

# INSTITUTE OF FOREST PRODUCTIVITY RANCHI

Institute of Forest Productivity, Ranchi is a premier forestry research organization which was created in the year 1993 after the merger of four centrally sponsored schemes with the objectives to formulate, organize, direct, manage & carryout forestry research & education in the eastern region of the country, encompassing a forest area of approximately 46,581 square kilometer which is 17% of the total geographical area of the country, comprising an operational area of six agro-ecological zones and eight main forest types, it encompasses the picturesque eastern Himalayas in North Bengal, the fertile alluvial expanse of indo-gangetic plains in Bihar and West Bengal, deltaic and coastal mangroves of the world famous Sunderbans, a pocket of Terai Sal forest in the North-West corner of Bihar and tropical deciduous forests of Kaimur and Chotanagpur plateau overlaying rich and enticing mineral resources within its jurisdiction. The Institute caters to the forestry research needs of eastern India.

An abstract of projects run by the Institute is as follows:

	No. of projects completed in 2008-09	No. of ongoing projects in 2008-09	No. of new projects initiated in 2008-09
Plan Projects	2	6	6
Externally Aided Projects	1	-	2
<b>Total</b>	<b>3</b>	<b>6</b>	<b>8</b>

## PROJECTS COMPLETED DURING THE YEAR 2008-2009

### PLAN PROJECTS

**Project 1: Development of appropriate silvicultural systems for selected medicinal flora of Chotanagpur and Santhal Parganas [IFP-022/FMS-3/2003-08]**

**Findings:** Plant propagules from natural forests of West Bengal and Jharkhand were collected. Vegetative propagation techniques were standardized for *Rauvolfia serpentine*, *Gloriosa superba*, *Asparagus racemosus* and *Withania somnifera* in Jharkhand. Growth of four species of medicinal plants were recorded under the shade of trees viz. Teak, Sisham, Khair and Sal. Exploitable plant parts of three species of medicinal plants were collected and preserved yearwise for a span of four years.



Cultivation of *Asparagus racemosus*

## Project 2: Vulnerability assessment of climate change and development of adaptation strategies to mitigate the impact on seed and biomass production in forest trees and herbs [IFP-029/FMS-4/2005–09]

**Findings:** Developmental stability of leaves in Neem and Sissoo is demonstrated suggesting that air pollutants and their associated changes in the environment such as increase in temperature and humidity did not induce genotypes to change to their environment. Hence, plants have inherent physiological adaptations to overcome evils of environment. Plants do not suffer under optimal water regimes, even under the influence of air pollutants indicating fair resistance to them. However, herbs showed susceptibility to diseases and pests under prolonged exposure to air pollutants.

## EXTERNALLY AIDED PROJECT

### Project 1. Documentation and inventorization of indigenous traditional medicinal knowledge in selected districts of Jharkhand [IFP-033/EBC–4/NMPB/2005–08] (Funded by NMPB)

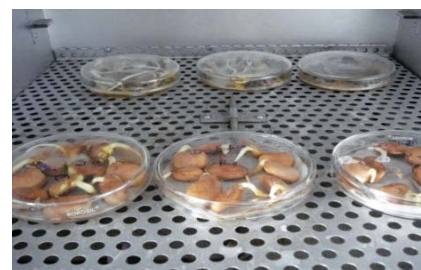
**Findings:** Traditional medicinal practices commonly used by 22 tribes of Jharkhand were documented. Herbal remedies for common ailments among ethnic communities viz. Arthritis, Diarrhoea, Dysentery, Spermatorrhoea, Bone fracture, Epilepsy, Piles, Asthma, Hyperacidity, Paralysis, Infertility (Male & Female), Otitis, Snake bite and Dog bite, etc. were noted. Herbarium specimens were preserved for plants used by different tribes for treatment of disease symptoms. Identification of two major forests in Chotanagpur region having rich biodiversity of flora and fauna was done.

## PROJECTS ONGOING DURING THE YEAR 2008-2009

### PLANPROJECTS

#### Project 1: Creation of seed database on economically important forestry species of Jharkhand aiming at functioning of a forestry seed certification agency [IFP-030/FMS-5/2006–11]

**Status:** Seeds of 15 species were collected and processed. Physical and physiological parameters of seeds (seed weight, length and width, volume, colour and germination per cent, time) were recorded. Data on seed storage and viability in types of containers and different storage temperatures were recorded.



