

Annual Report - 1993-1994

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

INTRODUCTION

The Institute passed through an year of hectic scientific and allied activities. Nearly 100 research projects were under operation providing new areas and venues for scientists and supporting staff. The financial constraint, a major bottleneck in research was overcome by attracting aided projects, consultancy, assignments, turnkey implementation programmes and others. Savings gathered from such activities were pooled for general improvements like civil works, purchase of equipments and vehicles, books and journals, etc. A number of research scholars joined during the current year as Ph.D. students and provided enthusiasm and support for the activities.

Basic studies on biodiversity of fauna and flora were initiated. Wildlife Census 1993, preparation of Project Elephant, studies on Medicinal Plant Conservation Areas and Sanctuaries and National Parks are throwing out new information every day. A forest map of Kerala was prepared for the Forest Department.

More and more applied studies were taken up to develop cost-effective methods for improving productivity of plantations, soil and water conservation in forest areas, nursery seedlings, etc. The Institute has commenced operational projects for large scale afforestation, soil and water conservation and joint forest management.

The Institute conducted Training Programmes on Seed Management, Biodiversity Conservation, Wood Utilisation, Mycorrhiza and Nitrogen Fixing Symbionts and Conservation Biology of Medicinal Plants. It is approved as a national and international training centre in different fields of forestry.

Institute scientists have been recognised as consultants at the national and international levels.

Overall, the year has been extremely productive and the KFRI is poised for growth through national and international recognition from the Ministry of Environment & Forests, State Forest Departments, Department of Biotechnology, FORSPA, Ford Foundation, Mac Arthur Foundation and Biodiversity Support Programme of USAID.

It is hoped that with the support from the Government of Kerala, Chairman of the Governing Body and members and Chairman and members of the Executive Committee and hard work from KFRI staff, the Institute can accomplish the cherished goals.

S. Chand Basha

GENERAL

FINANCE

The budget for 1993-94 approved by the Governing Body was for Rs.110 lakhs. Under the general grant-in-aid, the Government of Kerala released Rs.95 lakhs. In respect of projects funded by external agencies, the Institute received Rs.123.06 lakhs during the year as per details given below.

	(Rs. in lakhs)
Govt. of India, Ministry of Environment & Forests ..	5.19
Govt. of India, Dept. of Biotechnology ..	4.31
Govt. of India, Dept. of Science & Technology ..	6.00
Govt. of Kerala, Forest Department ..	61.49
Govt. of Kerala, Planning Department ..	5.00
State Committee on Science & Technology ..	1.27
IDRC, Canada ..	13.26
Ford Foundation ..	4.19
FAO ..	2.79
Others ..	19.56
Total ..	123.06 =====

The expenditure incurred during 1993-94 was Rs.96.45 lakhs. The break up is given below.

Books & Journals ..	Rs.3,46,797
Civil works and maintenance ..	2,67,057
Furniture and fittings ..	24,652
Fuel and maintenance of vehicles ..	2,93,943
Establishment charges ..	80,10,420
Electricity and telephone ..	3,55,310
Printing and stationery ..	61,859
Research expenses, chemicals and equipments ..	2,84,529
Total ..	96,44,567 =====

In respect of external projects, Rs.130.16 lakhs was incurred towards project expenses.

M/s. T.S. Vaidyanatha Iyer & Co. has been appointed as Auditors for the year and audit is in progress.

For the year 1994-95, the Governing Body has approved a budget of Rs.139 lakhs. The State Government has sanctioned an amount of Rs.91 lakhs as grant-in-aid for the year. So far 6 instalments of grant amounting to Rs.54.60 lakhs has been released.

ACTIVITIES OF DIVISIONS

Division of Agroforestry-cum-Publicity

The Division is handling four projects. Three projects are sponsored projects. One project on Rural Bamboo is in collaboration with Natural Resources Institute of Overseas Development Agency, United Kingdom. One project funded by the Wasteland Development Department relates to development of joint forest management in a degraded revenue land.

The Division is active in organising training programmes and environmental awareness campaigns. It caters to the publicity work of the Institute activities.

