Introduction

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Indian Council of Forestry Research and Education (ICFRE), an apex body in the National Forestry Research System, deals with the solution based forestry research in tune with the emerging issues in the sector, including global concerns such as climate change, conservation of biological diversity, combating desertification and sustainable management and development of resources. Topical research by the Council enhances public confidence in the ability of forest managers and researchers to successfully handle challenges related to natural resource management.

Mission Statement:

To generate, preserve, disseminate and advance knowledge, technologies and solutions for addressing the issues related to forests and promote linkages arising out of interactions between people, forests and environment on a sustained basis through research, education and extension.

Vision:

Increasing forest cover and enhancing forest productivity through operationalisation of National Forestry Action Programme and National Forestry Research Plan.

Objectives of ICFRE:

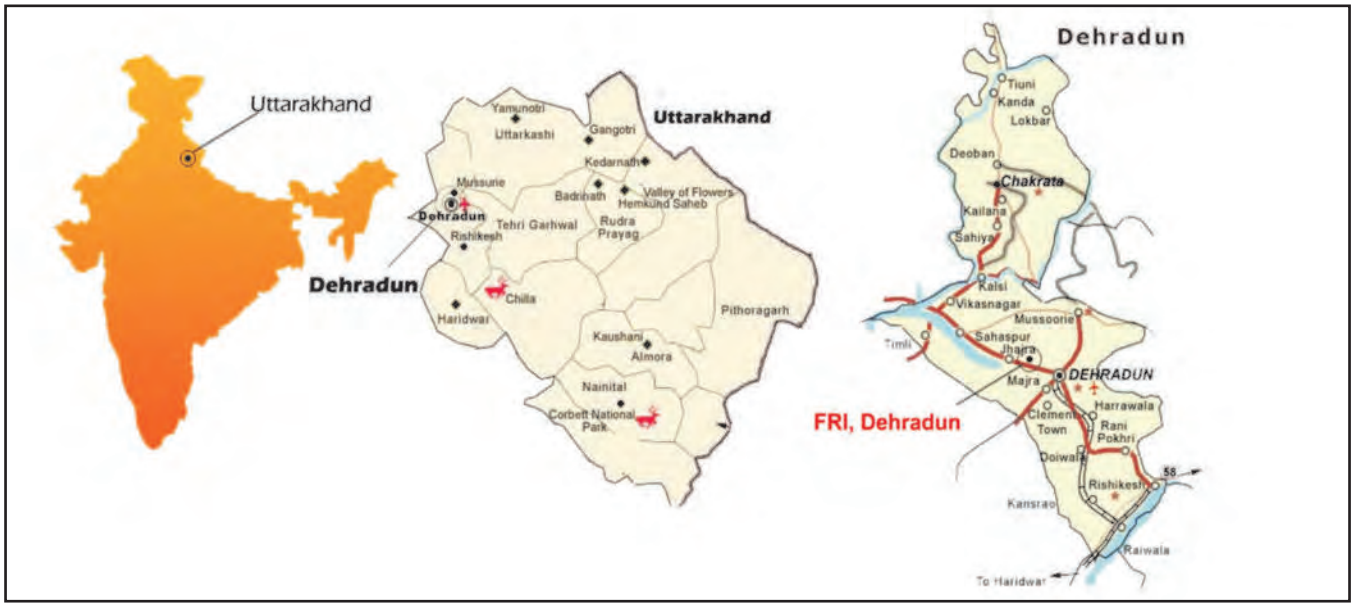
1. To undertake, aid, promote and coordinate forestry education, research and their applications.
2. To develop and maintain a national library and information centre for forestry and allied sciences.
3. To act as a clearing-house for research and general information related to forests and wildlife.
4. To develop forestry extension programmes and propagate the same through mass media, audio-visual aids and extension machinery.
5. To provide consultancy services in the field of forestry research, education and allied sciences.
6. To undertake jobs considered necessary to attain these objectives.

Institutes and Centres:

Indian Council of Forestry Research & Education (ICFRE) with headquarters at Dehradun has eight research institutes and four research centres spread over across the country to facilitate the forestry research, education and extension.

