments are far higher than anticipated at appraisal, mainly due to the high value wood production. A key accomplishment has been the strengthening of FD for implementing a larger statewide social forestry programme capable of generating benefits in the long term.

Sustainability

6. Sustainability of several of the activities initiated through the project is in doubt because of the non-availability of budgeted funds.

Lessons Learned

7. The key lessons learnt in the implementation of the project are as follows:

8. A blanket approach to farm forestry, similar to that adopted for other social forestry projects in the country, was followed, irrespective of prevailing farming systems characterized by tree and annual crops in Kerala. Tree species provided under this approach (mainly for fuelwood and fodder) were at variance with farmers' preference for commercial species. In the design and formulation of the projects, macro-level data should be reconciled with locality-specific data/information in order to ascertain the perception and priorities of different stakeholders. For example, surveys to determine species preferences of farmers, market prospects, and site compatibility should have preceded the design of the project and would have led to more accurate predictions of planting material requirements.

9. Contrary to expectations at appraisal, farmers plant trees on their own land primarily to obtain cash incomes, rather than to meet their domestic fuelwood needs. The project's fuelwood production goals, therefore, could have best been achieved by plantations on public land.

10. While free or subsidized seedling distribution contributed positively to the achievement of the project's planting targets, in the short term, it tended to undermine the fiscal sustainability of the project after the completion of the disbursement period.

11. While designing project implementation units (e.g. Social Forestry Wing) for execution of defined project activities, consideration should be given to the eventual integration of the unit with other wings of the FD structure, thereby meeting sectoral requirements for human resources. This has the advantage of promoting staff morale and ensuring the long-term stability of the organization.

PROJECT COMPLETION REPORT
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PART I. PROJECT REVIEW FROM BORROWER'S PERSPECTIVE

1. Project Identity

Project Name	:	Kerala Social Forestry Project
Credit No.	:	1514-IN
RVP Unit	:	South Asia Region
Country	:	India
Sector	:	Forestry

2. Background

2.1 Kerala, with about 29 million people and 39,000 km² of total geographical area, is the most densely populated (700 persons/km² or three times the national average) state in India. About 29 percent of its land area is under forests, and 60 percent under cultivation. More than 90 percent of the landholdings in the state are less than 1.0 ha in size, and land use involves a mix of several crops including trees (rubber, coconut, arecanut, and cashew - often intercropped - which account for over 60 percent of the cropped area), and foodcrops (paddy and tapioca) and spices (pepper and cardamom). The state contains a large number of enterprises engaged in the production of plywood, veneer, pulp and paper, which use wood as raw material and fuel. In recent decades, forested areas available for exploitation have declined and sources of fuelwood supply have not expanded in pace with the growing demand from the increasing population. To alleviate the situation, the Government of Kerala (GOK) has been implementing since 1982 a series of social forestry schemes which have shown the potential for increasing both wood production and farm incomes.

2.2 The Kerala Social Forestry Project (KSFP), implemented with World Bank assistance, represented the largest of such schemes and covered the entire state of Kerala. It was also the sixth in the series of ten projects in India supported by the Bank with total IDA credits of some US\$500 million, mostly for social forestry development in several other states of India including Uttar Pradesh, Gujarat, West Bengal, Jammu and Kashmir, Haryana, Karnataka, Rajasthan, Himachal Pradesh and Maharashtra. In addition, a Forestry Research, Education and Training project has recently been appraised at an estimated cost of US\$56.4 million with institutional and physical infrastructure components.

3. Project Objectives and Description

3.1 The objectives of KSFP were to: (a) increase farmers' incomes and self-sufficiency in wood products through their plantation of trees, making special efforts to involve tribal people; (b) increase production of fuelwood, small timber and poles by establishing plantations on available government lands, along railroads, canal banks, roadsides and coastal belts, and grounds of educational and other institutions; (c) reduce the effects of water and wind erosion, and lessen pressure on existing forests; and (d) strengthen the existing Social Forestry Wing (SFW) of the Forest Department (FD) and related institutions, and their capability to conduct a statewide social forestry programme which would yield benefits in the long-term. Project components included: plantation activities (85,300 ha) including farm forestry (69,200 ha), large and small block plantations on government lands (11,000 and 1,000 ha respectively), plantations along coastal, railway, roadside and canal strips (2,000 ha), special (tribal) fuelwood plantations (2,000 ha), and medicinal plants (100 ha) pilot scheme, plantation protection, extension and publicity, training, research and studies, and institutional development.

3.2 As appraised in 1984, this project was to be implemented over a period of six years at a total estimated cost of US\$54.5 million (Rs.599 million) including an IDA Credit of US\$31.8 million. The Credit became effective in March 1985, providing for retroactive financing from January 1984.

4. Project Design and Organization

4.1 The project design appropriately focused on the key elements of assistance required for the implementation of a large-scale social forestry programme in the state. It correctly emphasized a low-cost farm forestry component (81 percent of the total planting target area), complementing it with needed infrastructure and support services including orientation/reorientation training for the staff of the Forestry Department and related institutions. The project also sought to address, on a pilot scale, poverty alleviation concerns through support to the tribal population (tribal fuelwood and medicinal plants component). Small and large block plantations on public land aimed at reducing pressures on existing forests, and minimizing water and wind erosion. Seedling pricing has been an area of concern from the early stages of the project cycle. At appraisal, it was expected that a limited number of seedlings - 500 casuarina and 500 of other species - would be distributed free to each participating farmer and seedlings in excess of this free limit should be paid for at the actual financial cost of production. This was intended to meet the requirements of small farmers and gradually build up incentives for the transfer of this operation eventually to the private sector. For reasons explained in para 5.21, this strategy has been neither effective nor practicable.

4.2 In order to give singular attention to social forestry development, special provision was made to strengthen the capacity of the Social Forestry Wing in the Forestry Department to implement the project. In retrospect, however, it would appear that adequate attention was not given at the formulation stage to the possibility of integrating the functions of the Social Forestry Wing and other wings, e.g. Territorial Forestry Wing of the Forestry Department. Similarly, there was inadequate recognition of the need to align the project proposals with those of ongoing projects for the development of tribal communities living in forest areas. Past experience shows that the Forest Department alone could not advance the interest of the tribal population through tree planting without supplementary investments which would generate quick returns (e.g nurseries, medicinal plants processing/marketing and small ruminants production).

5. Project Implementation

5.1 The project was implemented over a period of eight years and four months instead of six years as planned at appraisal. The Credit Agreement was amended on three occasions (September 1989, October 1990, and November 1991), to allow a higher proportion of the costs to be met by IDA. The project underwent a Mid-Term Review in 1987, and a revision in December 1990, when the Government of India (GOI) and World Bank (WB) decided to extend the project until 31 March 1993. Following this and the 1991 Credit amendment, planting targets were increased from 85,300 to 127,100 ha. The increased target covered mainly farm forestry (87,000 ha) and large block plantations (37,000 ha) and was financed from Credit savings resulting from the devaluation of the rupee. There were no major changes in other components.

5.2 **Plantation targets.** Total planted area surpassed appraisal target by 32 percent but did not reach (by 12 percent) the expanded target set at project extension. As shown in Part III/4A of the Report, there were shortfalls vis-à-vis the targets set at project extension in respect of area planted under farm forestry (9 percent), large block plantations (27 percent), and tribal fuelwood plantations (10 percent). On the other hand, there was an increase in the area under small block plantations (170 percent). The tribal medicinal plants scheme met its revised target. As compared to appraisal expectations, strip plantations achieved only 54 percent of the targets, and the farm forestry component registered a decline in its share of the total planted area from 81 percent to 71 percent. This was largely offset by the increased share of the second largest component, i.e. block plantations (from 13 percent to 24 percent). Given that plantation densities were well below appraisal estimates (see para 5.10), the total number of trees planted was below the appraisal target.

5.3 **Other targets.** The institutional development component for strengthening the Social Forestry Wing of the Forestry Department provided for incremental staffing (360), civil works, mainly residential and office buildings (521), and vehicles (359). Implementation was slow at the start, and the targets for additional staffing and vehicles were still not met at completion. Due to largely local budget constraints, only 73 percent of the planned positions were filled, and 65 percent of the vehicles procured. Some of the divisional posts were filled with junior level officers (e.g. Assistant Conservator of Forests instead of Deputy Conservator of Forests). In earlier years, unduly low schedules of rates for civil works were reported to be main factors contributing to contractor reluctance to take up construction work. These rates were later revised in 1991. Although the total expenditure on civil works was less than the appraisal allocation (in US dollar terms), the number of works completed exceeded the appraisal target by 36 percent. Residential buildings accounted for the larger proportion of this increase and most of them were constructed during the last two years of the project, utilizing a part of the Credit savings. Most of the buildings have been well constructed and utilized for the intended purposes.

5.4 **Private and departmental nursery development and production.** Seedling production for farm forestry and public plantations was to be achieved through the establishment of a network of (1,055) private and (50) departmental nurseries. Family-operated (landowner and two family members) nurseries of 80,000 to 110,000 seedlings per annum capacity were expected to play an increasingly dominant role in seedling production. However, instead of targeting individual families, project management promoted the involvement of voluntary groups and non-governmental organizations (NGOs) in the establishment and management of these nurseries. This was done to avoid any perceptions of favouritism in the selection of nursery operators, and for equity considerations. Because of quick and high returns, several of the voluntary groups/ NGOs participated. The success of this experience was influenced by timely disbursement of payments due to them. Where project payments were delayed, even the motivated voluntary groups were reluctant to continue with nursery operations.

5.5 The number of private nurseries, which exceeded the appraisal target by reaching a maximum number of 3,168 in 1988-89, has since declined to 426 (in 1991-92) mainly in response to the discontinuation of the buy-back arrangement followed under the project, whereby the project purchased all seedlings produced for distribution to applicants. Most seedlings were raised in polypots and their density was influenced by polypot size.

5.6 Private nurseries produced, on average, 150 seedlings per m² as against the production rate of 100 seedlings/m² estimated at appraisal. This is within the expected nursery operational efficiency rates of projects of this kind. However, their unit size and capacity were below the appraisal estimate. The Departmental nurseries (consisting of about 26,000 nursery beds), with a seedling production rate of 150 to 160 seedlings/m², continued to be the dominant source of seedlings for private and public sector planting activities. At project completion, only 34 percent of total seedling production was from private nurseries, and the expectation that the private sector would become the primary source of seedling production did not materialize.

5.7 **Nursery technology and management.** The project contributed to impart and transfer improved nursery development and management technology to the private sector. This was done through providing training and supplying the required inputs, e.g. seeds and polythene bags, to the participating private nursery operators.

5.8 Surveys funded under the project have reported 40 percent plant survival in farm forestry as compared to 55-60 percent in public plantations. This difference is attributable to high rates of pre-planting seedling wastage (in farm forestry) rather than differences in the quality of seedlings produced in private and public nurseries as surmised by some. Given the generally favourable rainfall conditions in Kerala, the reported plant mortality rate is high. Field observations indicate that this could have resulted from high moisture stress (drought) - micro-climatic conditions in the project area.

5.9 Seedling quality improvement initiatives undertaken by the project included identification of "plus trees" for seed production and collection, and formulation of seedling grading standards for important social forestry tree species. However, there was limited management given to these "plus trees" (e.g. for crown thinning and exposure for better seed production), and seed procurement for project plantation activities continued to be primarily from uncertified sources and with limited quality control. Seedling grading standards were not used in day-to-day operations of the project, partly because of the scale of seedling production. Similarly, no initiative at the seedling production stage was taken to improve farm forestry plant survival rates by increasing seedling tolerance to moisture stress and drought, which 60 percent of farm forestry survey respondents identified as the main factor in high plant mortality. These operational difficulties could have been addressed by: (a) incorporating grading standards in the seedling production system itself, i.e. by controlling seeding and seedling density; manipulating polypot dimensions, and nursery bed or seedling nutrient management; and (b) favouring production of seedlings with high root-shoot ratios by varying seedbed seedling density, polypot size, fertilizer composition and frequency, and applying techniques like root-pruning. Technical guidance and supervision provided for private nurseries was not up to the level recommended at appraisal (for instance in 1988-89, the ratio of forester to the number of private nurseries was 1:16 as against the recommended 1:5).

5.10 **Private and public plantations establishment.** Provision was made in the project for the free distribution of seedlings, up to 3,000 casuarina and 500 seedlings of other species, including eucalyptus and *Acacia auriculiformis* per family for farm forestry. Over 80 percent of farm forestry planting has been done by farmers with holdings of less than one hectare. Each beneficiary, on average, planted 25 seedlings, 95 percent of which were planted on farm

boundaries and homesteads. The established plantation composition, however, does not correspond to Staff Appraisal Report (SAR) expectations. Instead of casuarina, eucalyptus and acacia, farm forestry has been dominated by high value timber species such as ailanthus and teak. These changes in stand composition have arisen from the farmers' preference for species producing higher value products. A key characteristic of these changes is the need for increased plant spacing (i.e. about 4 m² per plant) which would lead to lower biomass production.

5.11 Casuarina and Acacia auriculiformis have been planted on public lands in line with the appraisal report's proposals. The planting density for both species has been about 4,000 plants/ha as compared to the high density of 4,500 and 10,000 plants per ha for acacia and casuarina respectively, recommended in the SAR. Although the SAR recommended high density could be consistent with the original main objective of the production component, i.e. fuelwood production, it was inappropriate to the home-garden conditions of Kerala. The effective stand density in established stands ranges from 2,000 to 2,223 trees/ha. Stands established under the strip component are similar to block plantations in species mix and stand structure.