This year the Division is spaced in its own building with a seminar hall and lab.

Division of Botany

The Division is operating 8 projects. Seven projects are sponsored and two relate to the Bamboo and Reed Project sponsored by IDRC, Canada. A modern herbarium for the Division is being constructed.

Division of Ecology

The Division is operating 10 research projects. Four projects are at vegetation mapping of wildlife sanctuaries. One project on Biodiversity Conservation is funded by the World Wide Fund for Nature (WWF, India).

The Division has procured modern cartographic equipments, latest satellite and aerial photographs.

Division of Economics

The Division is operating four research projects. It is active with the implementation of the Ford Foundation Programme: Indian students dissertation programme and preparation of an undergraduate text book in

Forest Economics. The Proceedings of the "National Seminar on Socio-economic Research in Forestry" was published in 1994.

The Ford Foundation is funding another project on non-wood forest products to the Division.

Division of Entomology

The Division is operating 8 research projects. The most important one is "Management of teak defoliator using Nuclear Polyhydrosis virus" funded by the Department of Biotechnology, Government of India. A search for new termiticide in the light of the ban on use of aldrin is on

Division of Genetics

The Division has six projects. The central theme is genetic improvement through selection. A tissue culture lab has been set up and micropropagation of teak, sandal, rosewood, and certain important medicinal plants is underway.

Division of Non-wood Forest Products

This is a new Division established in early 1994.

Four projects are being operated at present. The Foundation for the Revitalisation of Local Health Traditions (FRLHT, Bangalore) has sponsored a project on Medicinal Plant Conservation Areas (MPCA) to the Division.

Division of Pathology

The Division is operating 12 research projects. Apart from aspects relating to control of diseases, the Division has enlarged its Mandate to formulation of biofertilisers, mushroom rearing, microbial biodiversity.

Division of Physiology

The Division is operating six research projects. The major areas are water-use, seed technology, propagation techniques and biodiversity.

Division of Silviculture

The Division is operating 9 projects. It is carrying out a turnkey project for the establishment of a Green Belt around Cochin Refineries. The major activities relate to development of silvicultural techniques, seed storage, establishment of germplasm, multitier forestry and nurseries.

Division of Soil Science

The Division is operating 12 projects. Almost all projects are funded by external agencies. The main Mandate is providing techniques for soil amendments and soil ameliorants for productivity improvement. Other areas relate to upland management, watershed eco-restoration, assessment of land cover and biodiversity, quantification of soil and water loss in plantations and others.

Division of Statistics

The Division is operating six research projects. The central theme is biometrics, stand modelling and development of expert systems. The Division has produced a Software package by name "SAMPLE" for analysing sample survey data.

Division of Wood Science

The Division is operating 9 projects. The central theme is wood quality and properties and enhancement of the same through appropriate techniques. The thrust species are rattan, bamboo, rubber, eucalypt and acacias. The Division is very active with consultancy assignments for units dealing with wood.

LIBRARY

Project initiated before 1-1-'94

Project Title: Bamboo Information Centre - India

Progress Work: Compendium on Indian Bamboos is nearing completion. Directory of Scientists and projects and cumulation of BIC - India Bulletin are also nearing completion. The project period has been extended for six months and now it will end by Dec. 1994.

Projects awaiting sanction:

Bamboo research of the World - a joined proposal of BIC - India, BIC - China and RIC - Malaysia has been given to INBAR, New Delhi. Total project outlay is CAN \$.15,000. Each institution will get one third of the total amount. In addition INBAR in principle agreed to introduce E-Mail facility in our Institute.

Total number of books accessed during 1-4-1993 to 31-3-1994 .. 628

Total number of books in the Library as on 8-9-1994 .. 12,840

Librarian K. Sankara Pillai attended IDRC sponsored Information Project Leaders Meeting in Kuala Lumpur from 21-23 Feb., 1994 organised by INBAR, New Delhi, to discuss about the preparation of Bamboo Research of the World.

Civil Works

The building for the Division of Agroforestry was completed. The auditorium was furnished and provided with furniture, panelling, acoustics, etc. The office-cum-lab of Field Research Centre at Palappilly was completed. The construction of the building for the herbarium is underway. Substantial progress was in the construction of Teak Museum and Research Centre at Nilambur.