Seed germination test

#### Project 2: Studies on Reproductive biology and propagation techniques of *Schleichera oleosa* Lour (Oken), an oil bearing tree and important lac host plants [IFP-046/BGT-12/2006–10]

**Status:** As many as 30 trees were selected from different parts of prominent lac growing region in Eastern India. Trials on cutting, grafting & budding as well as experimentation on micropropagation of Kusum were conducted. A Vegetative Multiplication Garden of Kusum was established at FRC, Mandar. Study on clonal fidelity was initiated with the extraction of DNA from clones. Variation in seed sources on



Blooming of Kusum

the basis of seed germination was recorded. Data on blooming, time of fruit initiation, fruit maturation period & a number of fruits per inflorescence were obtained from Orissa & Jharkhand.

### **Project 3: Species suitability and reclamation strategy for degraded forest soils of Chotanagpur Plateau, Jharkhand [IFP-031/SLR-7/2006–11]**

**Status:** Nursery and field trials were conducted in order to evaluate the suitability of tree species for degraded soils under Chotanagpur condition at Lalgutwa, IFP, Ranchi and the most suitable species were identified after compilation of growth data of the sixty species tried in nursery and field plantation. Field trials were under progress to study the effect of liming materials, bulky organic and mulching materials, macro and micro nutrients as a strategy to reclaim degraded soils using *Gmelina arborea*, *Madhuca indica* and *Pongamia pinnata* as test species.

### **Project 4: Genetic Evaluation & Molecular Characterization of *Jatropha curcas* L. of Eastern India [IFP-038/BGT-10/2007–10]**

**Status:** Twenty eight plus trees were selected from the states of Jharkhand, Bihar & West Bengal. Cuttings from the selected clones were collected & propagated in polybags in the mist chamber. Appropriate number of cuttings were raised for field trials & plantation in the farmers field. Plantation was carried out in selected site at FRC campus, Mandar during rainy season by using RBD design at spacing of 2 metre (of both clonal & seedling origin). After interval of one month, data on growth parameters were taken from the field trial. DNA extraction method and electrophoresis was standardized. One community land & nine farmers land were selected.

### **Project 5: Improvement of clonal propagation techniques of bamboos and enhancement in field survival [IFP-035/SLR-8/2007–11]**

**Status:** Rooting, Shooting & Rhizome genesis were performed for *B. bambos*, *B. nutans*, *B. striata*, *B. vulgaris* (Black), *D. strictus*, *D. asper* and *Gigantochloa atrovioleacea*. Survival and performance of Bamboo Planting Stock (BPS) of *B. nutans*, *B. striata*, *C. capitatum* and *D. strictus* under pot and field condition as influenced by organic soil treatment (Soil+ Sand; Soil + Sand-FYM Soil + Sand + FYM + Rice Husk & Soil + Sand + FYM + RH + Saw Dust)] have been undertaken. Quarterly data on propagation behavior Rhizome initiation, Rhizome, culm and clump growth were recorded. Planting stock of *D. asper* was generated through *in-vitro* propagation and placed for hardening for different duration (50 to 250 days). Hardened BPS of *D. asper* was planted in field under rainfed condition (without fertilization & irrigation) and their survival rate and growth & rhizome development were recorded. Germination behaviour and performance of *Melocanna baccifera* under Chotanagpur plateau climatic and soil condition were conducted.



Bamboo macro-propagation

### **Project 6: Assessment of the genetic diversity and development of species specific molecular markers in bamboos in Eastern India [IFP-039/BGT-11/2007–10]**

**Status:** Reviewed literature on genetic diversity/population structure of bamboos and developed marker systems. Germplasm of target species & 15 other species were collected and maintained. Identification of potential primers on the basis of prior studies and commercially available RAPD primers was done.



## NEW PROJECTS INITIATED DURING THE YEAR 2008-2009

### PLAN PROJECTS

**Project 1: Studies on collection, processing, sale and utilization of commercially important medicinal plants & NWFPs and their threat of extinction in tribal pockets of Jharkhand [IFP-040/EBC-05/2008-11]**

**Status:** Literature on collection, sale and marketing of medicinal plants were reviewed in selected districts of Jharkhand. Information was collected on local markets, 'hats', NWFP vendors and traders in the districts and blocks under study. More than 30 vendors involved in the trade were interviewed from Ranchi and Gumla markets. Nearly 70 sample specimens were purchased from local markets and stored.

