

**Kerala Forest Research Institute**

**ANNUAL REPORT  
1995-'96**

**Kerala Forest Research Institute  
Peechi - 680 653, Thrissur, Kerala, India**

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## ANNUAL REPORT, 1995-'96

### 1. INTRODUCTION

The Kerala Forest Research Institute (KFRI) was established on 3rd July 1975 under the Travancore-Cochin Literary, Scientific and Charitable Societies Act 1955 with the main objective of undertaking research in all aspects of forestry, wildlife management and wood science & technology. The Institute is situated at Peechi, 19 km east of Thrissur Town. The main campus extends over an area of 28 ha which forms part of the reserve forest in the Peechi Forest Range. The Institute has a sub centre at Nilambur in North Kerala over an area of 43 ha and a Field Research Centre at Veluppadam in Central Kerala in an area of 38 ha of land.

The control, administration and management of the Institute are vested with the Governing Body appointed by the Government of Kerala. The Director, appointed by the Government, is the Head of the Institute. The Institute is organized into structural units called Divisions. There are 14 Research Divisions, a Library and an Administrative Division including an Administrative Unit, Finance Unit, Engineering Unit and Computer Cell. The Research Divisions are Agroforestry, Botany, Ecology, Economics, Entomology, Genetics, Non-wood Forest Products, Pathology, Physiology, Silviculture, Soil Science, Statistics, Wildlife and Wood Science.

During the year, Dr. K.S.S. Nair, who was holding charge of the Director since January 1995, was appointed by Government as Director on a regular basis. Consequent to retirement of Shri Joseph K. John, Registrar, Shri P. Aravindakshan, formerly Dy. Registrar (Finance), was appointed as Registrar with effect from 1-8-1995.

The Governing Body met once on 18-7-'95 and the Executive Committee met 4 times.

### 2. INFRASTRUCTURE & STAFF

Construction and setting up of exhibits in the Teak Museum in the Nilambur Sub Centre, was completed and the Museum was opened to the public on 21-5-'95 by the Hon'ble Minister for Forests.

The list of staff as on 31-3-1996 is given in Appendix I.

### 3. FINANCE

During the reporting year, the Institute received Rs.116 lakhs from the State Government as grant-in-aid and Rs.120.65 lakhs from other agencies (including national and international) against specific research projects.



#### 4. RESEARCH

Research carried out by the Institute was directly related to the priorities of the forestry sector in Kerala. Brief highlights of research projects completed during the year and the significant interim results of the ongoing research activities are given below. During the year under report, 9 research projects were completed. There were 87 ongoing research projects and 11 new research projects were initiated.

##### 4.1. RESEARCH HIGHLIGHTS

###### Tree improvement in Eucalypts

High yielding, disease resistant clones of eucalypts (*E. tereticornis* and *E. camaldulensis*) were identified in multilocational trials of five species and several provenances of Eucalypts. The selected clones were multiplied by rooting of shoot cuttings in a specially developed, low-cost high humidity propagation unit. Some of the clones have registered a height increment of 6.5 meters in 18 months.

###### Water relations and photosynthesis of the oil palm

In a study sponsored by the Department of Biotechnology, Government of India, it was shown that atmospheric temperature, vapour pressure deficit and light availability had profound influence on photosynthesis of oil palms. Measurements of microclimatic and physiological parameters in Maharashtra, Karnataka and Andhra Pradesh showed that in spite of irrigation, atmospheric drought brought down the photosynthetic rate of oil palms drastically, suggesting caution in further expansion of the area under oil palm in these States.

###### Mycorrhizal fungi and nitrogen fixing symbionts for reforestation of degraded acid soils

Inoculation with certain VAM isolates increased the growth, biomass and P content of seedlings significantly in glass house trials. The combined treatment involving VAM,  $N_2$  fixing symbionts and fertilisers was the best as there was an increase of 57% and 84% respectively in height and diameter as compared to the control.

###### Patch planting of bamboo in teak plantation

A study of the growth of bamboo in teak plantations showed that the differential performance of the two species within a plantation was related to site characteristics, particularly water availability and Na and K turn-over. The study suggests that patch planting of bamboo in appropriate sites is better than mixed planting, in order to obtain better yield and ecosystem stability.

### Growth and architecture of tree species

Characters such as crown architecture, growth, leaf phenology and branch display were studied in nine forest tree species viz., *Ailanthus triphysa*, *Albizia odoratissima*, *Artocarpus hirsutus*, *Grewia tiliifolia*, *Macaranga peltata*, *Mangifera indica*, *Tectona grandis*, *Terminalia paniculata* and *Xylia xylocarpa* grown in home gardens of Pananchery Panchayath, Kerala, with a view to assess their suitability as components in home garden agroforestry system. It is seen that the growth and architectural characteristics of all these species have relevance especially in agrisilvicultural system in which more shade demanding components are used.

### Management and utilisation of rattans (canes)

In a study supported by the International Development Research Centre, Canada (IDRC), survey and identification of rattans in Andaman and Nicobar Islands and NE India were completed. Six new species were reported from Andaman and Nicobar Islands. Two nomenclatural problems in the identification of rattans were solved.

### Palm resources of Kerala

A detailed study was made on the palms of Kerala, consisting of 10 genera and 21 species. The identity, ecological requirements and the utilization potential of the rich variety of palms are documented.

### Shola forests of Kerala

Shola forests represent a rare but genetically rich vegetation commonly located at elevations above 1,800 m and also in protected hill folds surrounded by grasslands. In this pioneering study, over 700 species of plants were collected from the shola forests of Idukki of which 500 have been identified. About 70 species of ferns were collected of which 11 are rare.

### Identification of mammals based on hair structure

Structural characteristics of hair samples of 37 mammal species were studied and an identification key based on the hair structure was prepared.

### Stream fishes in the Nilgiri Biosphere Reserve

Ninety two species of fish including 25 species endemic to Western Ghats and 5 endangered ones were recorded in the Kerala part of the Nilgiri biosphere reserve. Two new species were described.



### Statistical software package for forest mensuration

A software package consisting of three modules - Sample, Treevol and Treebiom - was developed to facilitate data processing in forest mensuration. 'Sample' can estimate population parameters like mean, ratio, etc. for various sampling schemes. Treevol is for developing equations for tree level commercial volume from standard measurements. Treebiom helps in the estimation of tree biomass. The PC based package fills the need for a self-contained, user friendly software for common forest measurements.

#### 4.2. RESEARCH PROJECTS COMPLETED

During the year under report, 9 Research Projects were completed as shown below and Final Reports were published or submitted to the sponsoring agencies.

- KFRI 135/91 - Silviculture, management and utilization of bamboo resources of South India - Phase II  
Investigators : R. Gnanaharan, M.S. Mukteshkumar, K.C. Chacko, U.M. Chandrashekara and K.M. Bhat
- KFRI 136/91 - Management and utilization of rattan resources of India - Phase I  
Investigators : K.M. Bhat, T.K. Dhamodaran, and C. Renuka
- KFRI 150/92 - Impact of upland management on downstream ecosystem  
Investigator : S. Sankar
- KFRI 152/92 - Prey-Predator studies in Eravikulam National Park  
Investigator : P.S. Easa  
KFRI Research Report No.105
- KFRI 160/92 - Status survey of primates in Shendurney Wildlife Sanctuary and adjacent areas  
Investigator : K.K. Ramachandran  
KFRI Research Report No.106
- KFRI 185/93 - An investigative survey of stream fishes, their habitat and distribution in the Nilgiri Biosphere Reserve areas of Kerala  
Investigators : P.S. Easa and S. Chand Basha  
KFRI Research Report No.104

- KFRI 187/83 - Studies on growth and architecture of tree species of home garden agroforestry system of Kerala  
Investigator : U.M. Chandrashekhara  
KFRI Research Report No.101
- KFRI 210/94 - Botanical studies in the Medicinal Plant Conservation areas in Kerala  
Investigators : N. Sasidharan and C. Renuka  
KFRI Research Report No.99
- KFRI 212/94 - Preparation of a perspective plan for forestry sector of Kerala  
Investigator : S. Sankar

#### 4.3. ONGOING RESEARCH PROJECTS

During the year under report, 87 research projects were under operation in the following broad areas.