5.12 **Plantation management technology.** Post-planting management in farm forestry has only been carried out in block plantings which constitute only 5 percent of these plantations. For teak block plantations, these include weeding and soil working, fertilization and irrigation, and in some cases, branch pruning to improve stemwood quality. However, in the case of boundary and homestead planting, no post-planting care has been taken of the trees as farmers at this point do not see any value in the activity. Protection by fencing and harvest-scheduling have been the only management activities carried out in respect of plantations on government land. Lack of appropriate arrangements between the project and the participating institutions for protecting the established plantations has led to illicit felling and removal of trees, particularly in strip and institutional plantations.

5.13 The farm forestry plant survival rate estimate (40 percent) is based on the number of seedlings distributed and not on plants actually planted by the beneficiary. Field observations indicate that a significant proportion of the mortality has been a consequence of high seedling wastage (i.e. seedlings distributed but not planted), especially in the early years of project implementation. Some of the wastage could be attributed to the unrealistic emphasis on acacia and casuarina seedling distribution. These species were less compatible with the existing farming system and not preferred by the beneficiaries who were primarily interested in planting high-value species like teak and ailanthus. These problems could have been minimized if appropriate pre-plantation surveys had been carried out to determine farmers' preferences.

5.14 Furthermore, trends in survival rates (35 percent to 40 percent in farm forestry and 50 percent to 55 percent in public plantations) and productivity estimates (10 to 12m³/ha/yr as compared to 15m³/ha/yr), indicate that project initiatives did not lead to major technological improvements in either nursery operations or plantation development and management. The project did not address critical problems such as high mortality due to moisture stress and drought. As discussed earlier, apart from actions aimed at increasing drought tolerance of seedlings through improved nursery management, simple moisture conservation techniques including mulching would have gone a long way in mitigating this problem. Similarly, the provision of marketing guidance based on a standing tree girth to volume conversion table would have helped farmers to estimate the volume of their wood production and enhanced their negotiating power at the time of sale of their tree products.

5.15 The establishment of plantations on government land has prevented further degradation of these sites. The coastal strip plantations have become effective shelter-belts against wind and water-induced soil erosion. However, the present harvesting plans, which involve

almost total biomass harvesting, do not give adequate attention to soil nutritional aspects of plantation management. Such a high level of biomass harvesting can result in 'export' of large amounts of soil nutrients from these areas. Therefore, it would be essential that FD, while developing silvicultural and harvesting regimes, gives due importance to this aspect of sustainable wood production.

5.16 Protection arrangements. Another area of concern relates to lack of satisfactory arrangements for protection of public plantations established, both in institutional and degraded forest areas. The arrangements for long-term protection were not worked out in advance for institutional plantations. Consequently, after the termination of FD's activities in these lands, the benefiting institutions have not taken over protection responsibilities, resulting in illicit felling and damage to growing stock. Plantations established in degraded forest areas face similar problems due to lack of well-defined responsibilities for the local communities. Although, project management organized about 300 village panchayat committees to protect these plantations, only 160 were actually established, and most of them remain non-functional.

5.17 Publicity and extension. The project's provision for publicity was mainly used for dissemination of information through radio, film-shows and news media, and publication and distribution of materials on nursery and tree planting techniques. Given the high rate (over 95 percent) of literacy in the state, this approach worked well. It resulted in creating awareness among the public about the possibility and profitability of growing trees outside the traditional forest lands. It also led to the emergence of a large number of voluntary organizations, including women's associations, interested in operating nurseries and promoting farm forestry. The Social Forestry Wing maintained good liaison with extension staff of the Agriculture Department and made use of the available rural extension facilities, e.g. "Krishi Bhavans" (farmers' meeting points) to propagate farm forestry and distribute seedlings. However, the expectation that the existing agricultural extension system would lend support for providing follow-up guidance did not materialize, as indicated by farm forestry survey results which show that up to 70 percent of the beneficiaries did not receive any planting/post-planting extension advice.

5.18 Training. Training funds were mainly used for: (a) the construction of a training centre in Arippa, situated at about 60 km away from Trivandrum; (b) Forest Department staff training; and (c) training of farmers and representatives of voluntary organizations. The Arippa Training Centre was constructed at a total cost of Rs.11 million. All the civil works, including classrooms (with a capacity for 200 trainees), dormitory, staff and guest quarters covering about 5.7 ha of land area, have been completed, and equipment and furniture procured as planned. GOK has endowed the Centre with about 200 ha earmarked for its future expansion which, given the land scarce situation in the state, reflects the state's recognition of the importance of forestry training. Since it became functional in 1990, the facilities available in this Centre are reported to have been used for training some 2,500 persons including representatives of panchayats and NGOs, and agricultural extension workers (30 percent of whom were women), in social forestry operations. Training activities have, however, come to a standstill following the termination of the project. Consequently, the Centre now remains unused, due to lack of budget for training activities.

5.19 Project funds were used both for domestic and overseas training. Three state-level forestry officials benefitted from overseas training in communication technology and social forestry. Some 34 senior forestry officials of the Social Forestry Wing participated in the project-funded study tours to various national centres in forest administration and management, grassland development, and agro-forestry. Orientation courses and seminars/workshops on social forestry techniques were organized within the state in collaboration with the Kerala Agricultural University and other institutions for about 850 FD staff. The project also conducted short-term orientation

courses for farmers, women's groups, student "nature" clubs, and representatives of voluntary organizations. The short-term nature of the training courses organized, non-utilization of training consultancies, and the apparent reluctance of the government to use Credit funds, especially for overseas training, have contributed to the less than full use of the appraisal allocation.

5.20 Research and studies. In comparison to several WB-funded social forestry projects in other parts of India, the project has been successful in the implementation of its research component. A commendable aspect is the effective collaboration between the Forest Department and research institutions in carrying out social forestry-related research. From the outset, the advice of a Technical Committee consisting of representatives from the Social Forestry Wing, Central Plantation Crops Research Institute (CPCRI), Kerala Forest Research Institute (KFRI), and Kerala Agricultural University (KAU), was used to identify research priorities and define the scope of project research studies. The project financed a number of investigations relevant to social forestry operations in the state and covering a range of subjects, e.g. wood supply and demand, traditional and improved agro-forestry systems, seed collection procedures, and medicinal plant propagation. Most of these studies were completed on time. The results of some of these studies, e.g. Biomass Yield Tables with information on production allocation to different tree components, and documentation/analysis of social and ecological dimensions of indigenous agro-forestry systems in Kerala, could provide a sound basis for future planning of social forestry development and management in the state.

5.21 Seedling pricing. In the initial years, the Social Forestry Wing was reluctant to sell seedlings lest it might adversely affect implementation of the farm forestry component. Further, during the same period, seedlings were also being distributed free of cost under other ongoing schemes in the state. Moreover, the arrangement to distribute part of the seedlings free of charge and sell the rest not only imposed a cumbersome record keeping but resulted in 'binami' transactions by beneficiaries to evade paying for priced seedlings. At the recommendation of the Mid-Term Review (MTR), cashew and grevillia seedlings distributed under the project were priced in 1988-89 at Rs.0.10 for basketed plant. This price was subsequently eliminated later due to resistance from growers. A second attempt was made in the following year to price the seedlings at Rs.0.65 for ailanthus, Rs.1.25 for silver oak, and Rs.0.25 for teak stumps. For other species which were distributed in excess of the free distribution limit of 10 naked-root and 3-basketed seedlings, prices were fixed at Rs.0.02 per naked-root and Rs.0.10 for containerized seedlings, respectively.

5.22 Tribal plantations were originally included to benefit the socially backward and poor tribal population living in and around the forest areas. Following the Mid-Term Review, these plantation targets were reduced from 4,200 to 2,100 ha which, in turn, reduced the involvement of tribals and hence their employment opportunities in the project plantations. The area under tribal medicinal plants was also small and of an experimental nature, incorporating numerous species, many of which have no market. There appears to be no indication either that the tribals would be continuing with the schemes introduced under the project or deriving any major benefits therefrom.

5.23 Monitoring and evaluation (M & E). As planned at appraisal, an M & E office was established in 1986. It implemented a monitoring system in accordance with the "Operational Guidelines to the Monitoring and Evaluation of Social Forestry in India" formulated by GOI and WB. The office also monitored the physical and financial progress of the project, and conducted farm forestry surveys for 1985-86. For other years (1987-1988), these were undertaken by the Economics and Statistics Department of the State Government. Other investigations initiated by the M & E unit include evaluation of plantations by KFRI (1985-1990), study on wastage of seedlings (1987), and an impact study by consultants. Computers provided under the project proved useful

in upgrading the monitoring process. Two posts of M & E supervisors and three posts of instructors, however, provided under the project were not filled. As a result, data processing and analysis work was adversely affected. Overall, the establishment of the M & E unit improved information collection and its documentation. However, the linkages between this unit and the planning and field divisions were limited, so that there is little evidence that implementation decisions were affected by the outcome of its studies.

5.24 Project cost. At the time of appraisal, the project was estimated to cost Rs.599.2 million (US\$54.5 million) or Rs.7,025/ha over a planting area of 85,300 ha. The actual cost of implementing the project over 112,373 ha of planted area was Rs.896.8 million (US\$52.1) or Rs.7,980/ha, representing a cost overrun of about 50 percent in rupee terms or nearly 14 percent in per ha/rupee terms. The depreciation of the rupee against the US dollar has, however, led to an under-run of 5 percent in costs expressed in dollars. As expected, about 60 percent of the costs (compared to 58 percent at appraisal) were incurred directly on plantation activities. Total project costs at appraisal and completion of the project are given in Part III/5A. As shown in Table 2, the cost increase of 50 percent in rupee terms was caused by escalating prices and wages, which accounted for 44 percent of the additional costs; and quantities higher than the appraisal estimates which accounted for 6 percent of the additional costs. The breakdown of cost overruns is presented in Table 2.

5.25 Cost control. The project design has sought to reduce the cost of plantation models by allocating the largest share to the least cost plantation system (i.e. farm forestry). The design however acknowledged the additional benefits (production of poles and fuelwood on otherwise unproductive land, generation of considerable employment and conservation of land) obtainable from block plantations on government wasteland, which were sufficient to justify its high cost. It was considered appropriate to limit the extent of generally high cost strip plantations. Appraisal expectations have, by and large, been met as total cost per ha at project completion is estimated at Rs.5,320 (farm forestry), Rs.15,886 (large block plantation), Rs.8,713 (small block plantation) and Rs.10,750 (strip plantation). The overall project cost increase of 50 percent is partly explained by a reduction in the share of low cost farm forestry plantations, i.e. 71 percent of the total planted area compared to 81 percent foreseen at appraisal.

6. Project Results

6.1 The project was successful in achieving its main objectives: it has improved farmers' income earning opportunities, increased production (though less than expected) of fuelwood, poles and timber, helped check water and wind erosion, and strengthened the institutional capability of the Social Forestry Wing of the Forest Department and related institutions. It did not, however, benefit the tribal population significantly, limiting their involvement to very small-scale plantation schemes. The project has directly generated 2.30 million person-days of employment from plantations, about 30 percent higher than targeted at appraisal. Despite its overall achievements, the project suffered from some serious shortcomings. These related to distribution of seedlings without ascertaining farmers' preferences, high seedling wastage, lack of attention to moisture stress and drought which adversely affected plant mortality, and lack of satisfactory arrangements for protection of public plantations.

6.2 Production. Current estimates place the eventual size and distribution of production at 5.2 million m³ of fuelwood, 9.9 million m³ of timber, and 1.2 million m³ of poles, giving a total production of 16.3 million m³ over a 32-year production cycle, which equals only about 33 percent of the appraisal estimate. This large shortfall in project production is due to: (a) lower effective plant densities in farm forestry, i.e. 1,000 plants/ ha compared to the SAR estimate of up to 3,000/ha; (b) reduced effective densities in public plantations - one-half to one-fourth of

SAR projections because of a combination of low initial planting densities and mortality; and (c) Mean Annual Increments (MAIs) ranging from 8m³ to 12m³ per ha, compared to the SAR estimate of 10 to 15m³/ha for different species.

6.3 At appraisal, 72 percent of total production was expected in fuelwood and poles, and 28% in timber and peelers. However, as a consequence of change in the species mix and effective densities in response to farmer demand, the product mix would be 39 percent and 61 percent in fuelwood/pole and timber respectively. In spite of the reduced volumetric production, in farm forestry, the expected returns from plantation investments are far higher than anticipated, mainly due to production of high value teak and ailanthus.

6.4 **Financial analysis.** Financial rates of return, not estimated at appraisal, have been calculated based on PCR estimates of biomass yields and prices, detailed in Annex 1. The cash flows for the main plantation models (taken over a 32-year period), have been estimated using average level of costs updated to 1992/93. Costs are calculated per hectare and 1992/93 constant prices are used for both costs and returns. Farmers' labour inputs and products accruing to rural households have been valued at imputed prices equal to market wage rate (Rs.40/person-day) and prices ranging from Rs.20/pole to Rs.1,200/m³ for timber (see Section 6D of Part III). The opportunity cost of land is valued at Rs.1,000/ha/yr for only block planting by farmers which is assumed around 5 percent of the area planted to farm forestry, and Rs.100/ha/yr for grazing areas in public land. The results of the analysis show favourable rates of return ranging from 33 percent to 57 percent depending on the type of planting.

6.5 **Economic re-evaluation.** An economic re-evaluation has been undertaken for the project as a whole and for three of the five sub-projects. In line with the methodology of the SAR, no benefits have been included for the pilot tribal programme for the cultivation of medicinal plants which only account for 0.1 percent of total planted area. Similarly, production from tribal fuelwood plantations has been excluded due to inadequate and incomplete monitoring data. This accounts for less than 2 percent of total planted area. The analysis has been carried out in 1992/93 prices with past expenditures restated in 1992/93 price terms using the wholesale price index. Phased investment costs in financial terms, as well as in economic terms for the purposes of the analysis are shown in Table 1. The details regarding planted area and expected yields, as compared with the assumptions at appraisal, are in Annex 1. The following conversion factors have been used in converting the financial prices to economic values:

Unskilled labour including farm labour	0.70
Standard conversion factor (SCF)	0.80

Output prices, in financial and economic terms at stump, are summarized in Part III/6D. A 32-year period of analysis has been used for the purposes of estimating ERRs.