**Project 2: Integrated strategy for evaluation of Indigenous fast growing multipurpose trees of Eastern India for plantation forestry [IFP-041/FMS-07/2008-13]**

**Status:** Twenty candidate plus trees were identified in Jharkhand and West Bengal. Information gathered on natural growing areas/provenances in Bihar, Jharkhand and West Bengal. Experiments were designed for evolving clonal propagation procedures.

**Project 3: Domestication, mass multiplication and popularization of *Moringa oleifera* genotypes with superior leaf nutritive and cytokinin content [IFP-042/FMS-08/2008-12]**

**Status:** Superior seed sources were identified at 5 locations of Jharkhand and 3 locations in West Bengal. Fifteen candidate plus trees were marked. Shoot cuttings collected from 10 CPTs in North Bengal, 12 CPTs from Orissa & Jharkhand were planted in beds for clonal multiplication. Experiments were designed for clonal propagation procedures.



Superior seed source of Moringa

**Project 4: Development of Dynamic Database for Forestry Discussion Forum [IFP-043/CD(IT)-01/2008-10]**

**Status:** Literature were surveyed and completed for Forestry Discussion Forum. An outline of the possible forms for various internet pages to be included and the database structure with all possible records and E-R Diagram for inclusion in the Discussion Forum was completed. Identification of all possible records, fields and relationships between entities for inclusion in the discussion forum was completed. The database structure with all possible records and E-R Diagram to be implemented was finalized. The design and development of the GUI was initiated and was under progress. The programs/codes are being written and processed for information retrieval.

**Project 5: Development of low cost technique of enriched vermicompost for commercial production [IFP-044/SLR-09/2008-11]**

**Status:** Production of enriched vermicompost is 8 tonne with the production cost of Rs. 2.00 to Rs. 3.00 per/kg which is 50-75% less than the market



Testing of vermicompost on vegetable crop

price. The available NPK of enriched vermicompost is 3, 42 and 40 times higher than that of cowdung respectively. Enriched vermicompost and vermin wash increase the yield of Potato two and three times than the control respectively.

**Project 6: Conservation of medicinal plants through commercial cultivation and value addition by Joint Forest Management Committees/panchayats and farmers in eastern Himalaya and its socio-economic impact [IFP-045/FMS-09/2008–12]**

**Status:** Different areas of Darjeeling hill & foot hill were visited for collection of germplasm and conserved in the seeds garden of an area of 0.5 ha. Seeds were collected from seed garden for production of 107350 nos. QPMs of Sarpagandha, Tulsi, Satamali, Gurmar, Latakasturi & Ulatkambal. QPMs were distributed for cultivation to 78248 nos. of JFMC members through State Forest Department & farmers for commercial cultivation on free of cost during the year to motivate the farmers for cultivation.



Production of QPM

## EXTERNALLY AIDED PROJECTS

**Project 1: Documentation and inventorization of indigenous traditional medicinal knowledge of Jharkhand [IFP-047/EBC-06/NMPB/2008–10] (NMPB funded Project)**

**Status:** Ethnic communities dominated tribal pockets were selected for the study in different blocks of Sahibganj, Hazaribagh, Ranchi, Latehar and Palamu Districts of Jharkhand. Some blocks were surveyed in Sahibganj, Hazaribagh, Palamu and Latehar districts of Jharkhand. *Souria paharia* and Santal tribes are dominant in Sahibganj, Chero and Birhor tribes are dominant in Palamu and Latehar districts of Jharkhand.

**Project 2: Establishment of medicinal plants garden and propagation centre in Chotanagpur Plateau for conservation and production of quality planting material for promotion of *ex-situ* cultivation [IFP-048/FMS-10/NMPB/2008–11] (NMPB funded Project)**

**Status:** Herbal Garden was created in 1 ha. Nursery was created for establishment of propagation centre in 3 ha area. Mist chamber was installed with irrigation facility. The various activities were carried out viz. site preparation, making arrangement for water supply, preparation of nursery beds and soil analysis, etc. Planting materials of about 100 species of medicinal plants of the region were collected and 80 species were planted.