##### Natural Forests

- KFRI 146/92 - Macrofungus flora of Peechi-Vazhani Wildlife Sanctuary  
Investigators : E.J.M. Florence and K. Yesodharan
- KFRI 163/92 - Studies on the flora of Shendurney Wildlife Sanctuary with emphasis on endemic species  
Investigator : N. Sasidharan
- KFRI 164/92 - Vegetation mapping of Chimmony W.L.S.  
Principal Investigator : A.R.R. Menon
- KFRI 165/92 - Vegetation mapping of Peppara W.L.S.  
Principal Investigator : A.R.R. Menon
- KFRI 166/92 - Vegetation mapping of Aralam W.L.S.  
Principal Investigator : A.R.R. Menon
- KFRI 167/92 - Vegetation mapping of Eravikulam National Park  
Principal Investigator : A.R.R. Menon

- KFRI 168/92 - Vegetation dynamics of the grassland - forest ecosystems in the Western Ghats of Kerala  
P.I. : Director  
Investigators: K. Swarupanandan, S. Sankar, N. Sasidharan and M. Balagopalan
- KFRI 172/92 - Harvesting and regeneration techniques of reeds  
Investigator : R.C. Pandalai
- KFRI 174/93 - Ecological and environmental assessment of forest cover of Kerala with special reference to soil, vegetation and wildlife  
Investigator : S. Sankar
- KFRI 179/93 - Studies on the flora of Periyar Tiger Reserve  
Investigator : N. Sasidharan
- KFRI 184/93 - Studies on the epiphytic flora of the tropical forest ecosystems of Western Ghats with special reference to Nilgiri biosphere reserve  
Investigator : M.S. Mukteshkumar
- KFRI 198/93 - Preparation of an illustrated manual of the non-wood forest produce plants of Kerala  
Investigator : K.K.N. Nair
- KFRI 204/93 - Studies on the fern flora of Kerala with special reference to Sylvan Valley, Munnar  
Investigator : M.S. Muktesh Kumar
- KFRI 213/94 - Palm resources of Kerala and their utilization  
Investigators : C. Renuka and K.V. Bhat
- KFRI 217/94 - Effect of fire on forest soil and vegetation  
P.I. : Director  
Investigators: K. Swarupanandan, T. Surendran, K.V. Sankaran and Thomas P. Thomas
- KFRI 218/94 - Insect biodiversity in disturbed and undisturbed forests in the Kerala part of Western Ghats  
Investigator : George Mathew
- KFRI 220/94 - Studies on the Shola Forests of Kerala  
P.I. : Director  
Investigators: K. Swarupanandan, N. Sasidharan, U.N. Nandakumar and K.C. Chacko



- KFRI 221/94 - Studies on the diversity of selected group of insects in the Parambikulam Wildlife Sanctuary  
Investigators : V.V. Sudheendrakumar and George Mathew
- KFRI 223/94 - Soil microflora of shola forests of Eravikulam National Park  
Investigators : K.V. Sankaran and M. Balasundaran
- KFRI 225/94 - Evaluating plant diversity in different forest types of Kerala by laying out permanent sample plots  
P.I. : K. Balasubramanyan  
Investigator : K.K. Narayanan Nair
- KFRI 231/94 - Mapping of forests of Kerala  
Investigator : A.R.R. Menon
- KFRI 234/94 - Preparation of an exhaustive flora of Kerala Forest Research Institute campuses at Peechi, Velupadam and Nilambur  
Investigator : K.K. Narayanan Nair
- KFRI 237/94 - Conservation, management and sustainable utilization of non-timber forest products in Southern Western Ghats, Kerala, India  
Investigator : S. Sankar

### Plantation Forestry

- KFRI 104/87 - Tree improvement of eucalyptus for disease resistance and higher productivity  
Investigators : J.K. Sharma, E.J.M. Florence, M. Balasundaran, E.P. Indira, K.M. Bhat and T. Surendran
- KFRI 140/92 - Management of the teak defoliator using nuclear polyhedrosis virus (NPV)  
Investigators : K.S.S. Nair, M.I. Mohammed Ali, V.V. Sudheendrakumar, R.V. Varma and K. Mohanadas
- KFRI 142/92 - Use of alternative materials as containers for raising seedlings  
Investigator : U.N. Nandakumar

- KFRI 143/92 - Enhancement of productivity in *E. grandis* through fertiliser inputs and other cost effective treatments  
Investigators : M. Balagopalan and P. Rugmini
- KFRI 144/92 - Studies on the growth performance of teak nursery stock from genetically better sources for developing improved plantation technology  
Investigator : E.P. Indira
- KFRI 147/92 - Structural dynamics of teak stands in Kerala  
Investigator : K. Jayaraman
- KFRI 149/92 - Use of mycorrhizal and nitrogen-fixing symbionts in reforestation of degraded acid soils in Kerala  
Investigators : J.K. Sharma, K.V. Sankaran, M. Balasundaran and S. Sankar
- KFRI 151/92 - Soil nutrient management for teak plantations in Kerala  
Investigators : M. Balagopalan and P. Rugmini
- KFRI 158/92 - Green belt development at Cochin Refineries Ltd.  
Investigator : K.C. Chacko
- KFRI 175/93 - Tracing epicentres of teak defoliator outbreak in Kerala  
Investigators : K.S.S. Nair, K. Mohanadas, V.V. Sudheendrakumar, R.V. Varma and Santhosh K. John
- KFRI 176/93 - Evaluation of parasitoids for biological control of teak defoliators  
Investigators: V.V. Sudheendrakumar, R.V. Varma, K. Mohanadas and K.S.S. Nair
- KFRI 177/93 - Establishment of permanent plots to demonstrate the effect of protecting teak plantations from the teak defoliators  
Investigators : R.V. Varma, V.V. Sudheendrakumar, K.S.S. Nair, K. Mohanadas and Santhosh K. John
- KFRI 190/93 - Evaluation of newer teratocides including plant products for plantation establishment  
Investigators : R.V. Varma and K.S.S. Nair

- KFRI 194/93 - Underplanting rattans in rubber plantations  
Investigator : R.C. Pandalai
- KFRI 196/93 - Management of the bark feeding caterpillar *Indarbela quadrinotata* in *Albizia* plantations  
Investigator : George Mathew
- KFRI 199/93 - Growth of teak in successive rotations in relation to soil condition  
Investigator : M. Balagopalan
- KFRI 200/93 - Fungicidal management of quick wilt disease of pepper in forest plantations  
Investigators: M.I. Mohammed Ali, M. Balasundaran and K. Yesodharan
- KFRI 208/94 - Water relations and rooting depth of selected eucalypt species  
Investigators : Jose Kallarackal and C.K. Somen
- KFRI 216/94 - Management of the shoot borer *Hyppripyla robusta* in Mahogany plantations  
Investigator : K. Mohanadas
- KFRI 227/94 - Provenance trial in *Acacia*  
Investigator : E.P. Indira
- KFRI 228/94 - Status of *Acacia mangium* in Kerala  
Investigators : T.K. Dhamodaran and K.C. Chacko
- KFRI 238/95 - Fungal pathogens as a potential threat to tropical *Acacia* - Indian case study  
Investigator : J.K. Sharma and E.J.M. Florence

#### Mildlife

- KFRI 153/92 - Survey of small mammals in Kerala with special reference to endangered species and wildlife census in Chinnar Wildlife Sanctuary  
Investigators : P.S. Easa, P. Padmanabhan and James Zacharias
- KFRI 154/92 - Status, food and feeding habits of larger mammals in Idukki Wildlife Sanctuary  
Investigator : P.S. Easa



- KFRI 155/92 - Habitat utilisation by larger mammals in Chinnar Wildlife Sanctuary  
Investigators : E.A. Jayson and K.K. Ramachandran
- KFRI 156/92 - Habitat utilisation of animals in Parambikulam Wildlife Sanctuary with special reference to Gaur  
Investigators : P.S. Easa and A.R.R. Menon
- KFRI 157/92 - Status, food and feeding habits of larger mammals in Chimmony Wildlife Sanctuary  
Investigators : E.A. Jayson and P.S. Easa
- KFRI 159/92 - Studies on the ecology and population dynamics of endangered primates in Silent Valley National Park  
Investigator : K.K. Ramachandran
- KFRI 161/92 - Studies on man-wildlife conflicts in Peppara Wildlife Sanctuary and adjacent areas  
Investigator : E.A. Jayson
- KFRI 162/92 - Status, habitat utilisation and movement pattern of larger mammals in Wayanad Wildlife Sanctuary  
Investigator : P.S. Easa
- KFRI 173/92 - Management plan for Project Elephant areas in Kerala  
Investigator : P.S. Easa
- KFRI 178/93 - A field guide for identification of wild animals based on indirect evidences  
Principal Investigator : E.A. Jayson
- KFRI 183/93 - Studies on crop damage by wild animals in Kerala and evaluation of control measures  
Principal Investigator : E.A. Jayson
- KFRI 209/93 - Patterns and processes of fish assemblages in Periyar Lake-Valley System  
Principal Investigator : L.K. Arun
- KFRI 211/93 - A survey of reptiles and amphibians in Kerala part of Nilgiri Biosphere Reserve  
Investigator : P.S. Easa