6.6 Based on the above assumptions, species mix and yields, the current estimate of ERRs for the project as a whole and for the two sub-projects (farm forestry and departmental plantations) are 33 percent, 45 percent, and 29 percent as compared with the appraisal estimate of 26 percent, 33 percent, and 15-26 percent respectively. A combined analysis was undertaken for the departmental plantations (large block, small block and strip plantations) in the absence of adequate segregation of investment costs. The improved output prices (especially for timber) and shift of species mix to high value items have more than offset the reduced survival rate (40 percent in contrast to the appraisal estimate of 60 percent).

6.7 The sensitivity analysis indicates that a reduction in benefits by 20 percent would lower the ERR for the project as a whole to 29 percent; a reduction by 50 percent would lower the

ERR to 22 percent; while an increase in cost by 20 percent and by 50 percent would reduce ERRs to 30 percent and 27 percent respectively. A combined reduction in benefits and increase in costs by 50 percent will lower the ERR to only 16 percent. The project is therefore not sensitive to variations in either costs or benefits.

7. Project Sustainability

7.1 A key accomplishment of the project has been the strengthening of the Forest Department, and related institutions, to provide support for implementing a large-scale tree planting programme outside the traditional forest lands over the long term. However, sustainability of the programme is in doubt because of the non-availability of budgeted funds, particularly for plantation development in public lands with the result that the strengthened institutions cannot be effectively utilized. At present, the services of almost all the staff (about 300) belonging to the SFW, are not utilized for want of a budgeted programme for forestry operations. Similarly, the physical facilities established through the project are likely to remain under-utilized in the absence of such support. Sharp declines in the scale of post-project plantation programmes and in the training activities at Aripipa centre are indicative of this problem. Project plantations generate adequate resources generally providing surplus revenue to meet continuing development needs. A revolving fund mechanism, as recommended by the Bank missions, appears to be an ideal option to keep aside funds for sustaining project forestry operations.

8. Bank Performance

8.1 The Bank support to the project until its completion was satisfactory. The supervision missions included competent foresters familiar with the local situation, as well as with operational aspects of social forestry projects in other parts of the country. Besides providing continuity in their staffing, the Bank supervision missions made useful contributions towards adoption of bio-engineering soil and moisture conservation techniques. The Bank responded flexibly in dealing with problems of financial management. The decision to increase disbursement percentages helped to relieve local funding shortages and attain higher targets but in so doing could have reduced the pressure on the state government to allocate the funds required to sustain the institutions. Timely extension of the project closing date enabled the government to utilize the Credit savings for expanded operations.

9. Borrower Performance

9.1 The project was the first major effort in the forestry sector ever undertaken by the state government. In spite of this, the FD adapted itself well to the project implementation needs. The Social Forestry Wing responded positively to several of the recommendations of the supervision missions. A noticeable shortcoming was lack of progress in the establishment of the "Revolving Fund" to utilize the returns from project investments. The effectiveness of some of the project operations was hampered by a number of factors, including delays in the release of local funds, limited deployment of project staff for supervising private nurseries and monitoring and evaluation of project activities.

10. Project Documentation and Data

10.1 The SAR provided a general framework for project operations. In retrospect, it would appear that it should have been supplemented by an implementation manual specifying technical and management aspects of plantation development (i.e. nursery layout, application of

seedling grading standards, stand establishment procedures including pre-plantation surveys, silvicultural practices, and harvesting regime) for enhanced project performance.

11. Lessons Learned

11.1 A blanket approach to farm forestry, similar to that adopted for other social forestry projects in the country, was followed, irrespective of prevailing farming systems characterized by tree and annual crops in Kerala. Tree species provided under this approach (mainly for fuelwood and fodder) were at variance with farmers' preference for commercial species. In the design and formulation of the projects, macro-level data should be reconciled with locality-specific data/information in order to ascertain the perception and priorities of different stakeholders. For example, surveys to determine species preferences of farmers, market prospects, and site compatibility should have preceded the design of the project and would have led to more accurate predictions of planting material requirements.

11.2 Contrary to expectations at appraisal, farmers plant trees on their own land primarily to obtain cash incomes, rather than to meet their domestic fuelwood needs. The project's fuelwood production goals, therefore, could have best been achieved by plantations on public land.

11.3 It would have been advantageous to broaden the definition of farm forestry targets by including both the area planted as well as the number of households benefited.

11.4 While free or subsidized seedling distribution contributed positively to the achievement of the project's planting targets, in the short term, it tended to undermine the fiscal sustainability of the project after the completion of the disbursement period.

11.5 While designing project implementation units (e.g. Social Forestry Wing) for execution of defined project activities, consideration should be given to the eventual integration of the unit with other wings of the FD structure, thereby meeting sectoral requirements for human resources. This has the advantage of promoting staff morale and ensuring the long-term stability of the organization.

11.6. When a component (such as the medicinal plants pilot scheme under this project) forms an insignificant proportion of the total project investment and is outside the direct purview of the implementing agency (FD), it receives only slight management attention and seldom attains its goals.

PART II. PROJECT REVIEW FROM BORROWER'S PERSPECTIVE

KERALA SOCIAL FORESTRY PROJECT

CREDIT 1514-IN

PROJECT COMPLETION REPORT - PART II

SOCIAL FORESTRY WING, KERALA FOREST DEPARTMENT
THIRUVANANTHAPURAM.

JULY 1993

Kerala Social Forestry Project (CREDIT 1514-IN)Part II PCRIntroduction:

The Social Forestry Programme in Kerala with the assistance of the World Bank started in the year 1984. The agreement was executed on 12..12..1984. As per the project document the period of the project was fixed as six years 1984 to 1990. The original cost of the project in terms of SDR was fixed as 30.6 million and US \$ 31.8 million in rupee terms Rs.599.1 million. The important objectives of the project and the components are narrated below:-

- to increase the farmer's incomes and self sufficiency in wood products through their plantation of trees;
- to increase production of fuelwood, small timber and poles by establishing plantations on available Government lands, along the sides of railway lines, on 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 State wide Social Forestry Programme which would yield benefits in the long term.

The project consists of the following components:

1. Distribution of 340 million seedlings under farm forestry to raise plantations of about 69,000 ha.;
2. Large and small block plantations in Government land totalling 12,000ha.;
3. Strip plantation of 2,000 ha. along canal banks, road sides, railway sides and coastal belts;
4. Special plantation schemes for tribal people to the extent of 2,100 ha.;
5. Establishment/improvement of small family operated nurseries and large nurseries serving departmental plantations;
6. An intensive programme of extension and publicity, strengthening the linkage between Social Forestry and Agricultural Extension;
7. Training for Social Forestry staff, Voluntary and other interested organisations and farmers, and strengthening of selected institutions for Social Forestry Training;
8. Research activities including development of recommendations to be transmitted to the farmers by extension and evaluation of planting programmes, carrying out of forestry related research and studies and a wood supply and demand study;

9. Improving the capability of small farmers and schools to handle nursery work and increasing the role of voluntary organisations, and rural communities in Social Forestry; and
10. Monitoring and evaluation of the project in accordance with the guidelines for Monitoring and Evaluation developed by Government of India and IDA.

By the year 1990 the Social Forestry Project achieved the complete physical targets laid down in the original project for farm forestry and block plantation. Civil works were also progressing and other activities like extension training, research and studies, monitoring and evaluation were all progressing. The rate of exchange of rupee vs Dollar and rupee vs SDR depreciated considerably and as a result of which the physical targets were revised. There was about Rs.400 million available in the project account. This necessitated for the extension of the project from 1990 for two more years upto 1993. In the extension proposals submitted in 90 it was proposed to undertake additional planting activities to the extent of 16,410 ha. in the degraded forests and civil works 410 additional buildings and purchase of few vehicles and equipments etc. In farm forestry 4.5 crores seedlings were targeted for distribution.

The combined achievement are furnished below:

Achievements:

	<u>ha.</u>
Large Block Plantations	- 27027.01
Small Block Plantations	- 2696.49
Strip Plantations	- 813.744 + 200.93 Km.
Tribal Fuelwood Plan	- 1665.10
Tribal Medicinal Garden	- 112.60
Civil Works	- 507. No.
Farm Forestry	- Distributed 38.49 crores seedlings equivalent to 79969.50 ha.

Research & Studies:

The Kerala Social Forestry Project has a Component Research and Studies. We had entrusted three Research Institutions viz. Kerala Forest Research Institute, Kerala Agricultural University, Central Plantation Crops Research Institute - a few research projects and The following studies have been completed and final reports received.

<u>Name of Research Project</u>	<u>Agency</u>
1. Coconut based Agro-forestry Systems.	- C.P.C.R.I., Kasargode.
2. Oil Palm Based Agro-forestry.	- C.P.C.R.I., Kasaragode.
3. Demand and Supply of Wood and their Future Trends.	- K.F.R.I., Peechi.

4. Litter Dynamics root nodulation and microrizhial association in *Accacia Auriculiformis*. K.F.R.I., Peechi.
5. Water use of selected indigenous and exctic trees. - K.F.R.I., Peechi.
6. Propagation of Medicinal Plants Bamboo and Rattan by tissue culture methcds. - K.F.R.I., Peechi.
7. Studies on yield from Acacia Plantations in Kerala. - K.F.R.I., Peechi.
8. Exploitation of indigenous multi-purpose tree species in Agro - Social Forestry Systems. - K.A.U., Vellayani
9. Seed viability and germination studies in selected forest tree species. - K.A.U., Vellayani.

Financial Achievements:

The project had spent approximately Rs.87 crores till 31.3.1993 since its inception.

PART -II

(a). Adequacy and accuracy of factual information in Part-III of the P.C.R.

We have not received the Part-III of the P.C.R. from the Bank. Hence unable to comment at this stage.

(b). Comments on analysis of Part-I of the P.C.R.

As the Part-I of the P.C.R. has not been received from the Bank till now, we are unable to offer our Comments.

(c). Bank's performance during the evolution and implementation of the project.

The success of the Kerala Social Forestry Project is mainly attributable to the co-ordination and Co-operation extended by the Bank and its staff during the implementation of the project. The Bank's personnel consisted of professionals in all relevant disciplines. The mission members were experienced in their respective fields. The over all performance of the Bank during the implementation was extremely good.

Lessons learned.

1. The Social Forestry Project of Kerala learned certain lessons which are summarised below while implementing the programme.

2. Once the Bank sanctions the loan a 'Pass Book System' should be introduced. The pass book will contain the details of the loan amount and the subsequent withdrawals of the credit by way of 'reimbursement claims' and the balance at credit in the borrowers' account. In the case of Kerala Social Forestry Project a monthly disbursement summary was received intermittently through the Government of India. The monthly disbursement summary did not contain the current exchange rate at which the loan amount has been debited. As a result of which the borrower could not calculate the amount available in his credit at a particular point of time without consulting Government of India. This information will enable the project authorities to formulate their plans and take appropriate steps for speedy implementation of the project.

3. Flexibility required:

The project document contains the sanctioned amount for different components of the project. However, when the actual implementation takes place there may be a few interlinked activities to be carried out which may not find a place in the approved project document. Such interlinked activities would supplement and act as complement to the whole activities which have been undertaken. In such cases the project authorities are not given the liberty to allocate funds for the inter-linked activities. Therefore, a flexible approach

is required in respect of allocating money to the project components and some flexibility to be made available to the Project Manager. This flexibility may be fixed in terms of the percentage of financial target of each component.

4. Timely release of funds:

As per the usual pattern of funding, the State Government have to spend the amount first, and claim reimbursement afterwards. It has been our experience that and as per the available records in our office, the reimbursement claims were combined two or three together and the amounts released. Though during 1992 advance payment of the financial assistance was sanctioned on some occasions; it was not done regularly. Therefore there should be periodic release of amounts in advance to the State Government within definite intervals. This will enable smooth and timely implementation of the programmes. The assistance received may have to be utilised by operating a separate treasury account free from any treasury ban.

5. Monitoring:

Monitoring of the project by the Bank should begin with the commencement of the project work, as against its commencement from mid-term appraisal. This would enable to strengthen the monitoring and evaluation activities and take appropriate decision in time.

6) Composition of the supervision mission:

The supervisory mission should consist of not only qualified personnels and professionals from the Bank but also some local members from different disciplines so that the assessment of the project as well as addressing the problems at the time of implementation could be made more effective.

7) The need for a Bank's representative in the station:

As far as possible the Bank should station a designated officer or its representatives along with the project implementation authority so as to have better co-ordination and easy decision making.

- h) Borrower's own performance during the evaluation of the implementation of the project with special emphasis on lessons learned that may be relevant for the future.

The Social Forestry Wing did not have any major problems while implementating Social Forestry Programmes in Kerala. The targets laid down in the approved project document were achieved well within the time.

The Bank's supervisory mission have been making review reports. The suggestions and recommendations contained in the report were also complied with to the extent possible. The covenants of the project have been complied with in time. The project has created better positive impact among the people of Kerala. The following are the summary of the positive indicators:

1. The scope of agro-forestry in Kerala have increased with the advent of the Social Forestry Programme. The tree growing habits of the people have changed and strengthened further the gamut of agro-forestry and multiple tree cropping pattern. One of the brilliant features which can be found in Kerala is that every household however small, grows both agricultural and forestry species. This has been reflected in the farm forestry surveys conducted by the Department. It exhibited that 72% of the population on an average, required seedlings for growing in future. This shows the institutionalisation of the social Forestry Programme in the state as a whole.