Visit of Scientist Dignitaries

Mr Paul Eastman, Consultancy to INBAR (May 1994)

Prof. A.N. Rao, Singapore National University (May 1994)

Ms. Maria Rigter, Netherlands (January 1994)

Faculty members from Thribhuvan University, Institute of Forestry, Nepal (25/04/1994)

68th Batch of Soil Conservation Trainees from Central Soil and Water Conservation Training Institute, Udthagamandalam (30/01/1994)

Dr. P.S. Roy, Head, Forestry and Ecology Division, IIRS (06/01/1994)

Dr. S.N. Rai, IFS (CF, Research, Karnataka), Dr. Ravi Ralf, IFS, Dr. U.V. Singh, IFS and Mr. S.V. Hosur (Silviculturist) from Karnataka Forest Department.

Dr. C.T.S. Nair, Senior Programme Officer, FORSPA, Thailand and a team of six delegates representing different South and South East Asian Countries on 05/08/1994).

Mr. B.S. Adappa, CCF (General), Karnataka on 18/08/1994.

Dr. R.C. Thapliyal, Scientist, FRI, Dehra Dun on 08/07/1994.

Dr. D.M. Griffin, Pro-Vice Chancellor, Australian National University of Canberra, Australia.

Mr. Anders Jensen, Research Officer, FORSPA/FAO, Bangkok, Thailand.

Dr. Nick Malajczuk, Principal Scientist, CSIRO Division of Forestry, Wembly, Australia.

Dr. Alok Adholeya, Tata Energy Research Institute, New Delhi.

Mr. Precha Wadisirisuck, Biological Nitrogen Fixation Resource Centre for South & South East Asia, Bangkok, Thailand.

Dr. Loretto U. Della Cruz, Co-study Leader, Department of Silviculture and Forest Influences, College of Forestry, University of the Philippines at Los Banos, Laguna, Philippines.

- Dr. Nguy Duc Thang, Forest Science Institute of Vietnam, Research Centre Forest Ecology and Environment, Chem, Tuliem, Hanoi, Vietn
- Dr. ... Faculty of Forestry, Gadjat Mada University, ... esia.
- Dr. ... Bagyaraj, Head, Dept. of Microbiology, University of Sciences, Bangalore, India.
- Dr. C. ... air, Senior Programme Adviser, FORSPA/FAO, Bangkok, Thailand
- Dr. Eric ... athologist, Natural Resources Institute, UK.
- Mr. Mich ... eld, Social Scientist, Natural Resources Institute, UK.
- Dr. W. 2 ... Scientist, Technical University of Dresden, Germany
- Dr. S. N ... S, Karnataka Forest Department, Bangalore.

Research P

- ions brought out
- Muktes 1993. Status of Bamboo Taxonomy in India. *BIC India Bull.* 7-36.
- Sharmi and K.V. sankaran 1993. Chemical control of Web blight of *taria* caused by *Rhizoctonia solani*. *J. Trop. For.* 9 : 353-360.
- Basha and N. Sasidharan. 1994. A new species of polyalthia Bl. from Peninsular India. *Rheedea* 4:(1):21-23.
- Mathe and Nair, K.S.S. (1993) Factors influencing susceptibility of stored reed (*Ochlandra travancorica*) to *Dinoderus* borers. Proceedings of the 6th Kerala Scienc... ss, pp. 78-80.
- Nair, G. and Mathew G. (1993) Diversity of insects in India - the state of our knowledge - *Hexapoda* 5(2).
- Math and Rugmini, P. 1993. Impact of the borer *Alctero ogystia* (Lepidoptera : Cossidae) in forest plantations of teak (India). Presented in the IUFRO Conference Nov. 23-26, 1993. la.
- Sw... n, K. and Nicolson, D.H. 1993. A new variety of *Tylophora* (Asclepiadaceae). *Blumea* 38: 231-235.

