

CHAPTER-III
SUMMARY OF MAJOR ACHIEVEMENTS
DURING 1998-99

Highlights of the activities undertaken and research findings made by the Council and its Institutes during the year are as follows :

Forest Research Institute, Dehra Dun

- Species specific conservation measures were successfully carried out on about 50 species of different plant groups.
- Characterised endemic centres and key areas of conservation for threatened species.
- FRI Herbarium concept note for worldwide web finalised.
- 1300 wood samples examined and identified for various Departments.
- Evaluated clones of *Eucalyptus* for pulping and paper making.
- Technology of Katha from Gambier, was transferred to industries through NRDC on payment basis.
- Methods were standardised to isolate dyes from *Pinus roxburghii* and *Populus deltoides* bark to be used to dye silk, wool and cotton with good fastness properties.
- Methods developed to convert the "dye extracted biomass" to compost in short duration.
- Trap Tree Operation was evolved to check borer population in Sal forest of U.P. and M.P. The borer epidemic was successfully managed in Thano Range, where 4 lakhs beetles of *H. spinicornis* were trapped and killed in collaboration with state forest Department.
- Established that superior clones of *Paulownia fortunei* multiplied 20 times faster by planting root sprouts than by the conventional methods of planting root cutting *per se* in the nursery bed.
- Recommended *Ailanthus excelsa* to pencil industry showing that it has got good dyeing and whittling behaviour.
- Achieved faster drying rate keeping drying defects well within the permissible limits for *Eucalyptus* wood.
- Determined treatability for *L. speciosa*, *Chukrasia tabularis*, *A. wallichii* and *C. hystrix*.
- Patent on copper lignin complex was filed.

- Showed that machining properties of densified *Paulownia* are better compared to poplar and is, therefore, suitable for medium class furniture and joinery.
- Mixed species model evolved for reclaiming the soil.
- Showed that application of Fuadon with various concentration of deoiled neem cake enhances plant growth and reduces gall formation in *Paulownia fortunei* seedling.
- Information was gathered from timber markets of Chandigarh, Ludhiana, Amritsar, Yamunanagar and Baddi and published to show the structure, behaviour, method of sale, volume transacted and costs of transportation, including changes in different market functionaries and consumer's profile.
- Information was collected on socio-economic structure of farm tree growers, farm forestry species, method of sale by producers, harvesting and various marketing charges borne by the farmers together with mode of transport and tree growers perception of existing tree harvesting loss etc.
- New species *Populus illicifolia* and *P. euphratica* were introduced in India.
- Standardised methods of germination for maximum production of healthy seedlings of *Quercus leucotrichophora* in the nursery.
- Various combinations of seed storage for *Ailanthus excelsa* and germination capacity tested.
- Developed protocols for storage of bamboo and *Dalbergia sissoo* seeds.

Institute of Forest Genetics and Tree Breeding, Coimbatore

- ◆ Developed technique for finger printing of teak for the first time in India.
- ◆ Established breeding population for *Eucalyptus camaldulensis* and *Casuarina equisetifolia*.
- ◆ Developed controlled pollination technique for Teak, Tamarind and *Casuarina equisetifolia*.
- ◆ Five clones of *Casuarina equisetifolia* were identified as promising with 50% fibre yield for paper manufacturing.
- ◆ Six salt tolerant clones of *Casuarina equisetifolia* were identified for afforestation in salt affected area.
- ◆ Developed plant regeneration protocol for *Eucalyptus tereticornis*.
- ◆ Standardized seed storage condition for *Syzygium cuminii* and pre-treatment for *Terminalias strychnos*.
- ◆ Established that the spent mushroom beds waste from mushroom industry had potential use as

potting media in containerised nurseries. Ratio was standardised for *C. equisetifolia*, Eucalyptus and Neem.

- ◆ Various agroforestry systems were developed in the farmers field. *Casuarina equisetifolia* is found to be financially viable and the economic returns are very high in Casuarina + Teak, and Casuarina + Moringa models.
- ◆ Developed Biological control for defoliating beetle *Myllocarus viridanus* through fungus *Beauveria bassiana*.
- ◆ Developed Database for some commercially important medicinal plants.