- KFRI 214/94 - Study on man-wildlife interaction in Wayanad Wildlife Sanctuary, Kerala  
Investigators : P.S. Easa and S. Sankar
- KFRI 219/94 - Evaluation of methods for estimating the abundance of herbivores in the forest of Kerala  
Investigators : K. Jayaraman, P.S. Easa and E.A. Jayson
- KFRI 222/94 - Studies on the flora of Chinnar Wildlife Sanctuary  
Investigators : N. Sasidharan and Asst. Wildlife Warden, Chinnar Sanctuary
- KFRI 224/94 - Ecological studies on Sloth Bear (*Melursus ursinus*) in Parambikulam Wildlife Sanctuary  
Investigator : P.S. Easa
- KFRI 226/94 - Status and distribution of rare and endangered animals of Kerala and publication of a Booklet  
Investigator : E.A. Jayson
- KFRI 240/95 - Ecology and behaviour of gaur (*Bos gaurus*) in Periyar Tiger Reserve, Kerala  
Investigator : P.S. Easa

#### Wood Science & Technology

- KFRI 182/93 - Effects of faster growth on quality of teak  
Investigators : K.M. Bhat and E.P. Indira
- KFRI 186/93 - Studies on the growth and prevention of sapstain fungi in rubber wood and its effect on strength properties  
Investigators: E.J.M. Florence, R. Gnanaharan and J.K. Sharma
- KFRI 195/93 - Bee keeping - Use of unconventional timbers for hives  
Investigator : R.V. Varma
- KFRI 203/93 - Cambial activity and juvenile wood formation in teak  
Investigator : K.M. Bhat

### General & Environmental Studies

- KFRI 148/92 - Water relations and photosynthesis of the oil palm in peninsular India  
Investigator : Jose Kallarackal
- KFRI 188/93 - Expert system for designing experiments in forestry  
Investigators : P. Rugmini and K. Jayaraman
- KFRI 191/93 - Statistical analysis package for forest mensuration  
Investigator : K. Jayaraman
- KFRI 193/93 - Analysis of data from long term trials  
Investigators : P. Rugmini and K. Jayaraman
- KFRI 206/93 - Mushroom cultivation using forest litter and waste wood  
Investigators : E.J.M. Florence, J.K. Sharma and M. Balasundaran
- KFRI 207/93 - Mass rearing of selected butterflies for possible reintroduction in conservation programme  
Investigator : George Mathew
- KFRI 215/94 - Socio-economic and ecological aspects of developing bamboo resources in homesteads of Kerala  
Investigators: U.M. Chandrashekar, S. Sankar, C.N. Krishnankutty and R. Gnanaharan
- KFRI 232/94 - Rhizome and root morphology of rattans  
Investigators : C. Renuka and K.K. Unni
- KFRI 235/94 - Harvesting trials on bamboos  
Investigator : R.C. Pandalai
- BIC/India - Bamboo Information Centre - India  
Investigators : K. Sankara Pillai, N. Sarojam and K.H. Hussain

### Socio-Economics

- KFRI 181/93 - Teak plantation in Nilambur : An Economic Review  
Investigator : Mammen Chundamannil



- KFRI 189/93 - Economics of forest plantations in Kerala  
Investigator : Mammen Chundamannil
- KFRI 201/93 - Timber price trends in Kerala  
Investigator : C.N. Krishnankutty
- KFRI 230/94 - Biodiversity in Tropical Moist Forests : A sustainable use of non-wood forest products  
Investigators: P.K. Muraleedharan, N. Sasidharan, K.K. Seethalakshmi and E.M. Muralidharan

#### Medicinal Plants, Tissue Culture, Tree Improvement

- KFRI 129/90 - Propagation of medicinal plants, bamboo and rattan through tissue culture  
Investigator : E.M. Muralidharan
- KFRI 202/93 - Micropropagation of Teak, Rosewood and Sandal  
Investigator : E.M. Muralidharan
- KFRI 229/94 - Micropropagation of some medicinal plants  
Investigator : E.M. Muralidharan

#### Action Research Programmes

- KFRI 192/93 - Greening of Ayyampilly Hills - Participatory Action Research Programme  
Investigator : S. Sankar
- KFRI 197/93 - Eco-restoration of a degraded watershed in Mukundapuram Taluk of Thrissur District  
Investigator : S. Sankar

#### 4.4. NEW RESEARCH PROJECTS

During the year under report, the following 11 research projects were initiated.

##### Natural Forests

- KFRI 241/95 - Eco-restoration of a degraded watershed in Attappady  
Investigator : R.C. Pandalai

- KFRI 243/95 - Genetic diversity and conservation of rattans  
Investigators : C. Renuka, E.M. Muralidharan and E.P. Indira
- KFRI 244/95 - Biodiversity conservation potential and ecosystem rehabilitation using traditional knowledge at Chinnar Wildlife Sanctuary, the Western Ghats, Kerala, South India  
Investigator : S. Sankar
- KFRI 246/95 - Fire related ecosystem dynamics in the moist deciduous forests of the Western Ghats  
Investigators : K. Swarupanandan, K.V. Sankaran, T. Surendran and Thomas P. Thomas

#### Plantation Forestry

- KFRI 236/95 - Generation and transfer of silviculture and harvesting technology of selected medicinal plants  
Investigators: K.K.N. Nair, U.M. Chandrashekar, R.C. Pandalai and E.M. Muralidharan
- KFRI 239/95 - Atlas of teak soils in Kerala  
Investigators : M. Balagopalan and S. Sankar
- KFRI 242/95 - Tissue culture of rattans (canes) for clonal propagation  
Investigators: E.M. Muralidharan and R.C. Pandalai
- KFRI 245/95 - Use of baculovirus control agents within an integrated pest management strategy against the teak defoliator, *Hyblaea puer* in India  
Investigators: K.S.S. Nair, V.V. Sudheendrakumar, R.V. Varma and K. Mohanadas
- KFRI 247/96 - Development of spike disease resistant sandal seedlings through biotechnology involving ELISA technique and tissue culture  
Investigators : M. Balasundaran and E.M. Muralidharan

#### Wood Science & Technology

- KFRI 248/96 - Protection of rubber wood from insect borers  
Investigators: George Mathew and R. Gnanaharan

## Socio-Economics

- KFRI 249/96 - Study of private sector involvement in Forestry Research in India  
Investigators : K.S.S. Nair, Mammen Chundamanni & K.C. Chacko

## 5. OTHER ACTIVITIES

### 5.1. CONSULTANCY SERVICES

The following consultancy projects were taken up during the period.

- KFRI Cons.5/94 - Standardization of grading rules for Rattan  
Investigator : K.M. Bhat
- KFRI Cons.6/94 - Indigenous tools, equipment and technology for processing bamboo and rattan  
Investigator : R. Gnanaharan
- KFRI Cons.7/95 - Vegetation Mapping of Trichur Division  
Investigator : A.R.R. Menon
- KFRI Cons.8/95 - Properties and quality of teak timber with special reference to juvenile wood  
Investigator : K.M. Bhat
- KFRI Cons.9/95 - Vegetation Mapping of Pamba river basin  
Investigator : A.R.R. Menon
- POABS Cons.95 - Drying, Preservation and Processing of Wood  
Investigator : R. Gnanaharan

### 5.2. PARTICIPATION IN SEMINARS/SYMPOSIA

#### International

Shri E.A. Jayson attended the International Symposium on Measuring and Monitoring Forest Biological Diversity: The International network of Biodiversity Plots held at Smithsonian Institute, Washington, D.C., U.S.A., during May 1995.

Shri K.C. Chacko attended the Second Regional Seminar organised by FORSPA and the Ministry of Forestry at Yangon, Myanmar, during May 29 - June 3, 1995. He presented a satellite paper on "Silvicultural problems in management of Teak Plantation".