## TECHNOLOGY ASSESSED AND TRANSFERRED

### Technology Transferred

Institute of Forest Productivity has developed technologies related to improving forest productivity and environmental conservation/reclamation for transfer to user groups.

### Technology Assessed

- Macro propagation of bamboos
- Micro propagation techniques of important forestry species
- Laboratory analysis of soil and treatment for deficiencies
- Improved techniques for Lac cultivation

- Recycling of organic wastes by composting / vermicomposting
- Production of quality planting materials in hi tech nurseries using root trainers
- Bio reclamation of problem soils and mined over burdens
- Propagation techniques of selected medicinal plants

## EDUCATION AND TRAINING

### Trainings

#### Conducted

- Training on "Scientific Cultivation of Lac" was imparted by the Institute to the Forest Guards of SFD, Jharkhand from 5<sup>th</sup> to 9<sup>th</sup> May 2008.
- Training on "Modern Nursery Techniques" was also imparted to FROs of SFD, Jharkhand from 12<sup>th</sup> to 16<sup>th</sup> May 2008.
- A five-day training programme for the farmers and field functionaries of the state of Chhattisgarh under Bamboo Technology Support Group (BTSG), ICFRE, Dehradun of National Bamboo Mission was organized by the Institute during the period from 8<sup>th</sup> to 12<sup>th</sup> September 2008.
- Training of "Lac Cultivation through Scientific Method" was conducted by the Institute at Gari and Garu village of Daltonganj on 11<sup>th</sup> February 2009 and 18<sup>th</sup> February 2009.

#### Attended

- "Statistical Techniques for Research Methodology" for Scientific Personnel of ICFRE Dehradun held at ISRI, Pusa from 26<sup>th</sup> December 2008 to 8<sup>th</sup> January 2009.
- "Pest Management in Forestry" held at National Centre for Integrated Pest Management (ICAR), New Delhi held from 10<sup>th</sup> to 19<sup>th</sup> February 2009.

## LINKAGE & COLLABORATION

Linkages and collaboration were established with the following organization:

#### International

EWI, USA; DFID (U.K.); IDRC, UNDP

#### National

NABARD	National Medicinal Plant Board (NMPB)
Department of Biotechnology (DBT)	Central Coalfields Limited (CCL)
Damodar Valley Corporation (DVC)	Indian Institute of Natural Gum & Resins, Namkum
ISM, Dhanbad	HARP, Plandu
BAU, Kanke, Ranchi	SFD, Jharkhand
SFD, West Bengal	SFD, Bihar
FSI, Eastern Zone, Kolkata	Planning Commission, Govt. of India
MoEF, Govt. of India	ESSAR, Ranchi

## PUBLICATIONS

- Annual Lac Bulletin
- Brochures – Lac cultivation; Medicinal plants; Bamboo cultivation & propagation; Important species of Agroforestry; Indigenous fruits of Jharkhand.

## CONSULTANCIES

- Memorandum of Understanding (MOU) between the Institute of Forest Productivity, Ranchi and NGOs signed on 24<sup>th</sup> October 2008 for implementation of sanctioned project on "Biodiversity Conservation through Community based Natural Resource Management" in the state of Jharkhand being funded under GOI-United Nations Development Programme-CCF-II.
- Consultancy job on "Preparation of Conservation Plan of the specified Faunas at Karo and Tetariakhar OCP" for obtaining environmental clearance from MOEF of the mining projects of CCL, Ranchi for a period of 3 months.
- Consultancy services for "Bio diversity Assessment Report" for the proposal of 2000 MW Pit Head Thermal Power Station and Chakla Coal Mine of Essar Power (Jharkhand) Limited, Ranchi for a period of 6 months.
- Memorandum of Understanding (MOU) between the IFP, Ranchi and an NGO 'GRAM GAURAV', Hapamuni, P.O. - Gumla, Jharkhand executed for the purpose of developing a Model Village at Hapamuni under establishment of Demo Village for extension technologies on forestry research.