2. In the succeeding years it has been found out that the demand for timber species especially teak, has been very high. The fruit bearing trees were also in great demand. Similarly 'Ailanthus' is another species which is in great demand. This will show the composition of the agro-forestry system prevailing in Kerala, which has been established by the Social Forestry Programme.
3. Many institutions who had wastelands offered and co-operated with the Social Forestry Wing in afforesting the entire area which is a great achievement. Extensive wastelands available with Universities, V.S.S.C Thumba, Government Offices, P.A.C.T COCHIN etc. have been afforested successfully.
4. It is a fact that both sides of the National Highways over long distances have been covered by strip plantations by the social Forestry wing which even now stand as a testimony to the success of the programme.
5. As a result of the advent of the Social Forestry Programme, a joint awareness in greening has picked up among the people. The people are aware about the environment and its necessity for preservation and the need for creating environmental conservation plans and the ill effects of deforestation. Soil Conservation methods were adopted. Propagation about the

Social Forestry activities were carried out through various audio-visual mediums to the people and they are now aware of the programme. The "unanimous" will of the people is to grow more trees.

6. Enhancement of area under the forests:-

There has been an increase in the area covered under planting which has added upto the total area of forests of Kerala. More than ten thousand hectares of fallow land comprising those along railway lines, road sides, institutional compounds and other Revenue lands have been afforested with good stocking. They are all outside the reserved forest.

7. As a result of undertaking the Social Forestry Programme the infrastructure for the forest department has considerably created and many assets have been created and which would not have been possible had not the Bank provided the finance. Some of the major buildings are:

- i. The Social Forestry Headquarters at Thiruvananthapuram.
- ii. The Arippa Training Centre
- iii. Regional Offices at Kollam, Kottayam and Kozhikode.

Besides, District Level Offices, Quarters, dormitories etc. have been constructed. Thus the total assets in terms of buildings doubled during the 8 year period of the project.

8. Augmentation of many failed plantations and degraded forests within the reserve forests increased the biomass to a considerable extent.

Experiences :

The project document laid down farm forestry, block plantations, extension and training and Civil works as the major components of the project. The main thrust of the project document was given to the farm forestry programme in which seedlings were distributed to the public for planting in their homesteads. In the initial stages seedlings were distributed free of cost but later on pricing of seedlings was introduced gradually.

(i). Farm Forestry Programme.

As already stated this component constituted about 81% of the total planting programme. The farmers in most parts of Kerala are sophisticated tree growers and they have wide range of horticultural tree species such as coconut, cashew nut, arcanut etc. The objective as envisaged in the project was to increase the income and self sufficiency of the small farmers by adopting the Social Forestry programme as they will grow small timber, poles and fuelwood and fodder species. The unique feature of the farming community is that majority of the land holdings are small i.e. less than 2 hectares. But at the same time the farmers grow multiple tree species in the available lands, which formed a unique land use pattern.

During the mid-term appraisal of the project it was suggested that there has been a large demand for seedlings but the supply has to be channelised in a careful manner so as to avoid wastage of seedlings. A distribution register

was maintained from each distribution centre which contains the relevant details about the seedling distribution programme. The NGOs were involved in the distribution of seedlings. Further, the mission appraisal suggested that regular inspections should be carried out to avoid wastage and the Forest Department should provide better training to the farmers as well as NGOs. It was also further pointed out that the farmers should be given the freedom to select the species. While pointing out the need for better extension activities, it was brought to the notice that in many cases the extension should focus on the following:

- (a). Right spacing.
- (b). Appropriate species.
- (c). Planting of seedlings in a shady area.
- (d). Tackling weed menace
- (e). Right Pit sizes.
- (f). Application of manures and fertilizers and insecticides.

In the subsequent years the above points were considered in great detail. Consequently to avoid wastage, pricing of seedlings was introduced initially in four districts in 1988-'89. There was resistance from the farmers and the off-take of seedlings was considerably low. After the bitter experience in the district of Kollam, cashew seedlings^{were} distributed free of cost as demanded by the local people.

Afterwards, the department started limiting the supply of free seedlings to a particular no. and thereafter charging a nominal price. After great resistance this was accepted by the people. The department resorted to charging of production cost and the current practice of charging the production cost is being continued. The Government also co-operated with the department in issuing the order in accordance with the species.

IMPROVED EXTENSION AND TRAINING FACILITIES.

Originally, it was conceived that extension should be carried out through the Agricultural Extension T&V system prevalent in Kerala. But as the system did not work well we had to resort to our own way of imparting training and extension work. The Kerala Agricultural University was involved in giving training to the people. Similarly in the latter years the "Krishi Bhavans" of the Agricultural Department were also involved in imparting information on Farm Forestry to farmer groups.

As per the monitoring and evaluation survey report on farm forestry it was recommended that the extension support should be strengthened further in the farm forestry sector for better results. The wing yielding to this recommendation charted out training programmes for farmers, voluntary organisations, NGOs. These training programmes are conducted from the institute at Aripa and also from

the Regional Extension Centres established for the purpose. Apart from this training, monthly work shops, seminars, exhibitions and audio-visuals programmes, group discussions are arranged and large numbers of farmers participate in the programme.

Role of Voluntary Organisations:-

The Social Forestry Wing in the initial stages entrusted the work of distribution of seedlings to the NGOs/Voluntary Organisations. The Voluntary Organisation arranged distribution centres, at the time of seedling distribution and maintained the distribution registers. It was experienced at that time many of the NGOs were not doing their work properly and there were wastage of seedlings. This has been pointed out in the farm forestry survey report as well as in the evaluation report. To avoid this the wing resorted to giving some incentives to the voluntary organisations for the good work done by them. For eg., a small unit of the NGO like Sports & arts club will be given a sports kit as incentive. This enabled better distribution of seedlings avoided wastages of seedlings considerably.

During last year we have established the Panchayat Committees for the distribution of the seedlings. The committees were formed with the officials and representatives from the Department, Panchayats, Voluntary Organisations and local Villagers. They were given the choice to select the type of species to be distributed and they were given money for taking up the nurseries in accordance with the demand for local species. It functioned extremely well and now the committees are continued. With the involvement of the Panchayats the decentralised 'Micro-Planning' system was introduced in the Kerala Social Forestry activities. The committees will also make an assessment of the available resources in the village and tailor the Social Forestry Programme accordingly. This was in contrast to the earlier centralised system of decision making by the Forest Department.

Nurseries:

In the initial stages of the project, nurseries were established by the Forest Department itself to produce the required seedlings. Usually, the nurseries are established very near to a water source. Subsequently it was found that training in nursery management are required and this was also imparted from the Training Institute at Arippa.

Grading of seedlings:

The quality of the seedlings produced from the nurseries were checked regularly and it was found that the quality required to be improved. Therefore, "grading of seedlings" were introduced and the grades were prescribed and seedlings produced for distribution.

Guidelines were issued with regard to the 'package of practices' to be adopted for better nursery management. This is being continued.

Decentralised nurseries and Private nurseries

To encourage the local people to take up nurseries a decentralised nursery scheme was adopted. Under the scheme public were given a sapling and the poly bag, and they have to fill the bag with soil and grow the seedlings. After the seedlings reach a particular height they are free to sell these seedlings in the open market and if they are unable to sell the department will come to rescue by offering a 'buy back' price @ 30 paise per seedlings which has been subsequently enhanced to 45 paise per seedlings. Many missions visited and after their recommendations it was decided that the composition of private nurseries in the total nurseries will have to be enhanced to that of 66% and the remaining 33% will have to be established by the department. The directions issued by the World Bank that for departmental plantations seedlings will have to be purchased from the private nurseries was also adhered to the extent possible. But this was not possible in all cases since some of the plantations were far, in the interior where decentralised nurseries did not exist.

Regular Assessment:-

The Farm Forestry survey has been regularly conducted to assess the survival percentage of the seedling distributed under the programme. As per the survey the survival percentage hovers round 40%, Inter alia, the survey also made an indepth ^{Study} / on the reason for mortality of the seedling distributed and the future trends and extension activities

etc. The recommendations of the survey were timely acted upon in the subsequent years.

Plantations:

Block plantations represents the second largest component of the Social Forestry Programmes. Different categories of block plantations were envisaged in the project report. As per the project report the different categories and large block, small block, strip, tribal fuelwood and tribal medicinal gardens. Block plantations, barring a few, maintain good standard. Tribal fuel wood plantations are the same as other fuel wood plantations except in their location. Medicinal gardens have not succeeded in most of the cases as they are quite new and marketing has not been properly established.

Supervisory Missions visited and recommended that the strip plantations should be raised in two or three rows and in the first row flowering plants should be planted. The fuelwood and small timber plants should be planted in the second and third row. Fencing should be of live fence (Glyricidia, Jedropha) accordingly we have established the strip plantations throughout the State.

Harvesting plan - Management of plantations:-

As per the directions of the World Bank we have prepared a harvesting plan 'A Management Plan fixing the rotations' and submitted to the World Bank also. The detailed harvesting plan contains the district-wise plantations and area in hectares ready for harvesting in future.

Benefit sharing:-

The Steering Committee of the Government of Kerala

which monitors the project activities decided that the benefit sharing with the people should be in the following manner. In accordance with this decisions the Government of Kerala also issued a G.O. on benefit sharing.

1. The poles will be disposed of in open auction.
2. 75% of the produce will be disposed of in open auction ^{at} per auction rates.
3. 25% of the quantity of the fuelwood will be sold at 75% of the price fetched from the auction.

The order was not a workable proposition and therefore we submitted a proposal to liberalise the order and give more benefits to the people. As per the proposal submitted to the Government, 50% of the produce will be sold at a concessional rate to be people residing nearby the plantations.

Apart from the above twigs, branches, lops and tops dried materials etc. are supplied to the local people free of cost staying nearby the plantations. In 1988 in the district of Palakkad we have distributed the above thinned materials to be local people through committees. The criteria for selection of the beneficiaries is that the income as suggested in the ration card reckoned as Rs.500/- per month. This has been successfully done.

Technology Manual:

A technology manual for the plantations translated into the local language was prepared. The technology

manual covers various models of plantations, treatments, package of practice, micro-planning etc.

The multi-tier 'V' ditch planting:

The World Bank Mission recommended to adopt a vegetative, conservative multi-tier technology, intergrating planting and soil conservation works. As per the directions 30% of the total area under planting in an year should be brought under this scheme. We have attempted on this and almost ⁱⁿ every district 'demonstration plots' have been established to show to the public to adopt this technology.

Evaluation of plantations:

Evaluation of the plantations was conducted by the Kerala Forest Research Institute assessing the survival percentage in the plantations. According to their report 65% to 80% is the survival in these plantations.

Tribal Schemes:

As a part of the Social Forestry Programmes tribal fuelwood plantations were established in almost all the districts of Kerala. In these plantations tribal were engaged by the Department giving employment to them and the benefits were shared with them. The activities were planting Pepper, Rubber and Coconut. Further maintenance have also been done by department in certain areas

where the tribals are not conversant with that. Digging wells, constructing approach roads, constructing tribal houses and farm approach roads also have been done in some cases as approved by the District Level Committee. A tribal medicinal garden was also established. The produce from these plantations are shared as per a G.C. which stipulate for 75% of the sale produce will be distributed in cash among the tribal families and 25% of the amount will be deposited in a fund which will be used for common welfare activities of the tribal to ensure graduation of tribal families to self sufficiency.

MONITORING & EVALUATION

The Monitoring & Evaluation is an inbuilt mechanism in the project to monitor effectively the implementation of the Social Forestry schemes and to recommend suggestions for improved execution and assess the performance of the project. Monitoring could be done more effectively during the extension period of the project. A team of Officers from the headquarters were utilised for this purpose. They visited almost all divisions and send status reports. Based on their observation in respect of

- (i) Formation of nursery
- (ii) Quantity and quality of seedlings produced.
- (iii) Planting activities.

the defects were rectified.

Two stages of evaluation were done (1) the Farm Forestry survey which were conducted by the Department of Economics and Statistics and (2) Evaluation of plantations by the Kerala Forest Research Institute.

Constant monitoring were done by the Department and progress reports and inspection of nurseries distributions were done by the Senior Officers of the Department periodically. Whenever aberrations have taken place corrective measures were adopted.

The Farm Forestry surveys mainly assessed the survival of the seedlings distributed under the farm forestry programme. The method used was stratified systematic random sampling technique in selection of households. A detailed questionnaire was prepared and got filled up. While collecting the data details were also collected regarding extension advice, regarding future needs of the people willingness to plant more trees reason for mortality etc. These have been tabulated and presented in the report.

Based on the findings of the report periodic changes have been introduced in the implementation of the scheme. For instance the survey report indicated that many people are inclined to take fruit bearing trees and horticulture species. In the subsequent years of seedling distribution, the quantum of fruit bearing and horticulture species were increased.

Similarly extension activities were accentuated based on the report. The number of training programmes and the number of workshops the number of meetings, seminars were considerably enhanced in the subsequent years.

Research :

The project provided for undertaking a few research studies to improve the current practices and to design the future course of action to be adopted for better implementation of the programme. The Kerala Agriculture University, the Central Plantation Crops Research Institute, Kerala Forest Research Institute were engaged in the research studies. The reports have been received and are readily available in the office. Based on these reports also we have introduced some changes in the implementation of the programme. For instance the Central Plantation Crops Research Institute report found out that Ailanthus is the best inter crop to be grown in the midst of coconuts. This was introduced in the farm forestry and there are many homesteads where Ailanthus and Coconut are grown together for better results. Kerala Forest Research Institute have conducted a few studies on yield from Acacia plantations which is used for collecting the total biomass availability. Similarly the Kerala Forest Research Institute have conducted a demand supply of wood studies which is also very useful.

- (e) The relationship between the Bank in borrower during the evolution and implementation of the project.

There was a co-ordial relationship and the Bank co-operated and supported the Social Forestry Programme in a very effective way. There has been no difference of opinion nor any conflict nor any major problems.