Nine Scientists of KFRI including the Director, Dr. K.S.S. Nair participated in the 20th World Congress of the International Union of Forestry Research Organisation (IUFRO) held at Tampere, Finland, from 6-12 August 1995. This was made possible through support from the Scientific Assistance Programme of the Congress and from FAO/International Tropical Timber Organisation. The Director planted a tree in the IUFRO Memorial Garden at Tampere, Finland, representing India along with other country representatives. Dr. Nair, who was the Chairman of the IUFRO Working Party S2.07.07 (Protection of forests in the tropics), was responsible for organising two technical sessions during the Congress - (1) Success stories in tropical forest pest control and (2) Current research on tropical forest pests. He was the moderator for these sessions which had presentations by several scientists from across the world. In addition, he presented two papers - (1) Termite control in eucalypt plantations - a success story from India and (2) Field trials using the nuclear polyhedrosis virus for control of the teak defoliator in Kerala, India. Dr. J.K. Sharma (Chairman, IUFRO WP S2.06.15) organised two sessions on Management of diseases of economic importance in tropical plantations. He moderated one of these sessions and also presented an invited paper - Current pathogen: host stress condition in Asian Tropical Forests - in a session on Diseases in Unstable Forest Ecosystems. Dr. R. Gnanaharan, Dr. K.K.N. Nair, Dr. M. Balasundaran, Dr. V.V. Sudheendrakumar, Dr. C. Mohanan, Dr. K.M. Bhat and Shri T.K. Dhamodaran also presented papers.

Dr. Jose Kallarackal attended the Montpellier Symposium on "Tree - Biology and development" held in the University of Montpellier, Montpellier, France, in September 1995. Presented a paper entitled, "Water use of some fast-and slow-growing tree species in the tropics" by Jose Kallarackal and C.K. Soenen.

Dr. C. Renuka attended the Second Annual Meeting on the Biodiversity and Genetic Conservation of Rattans, at Indonesia during 27 Nov. to 1 Dec. 1995.

Dr. P.S. Easa attended the Sixth Meeting of the IUCN/SSC Asian Elephant Specialist Group (AESG) held at Asian Institute of Technology, Bangkok, Thailand, during 11-13 March, 1996.

#### National

Dr. S. Sankar participated in the Training Workshop on Biodiversity Monitoring at Bangalore in May 1995 organised by USAID.

Dr. E.M. Muralidharan attended the All India Symposium on 'Recent advances in the biotechnological applications of plant tissue and cell culture' held at CFTRI, Mysore, from June 23-25, 1995 and presented a poster paper entitled 'Low-input micropropagation of some species of Zingiberaceae.'

Mrs. E.J.M. Florence attended **Workshop on Mushroom cultivation and post harvest technology** held on 28-8-1995 at TBGRI, Palode.

Dr. U.M. Chandrashekara has participated in the **Fifth Swadeshi Science Congress** held at Kozhikode on 3-5 November 1995 and presented a paper titled '**Muzhayude Adivilayayi Bhukaanda Sasyangal**' written by U.M. Chandrashekara and P.K. Shajahan.

Dr. Jose Kallarackal attended the **project monitoring workshop of the Ministry of Environment** held on 10-11 November 1995 at Osmania University, Hyderabad.

Dr. M. Balasundaran attended the **National Workshop on Molecular Biology of the Gene** sponsored by the Dept. of Biotechnology, Govt. of India and organised by the Centre for Plant Molecular Biology, Osmania University, Hyderabad, during 11-26 November 1995.

Shri K.C. Chacko attended a workshop on '**Botanic education for botanical and zoological gardens**' organized by the Coimbatore Zoological Park & Conservation Centre on 13-11-1995.

The staff of the Wildlife Biology Division attended the **Tenth Year Celebration Seminar in Silent Valley National Park** on 25th November 1995.

Dr. N. Sasidharan attended workshop on **Teaching about plants** held at Trivandrum on 17-11-1995.

Dr. M. Balasundaran participated in the **International Symposium on Plant Biotechnology and Molecular Biology** at the Centre for Plant Molecular Biology, Hyderabad, during 27-30 November 1995.

Dr. P.S. Easa, Dr. K.K. Ramachandran and Shri E.A. Jayson attended **Southern Regional Meet on Wildlife Ecology and Conservation** organised by Salim Ali Centre for Ornithology and Natural History during 1-2 December 1995.

Dr. P.S. Easa attended the meeting at Kottayam convened by Kerala Forest Department (WL) to discuss the problems of Bird Conservation in and around Kumarakom, on December 3, 1995.

Dr. U.M. Chandrashekara has participated in the **Second Congress on Traditional Sciences and Technologies of India** held at Anna University, Madras, on 27-31 December 1995 and presented a paper titled **Indigenous ecological knowledge about cultivation, management and use of bamboos in Kerala** written by U.M. Chandrashekara and P.K. Shajahan.

Mrs. E.P. Indira attended the Seminar on '**Crop breeding in Kerala**' held at Trivandrum on 25th January 1996.



Dr. M. Balagopalan attended VIIIth Kerala Science Congress held at Cochin during 27-29 January 1996 and presented a paper entitled Cluster analysis of soil properties as influenced by elevation, in association with P. Rugmini.

Mrs. P. Rugmini attended the VIIIth Kerala Science Congress organised by State Committee on Science, Technology and Environment, Kerala, and the Department of Science and Technology, Government of India, at Cochin University during 27-29 January 1996.

Dr. E.M. Muralidharan attended the VIIIth Kerala Science Congress held from 27-29th January 1996 at Cochin.

Shri T. Surendran participated in the VIIIth Kerala Science Congress on 29th January 1996 at Cochin.

Dr. R.C. Pandalai attended the First Regional Workshop on ICFRE Extension Strategy and Extension Support Fund on 31-1-1996 and 1-2-1996 at Bangalore.

Dr. Jose Kallarackal attended the National Seminar on "Drought management in plantation crops" organised by the Centre for Water Resources Development and Management on 7-8 February 1996 in Kottayam. Presented a paper entitled, "Atmospheric drought and its physiological effects on oil palm plantations in Peninsular India" by J. Kallarackal and P. Jeyakumar.

Dr. N. Sasidharan attended in the 2nd CAMP (Conservation Assessment Management Plan) workshop on threatened medicinal plants of South India during 12-14 February 1996 at Bangalore.

Dr. P.K. Muraleedharan attended Indo-British Workshop on Biodiversity : A conservation and evaluation at TBGRI, Trivandrum, during February 15-17, 1996.

Dr. S. Sankar attended the 1st Inception Workshop on Extension organised by ICFRE in Bangalore in February 1996.

Dr. R. Gnanaharan attended the Global Forum on Investment Opportunities in the Indian Rubberwood Industry held at Cochin during 19-21 March 1996 and presented a paper.

### 5.3. TRAINING IMPARTED

Mr. Mohan Babu Gurung, Nepal, successfully completed the three months' Agroforestry training programme in February 1996 under the ODA's Third Country Training Programme. He was awarded a certificate.

Attachment training for two IFS Probationers of 1992 batch from 27-4-1995 to 3-5-1995.



Dr. C. Renuka was a resource person in the Seed Technology Workshop held at IFGTB, Coimbatore, from 20-22 July 1995.

Dr. R. Gnanaharan gave guest lectures to the participants of various refresher courses at the SFS College, Coimbatore, on 14 August and 9 September 1995, 16 January and 15 February 1996.

Dr. K.M. Bhat and Shri T.K. Dhamodaran were the resource persons for a training course in Cane Handicrafts and Furniture, organised by the District Industries Centre, Pathanamthitta, during 16-18 October 1995.

Dr. C. Renuka was a resource person in the Advanced Training Programme in cane furniture manufacturing for rattan artisans organised by KFRI and District Industries Centre, Pathanamthitta, during 16-18 Oct. 1995 at Kozhencherry.

Dr. C. Mohanan acted as resource person in a training programme to impart training to rattan workers in chemical preservation of rattans against fungal staining and biodeterioration at District Small Scale Industry Development Centre, Pathanamthitta, Oct. 16-18, 1995; imparted training to Mohan Babu Gurung, Forest Range Officer from Nepal on plant protection measures in plantations during Nov.8, 1995 to Feb. 2, 1996.

Dr. R. Gnanaharan took classes for the participants of Technology Clinic on Rubber Wood Processing organised by STED, Calicut, and held at Kottayam and Tiruvalla during December 1995.

Dr. K.M. Bhat and Dr. K.V. Bhat gave guest lectures to College/University teachers participating in a UGC-sponsored refresher course at the Bharathidasan University, Thiruchirapally, during January 1996.

Dr. S. Sankar took classes on forest environment and ecology for camps (10 Nos.) in Peechi Wildlife Sanctuary.

#### 5.4. PARTICIPATION IN TRAINING

##### International

Dr. N. Sasidharan (NWFP) attended the International Diploma Course in Herbarium Techniques at Royal Botanic Gardens, Kew, England, during 2nd June 1995 to July 30th 1995.