- Kallarackal, J. and Somen, C.K. 1993 Microclimate and transpiration in relation to growth in eucalypts. *Plant Physiology and Biochemistry* 20 :107-113.
- Seethalakshmi, K.K. 1993 Flowering and fruiting of seed bamboos in Kerala. *BIC - India Bulletin* 3(2): 37-41.
- Kallarackal, J. and Somen, C.K. 1994. "Eucaliyaekkurichu veendum" (Mal) *Aranyam* 19: 7-9.
- Florence EJM, Gnanaharan R and Sharma JK 1993 Influence of moisture content of rubber wood on the growth of *Botryodiplodia theobromae*. International Research Group on Wood Preservation Document No. IRG/WP/93-10029.
- Gnanaharan R, Mohanan C and Chand Basha 1993. Post-harvest technology of reed bamboo. *BIC-India Bulletin* 3(1): 1-6.
- Dhamodaran TK and Gnanaharan R 1993. Verification of an economical schedule for boron impregnation treatment of partially dried rubber wood. *Journal of TDA (India)* 39 (2): 33-35.
- Gnanaharan R and Dhamodaran TK 1993. Mechanical properties of rubber wood from a 35-year-old plantation in Central Kerala, India *Journal of Tropical Forest Science* 6:136-140.
- Gnanaharan R 1993. Shrinkage behaviour of bamboo grown in Kerala, India. *BIC-India Bulletin* 3 (2) : 1-6.
- Gnanaharan R 1994. Physical and strength properties of *Dendrocalamus strictus* grown in Kerala. *In: Bamboo in Asia and the Pacific*. FORSPA Publication 6. pp 188-192.
- Gnanaharan R 1994. Field evaluation of preservative treated bamboo. *In Bamboo in Asia and the Pacific*. FORSPA Publication, 6. pp 243-246.

Book:

- Basha, S. Chand, P.K. Muraleedharan, K.K. Seethalakshmi, K.V. Sankaran and K.K.N. Nair 1993. *Socio-economic Research in Forestry*. Ford Foundation and KFRI, Peechi.
- Day, RK; Rudgard, SA; and Nair, KSS (1994) *Asian Tree Pests- An Overview*, FORSPA Publication No. 12, FAO, Bangkok, 71 pp.

Chapter in Book:

- Nair, KSS (1994) Pest control practices in forestry. pp. 86-101, *In: The Pesticides Industry* (BV David, Ed.), Kothari's Desk Series, H.C. Kothari Group, Madras. Book

Seminars/Symposia/ Training attended

Dr. N. Sasidharan attended -

The Seminar on Ecology of the Mangrove forests of Kerala, Cannanore, April 17, 1994. Organized by the Kerala Forest Department.

Project Monitoring Workshop for evaluation of projects sponsored by the Wildlife Kerala Department, 27 April, 1994, KFRI.

Interaction Meeting on Evolutionary Ecology, Bangalore, 19-23 May, 94. Organized by the Department of Science and Technology, Govt. of India.

Dr. Jose Kallarackal was awarded a Fellowship by the International Tropical timber organization, Japan to visit the Botany Department, University of Queensland (Australia) and the New Zealand Forest Research Institute to do research in forest ecophysiology.

Dr. K.V. Sankaran was awarded Darwin Fellowship to spend 1 year at International Mycological Institute, UK from May 1994 - April 1995.

Dr. R. Gnanaharan attended -

The Task Force meeting convened by UPASI for the promotion of rubber wood, at Kottayam on 07 March and 01 September 1994.

A one-day seminar at Trivandrum on 03 May 1994 organised by Nirmidhi Kendra and presented an invited paper.

The INBAR Production Research meeting at Bangalore on 13,14 May 1994.

Dr. R. Gnanaharan was a resource person at the Workshops on Processing Rubber Wood convened by STED, Calicut at Kasargod (17, 18 June) and Trivandrum (20 June 1994).

Dr. R. Gnanaharan participated in the International Plant Biomechanics Congress held at Montpellier, France during 05-09 September 1994 and presented a paper titled, "Biomechanical response of reed bamboo".