Forest Research Institute (FRI), Dehradun

Established in 1906 **Forest Research Institute (FRI),** Dehradun is a premier scientific Forestry Research Institute. FRI has established itself in global arena of forestry and related allied sectors through its persistent innovative and rigorous research approach to foster the needs of the forestry for entire India and even in the other countries of the subcontinent. Presently its research is prioritized on the basis of needs in its jurisdiction over Uttarakhand, Uttar Pradesh, Haryana, Punjab and National Capital Territory of Delhi. The Institute is involved in meticulous research work related to improvement and management of forests and associated issues through different research divisions viz. Botany Division, Cellulose and Paper, Chemistry Division, Climate Change and Forest Influence Division, Ecology and Environment Division, Entomology Division, Extension Division, Forest Informatics Division, Forest Products Division, Forest Soil and Land Reclamation Division, Genetics and Tree Propagation Division, Non Wood Forest Products Division, Pathology Division, Resource Survey and Management Division, Silviculture Division. Apart from conducting research in the forestry sector it also undertakes the research in allied sectors of environment, climate change, soil reclamation, extension etc based upon the need and precedence. The Institute also has a field research station at Khirshu, Pauri Garhwal and a **Centre for Social Forestry and Eco-Rehabilitation** at Allahabad.



FRI, Dehradun has also been conferred the status of 'Deemed University' and at present is running courses on M.Sc. Forestry, M.Sc. Wood Science & Technology, M.Sc. Environment Management, Post Masters diploma in Natural Resource Management, Post Masters diploma in Non Wood Forest Products, Post Graduate diploma in Pulp & Paper Technology. It also has Doctoral program leading to award of Ph.D. degree.

The institute has excellent laboratory facilities for conducting advanced research. The **National Forest Library and Information Centre** (NFLIC) of the Institute is richest in documents on forestry and allied sciences in South and Southeast Asia. The Institute is ISO 9001:2000 certified.

Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore

Institute of Forest Genetics and Tree Breeding at Coimbatore, was formed in April 1988 by up-gradation of the Forest Research Centre (FRC), Coimbatore under the Forest Research Institute and Colleges, existing since late 1950s. IFGTB spread over about 150 acres, is located in the Forest Campus in Coimbatore city. It attends to the regional forestry research problems of Tamil Nadu, Kerala, Puducherry, Andaman & Nicobar

Islands and Lakshadweep.The Institute conducts national level research on the subjects of genetics and tree breeding of important forest tree species. IFGTB has been mandated to identify and evolve varieties of species used in afforestation and social forestry that will contribute to the national goal of achieving a growth of 3 to 4 cubic meters of biomass per hectare per year within the ecological considerations applicable to the area.

The Institute has various research divisions namely Genetics and Tree Breeding, Plant Biotechnology, Forestry, Land Use and Climate Change, Forest Protection, Seed Technology, Biodiversity, Bioprospecting, Forest Economics and Extension,

Information Technology and FGRMN Division with a number of specialized theme based laboratories namely Microscopy Lab, Soil and Water Testing Lab, Tissue culture Lab, Genomics Lab, DNA Finger Printing Lab, Genetic Transformation Lab, Molecular Physiology Lab, Isozyme Lab, Genotyping Lab, Entomology Lab, Pathology Lab, Entomopathology lab, Phytochemistry Lab and Oil and Seed Testing Labs.

Facilities like Vegetative Propagation Complex, Model Nursery Complex, Seed Bank are also available. The Institute maintains one of the country's old herbaria established in 1911, the oldest forest museum in the country, the Gass Forest Museum, established in 1906 and a Botanical Garden recognized by the Botanic Gardens Conservation International (BGCI) and the Indian Botanic Gardens Network, established in 1973 over an area of 3.7 ha supporting *ex-situ* conservation activities.

IFGTB has field units in Reserve Forests of Kerala and Tamil Nadu. In Kerala it is situated at Walayar and Panampally while in Tamilnadu the field units are in Gudalur RF in Chennai, Kurumbapatty in Salem, Kurichi, Bharathiar University, Karunya University and Forest Campus in Coimbatore. Field stations at Neyveli, Tirunelveli, Nagercoil and Rameshwaram in Tamil Nadu are also being established. To support fruitful forestry research IFGTB is in the process of establishing more field units across different agroclimatic zones in the mandated states. Keeping abreast in literature, a collection of over 7000 books on forestry and allied subjects, 40 Indian and foreign journals and 125 back volumes are available for ready reference in the relevant areas of forestry in the Institute Library.