Dr. R. Gnanaharan (Wood Science) conducted a collaborative study at the New Zealand Forest Research Institute, Rotorua, under the ITTO Fellowship during 10 June - 21 July 1995.

Dr. U.M. Chandrashekara (Agroforestry) participated in a training course Making Forest Policy Work organised in the Oxford Forestry Institute, Oxford, UK, during 10-28 July 1995. He also visited various forestry research institutes such as Natural Resources Institute, Kew Botanical Gardens, Natural History Museum, International Mycological Institute and University of Bangor.

Dr. K. Jayaraman (Statistics) on an assignment at the Ontario Forest Research Institute, Sault Ste. Marie, Ontario, Canada, during the period July 1995 to December 1995, worked on (i) Regression with autocorrelated errors : Application in stem profile models, (ii) Calibration of height-diameter relation for natural maple stands of Ontario through random parameter models.

Dr. P.K. Muraleedharan (Economics) visited Natural Resource Institute and Oxford Forestry Institute, UK, during August to September 1995 for consultation with Economists in the above organizations under the Ford Foundation Programme.

Dr. J.K. Sharma (Pathology) visited the following institutions in U.K., under the sponsorship of the British Council, in August '95. (i) Royal Botanic Garden, Institute of Terrestrial Ecology, and Forestry Commission, Edinburgh; (ii) Oxford Forestry Institute, Oxford, and its Field Station at Wyth; (iii) International Mycological Institute, Egham; (iv) International Institute of Biological Control, Ascot; (v) Forestry Commission, Farnham, Alice Holt.

Dr. J.K. Sharma (Pathology) also attended an Expert Meeting of FAO/IPGRI in Bangkok, Thailand, from 9-12 October 1995 to frame Technical Guidelines for the safe movement of eucalypt germplasm.

Dr. George Mathew (Entomology) attended the international short course on the sustainable management of tropical forests held at the University Pertanian Malaysia (UPM) from 21 Nov. to 2 Dec. 1995.

### National

Dr. K.K. Ramachandran (Wildlife) underwent training in Remote Sensing Technology and Applications through Visual Interpretation and Digital Analysis from 17-7-1995 to 22-9-1995 at National Remote Sensing Agency, Hyderabad.

Shri U.N. Nandakumar (Silviculture) attended a one week training programme on "Environmental impact assessment of water resources project" - October 20-25, 1995, organized by CWRDM.

Dr. E.M. Muralidharan (Genetics) attended a Short-term Training Course on 'Enzyme Purification, Yeast Genetic Transformation and Application of Molecular Markers' sponsored by DBT, SPIC and MSSRF from November 27 - December 11, 1995 at the MS Swaminathan Research Foundation, Madras.

Dr. V.V. Sudheendrakumar (Entomology) attended the Indo-British workshop on pheromone technology organised by SPIC at Madras during 29 November to 1 December 1995.



Dr. N. Sasidharan (NWFP) participated in a Training Programme on Botanical Research and Herbarium Management System held at IFGTB, Coimbatore, during 4-8 December 1995.

### 5.5. AWARDS/FELLOWSHIPS

Dr. K.V. Sankaran (Pathology) was awarded a Darwin Fellowship in biosystematics by the UK Dept. of Environment to work at the International Mycological Institute, UK, for a period of 12 months (May 1994 to May 1995).

Dr. K.K. Seethalakshmi (Physiology) was nominated for Technical Collaboration Training Award from ODA, UK, under Colombo Plan and worked as Visiting Post-doctoral Fellow in the University of Bath, UK, and IACR-Lang Ashton Research Institute Bristol, UK, under the project "Endogenous auxin and adventitious root formation in *Eucalyptus globulus*" along with Dr. David Blakesley, University of Bath, and Dr. Peter Hedden, IACR-Lang Ashton Research Station, University of Bristol, from May 1995 to April 1996.

**IUFRO Office Holders:** The following Scientists of KFR I were elected as IUFRO Office Holders of different Research Groups (RG) and Working Parties (WP) for the period 1996-2000.

Dr. K.S.S. Nair, Deputy Co-ordinator, RG 7.03.00

Dr. K.M. Bhat, Deputy Co-ordinator, RG 5.06.00; RG 5.08.00

Dr. J.K. Sharma, Co-ordinator, WP 7.02.07

Dr. K. Balasubramanian, Deputy Co-ordinator, WP 1.07.17

Dr. K.K.N. Nair, Deputy Co-ordinator, WP 1.17.02

Dr. V.V. Sudheendrakumar, Deputy Co-ordinator, WP 7.03.09

Dr. C. Mohanan, Deputy Co-ordinator, WP 7.02.03

### 5.6. EXTENSION/EXHIBITION

The Soil Science and Agroforestry Divisions were involved in assisting the organisation of the Seventh Board of Management Meeting of the UNESCO Tropical Soil Biology and Fertility Programme on 5-10 June 1995 at the Institute.

The Entomology Division attended the insect damage problem reported from teak nurseries under Kerala Forest Department and Social Forestry at Perumbavoor and Thodupuzha.



Mrs. E.P. Indira conducted a joint inspection to select a 77 ha teak seed production area at Nilambur and gave necessary advice.

Jointly with Forest Economic Division, the NWFP Division organized an interaction meeting with tribals, engaged on the collection of NWFPs at Muthanga, on 8-11-1995, at Muthanga Wildlife Sanctuary. Prepared a report on the status of trees along the road side at Para Junction, Nooranad, as per the directive from STEC, Kerala, to the Institute. Report was prepared jointly with Dr. P.S. Easa, Scientist-in-Charge, Wildlife Division.

Dr. N. Sasidharan and Dr. M. Balasundaran prepared a report on the status of vegetation involved in a litigation at Kanjiramukku near Edappon at the request of an Advocate Commission appointed by the High Court of Kerala.

Dr. M. Balasundaran investigated the disease problems affecting the teak raised by Kerala Rubber and Reclaims Ltd., Mamala, Ernakulam, and prepared a consultancy report (jointly with Dr. M. Balagopalan, Scientist, Division of Soil Science) suggesting control measures.

Dr. M. Balasundaran summarised and compiled final report of FORSPA (Forestry Research Support Programme for Asia and Pacific of FAO Regional Office, Bangkok) supported research projects on biofertilizers into a book entitled 'Use of micorrhizal and nitrogen fixing symbionts in revegetation degraded sites - An overview of FORSPA supported projects' - published by FORSPA.

The following disease problems referred to the Pathology Division were investigated and recommendations given for control, where necessary.

Disease problems affecting teak plantation raised by Kerala Rubber and Reclaims Ltd., Mamangalam, Ernakulam.

Death of seedlings of *E. tereticornis* in Perumbavoor.

White grub attack and collar rot in *Eucalyptus tereticornis* nursery at Kodanad.

Large-scale mortality of *E. grandis* seedlings in HNL 1994 and 1995 plantations at Pamba.

Disease problems in clonal *Eucalyptus* and *Casuarina* in IFGTB, Coimbatore.

Disease problems in *Pterocarpus santalinus* research plot at Palappilly.

Pink disease in HNL 1994 plantation of *E. grandis* in Munnar.

*Cylindrocladium* leaf and stem infection in *Eucalyptus tereticornis* plantation at Shaliakara, Thenmala.

*Cylindrocladium* leaf and stem infection in *Eucalyptus grandis* plantation at Kallar, Munnar.

Pink disease caused by *Corticium salmonicolor* in *Pterocarpus santalinus* plots at Palappilly, Kodanad Research Range.

Dr. Jose Kallarackal, Dr. J.K. Sharma and Shri K.C. Chacko prepared an extension report on the failure of teak stumps in Vazhachal Forest Division and submitted to the DFO, Vazhachal.

Shri T. Surendran gave a demonstration of vegetative propagation technique of eucalypts under mist chamber conditions to a batch of 6 Research Range Officers of Kerala Forest Department during their visit to KFRI.

Shri T. Surendran visited Research Range Office, Palode, and gave demonstration and guidance to forest officials, on vegetative propagation of eucalypts as well as on operation and maintenance of mist propagation unit, established at Palode.

Field demonstration and one day training programme on cultivation of selected medicinal plants for farmers from Palakkad District in July 1995 by Dr. R.C. Pandalai.

Dr. R.C. Pandalai took a class on "Rattan cultivation" at District Industries Centre, Kozhencherry, Pathanamthitta, in connection with the training programme on "Industrial Co-operative Training in Cane Handicrafts and Furniture" - October 1995.