Dr. George Mathew attended the Kerala Science Congress held at Trivandrum during 27-29 January 1994 and presented a paper entitled "Factors influencing susceptibility of stored reed, *Ochlandra travancorica* to infestation by *Dinoderus* borers (Coleoptera, Bostrychidae)" by George Mathew and K.S.S. Nair

Dr. K.S.S. Nair, Dr. V.V. Sudheendrakumar and K. Mohanadas participated in the seminar-cum-workshop on "Biological Control of insect pests of social and plantation forests" organised by the Entomology Research Institute, Loyola College, Madras during 25-26 February 1994 and presented a paper entitled "Biological control of the teak defoliator *Hyblaea puera* using insect parasitoids - Problems and prospects".

Dr. George Mathew participated in the International Congress on Kerala Studies held at Trivandrum during 27-29 August 1994 and presented a paper on "Insect biodiversity in Kerala forests - an overview".

Training

Dr. R.V. Varma attended a training programme in U.K. under the Colombo Plan. The 3-month training from April to June on "Forestry - People and participation" was held at the Universities of Wolverhampton and Oxford. As part of the training, he also visited Portugal. The training covered participatory issues in forestry, identification of training needs, presentation techniques and gender issues.

Shri. U.N. Nandakumar attended "10 weeks regular course on Remote Sensing" at NRSA and carried out a project work "Forest management using Remote Sensing and Geographic Information System" from 04-04-94 - 12-06-94. Attended the IUFRO Conference held during Nov. 23 -26, 1993 at KFRI, Peechi.

Dr. K.M. Bhat attended -

4 months intensive training in Wood Science & Technology from the University of Wales, School of Agricultural and Forestry Sciences, Bangor, U.K. (From February 1994-May 1994)

Training course on ISO - 9000; organised by Institution of Engineers (India), Kerala State Centre, Trivandrum, on 24-25th August 1994.

Annual Conference of the Institute of Wood Science (IWSc.) held at Chester, England, during 15th April to 17th April 1994.

Dr. K.K.N. Nair attended the Meeting of the reconstituted Research Advisory Committee of the Niligiri Biosphere Reserve at SACON, Coimbatore on 8.3.94 and presented project proposal on the Tree diversity of Silent Valley National Park using GIS.

Dr. C. Renuka presented a paper "Rattans of Andamans and Nicobar islands - A state-of-art report in the National Seminar on Frontiers in Plant Science Research held at Hyderabad in Feb. 1994.

Dr. C. Renuka presented a paper "Rattans - a potential plantation crop for Kerala forests in the International Seminar on Kerala Studies held at Trivandrum in Aug. 1994.

Dr. C. Renuka presented a paper "Genetic wealth of Bamboos and Rattans in the Western Ghats" in the National Workshop on the Genetic wealth of plant resources in Western Ghats held at Mannuthy, Trichur in Aug. 1994.

Dr. J.K. Sharma and Dr. M. Balasundaran attended the Meeting of Mycorrhiza and NFT Researchers held at KFRI from 1-5 August 1994. They presented results of the FORSPA Project.

U.M. Chandrashekara has attended the discussion meeting of Scientist working for conservation of biodiversity of the Western Ghats. This meeting was jointly organised by Tata Energy Research Institute and Centre for Ecological Sciences, IIT Bangalore on 05-01-1994.

U.M. Chandrashekara has participated in the State level workshop for voluntary organisations organised by the STEC at Thiruvananthapuram on 12-02-1994.

U.M. Chandrashekara has participated in the National seminar on Ecologically sustainable economic development organised on 21st and 22nd February 1994 at John Mathai Centre in Missouri. He has presented a paper entitled Ecological and economic benefits of tree components in homegarden farming systems of Kerala.

U.M. Chandrashekara has attended the National Workshop on Agroforestry for Sustainable Development which was held 22-25 June 1994 in the Indian Institute of Forest Management, Bhopal. He delivered a lecture on Homegarden Agroforestry systems of Kerala.

U.M. Chandrashekara has participated in the 3rd Meeting of Biodiversity Forum organised in MS Swaminathan Research Foundation, Madras on 11th June 1994.