- (f) Evolution of the performance of the co-financiers and assess their relationship with the borrower during the evolution and implementation of the project.

There has been no co-financiers and the Social Forestry Wing had implemented only one project with the assistance of the World Bank and hence there are no comments on this point.

Summary

To sum up the World Bank's assistance to the forestry sector in Kerala has helped to a very great extent in developing the infrastructure for the department to institutionalise the social forestry activities in the long run.

Traditionally, the Forest Department had to play a regulatory role in the protection of environment & forests. People were not involved in the forestry activities. The social forestry paved a great way in opening up the forest to the people. They were made to realise the need for protecting their environment and the need for preserving the forests, and the way for sustained economic development. If one scans through the records it would reveal that forestry was regarded as a 'revenue earning department' and little was done towards afforestation programme. Consequent upon taking social forestry, better management of forests ushered in. People were also allowed to partake in the nature building activities. The contractual obligation of the people to offer services for protecting the forests and thereby take away their legitimate share of forest produce strewn the way for better economic development. This enabled the forestry sector to be managed in a democratic way. The people were also provided with ample employment generation programme and in effect made them more self-reliant.

Prl. Chief Conservator of Forests (SF&V).

PART III

1. Related Bank Loans and/or Credits

Credit Title	Purpose	Year of Approval	Status
Uttar Pradesh Social Forestry Project (Cr.925-IN)	To increase the supply of fuelwood in rural areas, to provide poles, bamboo, small timber, fodder grass and minor forestry products and strengthen the social forestry organization to carry out project works.	1978	Completed
Gujarat Social Forestry Project (Cr.961-IN)	(as above)	1979	Completed
West Bengal Social Forestry Project (Cr.1178-IN)	(as above)	1982	Completed
Jammu and Kashmir and Haryana Social Forestry Project (Cr.1286-IN)	(as above)	1982	Completed
Karnataka Social Forestry Project (Cr.1432-IN)	To augment fuelwood supplies in priority rural areas and semi-urban areas, and to provide small timber fodder and other related forest products.	1983	Completed
National Social Forestry Project (Cr.1611-IN)	To assist the States of Gujarat, Uttar Pradesh, Himachal Pradesh, & Rajasthan to expand and improve their social forestry activities.	1985	Completed
Maharashtra Forestry Project (Cr.2328-IN)	To support restructuring and rationalization of the State's Forestry Department and its investment programmes, and to foster a greater role in forestry and development for village communities, non-government institutions, cooperatives and the private sector.	1992	Ongoing
West Bengal Forestry Project (Cr.2341-IN)	To support Government of West Bengal Forestry Department programme through installation of a sustainable protection system in all regions in the State, enhancement of forest productivity and conservation of biodiversity.	1992	Ongoing

2. Project Timetable

Item	Date Planned	Date Revised	Date Actual
Preparation	-	-	1983
Appraisal	-	-	Jan/Feb. 1984
Negotiations	-	-	June 1984
Board Approval	-	-	July 31, 1984
Credit Signature	-	-	Dec. 12, 1984
Credit Effectiveness	-	-	March 5, 1985
Closing Date	Dec. 31, 1990	Dec. 31, 1991	March 31, 1993

3. Credit Disbursements

Cumulative Estimated and Actual Disbursements (SDR Million)

	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94
Appraisal Estimate	2.50	6.30	11.40	17.00	22.80	28.90	30.6	30.6	30.6	30.6
Actual	0.3	2.5	6.2	10	12.6	15.4	18.5	22.8	24.7	24.8
Actual as % of Estimate	12%	40%	54%	59%	55%	53%	60%	75%	81%	81%

Comments: SDR4.5 million was cancelled on December 5, 1991. Final disbursement from the Credit was made on August 19, 1993 and the undisbursed balance of SDR1.3 million was cancelled. The final Credit amount was SDR24.8 million.

4. Project Implementation

A. Physical Targets and Achievements

Item	Appraisal Target		Extension Target ^{1/}		Actual Achievement ^{2/}	
	(ha)	(%)	(ha)	(%)	(ha)	(%)
1. Farm Forestry	69,200	81.1	87,000	68.5	79,962	71.2
2. Plantations on Government land						
- large blocks	11,000	12.9	37,000	29.1	26,875	23.9
- small blocks	1,000	1.2	1,000	0.8	2,711	2.4
- strip plantation	2,000	2.4	-	-	911	0.8
- tribal fuelwood	2,000	2.3	2,000	1.5	1,801	1.6
- tribal medicinal	100	0.1	113	0.1	113	0.1
Total Area Planted	85,300	100	127,100	100	112,373	100

^{1/} The project was extended by 27 months in December 1990.

^{2/} Actually achieved as on closing date, i.e. March 31, 1993.

B. Staffing, Civil Works and Vehicles

	Appraisal (No.)	In Position (No.)	Actual/Appraised (%)
1. STAFFING			
Pri. Chief Conservator of Forests (Social Forestry & Vigilance)	1	1	100
Chief Conservator of Forests	1	1	100
Conservator of Forests	4	4	100
Deputy Conservator of Forests	17	3	18
Assistant Conservator of Forests	18	18	100
Financial Manager	1	1	100
Economist	1	1	100
Statistician	1	1	100
Forest Ranger	47	39	83
Foresters	230	189	82
Forest Guard	34	4	12
M & E Supervisor	2	-	-
Instructor	3	-	-
Others	1	1	100
Total	360	263	73
2. CIVIL WORKS			
	Appraisal (No.)	Actual (No.)	Actual/Appraised (%)
A. Non-Residential			
- Social Forestry HQ	1	1	100
- Circle HQ (CF)	2	3	150
- District HQ (DFO)	14	13	93
- Range Offices	47	30	64
- Training, various types	43	36	84
- Others (garages, water supply, sheds etc., community halls under TSP)	54	88	163
B. Residential			
- CCF Quarters	1	1	100
- CF Quarters)	4	(6	(26
- DCF Quarters)	19	((
- ACF Quarters	15	19	127
- Range Officers	49	74	151
- Foresters	238 ^{1/}	292	123
- Forest Guards	34	144	424
Total	521	707	136
3. VEHICLES			
	Appraisal (No.)	Actual (No.)	Actual/Appraised (%)
Car	5	5	100
Minibus & Bus	4	4	100
Trailer/Trekker	36	12	33
2-W Jeep	36	25	69
Publicity Vans	3	2	67
Motorcycles	93	87	94
Mopeds	182	92	51
Boats	2	-	-
Truck	7	6	86
Total	359	233	65

^{1/} Foresters' store-cum-residence.

5. Project Cost and Financing

A. Project Cost (Rs million)

Item	Appraisal ^{1/}	Actual ^{2/}	Actual as % of Appraisal
A. Organization and Management	212.9	337.9	159
B. Plantation Activities			
- Seedling Production	213.4	216.9	102
- Large Block Plantation	94.6	253.2	268
- Small Block Plantation	6.8	36.0	529
- Strip Plantation	12.5	8.3	66
- Tribal Fuelwood Plantation	12.4	4.1	33
- Tribal Medicinal Pilot Scheme	0.9	6.2	689
- Plantation Protection	5.1	17.1	335
Sub-Total Plantation Activities	345.7	541.8	157
C. Extension and Publicity	4.9	0.7	14
D. Training	33.6	11.7	35
E. Research and Studies	2.1	4.7	224
Total Project Cost	599.2	896.8	150

^{1/} Includes physical and price contingencies.

^{2/} Actually incurred as at closing date, i.e. March 31, 1993.

B. Project Financing

B.1

	Planned		Actual	
	(SDR million)	(%)	(SDR million)	(%)
IDA	30.6	58	24.8	
GOK	21.8	42	N.A. ^{1/}	
Total	52.4	100		

^{1/} Figures not available at the time of PCR preparation.

B.2

Expenditure/Categories	Planned Credit Agreement	Revised Allocation		Final Amount	Final %
		May 1991	Dec. 1991		
IDA Credit (in SDR'000s)					
Civil works	5,190	4,050	3,200	3,363	11
Vehicles, equipment, furniture & materials	870	1,081	1,300	996	3
Plantation activities	17,670	20,086	17,400	17,102 ^{1/}	56
Consultant services and training	1,640	2,383	1,000	489	2
Incremental staff salaries	3,270	3,000	3,200	2,848	9
Unallocated	1,960	-	-	-	
Total disbursements	-	-	-	24,798	81
Cancellation	-	-	4,500 ^{2/}	4,500 ^{2/} 1,302 ^{3/}	15 4
Total	30,600	30,600	30,600	30,600	100

^{1/} Includes SDR 64,000 disbursement out of Special Fund.

^{2/} Cancelled as of December 5, 1991.

^{3/} Still uncommitted as of August 31, 1993, and would be cancelled.

6. Project Results

A. Direct Benefits

Item	Unit	Appraisal Estimate			PCR Estimate		
		Farm Forestry	Public Lands	Total	Farm Forestry	Public Lands	Total
Fuelwood	million m ³	7.7	4.2	11.9	2.0	3.2	5.2
Timber and Peelers	million m ³	13.9	-	13.9	9.9	-	9.9
Poles	million m ³	19.5	4.5	24.0	0.4	0.8	1.2
Total Production	million m ³	41.1	8.7	49.8	12.4	4.0	16.4
No. of Beneficiaries	million						
Employment Generated							
- from plantations	man-days		1.75 million			2.30 million	
- from Forest Department	jobs		550			263	

^{1/} Excludes production from tribal fuelwood and pilot medicinal components.

B. Economic Impact

	Appraisal Estimate	PCR Estimate
Economic Rate of Return (%)		
Farm Forestry	33	45
Departmental Plantations:		
- Large Block Plantations	26	(
- Small Block Plantations	17	(
- Strip Plantations	15	(29 ^{1/}
- Tribal Plantations	25	(
Total Project	26	33
Assumptions:		
- Project Life (years)	30	4.0
- Standard Conversion Factor	0.8	0.8
- Conversion Factor for Unskilled Labour	0.6	0.7

^{1/} A combined analysis was undertaken in the absence of adequate segregation of investment costs.

C. Financial Impact

	Appraisal Estimate	PCR Estimate
Financial Rate of Return (%)	Not Estimated	
Farm Forestry	"	43
Large Block Plantations	"	33
Small Block Plantations	"	57
Strip Plantations	"	50

D. Price of Outputs

	Appraisal Estimate				PCR Estimate			
	Firewood (Rs/m ³)	Small Poles (Rs/pole)	Large Poles (Rs/pole)	Small Timber (Rs/m ³)	Firewood (Rs/m ³)	Small Poles (Rs/pole)	Large Poles (Rs/pole)	Small Timber Rs/m ³
Market Price	210	40	80	700	250	30	345	1,500
Less Felling	18	0.35	0.80	30	20	5	33	30
Less Handling and Transport	42	0.80	1.90	70	50	5	62	270
Financial Stumpage	150	38.85 or 39	77.30 or 77	600	180	20	250	1,200
Conversion Factor	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Economic Price	120	31	62	480	144	16	200	960

7. Status of Covenants

Section	Summary Description	Type of Covenant	Level of Compliance	Revised Compliance Date	Original Compliance Date	Remarks
		1/	2/			
2.02	As and when required, GOK shall employ consultants on the basis of World Bank Guidelines for the use of Consultants, published in August 1981.	MAN	1	//	//	-
2.05a	GOK shall furnish to the Association their plans, reports, contract documents, work & procurement schedules for the project, etc., in such detail as the Association shall request.	ORG	1	//	//	-
2.05d	GOK to furnish a report on execution and initial operation of the project promptly after project completion, but not later than 6 months after the Closing Date.	RPT	4	//	//	-
3.01.ai	GOK to maintain separate records and accounts adequate to reflect their resources, expenditures and operations related to the project.	FIN	1	//	//	-
3.01.a.ii	GOK to furnish copies of their accounts and financial statements for each FY as soon as available but not later than 9 months after the end of such year.	FIN	1	//	//	-
3.01.bi	GOK to have their accounts and financial statements for each FY audited by independent auditors acceptable to the Association.	ADT	1	//	//	-
3.01.b.ii	GOK to furnish the Audit Report immediately following its finalization.	ADT	1	//	//	-
3.02	GOK to undertake a joint mid-term review of the project with the Borrower and the Association after third year's planting and not later than 3.31.87.	STD	1	//	03/31/87	-
8.01(c) SAR	GOK would complete and submit for IDA review the wood supply and demand study by 12.31.85.	STD	1	06/30/90	12/31/85	-
SCII.2.1	Positions of regional conservators of forests shall be filled by 12.31.84.	ORG	1	12/31/85	12/31/84	-
SCII.2.1	Field DCFs & quarter of DCFs to be posted.	ORG	1	//	12/31/84	Assistant Conservators instead of DCFs sanctioned.
SCII.2.2	Principles covering arrangements for sale of fuelwood from Forest Department's lands shall be finalized by 6.30.86.	ORG	1	09/30/89	06/30/86	-
SCII.2.3	Beginning with the 1985-86 planting season, up to 3,500 casuarina seedlings & up to 500 seedlings per family for all other species shall be distributed free of charge.	ORG	1	//	//	Four species are priced at full cost. For other species GOK has decided to continue free distribution up to 10 naked and 3 containerized seedlings and charge in excess of these at 02p and 10 p, respectively.