Dr. R.C. Pandalai delivered a lecture on "Tree for wasteland development - their planting techniques and management" in connection with the NSS Annual Camp at Government School, Peechi.

Shri K.C. Chacko participated in an AIR interview on "Planting of trees under wasteland development" on 12-10-1995.

Dr. R.C. Pandalai delivered lectures on "Soil and water conservation through tree planting" in the (i) National watershed programme, Venganellore, (ii) Agricultural Training Programme, ASLP School, Chelakkode.

Dr. R.C. Pandalai attended a one day Environment Awareness Seminar at Nattika. Lecture on "Water and Soil Conservation through Tree Planting" (11-3-1996).

As a resource person for XI & XII refresher courses for the State Forest Service Officers (ACFs/DCFs) at State Forest Service College, Shri K.C. Chacko delivered lectures on 'Improved nursery and plantation practices'.

Shri K.C. Chacko delivered a guest lecture on "Employment opportunities for forestry graduates" at College of Forestry, Vellanikkara, in a one-day Career Guidance Seminar organised by the Employment Guidance Bureau of Kerala Agricultural University.



An extension work at Vazhachal Forest Division (dying of teak in 1995 teak plantation) was attended jointly with the Pathology and Physiology Divisions, and a report provided to the Forest Department by Shri K.C. Chacko.

Shri K.C. Chacko gave an interview on "Planting trees in wasteland" for broadcast by AIR

The Soil Science Division conducted an exhibition on Forests and Forestry at Muthalamada, Palakkad District, in December 1995.

The Soil Science Division carried out extension work for Kerala Rubber and Reclaims Ltd., Mamala, with regard to stunting of teak plants and fertilizer management.

Dr. P.S. Easa visited Nooranad area, as per the instruction from the STEC, and prepared a report on the birds and their habitat. Conducted the Quiz Programme for Kerala Forest Department held in connection with the Wildlife Week Celebrations, 1995. Conducted a Quiz Programme in Dooradarshan Kendra, Trivandrum. Attended the Programme Advisory Committee Meeting of All India Radio, Trichur. Gave a lecture on Wildlife Population Estimation Techniques for the Forest Officials held at Institute of Management in Government, Cochin, on 3rd January 1996. Gave lectures on Wildlife Conservation, Population Estimation Techniques, Habitat Monitoring and Food Analyses for the Veterinarians held at Institute of Management in Government, Cochin. Lectures on Wildlife Conservation in Nature Camps in Peechi-Vazhani Wildlife Sanctuary. Lecture on the Role of youth in Diversity conservation in Dept. of Cooperation and Banking, Kerala Agricultural University, in connection with World Environment Day. Lectures on Wildlife Conservation in Govt. L.P.S. and N.S.S. High School, Mullurkara. Organised Wildlife Census in Silent Valley National Park, Peechi-Vazhani and Idukki Wildlife Sanctuaries.

Dr. P.S. Easa and Dr. L.K. Arun visited the Ashtamudi Lake, as per the request from the Kerala Forest Department (WL) for a study on Pearl Spot breeding.

Dr. P.S. Easa, Dr. L.K. Arun and the Research Fellows of the Wildlife Division helped the Kerala Forest Department (WL) in organizing exhibition at Interpretation Centre in Periyar Tiger Reserve.

The Research Fellows of the Wildlife Division participated in the Wildlife Census in Silent Valley National Park, Peechi-Vazhani and Idukki Wildlife Sanctuaries.

Wood Science Division carried out consultancy work for M/s. Plantation Corporation of Kerala Ltd., Kottayam, M/s. Emsons Treatwood, Aluva, and M/s. POABS, Tiruvalla.

The Wood Science Division determined the penetration of preservatives in treated wood for different wood industries.



Technical information on treated rubber wood was provided to M/s. BHEL, Hyderabad. Technical advice was given to the Telecom Engineering Centre of the Department of Telecommunication on the specification requirements of treated rubber wood for cable drums.

### 5.7. VISITORS

Dr. Eric Boa, Pathologist, International Mycological Institute, UK.

Mr. Mick Blowfield, Social Scientist, Natural Resources Institute, UK.

Dr. C. Chandrasekaran, FAO, Rome.

Dr. Lambert Kollé, Scientist, Bamboo Research Foundation, Indonesia.

Dr. Philip Bacon, Oxford Forestry Institute, Oxford, UK.

Dr. David Black, Office of the ODA, New Delhi.

Dr. Marlene Buchy, Lecturer in Rural Development Forestry, School of Agricultural and Forest Sciences, University of Wales, Bangor, UK.

Dr. D.D. Awasthi, Sr. INSA Scientist, March 1996.

Dr. H.F. Evans, principal Entomologist, Forestry Commission, UK.

Dr. A.M. O'Connell, Senior Principal Research Scientist, CSIRO Div. of Forestry and Forest Products, Wembley, W. Australia (6-21 Dec. 1995).

Dr. John Fryer, Research Co-ordinator (Forestry), ACIAR, Canberra, Australia (17-21 Dec. 1995).

Dr. Lene Lange, Research Scientist, NOVO Nordisk, Novo Alle, Denmark (12 Feb. 1996).

Dr. Jim Waller, Head, Plant Pathology Unit, International Mycological Institute, Egham, Surrey, UK (27 Feb. 1996).

Dr. H.C. Evans, International Institute of Biological Control, Ascot, Berkshire, UK (27 Feb. 1996).

Dr. Ramanuja Rao, INBAR.

Dr. Tonny O'Connell, ACIAR, Australia.

Dr. K.C. Jayaram, (Ichthyologist) Joint Director (Retd.), Zoological Survey of India.

Shri Prachya Musikasinthorn, Laboratory of Ichthyology, Tokyo University of Fisheries.

Mr. Lionel Jayanetti of TRADA Ltd., UK, on 3 November 1995.

## 6. PUBLICATIONS

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### Popular Articles

- 'Kavukale Kaividaruthu'  
- R.C. Pandalai in Karshakashree, Dec. 1995.
- 'Thekkuthai Nursery'  
- R.C. Pandalai in Karshakashree, Feb. 1996.
- 'Neela amarium pachilayum vilappetta oushadhangal'  
- R.C. Pandalai in Karshakashree in March 1996.

## 7. LIBRARY SERVICES

## Documents

The holdings in the Library are shown below:

## Books

Total number in the beginning of the year	..	12,973
Addition during the year 1995-96	..	59
Total number of Back Volumes at the beginning of the year	..	6,000
Number of journals currently subscribed	..	53
Journals newly subscribed during the year	..	9

## Reprints

Total number of Reprints at the beginning of the year	..	6,953
Number of reprints acquired during the year	..	290

## Books and Bulletins published

Directory of Bamboo Researchers and  
Projects of South and South-East Asia.

BIC India Bulletin .. Volume No.IV

## Other activities:

Databases of bamboo literature, projects and researchers of South and South-East Asia are developed and handed over to INBAR as part of the project 'Bamboo Information Centre - India'. The update of TREE-CD (compact disc of all the bibliographic citations and abstracts published in Forestry Abstracts, Forest Products Abstracts and Agroforestry Abstracts) and Wildlife/Fisheries Review in CD-ROM were procured. Circulation of 'Monthly Additions' of the Library among Scientists in the Institute was continued. A separate collection of teak literature was made and handed over to the Teak Museum, Nilambur Sub Centre, and a computer database of this literature was developed.

Microfilm reader service, reprographic service and photographic service were also made available through the Library.