U.M. Chandrashekara has been invited as a resource person for a training programme on Agroforestry for Ecodevelopment which was organised by the Peermade Development Society on 23-24 July 1994. He delivered a lecture on the topic Agroforestry for high ranges in Kerala.

Dr. K.K. Ramachandran attended The Users' Workshop on Coastal Zone mapping using remote sensing data at Centre for Earth Science Studies, Trivandrum on 4th February, 1994.

Dr. P.S. Easa attended Project Elephant Steering Committee, Ministry of Environment Govt. Of India, New Delhi March 1, 1994.

Dr. P.S. Easa attended Tiger Global Forum, Ministry of Environment and Forests, Govt. of India, New Delhi, March 2-3, 1994.

Seminars/ Symposia/ Training conducted

Training on medicinal plant conservation, 4-9 April 1994. Classes taken on FRLHT's conservation strategies. Classes taken for guard trainees on FRLHT's conservation strategies.

Dr. R.V. Varma and Dr. George Mathew took classes on insect pest problems in the forest seed management training conducted by KIRI during February 21-25, 1994.

A five day training course on Forest Seed Management for the Forest Officers and representatives of non-governmental organizations.

One day training programme for the final year students of MT, Seminary, Kottayam (24/01/94)

Meeting of Mycorrhiza and NFI Researchers was organised jointly by KFRI and FORSPA, Bangkok from 1-5 August 1994 at KFRI, Peechi.

KFRI organised an Environmental Awareness Seminar at Vellakkarithadam, Thrissur District on 20-03-1994. This was sponsored by the Ministry of Environment and Forest, Govt. of India under the National Environmental Awareness Campaign 1993-1994.

Training Programme on Conservation Biology For Foresters and Forest Guards form Medicinal Plants Conservation Areas (MPCAS) of Kerala on 4-9 April 1994.

Dr. P.S. Easa conducted Training Programme for Forests and guards, Parambikulam Wildlife Sanctuary - Lectures on Wildlife Conservation and Management Techniques. August 13-15, 1994.

ONGOING PROJECTS

1. BICINDIA/91 Bamboo Information Centre
2. ECON.21/86 Capacity Building in Forest Economic Research
3. KFRI/104/87 Tree Improvement of Eucalyptus for Disease Resistance and Higher Productivity
4. KFRI/115/87 Genetic Improvement of Ailanthus Triphysa
5. KFRI/127/89 Studies on Water Use, Assimilation and Growth of Eucalypts
6. KFRI/128/90 Water use of Selected Indegenious and Exotic Trees (Completed)
7. KFRI/129/90 Propagation of Medicinal Plants, Bamboo and Rattan by Tissue Culture Methods (Completed)
8. KFRI/130/90 Demonstration cum Research Plot on Multi-tier Forestry through Operational Research (Completed)
9. KFRI/131/90 Distribution of Mammals and Birds in Chinnar Wildlife Sanctuary and Eravikulam National Park
10. KFRI/132/90 Use Pattern and Chemical Characterisation of the Natural Salt Licks in Chinnar Wildlife Sanctuary
11. KFRI/134/90 Preparation of Forest Maps using Aerial Photographs and Satellite Imageries
12. KFRI/135/91 Silviculture, Management and Utilization of Bamboo Resources of Southern India - Phase II
13. KFRI/136/91 Management and Utilization of Rattan Resources of India - II Phase
14. KFRI/137/91 Studies on the Existing Flora and Specialized Ecological of the Malayattoor Forest Division, Kerala and Establishment of Nature Study Centre.
15. KFRI/138/91 Agroforestry Models in Kerala
16. KFRI/139/91 Evaluation of Social Forestry Plantations raised under the World Bank Scheme in Kerala (Completed)
17. KFRI/140/92 Management of Teak Defoliators Hyblaea Puera using Nuclear Polyhedrosis Virus (NPV)