Institute of Wood Science and Technology, Bangalore

- Investigated physical properties of *Grevillea robusta* (silver oak) for use as door shutters, joinery and frames, furniture, turnery and light construction.
- Successfully standardised chemical reactions to modify the aroma of *Eucalyptus* hybrid oil. Three modified oils of perfumery interest were obtained.
- Scientific debarking technique developed to minimise damage to *Machilus macrantha*.
- Developed methanol extraction process to increase the yield of *Santalins* and red pigment from *Pterocarpus santalins*.
- Techniques evolved to extract two new aromatic oils from exhausted sandal wood powder.
- 82 timber species were tested for natural durability at Krishna Patnam Coast and the study revealed that *Xyliaxylocarpa*, *Adina cordifolia* and *Garcinia indica* performed better in the circumstances.
- Technique evolved for commercial preservation of wood specimen by use of Cashew nut shell oil.

Tropical Forest Research Institute, Jabalpur

- Standardised potting media for *A. procera*, *A. nilotica* and *D. sissoo*.
- Allelopathic effect of Karanj and neem leaf extract alongwith nitrogen on soybean seed germination was found to be promotary.
- Parthenin, major constituent of *Parthenium hysterophorous*, was found to be effective against teak defoliator.
- Standardised effective *Jatropha curcus* seed toxic concentration against teak insect (*Eutectona machearalis*).

- Oil yield assessed for *Cympropogon martinii* inter cropped under *Dalbergia sissoo*.
- Socio-economic suitability of agroforestry species assessed in the selected villages of Jabalpur.
- Genetic gains for establishment of SSO were assessed from the Dhandatopa, Orissa, Teak plantations.
- Standardised media for mass multiplication through clonal propagation of Teak.
- Formulated a single media for both shoot and root multiplication of *Bambusa vulgaris* and *Kaempferia galanga*.
- Standardised method for highest multiplication of *Dendrocalamus strictus*.
- Integrated disease management regime evolved to control nursery diseases.
- Species suitability and suitability index assessed for the mine overburden area of Malajkhand.
- Phenolic activities of *A. nilotica* on various agricultural crops were identified and quantified.
- Evolved suitable system of MTP with vegetables, crop and medicinal plants. Socio-economics of the systems were assessed.
- Suitable hedgerow species recommended for alley cropping in sub-humid zones of Central India.
- Standardised media for storing Neem seed without significant loss of viability.
- Documented ethnobotanically important species from Central Madhya Pradesh.
- Established low cost drum type driers for demonstration in the four selected villages of M.P. and two villages of Orissa.

Institute of Rain and Moist Deciduous Forests Research, Jorhat

- Control measures developed to overcome the pest colletotrichum on *Dipterocarpus macrocarpus*.
- Field guide of forest insect pests of Northern-Eastern India is in progress.

Arid Forest Research Institute, Jodhpur

- ◆ Volume tables for irrigated plantations of *E. camaldulensis* and *D. sissoo* and above ground biomass tables for Neem were developed.
- ◆ Determined effective extractive concentration of root, seed, bark and branches of *Capparis decidua* for control of aphid *Myzus persicae*.
- ◆ Detailed studies on the bio-ecology of Rohida defoliator, *Patialus tecomella* and gall forming insects of *Prosopis* completed.

- ◆ Established that Nuclear Polyhedrosis Virus (NPV) isolated from babul defoliator *Taragama* (streblote) siva, is effective against the pest.
- ◆ Standardized methods for *Prosopis cineraria* to increase the pod production and to minimise the mite incidence.
- ◆ Standardized methods for establishing short culture and long term sub-culture from mature tree of *Ailanthus excelsa* and *Acacia nilotica*.
- ◆ Medium standardised for rooting of stem culling of *A. nilotica* and side grafting in *A. excelsa*.

Himalayan Forest Research Institute, Shimla

- Identified new fungus *Phytophthora cinnamom* in Deodar (*Cedrus deodara*). Control measure are being evolved.
- Established 7 ha of Seedling Seed Orchards of Shisham.
- Site established for Vegetative Multiple Garden of Shisham.