Goals

1. Increasing productivity in farmlands / plantations / homesteads by making available quality planting stock through quality seeds, scientific breeding programmes and biotechnological interventions.
2. Forest Genetic Resources Networking for conservation, management and sustainable utilization of commercial species to move towards the establishment of National Bureau of Forest Genetic Resources.
3. Promoting Consortia Based Research with a view to meeting the demands of wood based industries involving tree growers' co-operatives.
4. Resilience forestry to meet the challenges of climate change.
5. Strengthening forests and plantation health, productivity enhancement, precision silviculture techniques through species specific approaches.
6. Restoration of fragile and degraded ecosystems
7. Forestry Extension and education programmes for stake holders

Institute of Wood Science and Technology, (IWST) Bangalore

The Institute of Wood Science and Technology (IWST), Bangalore formed in 1988, is mandated to conduct research on Wood Science and Technology as its national objective and focuses its research on important forestry research needs of the States of Karnataka, Andhra Pradesh and Goa at regional level. Taking into consideration the expertise available and contributions made it has been assigned the status of Centre for Advanced Studies in the areas of Improved Utilization of Wood; Mangroves & Coastal ecology and Research on Sandal. The focus of research being carried out at IWST is coherent with the aims of National Forest Policy in the areas of utilisation of timber and non-timber products and increasing productivity. The Institute aims to develop strategies for use and production of wood and other forest products in a way that sustain their supply.

The Vision of the Institute is to attain excellence in forestry and wood science research for generation of resource, products, services in a way that sustains diversity and productivity in an eco-friendly regime.

It has a campus of 10 hectares housing the main laboratories (6997 sq.m.) and workshops for wood processing machinery, timber seasoning and

preservation plants. The Institute also has a tissue culture laboratory, mist chamber, shade house and green house, nurseries, extension support building, scientists hostel, guest house, library and information facilities. There are 91 residential quarters. A Shore Laboratory at Visakhapatnam and a **Forest Research Centre** at Hyderabad have been established. It has field stations at Gottipura & Nallal near Bangalore and Yelawala near Mysore.

The Institute's laboratories are well equipped with TLC, GLC, and HPLC and UV, IR and Atomic Absorption Spectrophotometer, X-ray Fluorescence Analyzer, Flow Injection Analyzer, Nitrogen Analyzer, Compound Research Microscopes with CCTV, Image Analysis System, Porometer, Photosynthetic Analyzer, Leaf Area Meter, an Universal Testing Machine and Xenon-Arc Weatherometer, FTIR, Spectroflurometer, Molecular biology equipments like Electrophoresis unit with power supply, Zeal Documentation System, PCR (Thermal cycler), Micro Centrifuge, Deep Freezer (-30°C), Laminar Air Flows, Autoclaves, Electronic Balance, Water Purification System, temperature controller, sequential timer, culture racks, seed germinator, seed germination trolleys, seed storage cabinets, twin screw extruder, Automatic Bomb Calorimeter, computers with internet facilities etc.

The Institute conducts a number of training programmes and carries out extension activities. It is one of the Regional Centres of the FRI University to enable candidates to pursue their Doctoral (Ph.D) programme. It also attends to queries related to wood properties and uses, biodeterioration and its control, cultivation of timber trees, chemistry of forest products, agro-forestry etc.

IWST is an ISO 9001:2008 Certified institute concerning all activities related to R & D activities, Consultancy, Training and Testing Services related to Forestry and Wood Science.

Forest Research Centre (FRC), Hyderabad

To cater to the research needs of the states of Andhra Pradesh, Karnataka and Goa in the field of forestry, Forest Research Centre (FRC), Hyderabad started functioning under the administrative control of Institute of Wood Science and Technology, Bangalore from July, 1997. The campus is spread over 100 acres of area in Dulapally Reserved Forests. The research activities of the centre are grouped under six categories namely Agroforestry, Climate Change, Ecology and Biodiversity, Information Technology, Soil Science and Tree Improvement & Propagation.

Research activities include carrying out tree improvement studies for improving productivity in socially relevant multipurpose forestry species, establish and maintain seed production areas & seed orchards, do research on biotechnology and mass propagation of quality planting stock , establish model nursery, Clonal and Seedling Seed Orchards, germplasm bank, provenance trials of selected MPT species for improving forest productivity, demonstration of agro-forestry models, study Bio-diversity of Eastern Ghats, impact assessment of eco-disturbance and rehabilitation, ecological and

vegetation studies of mangrove forests, studies on non-wood forest products and ethno-botany, and establish medicinal plant garden and museum, chemistry of forest products, evaluation and standardization techniques, forest fire, diseases and pests , research relating to climate change and soil sciences.

