KFRI VISION
2010 & 2015





KFRI

Kerala Forest Research Institute

Sustaining Forests | Preserving Biodiversity | Bringing Progress to Society

KERALA FOREST RESEARCH INSTITUTE

The Kerala Forest Research Institute (KFRI) was established in 1975 as an autonomous institute under Science and Technology Department of the State. In 2003, KFRI was amalgamated with the Kerala State Council for Science, Technology and Environment (KSCSTE), an autonomous registered society, along with five other R & D Centres. The Institute has a mandate to conduct research on all aspects of tropical forestry including wood science & technology, wildlife biology and socio-economics. The Institute has created a strong niche among the leading forestry institutions in the country by conducting problem solving time bound research in thrust areas addressing the needs of stakeholders.

The Rules and Regulations of KSCSTE guide the functioning of KFRI. The control, administration and management of the Institute are vested with the Management Committee chaired by the Director who as the head of the Institute is also responsible for the day-to-day administration and implementation of programmes.

The research is undertaken in nine scientific Programme Divisions; of them six are research divisions and three are supporting divisions. The six research Divisions are Sustainable Natural and Plantation Forest Management, Forest Ecology and Biodiversity Conservation, Forest Protection, Forest Utilization, Forestry and Human Dimensions, and Forest Information Management System. The supporting scientific Divisions are Extension & Training, Library & Information and Instrumentation. Each Programme Division is headed by a Programme Co-ordinator and each discipline within the Programme Division having laboratory and other facilities is under the charge of a Scientist–in–Charge (Facilities). The Research Co-ordinator, who heads the Research Monitoring and Evaluation (RME) Unit, oversees the implementation of all the research programmes.

Besides, basic and applied research, KFRI also undertakes extension & training activities for transfer of technology and dissemination of information as well as consultancy for end users and stakeholders. Every year regular training programmes are being conducted by KFRI on different modules of tropical forestry to meet the need of stakeholders; participants are from within the country as well as abroad.

Front page photographs(Clock-wise): Nilgiri Tahr, Bamboo artisans at work, Clonal teak plantation, Tree ferns in evergreen forest and Shola-grassland landscape

VISION

To become a Centre of Excellence in Tropical Forestry to provide scientific backbone for effective conservation of forest ecosystems and sustainable utilization of natural resources for ensuring benefits to the society at large.

MISSION

As an institution to undertake research in areas like forestry, biodiversity, wildlife management, wood science & technology, etc., which are vital to the development of the Kerala State. The Kerala Forest Research Institute's mission is to provide technical support to facilitate scientific management and utilization of forests for social benefits. KFRI envisages to

- Conduct inter/multidisciplinary research on priority areas of tropical forestry, including wildlife, socio-economics, indigenous knowledge, value addition of forest products, participatory forest management and livelihood improvement of forest dwellers for scientific management of forest resources.

- Provide technical advice and solutions to practical problems related to forest conservation, degraded forests, productivity improvement, conservation and sustainable utilization of forest resources and environmental health through quality research, extension and training for overall economic prosperity of State.

- Disseminate knowledge and information on forest related matters to end-users, farmers, general public and transfer of technology to stakeholders for social benefits.

PRIORITY AREAS OF RESEARCH

- Bamboos and Canes: Resource enhancement and utilization
- Productivity improvement of teak plantations
- Indigenous Tree Species as plantation species and conservation of Rare Endangered Threatened (RET) species
- Increasing productivity of eucalyptus plantations
- Sustainable management of natural forests and conservation of natural resources
- Introduction of Mixed Species plantations for better ecological security
- Conservation of fragile ecosystems: mangroves and fresh water swamps
- Conservation and sustainable utilization of forest resources: Non-wood forest products
- Conservation and management of Biodiversity: wildlife and endemic flora
- Medicinal Plants and their bio-prospecting for herbal drug development
- Forest Information & Management System for better utilization of forest resources

SHORT TERM OBJECTIVES

(upto five years)

i. Bamboo and Canes

- Standardization of techniques for micro-propagation of bamboo and rattans for production of large scale planting stock.
- Mapping of natural stands of bamboo by density classes and evaluation of growing stock.
- Emerging technologies for harvesting and utilization of bamboos for protection against pests and diseases, charcoal making, bamboo shelters and value addition of products.

ii. Teak

- Standardization of micro-propagation techniques for teak clones for production of large scale planting stock; establishment of clonal germ bank and DNA finger printing for mapping of clones.
- Assessment of site factors in second and third rotations for poor growth/ productivity; amelioration measures for increasing productivity.
- Transfer of technology of biocontrol of teak defoliator using HpNPV to the Kerala Forest Department at field level.

iii. Indigenous Tree Species

- Develop nursery and plantation techniques and establish species trial plantations of *Dalbergia, Xylia, Terminalia, Gmelina, Sweitenia* and *Anthocephalus, Ailanthus, Pterocarpus* for growth and productivity.
- Identification of high value species of timber trade such as sandal wood based on wood anatomy and DNA finger printing.
- Focused research on RET species for propagation, reproduction biology population genetics, nutrient requirements in vitro conservation and cryopreservation *ex situ* conservation.