Institute of Forest Productivity, Ranchi

- ◆ Developed technologies for improved cultivation of lac.
- ◆ Developed propagation technology for *Bambusa vulgaris*, *B. balcooa*, *B. tulda* and *B. arundinacea*.
- ◆ Standardised nursery techniques for *Paulownia* and Poplar.
- ◆ Updated data on lac cultivation, production, and market prices in the country.

Centre for Forestry Research and Human Resource Development, Chhindwara

- Conducted three Junior Certificate Courses on Nursery and Plantation Technology, 36 trainees were trained.
- Conducted Senior Certificate Course on Nursery Plantation Technology, 9 (nine) trainees were trained.
- Native wild medicinal plants used by the tribals of Chhindwara were collected and identified as a source of natural plant products.
- Extracted essential oils from eucalyptus species, *Ocimum* spp. and *Curcuma cassia*.
- Standardised effective concentration of plant pesticide against bahera seed borer *Mecobaris terminalae*.
- Established locally fabricated low cost mist unit.
- Evolved Micro-plan for village Forest Committee for State Forest Department.

EXTERNALLY AIDED PROJECTS OF ICFRE

UNDP-ICFRE Project- Strengthening and Developing of ICFRE

UNDP-ICFRE Project for strengthening and developing of Indian Council of Forestry Research and Education launched on 4-9-1992 with UNDP assistance of US \$ 2.56 million and Indian contribution of Rs.21.94 million was a 5 year project aiming at poverty alleviation through enhancement of the contribution of forestry to rural development in India. The project was designed to undertake and extend forestry research. The project was extended for a period of one and a half year and has been completed in March 1999.

The major achievements are :-

- 1000 ha of seed production area identified for main spp., like *D. sissoo*, *T. grandis*, *A. nilotica*, *C. deodara*, *G. arborea*, *Pinus* spp., *A. indica*, *Eucalyptus* spp., *Casuarina*, *D. macrocarpus*, Sandal, Bamboo, Fir, spruce, khair, etc.
- More than 50,000 candidate plus trees of *D. sissoo*, *G. arborea*, *T. grandis*, *S. assamica*, *P. goalparents*, *D. ceiba*, *Acacia* spp., *A. indica*, *E. grandis*, *E. tereticornis*, Sandal, *A. lebbeck* have been identified.
- 198 ha of clonal seed orchard for important species established.
- More than 22.5 lakhs seedlings inoculated with VAM Fungi and Rhizobia were distributed.
- 126 villages identified, socio-economic survey conducted and agroforestry plantations were raised in these villages based on the preference of farmers. A video film "Song of prosperity" on project activity has been prepared on Beta com format and is being used for extension activity.
- 48 ICFRE personnel, 13 senior Managers of ICFRE and 84 ICFRE Scientists were trained in various national and international Institutes in the field of advance research in forestry..
- 6315 forest personnels, NGO's, teacher, school/ university students, landless and unemployed rural youth were trained in identification and inoculation with VAM fungi and rhizobia. Introduction of biofertilizer has been done in 57 nurseries by different ICFRE institutes.
- 17522 farmers, 687 NGO's, 5700 foresters, 693 students, 486 teachers, 53 fisherman, 674 women, 204 rural unemployed youth have been trained in seed technology and plantation management.
- Workshop on Research Methodology and Forestry Research in Conservation of Natural Forests Organised at ICFRE.
- 16 International Consultants have visited ICFRE and its institutes in connection with various subjects. Consultant reports have been published and widely circulated amongst Scientist, Forest Departments and user agencies.

ICFRE-IDRC Research Project on Himalaya Eco-rehabilitation

Geo-spatial database was created for Socio-economic management of mine affected villages of Dehra Dun, Mussoorie area (Garhwal Himalaya) using GIS technology. Soil resource map pertaining to 501 Top sheet 53 J/3 prepared. A trial on fast growing agroforestry tree species of *Populus euphratica* conducted

in Bhrtarli watershed. Rehabilitation of mine land in Himachal is in progress. Identification and testing of appropriate intervention done in shifting cultivation area in North-Eastern States.