B. Mission Data

Type of Mission	Month/Year	No. of Persons	Days in Field	Specialization Represented ^{1/}	Performance Rating Status ^{2/}	Type of Problem ^{3/}	Comments
Appraisal	6/84	4		E + F			
Supervision 1	9/84	1	7	E		F	Delays in release of local funds.
Supervision 2	3/85	2	8	E + F		M + T	Slow progress in appointment of key staff & inadequate provision of technical advice on seedling production.
Supervision 3	9/85	3	10	E + S + F		M + T	Inadequate extension support and wastage of seedlings distributed.
Supervision 4	6/86	1	10	E		I	Lack of social participation in departmental plantations.
Supervision 5	6/87	1	10	E		M + I	Inadequate extension advice and limited social participation.
Supervision 6	1/88	1	7	F		T	Lack of extension technology.
Supervision 7	7/88	1	7	F		T + M	Lack of extension technology.
Supervision 8	1/89	2	6	F + S	3	M	Implementation problems in farm forestry.
Supervision 9	7/89	1	4	F	2	M	Limited extension support.
Supervision 10	3/90	1	4	F	2	M	Weak extension and M & E.
Supervision 11	8/90	2	7	F	2	I + M	Benefit distribution problematic; extension and M & E inefficient.
Supervision 12	3/91	3	5	A + F	2	F	Local fund availability.
Supervision 13	8/91	3	5	F + S	2	M	Inadequate extension.
Supervision 14	3/92	2	7	F	2	M	Lack of coordination.
Supervision 15	10/92	2	6	F	1	M	Lack of coordination with Territorial Forestry Division, insufficient M & E, & poor quality of nursery stock.

^{1/} Specialization represented: A = Agriculture; E = Economics; F = Forestry; S = Sociology.

^{2/} Performance rating status: 1 = No significant problems; 2 = Moderate problems; 3 = Major problems being addressed adequately.

^{3/} Type of problem: I = Institutional; F = Financial; M = Management; T = Technical.

INDIA: Kerala Social Forestry Project (Cr.1514-IN)
Project Completion Report

Table 1. Exchange Rate and Inflation Factors

Fiscal Year	Exchange Rate ^{1/} (at Rs to US\$1.00) (Period Average)	Wholesale Price Index (Base Year 1993-100)
1984/85	11.89	190.0
1985/86	12.24	182.0
1986/87	12.79	172.0
1987/88	12.97	159.0
1988/89	14.48	148.0
1989/90	16.66	138.0
1990/91	17.95	125.0
1991/92	24.52	109.9
1992/93	26.41	100.0

^{1/} IMF - International Financial Statistics.

INDIA: Kerala Social Forestry Project (Cr.1514-IN)
Project Completion Report

Table 2. Cost Overruns

Item	Appraisal Estimate in FY84 Prices	Actual Expenditure	Actual Expenditure in FY84 Prices	Cost Overrun		
				Total	Price	Quantity
..... (Rs million)						
Plantation activities	345.7	541.8	393.8	57	43	14
Other costs	253.5	355.0	239.8	40	45	(5)
Total Cost	599.2	896.8	633.6	50	44	6

ANNEX 1

FINANCIAL AND ECONOMIC RE-EVALUATION

A. INTRODUCTION

1. This annex presents a discussion of the financial and economic assumptions and results of investments made by farmers and the Forest Department under the Kerala Social Forestry Project. Returns to these investments have been computed on the basis of estimated yields and they must therefore be considered interim.

2. Three types of analysis have been carried out. First, a financial cash flow analysis was prepared from the investor's point of view to determine the financial viability of the plantation models. This analysis was not carried out at appraisal. Secondly, economic analysis of plantations raised by farmers and the Forest Department was carried out using only direct costs of plantations covering farm forestry, large block plantation, small block plantation, and strip plantation. Finally, an economic analysis was carried out for the project as a whole using both the direct costs of plantation establishment and maintenance, and indirect costs of management. In doing so, no benefits have been included for the tribal medicinal pilot programme (in line with the appraisal methodology), or for tribal fuelwood plantations (due to insufficient data).

3. Kerala is dominated by small-scale farmers who have, on average, land holdings of less than one hectare. Most of their plantings under the project have been on bunds or peripheries of homesteads as they cannot plant their small land holdings with forest species and wait for 5-15 years to receive a return. Available evidence suggests that some of the larger farmers have gone in for tree planting (particularly teak) in their agricultural fields but the area involved would not exceed 5% of the total area planted under farm forestry. Departmental plantations have generally been on 'wastelands' some of which had previously been subject to grazing. Opportunity cost of land in both cases (field crops and grass) has been considered in deriving the financial and economic rate of return, although, at appraisal no land value had been imputed for grass on departmental plantations on wasteland.

4. The annex is divided into two main sections. The first provides the results of the financial analysis while the second gives the economic rates of return for plantations established under the project.

B. FINANCIAL ANALYSIS

General

5. The financial cash flow analysis indicates that all four plantation models on a per ha basis are quite profitable, generating financial rates of return ranging from 33%

(large block plantation), 43% (farm forestry), 50% (strip plantation) and 57% (small block plantations) (see Tables 1-4).

6. Costs are calculated per hectare and 1992/93 prices are used for both costs and returns. Farmers' labour inputs and products accruing to rural households have been valued at imputed prices equal to market wage rate (Rs40/man-day) and output prices ranging from Rs20/pole to Rs1,200/m³ for timber (see Part III/6D).

Establishment Cost

7. Plantation costs have obviously varied from place to place, depending on different site conditions, methods of work and type of production units. However, on average costs have been estimated from these figures based on data provided by the Forest Department and updated to 1992/93 prices. The updated figures are provided in Table 1 (farm forestry), in Table 2 (large block plantation), in Table 3 (small block plantation) and in Table 4 (strip plantation). In summary, the total cost is reckoned at Rs5,320/ha (farm forestry), Rs15,886/ha (large block), Rs8,713/ha (small block) and Rs10,750/ha (strip plantation). As expected, farm forestry represents the lowest cost model.

Plantation Maintenance

8. Plantation maintenance is estimated to cost Rs90/ha (departmental plantations) annually. No maintenance, except for casualty replacement, is assumed for smallholder farm forestry.

Production Volume

9. Projected production at SAR and PCR estimated production are given below:

INDIA: Kerala Social Forestry Project (Cr.1514-IN)
Annex 1: Financial and Economic Re-evaluation
Project Completion Report

Production	SAR		PCR	
	Farm Forestry	Public Lands	Farm Forestry	Public Lands
 (million m ³)			
Fuelwood	7.7	4.2	2.0	3.22
Poles	19.5	4.5	0.43	0.75
Timber	13.9	-	9.91	-
Sub-Total	41.1	8.7	12.34	3.97
Total	49.8		16.31	

10. The differences in product mix and quantities between the SAR and PCR arise from changes in:

- (i) **Species mix.** The agro-forestry component in the SAR recommended that casuarina be planted at a density of 3,000 seedlings/ha on a hectare equivalent basis. Similarly, high yielding eucalyptus species were expected to form a substantial proportion of the species mix. However, based on seedling distribution records and reports, and mission estimates, casuarina's contribution to the species mix at the time of planting was only 16% of the total planted stock, while ailanthus and teak accounted for 41% and 10% of the species composition at distribution. In addition, the relative survival rates of these species^{1/} have further skewed the stand composition towards teak and ailanthus. Eucalyptus is practically non-existent. Therefore, in the established phase, teak and ailanthus will represent up to 80% of the growing stock.
- (ii) **Densities.** As a consequence of these species changes, the densities expected at SAR (for example 3,000 seedlings/ha) were not achievable. Furthermore, the farming systems in which those species had to be integrated into did not lend themselves to such high density planting. Moreover, farm land being at such a premium in Kerala, the farmer very rationally puts it to production of a product of the highest possible value. His perceived returns should justify his land, labour and capital investments. Energy for fuel production, though an important commodity and reportedly scarce, does not match well with high-value products like teak and ailanthus timber;

^{1/} 56% for teak, 45% for ailanthus and only 9% for casuarina.

more so when substantial domestic energy needs are met from coconut husks and other tree crops. These changes in management goals have led to changes in densities at which these tree species have been raised.

- (iii) **Survival rates.** Moreover, the survival rates of the farm forestry component have been about 40% as against 60% expected at appraisal. This means that even on an increased national area of 79,962 ha, only 31,984 ha are under actual production as against 41,520 productive hectares expected at SAR. Similarly, in public land plantations the established stand densities were estimated at 6,000 stems for casuarina with an initial spacing of up to 10,000 seedlings/ha. However, the PCR estimates are in the 2,200 to 2,400 range for *Casuarina equisetifolia* and *Acacia auriculiformis* on government lands. One of the consequences of this deviation in densities is the reduced pole production. Finally, it seems that total project production estimates of 49.8 million m³ are not in agreement with the MAI estimates given for different species in the SAR. The total production level would require an MAI of about 20 m³/ha/yr, which is even higher than the highest yielding species, i.e. *Eucalyptus tereticornis* in this case at 15 m³/ha/yr.

11. Estimates of total production are summarized below.

	Unit (million)	Farm Forestry	Large Block	Small Block	Strip	Total
Fuelwood	m ³	2.00	2.95	0.20	0.068	5.22
Poles	No.					
- small (7.5 cm, dia.)		2.88	-	-	-	2.88
- large (10 cm, dia.)		8.48	15.05	1.49	0.50	25.52
Timber	m ³	9.91	-	-	-	9.91

The planted area by plantations models and by year is given in Table 8.

12. Per hectare yield estimates of major species planted under the project are given below.

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Species	MAI per ha per year of Woody Biomass	Rotation (years)
Acacia auriculiformis	9.5 m ³ or 6 mt.	8 to 10
Ailanthus triphysa	10 m ³ or 6.3 mt.	10
Casuarina equisetifolia	9.5 m ³ or 6 mt.	8 to 10
Grevillia	8 m ³ or 5 mt.	15
Teak (<i>Tectona grandis</i>)	12 m ³ or 8 mt.	40 - 60

Note:

1. These are silviculturally available production estimates, actual yields may be lower due to fire damage, or loss due to illicit felling, etc.
2. Pole dimensions are:

Small = 6 m long, 7.5 cm dia., = 0.0185 m ³ /pole;
Large = 8 m long, 10 cm dia., = 0.044 m ³ /pole.
3. 1 m³ = 0.63 mt.

Output Prices

13. Prices used in calculating financial revenues are unit values which the producing unit expects to obtain at stump. Average 1992/93 prices prevailing in the project areas have been used, net of felling, handling and transportation costs. The financial prices and standing values are given in Part III/6D and summarized below.

Financial Prices at Stump				
	Fuelwood (Rs/m ³)	Small Poles (Rs/pole)	Large Poles (Rs/Pole)	Timber (Rs/m ³)
At Appraisal	150	39	77	600
At PCR	180	20	250	1,200

The opportunity cost of land has been estimated at Rs1,000/ha/yr for agricultural fields and at Rs100/ha/yr for grass in wastelands.

Financial Rates of Return

14. On the basis of the foregoing discussion, cost and revenue projections have been prepared with an assumed project life of 32 years. These are presented in Tables 1-4 and the results of the analysis are summarized below.

	FRR (%)
Farm forestry	42.5
Large block plantation	33.0
Small block plantation	56.9
Strip plantation	50.3

C. ECONOMIC RE-EVALUATION

General

15. An economic re-evaluation has been undertaken for the project as a whole and for farm forestry and departmental plantations comprising large block, small block and strip plantations. Following the SAR, only direct costs of plantations have been included in estimating the ERR for component plantations. Other main assumptions and estimates made in the SAR and PCR are set out below.

Appraisal Estimates

16. At appraisal, the project's economic rate of return (ERR) was estimated to be 26%, and the rates of return of the component plantations to be 33% for farm forestry and 15-26% for departmental plantations based on the following assumptions:

- project life of 30 years, including an implementation period of 6 years;
- initial mortality/wastage rate of 40%;
- all farm labour valued at 60% of market wage rates;
- a standard conversion factor of 0.8 applied to all prices;
- opportunity cost of land valued at Rs200/ha/yr for planting by farmers, and no land value imputed for departmental plantations on wasteland;
- no benefits included for the pilot tribal programme for cultivation of medicinal plants.

PCR Estimates

17. The recalculation of the ERR's follows the SAR methodology. The main differences are:

- actual costs are used for project years FY1984-85 to 1992-93 with past expenditures restated in FY1992/93 prices using wholesale price index;
- all values are expressed in constant 1992/93 price terms, the project's completion year;
- all farm labour valued at 70% of market wage rates to be consistent with calculations in National Social Forestry PCR;
- opportunity cost of land valued at Rs1,000/ha/yr for block planting by farmers (about 5% of the area) and Rs100/ha/yr for grazing lands in government wastelands;
- no benefits quantified for tribal fuelwood plantations because of insufficient data and insignificant area involved (1.6%);
- costs after project completion include 1% of the total expenditure for civil works as maintenance, 10% of staff salaries and 10% of vehicle and office operating costs of the year 1992/93 to continue, and Rs90/ha/yr as plantation maintenance for departmental plantations; and
- a combined economic rate of return calculated for the three plantation models (large block, small block and strip plantations) because of inadequate and incomplete monitoring data segregated by individual models.

18. Phased investment costs in financial terms and economic values for the purpose of the analysis are shown in Tables 5, 6 & 7. The details regarding planted area (see Table 8) and expected production are discussed above.

19. Based on the above assumptions, species mix and expected yields, the current estimates of ERRs for the project as a whole, for farm forestry and for the combined plantation model are 33%, 45%, and 29% respectively (see Tables 9-11). The principal factors which have contributed to the higher ERRs as compared with the appraisal estimates are the following:

- (i) improved output prices, particularly for timber;
- (ii) shift of species mix to high value species (teak and ailanthus) as opposed to appraisal expectations of casuarina, eucalyptus and acacia;
- (iii) increase in planted area by 32% (from 85,300 ha at appraisal to 112,373 ha at project completion).

The lower expected production due to reduced survival rate (40% in contrast to the appraisal estimate of 60%) was more than offset by the above factors.