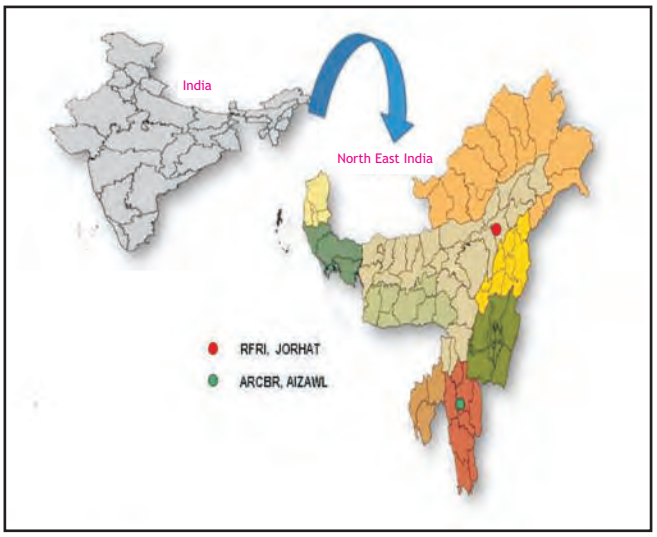
Rain Forest Research Institute (RFRI), Jorhat

The Rain Forest Research Institute (RFRI), Jorhat, Assam was established in 1988 with an aim to extend knowledge on forestry related issues through research, education and extension in general and to support forestry research of northeastern states including Sikkim, in particular.

The strategic location of the Institute offers easy access to a variety of forest ecosystems of North East like tropical wet evergreen, semi evergreen, moist deciduous, sub-tropical broad leafed hill and montane forests. The RFRI has adopted multidisciplinary approach to tackle research problems and has a network of coordinated projects with forest departments, NGOs, industries, universities, and farmers. The Advanced Research Centre for Bamboo and Rattan (ARCBR) at Aizawl, Mizoram; a unit of RFRI is specially meant for handling research problems on Bamboo and Rattan.

The mandate of the Institute lays special emphasis on conservation methods to restoration of degraded lands under shifting cultivation, management of community forests, preserve the unique heritage of the region for eco-restoration and multi-faceted use of bamboo and cane without damage to the ecology. In keeping with its mandate and need of the hour, the Rain Forest Research Institute during its short period of existence has made significant strides in research under different disciplines.

In NE Region Forestry Research Priorities underway are Managing Shifting Cultivation, Development of Models for Cultivation of medicinal & aromatic plants & Bamboos and Rattans on farm lands , Biodiversity



Conservation and Utilization, Development of Agroforestry/Social Forestry Models, Impact Study of Shifting Cultivation, Tissue Culture of Important Species, Soil and Water Conservation, Extension of tested technologies and Impact Assessment, Information on Economics and Market Studies, Value Addition to NTFPs, Natural Regeneration of Important Species, Management of Natural Forests, *Bio-diesel*–developing alternative fuel species, Nursery Techniques of Important Species and Carbon Credit.

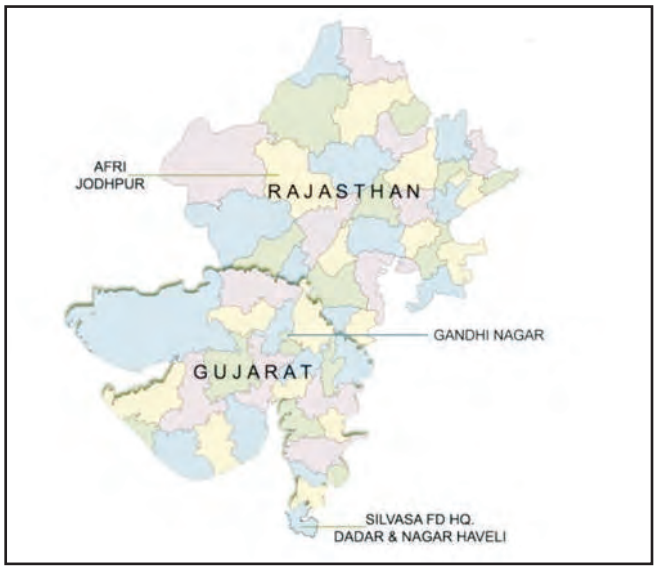
Rain Forest Research Institute, Jorhat

Arid Forest Research Institute (AFRI), Jodhpur

Arid Forest Research Institute at Jodhpur under ICFRE is mandated to carry out scientific research in forestry & allied fields to enhance the productivity & vegetative cover, to conserve the biodiversity and to

develop the technologies for the end-users in Rajasthan, Gujarat and Dadra & Nagar Haveli.