IDRC : Project on Studies on Cultivation and Optimum Time of Harvesting of Temperate and Alpine Medicinal Plants of High Market Value.

- Survey on natural distribution of *Taxus baccata*, *Nardostachys jatamansi* and *Picrorrhiza kurroa* in U.P. hills completed.
- Germplasm of rare and endangered medicinal and aromatic plants maintained and multiplied at Chakrata nursery.
- Provenance trails of *Nardostachys jatamansi* and *Picrorrhiza kurroa* completed to select superior provenance from U.P. hills.
- Video films on Non-wood forest produce, Medicinal plant, Food from forest, Oil seeds from forests have been produced.
- An exhibition on Medicinal Wealth of Uttarakhand was organised at Dehra Dun.
- A Popular pamphlet "Uttarakhand Ki Aushidhy a Sampada" was brought out.

Conservation of Indigenous Poplars in India (To/94.02.T).

- Extensive survey on occurrence on *P. ciliata* and *P. gamelei* in Arunachal Pradesh, Uttarkashi, Gangotri, Harzil, Bhagirathi, Dharli, Almora, Pithoragarh and Nainital, U.P. hills areas completed.

Development of Neem in various Agro-Ecological Regions of India (FRI - Punjab, Haryana, Western Uttar Pradesh; TFRI - M.P. and Orissa; AFRI - Gujarat; IFGTB - Tamil Nadu, Andhra Pradesh and Karnataka).

- The project proposals were discussed before the project appraisal committee on November 17th 1998.
- National oil seeds and vegetable oils development Board, Ministry of Agriculture, has accorded the approval under National Network on Integrated Development of Neem on 31st March 1999 with an outlay of Rs.181.77 lakhs.

ICFRE Ford Foundation – Productivity Enhancement Management for Peoples Participation.

- Socio-economic studies completed in selected sites of Madhya Pradesh.
- *Stylosanthes hamata* and *Pennesetium pedicillatum*, the preferred species were grown in identified patches.
- Aquaculture initiated in the existing ponds with breeding and rearing inputs.
- Marketing established with Forest Protection Committee for better/safe economic return.
- Mushroom cultivation extended to many other village.

- The Forest Protection Committees were apprised of prevailing market rates to enable them to get better return for their produce.
- Workshop conducted to develop the skills of local villagers for sustainable collection of medicinal plant products.
- The lac cultivation technique extended to many more farmers.
- Distributed vegetable seeds among farmers to generate income through vegetable garden.
- Various MPT seedlings were distributed among villagers to plant in farm bunds and home-steads.
- Medicinal plant survey of commercially important species was carried out.
- Commercially important medicinal species Ashwagandha and Senoy distributed among villagers.
- Market survey in seven markets conducted.
- Studies on Gender- conflicts were conducted in two selected villages.

ICFRE-NABARD Project for Development of Agroforestry Models for Various Agro-ecological Regions of India.

The project is being implemented by ICFRE since September 1995 under the auspices of the National Bank of Agriculture and Rural Development (NABARD). The budget outlay for the project is Rs.126 lakhs assistance from NABARD with ICFRE contribution of Rs.44.10 lakhs. It is a 5 year project and is expected to be completed by September 2000. The objective is to identify and develop different agroforestry model taking a micro-watershed approach for sustainability of eco-system. The project is progressing well in following four Institutes of ICFRE.

Hot semi-arid loamy soils – Institute of Forest Genetics and Tree Breeding, Coimbatore.

Hot sub-humid red black soil – Tropical Forest Research Institute, Jabalpur.

Hot sub-humid alluvial soil – Centre for Social Forestry & Eco-rehabilitation, Allahabad.

Hot arid-desert and saline soil – Arid Forest Research Institute, Jodhpur.

1. Both primary and secondary level surveys have been completed.
2. Nurseries at the project sites have been established.
3. Seeds have been collected from candidate Plus tree. 152.86 kg good quality of seeds have been sown to get genetically improved planting material.
4. Different Agroforestry models have been designed and laid out in the field. 2,55,084 plants have been planted under different agroforestry models. 2,73,896 forestry species and 38,994 fruit spp. seedlings have been raised during the year.