18. KFRI/141/92 Evaluation of Forest Schemes under Western Ghat Development Program
19. KFRI/142/92 Study on the Design of Cost-Effective Containers for Raising Planting Stock
20. KFRI/143/92 Enhancement of Productivity in Eucalyptus Grandis through Fertilizer Inputs and other Cost Effective Treatments
21. KFRI/144/92 Studies on the Growth Performance of Teak Nursery Stock from Genetically better Sources for Developing Improved Plantation Technology
22. KFRI/145/92 Ecological Studies in Disturbed Forest Echo System with Special Reference to Moist Deciduous Forest
23. KFRI/146/92 Microfungal Flora of Peechi-Vazhani Wildlife Sanctuary
24. KFRI/147/92 Structural Dynamics of Teak Stands in Kerala
25. KFRI/148/92 Water Relations and Photosynthesis of Oil Palms in peninsular India
26. KFRI/149/92 Use of Micorrhizal and Nitrogen Fixing Symbionts in Reforestation of Degraded Acid Soil in Kerala
27. KFRI/150/92 Impact of Upland Management on Downstream Ecosystems
28. KFRI/151/92 Soil Nutrient Management for Teak Plantations in Kerala
29. KFRI/152/92 Prey-Predator Studies in Eravikulam National Park
30. KFRI/153/92 Survey of small Mammals in Kerala with Special Reference to Endangered Species and Wildlife Census in Chinnar Wildlife Sanctuary
31. KFRI/154/92 Status and Food and Feeding Habits of Larger Mammals in Idukki Wildlife Sanctuary
32. KFRI/155/92 Habitat Utilization by Larger Mammals in Chinnar Wildlife Sanctuary
33. KFRI/156/92 Habitat Utilization of animals in Parambikulam Wildlife Sanctuary with special reference to Gaur

34. KFRI/157/92 Status, Food and Feeding habits of Larger Mammals in Chimmony Wildlife Sanctuary
35. KFRI/158/92 Green Belt Development at Cochin Refineries Limited
36. KFRI/159/92 Studies on the Ecology and Population Dynamics of Endangered Primates in Silent Valley National Park
37. KFRI/160/92 Status Survey of Primates in Shendurumy Wildlife Sanctuary and adjacent areas
38. KFRI/161/92 Studies on Man-Wildlife Conflict in Ippara Wildlife Sanctuary and adjacent areas
39. KFRI/162/92 Status, Habitat Utilization and Movement Pattern of Larger Mammals in Wyanad wildlife Sanctuary
40. KFRI/163/92 Studies on the Flora of Shendurumy Wildlife Sanctuary with Emphasis on Endemic Species
41. KFRI/164/92 Vegetation Mapping and Analysis of Chimmony Wildlife Sanctuary using Remote Sensing Techniques
42. KFRI/165/92 Vegetation Mapping and Analysis of Peppara Wildlife Sanctuary using Remote Sensing Techniques
43. KFRI/166/92 Vegetation Mapping and Analysis of Aralam Wildlife Sanctuary using Remote Sensing Techniques
44. KFRI/167/92 Vegetation Mapping and Analysis of Eravikulam Wildlife Sanctuary using Remote Sensing Techniques
45. KFRI/168/92 Vegetation Mapping of the Grassland Forest Ecosystem in Western Ghats of Kerala for Afforestation Programme
46. KFRI/169/92 Structure and Function of the Home-garden Agroecosystem and Local Natural Forest Ecosystems of Kerala
47. KFRI/170/92 Qualification of Soil and Water Loss from Teak and Eucalypt Plantations
48. KFRI/171/92 Study of Impact of Mixed Vegetation on the Growth of Teak Plantations
49. KFRI/172/92 Harvesting and Regeneration Techniques of Reeds