The main areas of forestry research are soil, water & nutrient management, technologies for afforestation of stress sites, management of plantations, growth and yield modeling, biotechnology and planting stock improvement, bio-fertilizers and bio-pesticides, Agroforestry, JFM & extension, Phytochemistry & non-timber forest products, integrated pest & disease management and forestry education and extension. During 2011-12, three consultancy projects and thirty eight projects were executed including ten externally funded projects from the Rajasthan Forest Department, Gujarat Forest Department, Department of Biotechnology, National Medicinal Plant Board and CSIR, New Delhi.

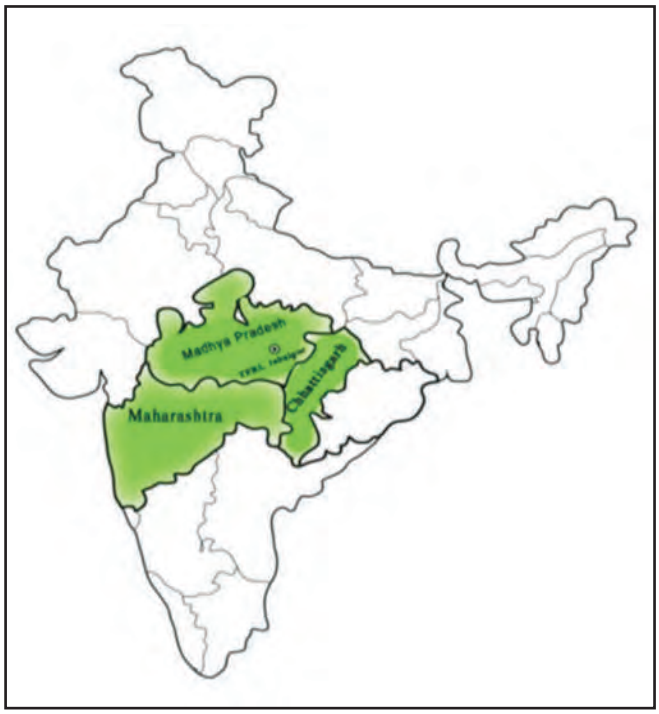


Mandated states of AFRI, Jodhpur

Tropical Forest Research Institute (TFRI), Jabalpur

Tropical Forest Research Institute, came into existence in April 1988, although its origin goes back to 1973 when a Regional Centre of FRI, Dehradun was established at Jabalpur to provide research support to the problems of forest management in central India. It caters to the forestry research needs in three states of central India, viz. Madhya Pradesh, Chhattisgarh and Maharashtra. Thrust areas of research in the Institute relates to Non-wood Forest Produce, rehabilitation of mined areas and other stress sites, development and demonstration in Agroforestry Models, Planting Stock Improvement, Sustainable Forest Management, Biodiversity Conservation and control of forest diseases and pests.

It has an area of 109 ha and a constant liaison with state forest departments, NGOs working in the field of forestry and allied areas, universities imparting education in forestry, and forest based industries.



Centre for Forestry Research & Human Resource Development (CFRHRD), Chhindwara under TFRI, Jabalpur came into existence in 1995. The mandate of the centre is to take up forestry research in the specialized areas like biodiversity conservation, non-wood forest products, forest protection, Silviculture and tree improvement. In addition to this, the centre has also been assigned to develop human resource in forestry sector by imparting vocational training leading to poverty alleviation through self employment in Central India.

Himalayan Forest Research Institute, Shimla

Himalayan Forest Research Institute (HFRI), Shimla, Himachal Pradesh started its journey as High Level Conifer Regeneration Research Centre during 1977 with an aim to carry out research on the problems associated with natural regeneration of Silver fir and Spruce. However, during 1987 with coming up of *Indian Council of Forestry Research & Education* (ICFRE), Dehra Dun, the mandate of this centre was also expanded from Regeneration of Silver fir and Spruce to Eco-Rehabilitation of Cold Deserts, Mined Areas Rehabilitation, Insect-pests and Disease incidences & Management, besides studies on Agro-forestry practices in hills including existing mandate of regeneration studies on Coniferous and their broad-leaved associates. This Centre was re-designated as **Himalayan Forest Research Institute, Shimla** in 1998. The Institute has contributed its expertise to this most fragile, sensitive and susceptible eco-system for better and scientific management of the forest eco-system in the states of Himachal Pradesh and Jammu & Kashmir.