20. Sensitivity analysis indicates that a reduction in benefits by 20% will lower the ERR for the project as a whole to 29%; a reduction by 50% will lower the ERR to 22%; while an increase in cost by 20% will lower the ERR to 30%; and an increase in cost by 50% will lower the ERR to 27%. A combined reduction in benefits and increase in costs by 50% will lower the ERR to 16%. The project is therefore not sensitive to variations in either costs or revenue. The results are presented in Table 12.

21. It can be concluded that, on the basis of the above analysis, social forestry in Kerala is both financially and economically profitable. Indirect benefits resulting from water and soil conservation (presently excluded) would have pushed up the ERRs. It is also clear that the farmers have utilized the land for maximizing possible benefit by planting high value trees, in contrast to appraisal expectations.

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Table 1. Farm Forestry: Financial Costs and Returns per ha (Rs'000)

(Page 1)

	1	2-03	4	5-07	8	9	10	11-14	15	16	17-23	24	25-31	32
Costs														
Establish. & maint. costs	5.084	0.118	-	-	-	-	-	-	-	-	-	-	-	-
Opportunity cost of land	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Total costs	5.134	0.168	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Benefits														
Fuelwood	-	-	0.022	-	0.416	-	1.562	-	0.450	0.900	-	1.170	-	-
Small poles	-	-	0.720	-	-	-	-	-	-	-	-	-	-	-
Large poles	-	-	-	-	26.500	-	-	-	-	-	-	-	-	-
Small timber	-	-	-	-	-	-	63.360	-	-	-	-	-	-	-
Large timber	-	-	-	-	-	-	-	-	11.040	20.232	-	30.192	-	23.832
Total benefits	-	-	0.742	-	26.916	-	64.922	-	11.490	21.132	-	31.362	-	23.832
Net benefits	-5.134	-0.168	0.692	-0.050	26.866	-0.050	64.872	-0.050	11.440	21.082	-0.050	31.312	-0.050	23.782

FRR = 42.5%

1/ Seedling price Rs1,122.00 (mix of species - ailanthus, casuarina, grevillia, teak, mahogany and others), transportation cost Rs250/= (=/10 per seedling), crow bar planting cost of Rs100 for teak at =/40 per stump for 250 plants, pit digging for 2,250 plants at =/70 per pit Rs1,575/=, planting cost of Rs785 for 2,250 plants at =/35 per plant, fertilizer 10 gram/plant at =/50 per plant for Rs1,250 - all totalling 5,084 in Year 1, and casualty replacement at Rs118 in Years 2 & 3.

2/ Costs in 1992/93 prices.

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Table 1. Farm Forestry: Calculation of Benefits (Rs'000)

(Page 2)

	1-03	4	5-07	8	9	10	11-14	15	16	17-23	24	25-31	32
Fuelwood price (m3)	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Large poles	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Small poles	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Small timber	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Fuelwood (m3)	-	0.12	-	2.31	-	8.68	-	2.50	5.00	-	6.50	-	-
Small poles (no.)	-	36.00	-	-	-	-	-	-	-	-	-	-	-
Large Poles (no.)	-	-	-	106.00	-	-	-	-	-	-	-	-	-
Small timber	-	-	-	-	-	52.80	-	-	-	-	-	-	-
Large timber	-	-	-	-	-	-	-	9.20	16.86	-	25.16	-	19.86
Fuelwood benefits	-	0.02	-	0.42	-	1.56	-	0.45	0.90	-	1.17	-	-
Small poles benefits	-	0.72	-	-	-	-	-	-	-	-	-	-	-
Large poles benefits	-	-	-	26.50	-	-	-	-	-	-	-	-	-
Small timber benefits	-	-	-	-	-	63.36	-	-	-	-	-	-	-
Large timber benefits	-	-	-	-	-	-	-	11.04	20.23	-	30.19	-	23.83

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Table 2. Large Block Plantations: Financial Costs and Returns per ha (Rs'000)

	1	2	3	4	5	6	7	8-09	10	11-32
Costs										
Establish. & maint. costs ^{1/}	7.553	4.588	2.070	0.625	0.550	0.500	-	-	-	-
Opportunity cost of land	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
Total costs	7.653	4.688	2.170	0.725	0.650	0.600	0.100	0.100	0.100	0.100
Benefits										
Fuelwood	-	-	0.432	0.432	1.800	-	0.216	0.432	16.020	-
Large poles	-	-	-	-	-	-	-	-	140.000	-
Total benefits	-	-	0.432	0.432	1.800	-	0.216	0.432	156.020	-
Net benefits	-7.653	-4.688	-1.738	-0.293	1.150	-0.600	0.116	0.332	155.920	-0.100

FRR = 32.98%

Calculation of Benefits

	1-02	3-04	5	6	7	8-09	10	11-32
Fuelwood price (m3)	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Large poles	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fuelwood (m3)	-	2.40	10.00	-	1.20	2.40	89.00	-
Large Poles (no.)	-	-	-	-	-	-	560.00	-
Fuelwood benefits	-	0.43	1.80	-	0.22	0.43	16.02	-
Large poles benefits	-	-	-	-	-	-	140.00	-

^{1/} Costs as provided by the forest Department starting from 1987/88 for a typical hectare, which was updated to 1992/93 using WP1.

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Table 3. Small Block Plantations: Financial Costs and Returns per ha (Rs'000)

	1	2	3	4-07	8	9-32
Costs						
Establish. & maint. costs ^{1/}	4.373	2.960	1.380	-	-	-
Opportunity cost of land	0.100	0.100	0.100	0.100	0.100	0.100
Total costs	4.473	3.060	1.480	0.100	0.100	0.100
Benefits						
Fuelwood	-	-	1.800	-	11.700	-
Large poles	-	-	-	-	137.500	-
Total benefits	-	-	1.800	-	149.200	-
Net benefits	-4.473	-3.060	0.320	-0.100	149.100	-0.100

FRR = 56.9%

Calculation of Benefits

	1-02	3	4-07	8	9-32
Fuelwood price (m ³)	0.18	0.18	0.18	0.18	0.18
Large poles	0.25	0.25	0.25	0.25	0.25
Fuelwood (m ³)	-	10.00	-	65.00	-
Large Poles (no.)	-	-	-	550.00	-
Fuelwood benefits	-	1.80	-	11.70	-
Large poles benefits	-	-	-	137.50	-

^{1/} Costs as provided by the Forest Department starting from 1987/88 for a typical hectare, which was updated to 1992/93 using WP1.

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Table 4. Strip Plantations: Financial Costs and Returns per ha (Rs'000)

	1	2	3	4-07	8	9-32
Costs						
Establish. & maint. costs ^{1/}	6.360	3.700	0.690	-	-	-
Opportunity cost of land	0.100	0.100	0.100	0.100	0.100	0.100
Total costs	6.460	3.800	0.790	0.100	0.100	0.100
Benefits						
Fuelwood	-	-	1.800	-	11.700	-
Large poles	-	-	-	-	137.500	-
Total benefits	-	-	1.800	-	149.200	-
Net benefits	-6.460	-3.800	1.010	-0.100	149.100	-0.100

FRR = 50.3%

Calculation of Benefits

	1-02	3	4-07	8	9-32
Fuelwood price (m3)	0.18	0.18	0.18	0.18	0.18
Large poles	0.25	0.25	0.25	0.25	0.25
Fuelwood (m3)	-	10.00	-	65.00	-
Large Poles (no.)	-	-	-	550.00	-
Fuelwood benefits	-	1.80	-	11.70	-
Large poles benefits	-	-	-	137.50	-

^{1/} Costs as provided by the Forest Department starting from 1987/88 for a typical hectare, which was updated to 1992/93 using WP1.

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Table 5. Investment Costs in Financial and Economic Terms (Rs million)

I. INVESTMENT COSTS	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93
Civil Works	0.943	8.983	14.701	13.349	13.467	12.965	10.717	19.530	95.429
Economic Cost at CF.66	0.622	5.929	9.703	8.810	8.888	8.557	7.073	12.890	62.983
Vehicles, Equipment & Furniture	4.700	5.733	2.104	1.309	2.601	1.983	1.909	1.354	11.333
Economic Cost at CF.66	3.102	3.784	1.387	0.864	1.717	1.309	1.260	0.894	7.480
Seedling Production Farm Forestry	5.419	20.259	29.519	27.302	26.671	5.778	8.112	10.412	14.290
Economic Cost at CF.70	3.793	14.181	20.663	19.111	18.670	4.045	5.678	7.288	10.003
Seedling Production Governmental	1.160	4.133	6.903	8.754	9.342	6.486	5.972	15.635	10.758
Economic Cost at CF.70	0.812	2.893	4.832	6.128	6.539	4.540	4.180	10.944	7.531
Plantation Establishment	2.332	14.585	26.351	29.253	27.087	24.424	25.070	34.704	45.932
Economic Cost at CF.70	1.632	10.209	18.446	20.477	18.961	17.097	17.549	24.293	32.152
Plantation Management	0.415	0.789	4.751	6.178	7.114	12.177	15.731	20.277	27.713
Economic Cost at CF.70	0.290	0.552	3.326	4.325	4.980	8.524	11.012	14.194	19.399
Training	0.069	0.153	0.250	0.555	0.144	0.035	0.353	0.051	0.230
Economic Cost at CF.97	0.067	0.148	0.242	0.538	0.140	0.034	0.342	0.049	0.223
Research & Studies	0.021	0.068	0.053	0.151	0.114	1.195	0.558	2.378	0.127
Economic Cost at CF.78	0.016	0.053	0.041	0.118	0.089	0.932	0.435	1.855	0.099
Total Investment Costs in Financial Terms	15.059	54.703	84.632	86.851	86.540	65.043	68.422	104.341	205.812
Total Investment Costs in Economic Terms	10.334	37.749	58.640	60.371	59.984	45.038	47.529	72.407	139.870
II. OPERATING COSTS									
Staff Salaries	3.552	6.561	8.468	9.997	11.162	12.799	16.697	18.213	19.529
Economic Cost at CF1.0	3.552	6.561	8.468	9.997	11.162	12.799	16.697	18.213	19.529
Vehicle Operating Costs	0.403	0.906	1.003	1.008	1.100	1.109	1.160	1.309	1.825
Economic Cost at CF0.80	0.322	0.725	0.802	0.806	0.880	0.887	0.928	1.047	1.460
Office Operating Costs	0.485	0.771	0.955	1.033	0.850	0.835	0.964	1.255	1.414
Economic Cost at CF.84	0.407	0.648	0.802	0.868	0.714	0.701	0.810	1.054	1.187
Total Operating Costs in Financial Terms	4.440	8.238	10.426	12.038	13.112	14.743	18.821	20.777	22.768
Total Project Costs in Financial Terms	19.499	62.941	95.058	98.889	99.652	79.786	87.243	125.118	228.580
Total Project Costs in Economic Terms	14.615	45.683	68.712	72.042	72.740	59.417	65.964	92.721	162.046
MPI	1.90	1.82	1.72	1.59	1.48	1.38	1.25	1.10	1.000
Total Project Economic Cost in 1992/93 Terms	27.768	83.143	118.185	114.547	107.655	81.955	82.455	101.993	162.046

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Table 6. Financial and Economic Costs

	FY84-85	FY85-86	FY86-87	FY87-88	FY88-89	FY89-90	FY90-91	FY91-92	FY91-92
..... (Rs million)									
Farm Forestry									
Seedling Production									
- Financial Cost	5.419	20.259	29.519	27.302	26.671	5.778	8.112	10.412	14.290
- Economic Cost (CF.70)	3.793	14.181	20.663	19.111	18.670	4.045	5.678	7.288	10.003
- WP1	190	182	172	159	148	138	125	110	100
- Economic Cost in 92/93 price	7.207	25.809	35.540	30.386	27.632	5.582	7.097	8.017	10.003
Departmental Plantations									
Seedling Production									
- Financial cost	1.160	4.133	6.903	8.754	9.342	6.486	5.972	15.635	10.758
Plantation Establishment									
- Financial cost	2.332	14.585	26.351	29.253	27.087	24.424	25.070	34.704	45.932
Plantation Management									
- Financial cost	0.415	0.789	4.751	6.178	7.114	12.177	15.731	20.277	27.713
Total Financial Cost	3.907	19.507	38.005	44.185	43.543	43.087	46.773	70.616	84.403
Total Economic Cost	2.735	13.655	26.604	30.929	30.480	30.161	32.741	49.431	59.082
Economic cost in 92/93 price	5.196	24.852	45.759	49.177	45.110	41.622	40.926	54.374	59.082

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Table 7. Economic Cost of Farm Forestry and Department Plantations (Rs million)

	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95
Farm Forestry											
Seedling Production	7.207	25.809	35.540	30.386	27.632	5.582	7.097	8.017	10.003	-	-
Establishment & Maintenance	17.064	36.098	84.929	71.762	66.556	9.002	11.017	6.982	8.739	0.348	0.194
Sub-total	24.271	61.907	120.469	102.148	94.188	14.584	18.114	14.999	18.742	0.348	0.194
Departmental Plantations ^{1/}											
Seedling production, establishment & maintenance	5.196	24.852	45.759	49.177	45.110	41.622	40.926	54.374	59.082	2.95	2.95
Civil Works & Vehicles	7.076	17.678	19.075	15.382	15.695	13.615	10.416	15.162	70.463	1.846	1.846
Training, Research & Studies	0.158	0.366	0.487	1.043	0.339	1.333	0.971	2.094	0.322	-	-
Staff Salaries	6.749	11.941	14.565	15.895	16.520	17.662	20.871	20.034	19.529	1.953	1.953
Vehicle & Office Operating Costs	1.385	2.499	2.759	2.661	2.359	2.191	2.172	2.311	2.647	0.265	0.265
Sub-total	20.564	57.336	82.645	84.158	80.023	76.423	75.356	93.975	152.043	7.014	7.014
TOTAL COSTS	44.835	119.243	203.114	186.306	174.211	91.007	93.470	108.974	170.785	7.362	7.208

^{1/} Costs after FY 1993 are estimated at Rs90/ha/yr for departmental plantations, 1% of total expenditure for civil works, 10% of 1992/93 staff salaries and 10% of FY 1993 expenditure for vehicle and operating costs.