## APPENDIX - I

## LIST OF STAFF AS ON 31-3-1996

DIRECTOR : Dr. K.S.S. Nair

ADMINISTRATION DIVISION

REGISTRAR : Shri P. Aravindakshan

Administration Unit

1.	Shri K.K. Bhagianadh	Dy. Registrar (Admn)
2.	Shri P. Achuthankutty	PA to Director
3.	Smt. K.N. Rajamma	Superintendent
4.	Shri M.K. Aravindakshan	"
5.	" T.J. Alfred Headisjis	PA to Registrar
6.	Smt. Grace Andrews	Stenographer
7.	Shri M.S. Sukumaran	Office Assistant
8.	Shri P.A. Sulaiman (on deputation to the University of Sanskrit, Kalady)	"
9.	Shri E.V. Eshac	Office Assistant
10.	Smt. Mary Kuruvila	Receptionist
11.	Shri P.R. Jose	Sergeant
12.	" M. Cherukunhan Nair	Typist
13.	" K.S. Karunakaran	Clerical Assistant
14.	" T. Chandran	Driver
15.	" K. Dhorairaj	"
16.	" V.D. Johny	"
17.	" Kurien Mathew	" (on leave)
18.	" K. Chandran	Attender
19.	" P.V. Subramanian,	"
20.	" K.R. Sevaraman	"
21.	" P.A. Sankarankutty	"
22.	" V.N. Balakrishnan	"
23.	" V.K. Mohandas	Bus Cleaner
24.	" A.C. Antony	Watcher
25.	" K. Said Mohammed	"
26.	" K. Nanu	"
27.	Smt. V.M. Ammini	Sweeper
28.	" K.D. Chinamma	"
29.	" P.K. Thankamani	Field Worker
30.	" A.K. Ammini	"
31.	" K.C. Mary	"
32.	" E.V. Thanka	"
33.	" K.V. Bharathy	"



Accounts Unit

34.	Smt. V.K. Leela	Superintendent
35.	Shri K.K. Thomas	Office Assistant
36.	" V.K. Mohanan	"
37.	Smt. K.M. Suseela	"
38.	" M. Kamalamma	"
39.	Shri K.A. Gopalan	"
40.	" B.P. Sreedharan	Attender

Engineering Unit

41.	Shri K.R. Mukundan	Engineer
42.	" P.P. Sunny	Skilled Maintenance Asst.
43.	" U.Y. John	Overseer
44.	Smt. T.V. Chandrika	Typist
45.	Shri D. Skariah	Pump Operator
46.	" K.C. Subramanian	"
47.	" K.M. Velayudhan	"
48.	" P.B. Sajeeva Rao	"
49.	" M.R. Anilkumar	"
50.	" K.K. Ahammed	Attender

Computer Cell

51.	Shri A.R. Rajan	Programmer
-----	-----------------	------------

Nilambur Sub Centre

52.	Shri K.V. Mohammed Kunhi,	Senior Scientific Asst. (Officer-in-Charge, Teak Museum, Nilambur)
-----	---------------------------	--

53.	Shri K. Rajendran	Office Assistant
54.	" K.P. Manoj	Typist
55.	" K. Mohanan	Ticket Vendor
56.	" V. Mohammed Ali	Field Worker
57.	Smt. A.V. Thankam	"
58.	" K.T. Pathamma	"
59.	Shri P. Mohammed	"
60.	" C.P. Shoukathali	"
61.	" E.T. Narayanan	"
62.	" K. Muhammed	"
63.	" K.K. Mohammed	Cook
64.	" T.P. Padmanabhan	

Field Research Centre, Palappilly

65.	Shri K.K. Unni	Field Assistant
66.	" E.P. Ulahannan	Field Worker
67.	" C.J. John	Field Worker

RESEARCH DIVISIONSAgroforestry

- |     |                         |                       |
|-----|-------------------------|-----------------------|
| 68. | Dr. U.M. Chandrashekara | Scientist             |
| 69. | Shri V.P. Ravindran     | Field Assistant       |
| 70. | " T.M. Abdul Vahab      | Word Processing Asst. |

(Dr. S. Sankar, Scientist-in-Charge, Soil Science Divn., held additional charge of the Division)

Botany

- |     |                         |                         |
|-----|-------------------------|-------------------------|
| 71. | Dr. K.K. Narayanan Nair | Scientist-in-Charge     |
| 72. | Dr. C. Renuka           | Scientist               |
| 73. | Dr. M.S. Mukteshkumar   | "                       |
| 74. | Dr. K. Yesodaran        | Senior Scientific Asst. |
| 75. | Shri K. Vijayan         | Driver                  |
| 76. | " M.C. Mohandas         | Attender                |

Ecology

- |     |                            |                     |
|-----|----------------------------|---------------------|
| 77. | Dr. K. Balasubramanian     | Scientist-in-Charge |
| 78. | Dr. K. Swarupanandan       | Scientist           |
| 79. | Dr. A.R. Ramachandra Menon | "                   |
| 80. | Smt. K. Annapoorni         | Stenographer        |
| 81. | Shri M.A. Sankarankutty    | Attender            |

Economics

- |     |                         |                     |
|-----|-------------------------|---------------------|
| 82. | Dr. P.K. Muraleedharan  | Scientist-in-Charge |
| 83. | Shri Mammen Chundamanni | Scientist           |
| 84. | " S. Shahul Hameed      | Driver              |

Entomology

- |     |                          |                     |
|-----|--------------------------|---------------------|
| 85. | Dr. R.V. Varma           | Scientist-in-Charge |
| 86. | Dr. George Mathew        | Scientist           |
| 87. | Dr. V.V. Sudheendrakumar | "                   |
| 88. | Shri K. Mohanadas        | Driver              |
| 89. | " P. Mohandas            | Attender            |
| 90. | " K.C. Subramanian       |                     |

Genetics

- |     |                        |           |
|-----|------------------------|-----------|
| 91. | Smt. E.P. Indira       | Scientist |
| 92. | Dr. E.M. Muralidharan  | "         |
| 93. | Shri E.D. James Tidode | Typist    |
| 94. | " A.S. Sreenivasan     | Attender  |

(The Director held additional charge of the Division)

Non-wood Forest Products

95.	Dr. N. Sasidharan	Scientist
96.	Shri C.K. Vincent	Gardener
97.	Smt. A.M. Lalitha	Field Worker
98.	" T.G. Chandrika	"
99.	Shri N.I. Thankappan	"

(The Director held additional charge of the Division)

Pathology

100.	Dr. J.K. Sharma	Scientist-in-Charge
101.	Dr. M. Balasundaran	Scientist
102.	Dr. C. Mohanan	"
103.	Dr. K.V. Sankaran	"
104.	Smt. E.J. Maria Florence	" (on leave)
105.	Shri M.I. Mohammed Ali	Stenographer
106.	Smt. D. Sumangalamma	Attender
107.	Shri A.V. Velayudhan	Field Worker
108.	Smt. T.S. Chandrika	

Physiology

109.	Dr. Jose Kallarackal	Scientist-in-Charge
110.	Dr. K.K. Seethalakshmi	Scientist
111.	Shri T. Surendran	"
112.	" C.K. Somen	Senior Scientific Asst.
113.	" P.I. Madhavan	Driver
114.	" M.B. Dasan	Attender
115.	" M.K. Sivaraman	Field Worker

Silviculture

116.	Shri K.C. Chacko	Silviculturist-in-Charge
117.	Dr. R. Chandrasekhara Pandalai	Silviculturist
118.	Shri U.N. Nandakumar	"
119.	" P.K. Chandrasekhara Pillai	Field Assistant
120.	" T.C. Paul	Driver
121.	" K.R. George	Attender

Soil Science

122.	Dr. S. Sankar	Scientist-in-Charge
123.	Dr. M. Balagopalan	Scientist
124.	Shri Thomas P. Thomas	"
125.	Smt. M.P. Sujatha	Stenographer
126.	Shri A. Ramakrishnan	Field Assistant
127.	" K.K. Ramesh	Attender
128.	" P.M. Vasu	



Statistics

129.	Dr. K. Jayaraman	Scientist-in-Charge
130.	Smt. P. Rugmini	Scientist
131.	Shri C.N. Krishnankutty	"
132.	" K. Girijavallabhan	Driver
133.	" P.S. Raman	Attender

Wildlife

134.	Dr. P.S. Easa	Scientist-in-Charge
135.	Dr. K.K. Ramachandran	Scientist
136.	Dr. P. Vijayakumaran Nair	"
137.	Shri E.A. Jayson	"
138.	" P. Padmanabhan	Senior Scientific Asst.
139.	" E.T. Kuttikrishnan	Attender

Wood Science

140.	Dr. R. Gnanaharan	Scientist-in-Charge
141.	Dr. K. Mahabala Bhat	Scientist
142.	Dr. K.V. Bhat	"
143.	Shri T.K. Dhamodaran	"
144.	" P.K. Thulasidas	Laboratory Asst.
145.	" V.C. Chandran	Driver
146.	" V.S. Neelakantan	Attender

Library

147.	Shri K. Sankara Pillai	Librarian
148.	Smt. N. Sarojam	Asst. Librarian
149.	Shri Subash Kuriakose	Artist Photographer
150.	Shri K.H. Hussain	Library Asst. (on leave)
151.	" V. Asokan	Fair Copy Superintendent
152.	" K.F. George	Library Assistant
153.	" P.M. Venugopalan	Typist
154.	" C.A. Jose	Binder
155.	" T. Prabhakaran	Clerical Assistant
156.	" M.C. Reghunathan	Attender
157.	" K.V. Sidharthan	"
158.	Smt. N. Baby	"

## APPENDIX - II

T.S. VAIDYANATHA IYER & CO.  
Chartered Accountants  
Near Thiruvambadi Temple  
Trichur - 680 001

## AUDITORS' REPORT

We have audited the annexed Balance Sheet of the KERALA FOREST RESEARCH INSTITUTE, PEECHI, as at 31st March 1996 and the annexed Income and Expenditure Account for the year ended on that date and report that:

- 1) We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit.
- 2) In our opinion, proper books of account and records have been kept by the Institute so far as appears from our examination of the books and records.
- 3) The Balance Sheet and the Income and Expenditure Account dealt with by this report are in agreement with the books of account and records maintained by the Institute.
- 4) As in the past, fixed assets have not been physically verified by the Management during the year under review.
- 5) In our opinion and to the best of our information and according to the explanations given to us, the accounts, together with notes thereon, give a true and fair view:
  - a) In the case of the Balance Sheet, of the state of affairs of the Institute as at 31st March, 1996; and
  - b) In the case of the Income and Expenditure Account, of the excess of Expenditure over Income for the year ended 31st March, 1996.