Spread over in different agro-climatic zones the institute has nine **Field Research Stations** for carrying out site specific/ objective research as per the mandate of the Institute. In the process of broadening of research base in different Agro-climatic zones in the state of Jammu & Kashmir for carrying out required and more pointed research, the institute has recently established **Field Research Stations** at Nagbani (Jammu region) and at Badami Bag (Leh & Laddakh).

The Institute has been declared as the **Advanced Centre for Cold Desert Afforestation & Pasture Management** for taking up advanced research in Eco-restoration of these harsh sites. Forest Research Station located at Tabo, Lahaul-Spiti (HP) and another Station established recently in Leh (J&K) are catering to the specific research needs of the Cold Deserts in the mandated states.

This Institute till the recent past has made significant contribution to the research on artificial regeneration of Silver fir (*Abies pindrow*) and Spruce (*Picea smithiana*). Other notable achievements include development of nursery and planting techniques of other conifers like, Deodar, *Taxus*, Chir-Pine, Blue-Pine, including their broadleaved associates like, Birds cherry, Horse-chestnut, Oaks, Maples, Poplars and of the species endemic to the cold desert areas. Research and extension activities of the Institute include establishment and standardization of agro-forestry models in the lower hills of Himachal Pradesh, Eco-economic rehabilitation of mine damaged areas including organizing the workshops and trainings for the user groups.

Considerable work has been taken up in the cold desert areas of Himachal Pradesh and Jammu & Kashmir for documentation of flora of such areas including standardization of the nursery techniques for the species endemic to these areas. Insect-pest attacks and diseases of Deodar, Shisham, Chir-pine, Oaks and Willows were investigated and remedial measures suggested to the State Forest Departments of Himachal Pradesh and Jammu & Kashmir.

Sharing Planting Techniques of Cold Deserts Species with the End Users

The institute in collaboration with the State Forest Departments of Himachal Pradesh and Jammu & Kashmir established **Van Vigyan Kendras (VVKs)** at Sundernagar, Mandi and at Janipur, Jammu & Kashmir through which the Institute is now having more focused approach for carrying out extension activities with sufficient means for reaching and penetrating deep into the mindset of the people. Besides, show-casing research activities of the Institute, a **Model Village** at Lanabanka, Distt. Sirmour, Himachal Pradesh had also been established.

Institute of Forest Productivity, Ranchi

The Institute of Forest Productivity caters to the forestry research needs of eastern States of Bihar, Jharkhand, West Bengal and Odisha in India and came into existence in the year 1993 with the objective to formulate, organize, direct, manage and carryout forestry research & education in eastern region of the country, comprising approximately 46,581 square kilometre forest area which is 17% of the total geographical area of the country. The operational area comprises of six agro-ecological zones viz., Eastern Plateau, Chhotanagpur Plateau, Bengal Plains, Northern Plain, Eastern Plain and Eastern Himalayas and eight main forest types falling in the mandated states.

The Institute has taken up a number of research and training programmes for the benefit of different stakeholders and user agencies, NGOs., Research Organizations in the states of of Bihar, Jharkhand and West Bengal and the public at large.

The administrative building of the Institute is located at Lalgutwa on Ranchi–Gumla National Highway. The Institute also functions as one of the research centre of FRI University. The following research & extension centres are functioning under the Institute:

(i) **Forest Research Centre, Mandar, Ranchi (Jharkhand)** – This centre is spread over an area of 24.32 ha. It is equipped with Tissue culture laboratory, soil testing & biochemistry laboratories; modern nursery facilities with mist chambers, agronet shed houses and composting units; seed processing, packaging & storage unit are functioning apart from vast experimental area for provenance / progeny trials and demonstration plantations.

(ii) **Environmental Research Station, Sukna, Darjeeling (West Bengal)** – It is equipped with observatories at Sonada and Sukna with Hydro-meteorological recording facilities in Darjeeling district of West Bengal for hydrological data recording in selected watersheds.

(iii) **Forest Research & Extension Centre, Patna (Bihar)**- The centre is functioning for providing technology and services to the Environment & Forest Department, Govt. of Bihar, for implementation of agro forestry component of "Integrated Community Based Forest Management Project in Bihar" funded by Planning Commission, GOI.