5. Mechanical and biological interventions through construction of check dam/Engineering structure, Contour trenches, vegetative hedges have been introduced for conservation of soil and moisture.
6. 664 farmers, 3 NGOs and 28 Forest Officers were trained in agroforestry and useful extension material was distributed.

World Bank Assisted Forestry Research, Education and Extension Project (FREEP)

Forestry Research, Education and Extension (FREE) Project was launched on 30th September, 1994 with the assistance of World Bank. The total estimated cost of the project is Rs.2151.48 million equivalent to US \$ 47.0 million. IDDA credit (er-2572 IN) is for US \$ 47.0 million equivalent. The project period is for five years with the project closing date 31st December, 1999.

Achievements during the year include :

- Three industrial technical demonstration were organised at FRI, Dehra Dun.
- National demonstration workshop on uses of advance technologies in forestry was held at Hyderabad during April, 1998.
- Training programme on forestry were organised for various target group.
- 51 brochure, 39 handouts in English and regional languages were brought out.
- Workshop on marketing of Forest Products in India was held at FRI, on Oct. 30-31, 1998.
- National Seminar on popularising theme trees was held at ICFRE, H.Q., Dehra Dun in Sept., 1998.
- Thirteen films and TV spots on different subjects are at different stages of production.
- Workshop on "Clonal Technology Organised by IFGTB during November, 1998.
- Workshop on biodiversity conservation organised at IFGTB during September, 1998.
- Twenty three projects sanctioned under Extension Support Fund are being monitored by ICFRE.
- 1290 ha Seed Production Areas (SPA's) identified. Culling operation in 564.38 ha area completed.
- 136.40 ha of Clonal Seed Orchards (CSO) was established.
- 298.65 ha Seedling Seed Orchard (SSO) established.
- 36.07 ha Vegetative Multiplication Gardens (VMG) created.
- 224 projects have been sanctioned to State Forest Departments, Universities and other private sector organisation, with a total outlay of Rs.170.53 million.
- Hon'ble Shri Suresh P. Prabu, the then Union Minister of Environment and Forests inaugurated the new NFLIC building in Dec, 1999.

- ICFRE has established facilities like electronic mail; Access to CD-ROM bibliographic Database (seven); Library Database On-line Public Access Catalogue (OPAC) and Internet services.
- ICFRE has launched its own website globally visible at <http://www.icfre.up.nic.in>.
- ICFRE has enriched NFLIC collection with addition of 2468 new books worth Rs.5578192.
- NFLIC has started Current Awareness Service (CAS) and Selective Dissemination of Information (SDI) for ICFRE and its Institute.
- A Network involving libraries under ICFRE and related institutes (Indian Forest Library Information Network, IFLIN) established.
- Process of installation V-SAT in new Library building has been initiated.
- Work on collection and documentation of grey literature has started. State consultant in 18 states have been appointed alongwith the Chief Consultant at Dehra Dun.
- Forest Statistic India 1996 completed.
- Biometrical Support provided to 87 research projects under different Institutes of ICFRE.
- Report on developing National Forestry Database Management System received from M/s CMC Limited.
- Two M.Sc. Courses on Forestry, and Wood Science and Technology were started in addition to the two ongoing P.G. Diploma Courses. 90 student were enrolled during the year 1998-99.
- 45 persons were provisionally awarded Ph.D. degree during the year 1998-99.
- A total of 216 fellowship were allotted to various institutes.
- National level training on Research Methodology with Special Emphasis on Statistics at IASRI, New Delhi; Research Methodology with Special Emphasis on Statistics at ISI, Bangalore; Research Management at ICFRE were organised and a total of 89 persons from various Institutes were trained.

To provide latest training and educational exposures to foresters/scientists of ICFRE, arrangements were made for short term, long term training courses, meetings/symposia and workshops.

ICFRE has identified 33 tested technologies out of which 17 tested technologies have been prioritized on the basis of clients demand for extension. A report on technologies developed is under publication.