For T.S. VAIDYANATHA IYER & CO.,  
Chartered Accountants

Sd/-

T.V. Balakrishnan  
Proprietor

Trichur,  
18th November, 1996

## KERALA FOREST RESEARCH INSTITUTE, PEECHI

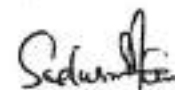
## BALANCE SHEET AS AT 31ST MARCH, 1996

LIABILITIES	Current year		Previous year	
	Rs.	Rs.	Rs.	Rs.
<b>GENERAL FUND</b>				
Balance as per last Balance Sheet	1,21,28,640		1,06,32,002	
Add. Grant received from Government	1,16,00,000		91,00,000	
Grant received from Forest Department	5,00,000		000	
	2,42,28,640		2,48,32,002	
Less: Excess of Expenditure over Income	1,18,25,712	1,23,02,828	1,25,83,382	1,21,28,640
<b>RESERVES AND SURPLUS</b>				
Surplus in Grants (Excess of Income over Expenditure of completed external projects)	4,00,743		4,00,743	
Overhead Charges of External Projects capitalised	000		8,52,889	
Less: Cost of Boat transferred	10,320	3,90,423		12,53,812
<b>CURRENT LIABILITIES AND PROVISIONS</b>				
As per Schedule - "A"		77,05,195		72,83,482
Total Liabilities		2,03,98,546		2,06,65,734
<b>ASSETS</b>				
<b>FIXED ASSETS</b>				
As per Schedule - "B"		1,80,74,814		1,46,17,525
<b>CAPITAL WORK-IN-PROGRESS</b>				
As per Schedule - "C"		000		15,99,190
<b>CURRENT ASSETS, LOANS AND ADVANCES</b>				
As per Schedule - "D"		43,23,732		44,49,019
Total Assets		2,03,98,546		2,06,65,734

Auditors' Report annexed

For T. S. VAIDYANATHA IYER & CO.  
Chartered AccountantsT. V. Balakrishnan  
Proprietor

Trichur, 18th November, 1996



D I R E C T O R



**KERALA FOREST RESEARCH INSTITUTE, PEECHI**

Income and Expenditure Account for the year ended 31st March, 1996

Particulars	Current year Rs.	Previous year Rs.
<b>EXPENDITURE</b>		
Salaries and allowance	87,23,803	82,80,436
Contribution to Provident Fund	7,70,177	5,57,628
Leave Travel Concession	23,796	25,714
Leave Salary & Pension Contribution	18,071	14,537
Group Gratuity Assurance	2,30,000	2,54,013
Staff Welfare Expenses	90,195	1,10,802
Travelling Expenses	1,17,516	87,313
Postage Telephone, Telex	1,94,928	2,79,718
Printing, Stationery, Photocopy	80,163	1,43,327
Electricity Charges	2,43,426	2,37,339
Books and Periodicals	49,659	1,26,022
Seminars and Symposia	0	4,086
General Research Expenses	1,37,238	1,90,180
Repairs and Maintenance	6,34,803	6,04,580
Legal Expenses	2,250	8,000
Auditors' Fees	9,000	8,500
Other Expenses	1,27,500	98,855
Depreciation	10,20,381	8,15,865
<b>Total</b>	<b>12,482,906</b>	<b>1,29,55,076</b>
<b>INCOME</b>		
Interest on Bank/Treasury Deposits	57,387	73,033
Rent Recoveries from Staff	132,742	1,37,442
Guest House Rent	14,539	15,385
Vehicle Hire Charges recoveries	72,684	75,400
Photocopying Charges	54,223	47,197
Other Income	225,619	1,03,256
Excess of Expenditure over Income	11,925,712	1,25,03,382
<b>Total</b>	<b>12,482,906</b>	<b>1,29,55,076</b>

Referred to in our report of even date.

For T. S. VAIDYANATHA IYER & CO.,  
Chartered Accountants

*T. V. Balakrishnan*  
T. V. Balakrishnan  
Proprietor

Trichur, 18th November, 1996

*Sudhan*

DIRECTOR

## APPENDIX - III

## THE GOVERNING BODY

1. Shri Kadavoor Sivadasan (Chairman)  
Hon'ble Minister for Forests  
Government of Kerala  
Secretariat  
Thiruvananthapuram - 695 001
2. Dr. P.K. Iyengar (Vice-Chairman)  
Chairman  
State Committee on Science,  
Technology & Environment  
General Hospital Road  
Thiruvananthapuram - 695 037
3. Shri John Mathai  
Secretary to Government of Kerala  
Forest & Wildlife Department  
Secretariat  
Thiruvananthapuram - 695 001
4. Shri K.V. Nambiar, IAS  
Secretary to Government  
Planning & Economic Affairs Dept.  
Secretariat  
Thiruvananthapuram - 695 001
5. Shri N. Basheer Rawther  
Joint Secretary  
Finance Department  
Secretariat  
Thiruvananthapuram - 695 001
6. Shri P.N. Surendran, IFS  
Principal Chief Conservator  
of Forests  
Forest Headquarters  
Vazhuthacaud  
Thiruvananthapuram - 695 014
7. Dr. A.M. Michael  
Vice-Chancellor  
Kerala Agricultural University  
Vellanikkara  
Thrissur Dist.

8. Shri S. Shyam Sundar, IFS  
Principal Chief Conservator  
of Forests (Retd.), Karnataka  
2989/D, 12th Main  
HAL II Stage  
Bangalore - 560 008
9. Dr. K.N. Subramanian  
Retd. Director (IFGTB)  
XXVII/52, "SUDHARSANAM"  
Thekkumbhagam  
Thripunithura - 682 301
10. Dr. P. Pushpangadan  
Director  
Tropical Botanical Garden &  
Research Institute  
Pacha, Palode  
Thiruvananthapuram Dist.
11. Shri S. Easwaramurthy  
Chief Conservator of Forests  
(Research)  
Adayar  
Madras - 600 020
12. Shri M.F. Ahammed, IFS  
Inspector General of Forests  
Ministry of Environment & Forests  
Paryavaran Bhavan  
CGO Complex, Lodi Road  
New Delhi - 110 003
13. Shri A.K. Kaderkutty  
Managing Director  
Western India Plywoods Ltd.  
Baliapattom  
Kannur Dist. - 670 010
14. Dr. K.S.S. Nair  
Director  
KFRI, Peechi

(Member-Secretary)



## APPENDIX - IV

## THE EXECUTIVE COMMITTEE

1. Dr. P.K. Iyengar (Chairman)  
Chairman  
State Committee on Science,  
Technology & Environment  
General Hospital Road  
Thiruvananthapuram - 695 037
2. Shri John Mathai  
Secretary to Government of Kerala  
Forest & Wildlife Department  
Secretariat  
Thiruvananthapuram - 695 001
3. Shri P.N. Surendran, IFS  
Principal Chief Conservator  
of Forests  
Forest Headquarters  
Vazhuthacaud  
Thiruvananthapuram - 695 014
4. Dr. K.N. Subramanian  
Retd. Director (IFSTB)  
XXVII/52, "SUDHARSANAM"  
Thekkumbhagam  
Thripunithura - 682 301
5. Dr. P. Pushpangadan  
Director  
Tropical Botanical Garden &  
Research Institute  
Pacha, Palode  
Thiruvananthapuram Dist.
6. Dr. K.S.S. Nair (Member-Secretary)  
Director  
KFRI, Peechi