iv. Natural forests

- Criteria and indicators of sustainability, hydrological, eco-physiological and nutrient cycling studies to understand water shed characteristics, fire production and control strategies, impact of fire and nutrient cycling.

v. Eucalyptus

- Development of new eucalypt clones for higher productivity and their multiplication; assessment of productivity; water use; nutrient requirement; assessment of growth in relation to site factors.

vi. Mixed Species plantations

- Identifying the appropriate combinations and site species matching; nursery technology, growth and productivity assessment.

vii. Conservation of Forest Ecosystems and Biodiversity

- Biodiversity evaluation and conservation of fragile ecosystems, ecoresoration of mangroves and fresh water swamps, threat analysis and identification of hot spots for conservation and rehabilitation.
- Population ecology, dynamics, behaviour, reproductive biology of selected mammals and man-forest and man-wildlife interactions.
- Traditional knowledge system analysis, documentation of traditional and tribal knowledge, identification of socially valued tree species and landscapes and their management.

viii. Medicinal Plants/Non-wood Forest Products

- Chemical characterization of non-wood forest products used in ethno-medicines.
- Demand-supply, socio-economics and marketing of non-wood and wood composite products, environmental and social impact assessment.
- Nursery practices and silvicultural management of medicinal trees, land suitability, methods of propagation including organic farming practices.

ix. Forest Information & Management System

- Creation of statistical database on Kerala forestry sector.
- Mapping of forest resources.
- Preparation of vegetation maps of forest areas including digital elevation maps; mapping biodiversity at habitat and landscape levels and site-species matching.
- Validation of growth models and density management schemes; working out sustainable harvest levels for teak plantations.

LONG TERM OBJECTIVES

(upto 10 years)

i. Natural Forests

- Developing models for rehabilitation of degraded forests through participatory approach.
- Nutrient cycling pattern and nitrogen mineralization.
- Eco-physiological and hydrological studies to understand water, use and productivity.
- Productivity improvement of natural forests through enrichment planting and appropriate silvicultural techniques; forest growth/transition models for sustainable management.
- Biogeochemical and eco-physiological studies for the rehabilitation of mangrove wetlands.
- Population genetics – genetic characterization of populations through DNA markers and molecular taxonomy.
- Ecotourism, nature trails for recreational, educational and cultural purpose.

ii. Forest Plantations

- Improving productivity of forest plantations with better genotypes and site amelioration methods.
- Micro and macro-propagation of indigenous trees, establishment of trials and assessment of growth and productivity.
- Development of silvicultural management strategies for establishment and management of mixed plantations.
- Carbon sequestration studies in plantations to support the Clean Development Mechanism (CDM) projects.
- Fire prediction in plantations, modelling and assessing the impact of fire on ecosystem dynamics.
- Management of important pests and diseases through biological means
- Development of criteria and indicators for sustainable plantation forest management.
- Properties and processing of fast growing teak timber from forest plantations and agroforestry systems and efficient utilization of wood residues and waste.

iii. Forest Ecosystem Studies and Biodiversity

- Floral and faunal diversity evaluation; inventorization and conservation of biodiversity of Protected Areas, conservation of fragile ecosystems such as mangroves; development of reserved forests and other specialized ecosystems; bioinformatics.
- Forest ecosystem dynamics and long-term monitoring of permanent plots for growth and biophysical changes.
- Population ecology and dynamics; community ecology of RET endemic tree species; wildlife forest linkages.
- Carrying capacity of Protected Areas; behaviour, reproductive biology and management of mammals, birds and reptiles.
- Ecosystem and landscape analysis, rehabilitation and restoration of degraded forests.

- Linkages between forest and non-forest ecosystems and conservation/ rehabilitation through participatory approaches in the context of traditional knowledge.
- Linkages between cultural, biological diversity and traditional knowledge.

iv. Non-wood forest products (NWFP) and medicinal plants

- NWFP species – assessment of genetic diversity, cloning of superior genotypes, production of secondary metabolites through hairy root cultures.
- Standardization of techniques for sustainable harvest of NWFP from forest and semi-processing through participation of tribals.
- Enrichment planting in natural forests as well as mixed cropping with NWFP in forest plantations.
- Traditional knowledge and ethnobiological studies.
- Phytochemical characterization of NWFP, isolation, purification and commercialization of biomolecules.

v. Timber Technology

- Life cycle analysis (LCA) of timber/timber products for carbon accumulation and energy consumption for CDM in line with Kyoto protocol.
- Effect of environment on wood quality – dendrological studies, tree ring analysis: effect of drought and fire.
- Properties and processing of timber of fast growing indigenous trees.
- Genetic engineering for improvement of wood quality.
- Developing appropriate technologies for wood residue utilization and wastage minimization.
- Enhancing durability of unconventional timbers; development of new wood products through innovative technologies.