50. KFRI/173/92 Preparing a Management Plan for Project Elephant Areas in Kerala
51. KFRI/174/93 Ecological and Environmental Assessment of Forest Cover of Kerala with Special Reference to Soil/Vegetation and Wildlife
52. KFRI/175/93 Tracing the epicentres of teak defoliator outbreaks in Kerala
53. KFRI/176/93 Evaluation of Parasites for Biological Control of the Teak Defoliator
54. KFRI/177/93 Establishment of Permanent Plots to Demonstrate the Effect of Protecting Teak Plantations from the Teak Defoliator
55. KFRI/178/93 Standardisation of indirect evidences of wild animals for field identification and preparation of a field guide
56. KFRI/179/93 Studies on the Flora of Periyar Tiger Reserve
57. KFRI/180/93 Wildlife Census of Kerala 1993
58. KFRI/181/93 Teak Plantations in Nilambur: An economics review
59. KFRI/182/93 Effects of faster growth on quality of teak
60. KFRI/183/93 Studies on crop damage by wild animals in Kerala and evaluation of control measures
61. KFRI/184/93 Studies on the epiphytic flora in the tropical forests ecosystem of Western Ghats with special reference to Nilgiri Biosphere
62. KFRI/185/93 An investigative survey of stream fishes, their habitat distribution and behaviour ecology in the N.B.R. area of Kerala
63. KFRI/186/93 Studies on the growth and prevention of Sapstain fungi in rubberwood and its effect on strength properties
64. KFRI/187/93 Studies on the growth and architecture of tree species of home garden agroforestry systems of Kerala.
65. KFRI/188/93 Expert system for designing experiments in forestry
66. KFRI/189/93 Economics of Forest Plantations in Kerala

67. KFRI/190/93 Evaluation of newer termiticides including plant products for forest plantation establishment.
68. KFRI/191/93 Statistical Analysis Package for Forest Mensuration
69. KFRI/192/93 Afforestation of Ayyampilly Hills - Participatory Action Research Programme.
70. KFRI/193/93 Analysis of data from long-term trials
71. KFRI/194/93 Underplanting Rattan in Rubber Plantation
72. KFRI/195/93 Bee-keeping - Use of unconventional timbers for Bee Hives.
73. KFRI/196/93 Management of the barkfeeding caterpillar *Indarbela quadrinotata* in Albizia Plantations.
74. KFRI/197/93 Ecorestoration of a Micro Watershed in Mukundapuram Taluk of Thrissur District
75. KFRI/198/93 Preparation of an illustrated manual of the commercial non-wood forest produce plants of Kerala
76. KFRI/199/93 Growth of teak in successive rotations in relation to soil conditions.
77. KFRI/200/93 Fungicidal Management of quick wilt disease of Pepper in forest plantation
78. KFRI/201/93 Timber price trends in Kerala
79. KFRI/202/93 Micro propagation of Teak, Rosewood and Sandal.
80. KFRI/203/93 Cambial activity and Juvenile Wood formation in Teak
81. KFRI/204/93 Studies on the fern flora of Kerala with special reference to sylvan valley
82. KFRI/205/93 Preparation of an action plan for the ecorestoration of a degraded micro watershed.
83. KFRI/206/93 Mushroom cultivation using forest litter and Waste wood.
84. KFRI/207/93 Mass rearing of selected butterflies for possible reintroduction in conservation programmes.

85. KFRI/208/94 Water relations and rooting depth of selected eucalypt species.
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91. KFRI/214/94 Study on Man Wildlife interaction in Wyanad Wildlife Sanctuary, Kerala.
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93. KFRI/216/94 Management of the shoot borer Hypsipyla robusta (Lepidoptera: Phycitidae), in Mahogany plantations.
94. KFRI/217/94 Studies on the effect of fire on Forest soils vegetation and timber value.
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96. KFRI/219/94 Evaluation of methods for estimating the abundance of herbivores in the forest of Kerala
97. KFRI/220/94 Studies on the Shola forests of Kerala
98. KFRI/221/94 Studies on the Diversity of selected groups of insects in Parambikulam Wildlife Sanctuary
99. KFRI/222/94 Studies on the Flora of Chinnar Wildlife Sanctuary
100. KFRI/223/94 Soil Microflora of shola forests of Eravikulam National park.
101. KFRI/224/94 Ecological studies on Sloth Bear in Parambikulam Wildlife Sanctuary.
102. KFRI/225/94 Evaluating plant diversity in different forest types of Kerala by laying out permanent sample plots
103. KFRI/226/94 Status and Distribution of Rare and endangered animals of Kerala and Publication of a Booklet

104. KFERI/226/94 Provenance trials in Acacia

105. KFERI/228/94 Status of *Acacia mangium* in Kerala.