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Table 8. Physical Phasing

	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93
1. Farm Forestry (ha)	4,795	10,032	21,425	17,339	17,802	1,714	2,643	1,861	2,351
2. Departmental Plantation (ha)									
- large block	322	1,434	2,338	2,447	2,870	2,139	4,366	4,626	6,333
- small block	23	123	172	419	580	388	383	198	425
- strip	50	65	66	169	125	344	54	3	35

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Table 9. Economic Analysis: Total Project (Rs million)

(Page 1)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Costs													
Farm For. maint.& land	15.704	43.824	74.244	62.923	61.857	12.183	15.438	15.101	18.051	4.000	4.000	4.000	4.000
Dep. Pl. maint. and land	5.235	25.054	46.218	49.940	46.230	43.029	42.814	56.744	62.132	6.000	6.000	6.000	6.000
Other Expenditures													
Civil works and vehicles	7.076	17.678	19.075	15.382	15.695	13.615	10.416	15.162	70.463	1.846	1.846	1.846	1.846
Training, res. & studies	0.158	0.366	0.487	1.043	0.339	1.333	0.971	2.094	0.322	-	-	-	-
Staff salaries	6.749	11.941	14.565	15.895	16.520	17.662	20.871	20.034	19.529	1.953	1.953	1.953	1.953
Vehicle & office operat.	1.385	2.499	2.759	2.661	2.359	2.191	2.172	2.311	2.647	0.265	0.265	0.265	0.265
Total costs	36.307	101.362	157.348	147.844	143.000	90.013	92.682	111.446	173.144	14.064	14.064	14.064	14.064
Benefits													
Farm Forestry	-	-	-	2.845	5.952	12.711	10.287	113.811	217.032	711.947	895.500	1497.489	937.459
Departmental Plantation	-	-	0.183	0.734	2.039	4.210	6.043	15.442	29.532	76.610	259.418	386.131	406.198
Total benefits	-	-	0.183	3.578	7.991	16.921	16.330	129.253	246.564	788.557	1154.917	1883.620	1343.657
Net benefits	-36.307	-101.362	-157.165	-144.265	-135.009	-73.093	-76.352	17.807	73.421	774.493	1140.854	1869.556	1329.593

ERR = 33.2%

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Table 9. Economic Analysis: Total Project (Rs million)

(Page 2)

	14	15	16	17	18	19	20	21	22	23	24	25	26
Costs													
Farm For. maint. & land	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
Dep. Pl. maint. and land	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000
Other Expenditures													
Civil works and vehicles	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846
Training, res. & studies	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff salaries	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953
Vehicle & office operat.	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Total costs	14.064	14.064	14.064	14.064	14.064	14.064	14.064	14.064	14.064	14.064	14.064	14.064	14.064
Benefits													
Farm Forestry	981.510	173.169	361.172	463.192	643.689	456.762	316.709	53.271	61.788	53.072	160.050	251.699	537.545
Departmental Plantation	413.477	296.906	601.515	583.566	790.460	-	-	-	-	-	-	-	-
Total benefits	1394.986	470.076	962.687	1046.758	1434.148	456.762	316.709	53.271	61.788	53.072	160.050	251.699	537.545
Net benefits	1380.922	456.012	948.623	1032.694	1420.085	442.698	302.645	39.207	47.724	39.008	145.986	237.635	523.481

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Table 9. Economic Analysis: Total Project (Rs million)

(Page 3)

	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Costs														
Farm For. maint. & land	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
Dep. Pl. maint. and land	6.000	6.000	6.000	6.000	6.000	6.000	5.960	5.798	5.540	5.237	4.879	4.592	4.112	3.629
Other Expenditures														
Civil works and vehicles	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846	1.846
Training, res. & studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff salaries	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953	1.953
Vehicle & office operat.	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Total costs	14.064	14.064	14.064	14.064	14.064	14.064	14.024	13.862	13.604	13.301	12.943	12.656	12.176	11.693
Benefits														
Farm Forestry	435.029	446.645	43.004	66.312	46.692	150.405	191.266	408.480	330.578	339.406	32.678	50.390	35.481	44.823
Departmental Plantation	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total benefits	435.029	446.645	43.004	66.312	46.692	150.405	191.266	408.480	330.578	339.406	32.678	50.390	35.481	44.823
Net benefits	420.965	432.581	28.940	52.248	32.628	136.342	177.242	394.618	316.974	326.105	19.735	37.734	23.305	33.130

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Table 10. Farm Forestry: Economic Costs and Returns (Rs million)

(Page 1)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Costs													
Seedl., est. & mainten.	15.464	43.084	72.434	60.243	58.287	8.533	11.648	11.221	14.051	-	-	-	-
Opportunity cost of land	0.240	0.740	1.810	2.680	3.570	3.650	3.790	3.880	4.000	4.000	4.000	4.000	4.000
Total costs	15.704	43.824	74.244	62.923	61.857	12.183	15.438	15.101	18.051	4.000	4.000	4.000	4.000
Benefits													
Fuelwood	-	-	-	0.083	0.173	0.370	0.300	1.903	3.367	13.166	18.339	32.742	22.243
Small poles	-	-	-	2.762	5.778	12.341	9.987	10.254	0.987	1.522	1.072	1.354	-
Large poles	-	-	-	-	-	-	-	101.654	212.678	454.210	367.587	377.402	36.337
Small timber	-	-	-	-	-	-	-	-	-	243.049	508.502	1085.990	878.879
Large timber	-	-	-	-	-	-	-	-	-	-	-	-	-
Total benefits	-	-	-	2.845	5.952	12.711	10.287	113.811	217.032	711.947	895.500	1497.489	937.459
Net benefits	-15.704	-43.824	-74.244	-60.078	-55.905	0.528	-5.151	98.710	198.981	707.947	891.500	1493.489	933.459

ERR = 44.9%

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Table 10. Farm Forestry: Economic Costs and Returns (Rs million)

(Page 2)

	14	15	16	17	18	19	20	21	22	23	24	25	26
Costs													
Seedl., est. & mainten.	-	-	-	-	-	-	-	-	-	-	-	-	-
Opportunity cost of land	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
Total costs	4.000	4.000	4.000	4.000	4.000	4.000	4.000						
Benefits													
Fuelwood	23.130	4.488	11.149	17.262	24.607	18.893	13.434	2.186	2.573	2.186	6.181	9.390	20.054
Small poles	-	-	-	-	-	-	-	-	-	-	-	-	-
Large poles	56.032	39.453	49.841	-	-	-	-	-	-	-	-	-	-
Small timber	902.348	86.879	133.968	94.330	119.167	-	-	-	-	-	-	-	-
Large timber	-	42.349	166.213	351.600	499.915	437.869	303.274	51.085	59.215	50.885	153.869	242.309	517.491
Total benefits	981.510	173.169	361.172	463.192	643.689	456.762	316.709	53.271	61.788	53.072	160.050	251.699	537.545
Net benefits	977.510	169.169	357.172	459.192	639.689	452.762	312.709	49.271	57.788	49.072	156.050	247.699	533.545

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Table 10. Farm Forestry: Economic Costs and Returns (Rs million)

(Page 3)

	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Costs														
Seedl., est. & mainten.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Opportunity cost of land	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
Total costs	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
Benefits														
Fuelwood	16.229	16.663	1.604	2.474	1.742	2.201	-	-	-	-	-	-	-	-
Small poles	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large poles	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small timber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large timber	418.799	429.982	41.399	63.838	44.950	148.205	191.266	408.480	330.578	339.406	32.678	50.390	35.481	44.823
Total benefits	435.029	446.645	43.004	66.312	46.692	150.405	191.266	408.480	330.578	339.406	32.678	50.390	35.481	44.823
Net benefits	431.029	442.645	39.004	62.312	42.692	146.405	187.266	404.480	326.578	335.406	28.678	46.390	31.481	40.823

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Table 11. Departmental Plantations: Economic Costs and Returns (Rs million)

(Page 1)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Costs														
Seedl. estab. & mainten.	5.196	24.852	45.759	49.177	45.110	41.622	40.926	54.374	59.082	2.950	2.950	2.950	2.950	2.950
Opp. cost land small blo.	0.002	0.015	0.032	0.074	0.132	0.170	0.209	0.229	0.271	0.271	0.271	0.271	0.271	0.271
Opp. cost l. large blocks	0.032	0.176	0.409	0.654	0.941	1.155	1.592	2.054	2.687	2.687	2.687	2.687	2.687	2.687
Opp. cost l. strip plant.	0.005	0.011	0.018	0.035	0.047	0.082	0.087	0.088	0.091	0.091	0.091	0.091	0.091	0.091
Total costs	5.235	25.054	46.218	49.940	46.230	43.029	42.814	56.744	62.132	6.000	6.000	6.000	6.000	6.000
Benefits														
Strip pl. total benefits	-	-	0.072	0.094	0.095	0.243	0.180	6.463	7.836	7.882	20.222	14.920	41.060	6.445
Small block tot. benefits	-	-	-	0.033	0.177	0.248	0.603	3.365	14.304	20.623	47.985	68.334	48.109	45.762
Large block benefits	-	-	0.111	0.607	1.767	3.719	5.260	5.614	7.392	48.105	191.210	302.877	317.030	361.269
Total benefits	-	-	0.183	0.734	2.039	4.210	6.043	15.442	29.532	76.610	259.418	386.131	406.198	413.477
Net benefits	-5.235	-25.054	-46.035	-49.206	-44.191	-38.820	-36.770	-41.302	-32.600	70.610	253.418	380.131	400.199	407.477

ERR = 29.4%

INDIA: Kerala Social Forestry Project (Cr.1514-IN)
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Table 11. Departmental Plantations: Economic Costs and Returns (Rs million)

(Page 2)

	15	16	17	18	19-32	33	34	35	36	37	38	39	40
Costs													
Seedl. estab. & mainten.	2.950	2.950	2.950	2.950	2.950	2.950	2.950	2.950	2.950	2.950	2.950	2.950	2.950
Opp. cost land small blo.	0.271	0.271	0.271	0.271	0.271	0.269	0.256	0.239	0.197	0.139	0.101	0.062	0.042
Opp. cost l. large blocks	2.687	2.687	2.687	2.687	2.687	2.655	2.512	2.278	2.033	1.746	1.532	1.096	0.633
Opp. cost l. strip plant.	0.091	0.091	0.091	0.091	0.091	0.086	0.080	0.073	0.056	0.044	0.009	0.004	0.003
Total costs	6.000	6.000	6.000	6.000	6.000	5.960	5.798	5.540	5.237	4.879	4.592	4.112	3.629
Benefits													
Strip pl. total benefits	0.358	4.178	-	-	-	-	-	-	-	-	-	-	-
Small block tot. benefits	25.365	48.603	3.978	-	-	-	-	-	-	-	-	-	-
Large block benefits	271.183	548.734	579.588	790.460	-	-	-	-	-	-	-	-	-
Total benefits	296.906	601.515	583.566	790.460	-								
Net benefits	290.907	595.515	577.566	784.460	-6.000	-5.960	-5.798	-5.540	-5.237	-4.879	-4.592	-4.112	-3.629

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Table 11. Departmental Plantations: Economic Costs and Returns (Rs million)

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Present Values of Net Streams at a Discount Rate of 12.0%								Internal Rates of Returns of Net Streams						
=====								=====						
	BTOT20	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	BTOT20	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%
CTOT	2001.5	2265.2	2529.0	3320.3	1737.7	1473.9	682.6	33.248	34.853	36.341	40.254	31.501	29.584	22.284
UP 10%	1937.8	2201.6	2465.4	3256.7	1674.1	1410.3	619.0	31.667	33.248	34.713	38.565	29.947	28.059	20.870
UP 20%	1874.2	2138.0	2401.7	3193.0	1610.5	1346.7	555.4	30.244	31.803	33.248	37.046	28.549	26.687	19.598
UP 50%	1683.4	1947.1	2210.9	3002.2	1419.6	1155.8	364.5	26.687	28.191	29.584	33.248	25.050	23.254	16.417
DOWN 10%	2065.1	2328.8	2592.6	3383.9	1801.3	1537.5	746.3	35.024	36.657	38.171	42.152	33.248	31.298	23.873
DOWN 20%	2128.7	2392.5	2656.2	3447.5	1864.9	1601.2	809.9	37.046	38.711	40.254	44.314	35.236	33.248	25.681
DOWN 50%	2319.6	2583.3	2847.1	3638.4	2055.8	1792.0	1000.7	45.517	47.317	48.987	53.385	43.560	41.413	33.248
	BTOT20	LAG 1	LAG 2	LAG 3				BTOT20	LAG 1	LAG 2	LAG 3			
CTOT	2001.5	1718.9	1466.5	1241.2				33.248	29.069	25.841	23.269			
UP 10%	1937.8	1655.2	1402.9	1177.6				31.667	27.718	24.661	22.222			
UP 20%	1874.2	1591.6	1339.3	1114.0				30.244	26.500	23.596	21.275			
UP 50%	1683.4	1400.8	1148.4	923.1				26.687	23.444	20.916	18.889			
DOWN 10%	2065.1	1782.5	1530.1	1304.9				35.024	30.583	27.161	24.440			
DOWN 20%	2128.7	1846.1	1593.8	1368.5				37.046	32.303	28.658	25.765			
DOWN 50%	2319.6	2036.9	1784.6	1559.3				45.517	39.455	34.851	31.226			
LAG 1	-	1787.0	1534.7	1309.4					33.248	29.069	25.841			
LAG 2	-	-	1595.5	1370.3					-	33.248	29.069			
LAG 3	-	-	-	1424.6					-	-	33.248			