vi. Forestry & Human Dimensions

- Economic valuation and accounting of natural resources, biodiversity valuation.
- Sustainable management and utilization of NWFPs, including bamboos and rattans.
- Sacred landscape studies.
- Socio-economic dependencies and conflict management studies.
- Linkages between cultural, biological diversity and traditional knowledge.
- Policy issues and strategic planning.
- Agroforestry systems.
- Participatory forest management.

vii. Forest Information Management

- Statistical database on Kerala Forestry Sector.
- Forest growth modeling and prediction for natural forests and plantations for density management, sustainable harvest levels, etc.
- Developing a MIS covering biophysical (land, people, forest, soil and water) and socio-economic aspects of Kerala for real time information on the status of each district.
- Preparation of vegetation maps of forest areas, digital elevation maps.

PERSPECTIVE PLAN

Keeping in view of developmental needs of the State, KFRI is committed to achieving excellence in scientific research in Bamboo & Cane, Biodiversity, Mangroves, Forest biotechnology and Timber Technology during the next two decades by addressing focused R & D activities on priority themes, attaining status of Centre of excellence in specialized areas, development of new products and their commercialization for self reliance and appropriate human resource development for technical expertise/ capabilities of international standard.

1 Research and Development

- Biodiversity evaluation, documentation, conservation and traditional knowledge system analysis
- Increasing forest productivity
- Bamboo and canes
- Managing alien weeds
- Nutrient cycling pattern and nitrogen mineralization in natural forests
- Conservation and afforestation of mangroves
- Non-wood products, sustainable utilization, medicinal plants, phytochemical studies, natural products/biomolecules product development and commercialization
- Wood processing & utilization technologies
- Management Information on forest resources for the State
- Biotechnology and forestry, transgenic trees for pest and disease resistance and other desirable timber traits
- Carbon sequestration in plantations and natural forests
- Urban and recreation forestry and ecotourism
- Increasing livelihood of people dependent on forest resources
- Sustainable utilization of forest resources through Joint Forest Management/ people's participation

2 Centre of Excellence

i. *Bamboo and Canes*

- Mapping bamboo and cane resources
- Establishment of trial plantations of selected species in different agroclimatic zones
- Micro propagation techniques for large scale production of planting stock
- Flowering, fruiting, biology, hybridization, mechanism of flowering
- DNA finger printing, selection and propagation of elite material

ii. *Biodiversity*

- Focused research on RET endemic tree species
- Biodiversity Museum
- Database generation, bioinformatics, networking, dissemination of information
- Conservation strategies, gene pools
- Environmental awareness

iii. *Mangroves*

- Mapping of mangrove along the western coast, especially Kerala
- Ecology, biology and conservation strategies, fauna, flora
- Afforestation, planting, policy

iv. *Forest Biotechnology*

- Identification and mapping of genes for desirable traits in teak timber and developing DNA markers for these characters, marker aided breeding and mass propagation
- Identification of genes governing bamboo flowering, cloning and sequencing, ozone manipulation for altering bamboo flowering cycle
- Genetic diversity and mating system, studies of rare and endangered endemic tree species and medicinal plants for developing strategies for their conservation
- Developing low cost tissue culture technology for mass production of bamboos and other tree species – screening of microbial population for commercial exploitation

v. *Timber Technology*

- Genetic engineering for improvement of wood quality in teak, rosewood, sandal and red sanders
- Developing appropriate technologies for wood residue utilization and wastage minimization
- Enhancing durability of unconventional timbers; development of new wood products through innovative technologies
- Effect of environment as wood quality – dendrochronological studies, tree ring analysis, effect of drought, fire

3 R & D networking and Commercialization

- Public relation and popularization of technologies and new information generated by KFRI
- Collaboration with entrepreneurs, universities and other R & D Centres
- Commercialization of products/processes
- Encourage private sector/industry to participate in KFRI's activities and fund need-based research activities

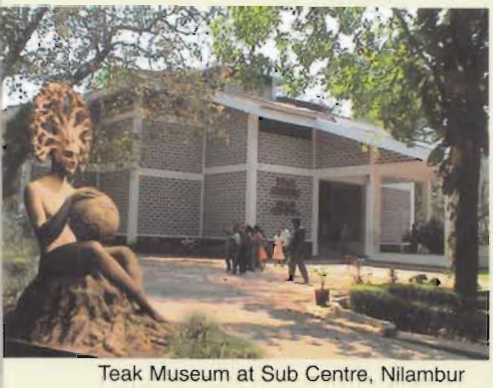
4 Towards self-reliance

- Intensify training programmes for stakeholders at global level for generating funds
- Increase revenue from technical services, sale of products, books, plants and seeds

5 Human Resource Development

- Upgrading skills and expertise through imparting training
- Extension and packaging of information Incentives for excellence, recognition for significant achievements, patents, etc.

Silver Jubilee Block at Main Campus, Peechi



Teak Museum at Sub Centre, Nilambur

Bamboo germplasm at Field Research Centre, Velupadam

Kerala Forest Research Institute

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