## CONFERENCE/MEETINGS WORKSHOPS/SYMPOSIA/EXHIBITIONS

### Attended

The representatives from Institute of Forest Productivity, Ranchi attended the Workshops/Seminars/Conferences/Symposia as given below during the period under report:

- The Institute participated in an exhibition of the products organized by NABARD at Hotel Ashoka, Ranchi on 12<sup>th</sup> May 2008.
- The Institute participated in a ten days Rural Exhibition-cum-Fair-"Sunderban Kristi Mela-O-Loko- Sanskriti Utsab held from 20<sup>th</sup> to 29<sup>th</sup> December 2008" organized by Kultali Milon Tirtha Society, South 24 Parganas, West Bengal. Award of 3<sup>rd</sup> Pavallion Prize was received by Dr Rajiv Rai on behalf of the Institute from Shri Kantilala Ganguly, Hon'ble Minister for Development of Sunderban, West Bengal.
- Training programme on "Environment Impact Assessment" organized at Wild life Institute of India, Dehradun from 18<sup>th</sup> to 22<sup>nd</sup> August 2008 under HRD Plan for skill upgradation at various levels.
- Second National Conference of Zoology on Recent Trends in Ecological Researches in India with Focus on Jharkhand 2NCZ 2008 organized from 17<sup>th</sup> to 19<sup>th</sup> November 2008 under the auspices of Suraj Singh Memorial College, Ranchi.
- Workshop on "Forestry for Common People" organized by ICFRE at Dehradun on 25<sup>th</sup> November 2008.
- National Workshop on "Extension Strategy in Forestry Research" organized by Directorate of Extension, Indian Council of Forestry Research & Education, Dehradun on 15<sup>th</sup> and 16<sup>th</sup> January 2009.



Dr. Rajeev Rai receiving  
3rd Pavallion Prize



- National Seminar on "Medicinal Plants Seminar-cum-Buyers and Sellers Meet" organized jointly by BAU, Ranchi and NMPB on 28<sup>th</sup> January 2009.
- "Agrotech – 2009 Kisan Mela" organized during 26<sup>th</sup> to 28<sup>th</sup> February 2009 by Birsa Agricultural University, Ranchi.
- International Conference on "Improvement of Bamboo Productivity & Marketing for Sustainable Livelihood" organized from 15<sup>th</sup> to 18<sup>th</sup> April 2008 by National Bamboo Mission at New Delhi.

### Organized

- A workshop on GOI-UNDP CCF-II project titled "Biodiversity Conservation through Natural Resource Management in the State of Jharkhand" was organized by the Institute on 2<sup>nd</sup> August 2008.
- A workshop on "Preparation of People's Biodiversity Register under Biological Diversity Act 2004" was organized by the Institute on 19<sup>th</sup> and 20<sup>th</sup> December 2008 under UNDP-CCF-II Project – Biodiversity Conservation through Community Based Natural Resources Management.
- One day workshop was conducted on 5<sup>th</sup> March 2009 at Udai Singh Jote under the project "Conservation of Medicinal Plants through Commercial Cultivation & value Addition by JFM & Farmers in Eastern Himalaya and its socio-economic Impact".
- Awareness meeting on "Importance and Cultivation of *Jatropha curcas*" was organized on 25<sup>th</sup> and 26<sup>th</sup> March 2009 at Forest Research Centre, Mandar, Ranchi.

### AWARDS

- Sri Satya Prakash Mishra, JRF under the project "Domestication, Mass Multiplication and Popularization of *Moringa oleifera* genotypes with Superior Leaf Nutritive and Cytokinin Content" received 'Young Researcher Award – First Prize' in National Conference on "Recent Trends in Ecological Research in India", from 17<sup>th</sup> to 19<sup>th</sup> November 2008 Ranchi.

### DISTINGUISHED VISITORS

- Dr. Shashi Kumar, Director (Research) visited the Institute on 1<sup>st</sup> April 2008 in connection with the evaluation of SASVPS Project.
- Shri B. S. Sajwan, CEO, NMPB, New Delhi and Shri Shiv Basant, Joint Secretary, Ministry of Health & Family Welfare, GoI, New Delhi visited the Institute on 28<sup>th</sup> April 2008.

### MISCELLANEOUS

- The Institute celebrated "International Day on Biological Diversity" on 22<sup>nd</sup> May 2008.
- Vigilance Awareness Week from 7<sup>th</sup> to 14<sup>th</sup> November 2008 was celebrated by the Institute.

