Continued ICFRE funded research projects- 2010- 11- IFP

Sl. No	Projects	Name of PI	Thrust area	Current status
1	Species Suitability & Reclamation Strategy for Degraded Forest Soils of Chotanagpur Plateau, Jharkhand. **(5 years 2006 – 2010)**	Dr. S. Nath, Scientist - E	Forest Productivity (Forest Soil and Land Reclamation)	**Obj. 1: Identification of nature and degree of degra-dation and other limiting factors of the soils.** • 10 samples from diff. aspects & physiographic situation were collected & analysed. Soils are highly eroded, shallow, acidic, low in OM, available nutrients except K **Obj. 2: Evaluation of Species suitability for Chhotanagpur Plateau** • Raised 100-150 seedlings each of 60 spp. • Suitability trends of the species under degraded soil have been assessed based on root-shoot growth, fresh & DM production. • Assessed species Suitability from Periodic growth parameters • Shortlisted 21 tree species performing better in degraded soil. **Obj. 3: Reclamation of Degraded sites and establishment of Demonstration Plots through soil amendments** • Raised 2000 seedlings of *G. arborea.* 1000 seedlings each of *Madhuca indica* & *Pongamia pinnata* for trial with bulky OM & Liming materials respectively • Field plantation raised in 99 plots each for OM & Liming treatments (Total 198 plots - 9 plants/plot). • Applied Treatments for two consecutive years • Recorded periodic data. Higher doses of NPK (50:30:30 g for 1-2 yr & 100:50:50 g for 3 yr old *G. arborea, M. indica* & *P. pinnata*) in addition to 1.5 kg OM for 1-2 yr & 3.0 kg for 3yr supplemented with 100 mg each of B, Fe, Mn, Zn , 25 mg Cu & 2.5 mg Mo per plant for 1-3 yr are essential for normal growth. ➢ Liming with either Lime or dolomite enhances nutrient (N,P,K, Ca & Mg) uptake by *P. pinnata* than *M. indica* & improves their growth. ➢ OM addition improves soil moisture status under *G. arborea*, more with rice husk & saw dust but for limited period (25-35 days) ➢ Liming reduces soil moisture more under *P. pinnata* than *M. indica* **Obj. 4: Impact Analysis of reclamation as an indication of moisture conservation and growth performance of the planted species.** • 198 soil & Plant Samples have been collected and analyzed to assess the impact of treatments in respect to moisture nutritional parameters i) Periodic growth data of all trials are being compiled. ii) Reports submitted time to time iii) Paper presented on at the National Workshop organized by CSFER, Allahabad.
2	Creation of seed database on economically imp. forestry sps of Jharkhand, aiming at	Dr. Sanjay Singh, Scientist - D	Forest Productivity (Silviculture)	• Identification of superior seed sources of target species in Jharkhand. • Collection of seeds of more than 20 species for physical and physiological studies. • Repair and maintenance of the seed unit of the Institute for large scale seed testing and storage.

	functioning of a forestry seed certification agency **(5 years April 2006) PI**			• Studies on physical parameters of seeds (i.e. seed weight, length and width, volume, colour, seed/fruit weight etc.) of collected species. • Studies on initial moisture content and germination percentage and rate of seeds of collected species. • Experimentation on seed storage in different types of containers under ambient and cold temperatures. • Viability of stored seeds analyzed after 3 months, 6 months, 1, 1.5 and 2 year storage.
3	Improvement of clonal propagation techniques of bamboos and enhancement in field survival **(4 years April 2007)**	Dr. S. Nath, Scientist - E	Genetic Improvement (Vegetative propagation)	**Obj. 1: Refinement of macro- propagation procedures of common bamboos of Eastern India.** • Trials conducted on vegetative propagation with Culm/Br cuttings & Seedlings for root/shoot initiation in 4 diff. seasons with or without GPS; Spp. : *B. Balcooa, B. bambos, B. nutans, B. striata, B. tulda, B. vulgaris*, *B. vulgaris* (Black), *D. strictus, D. asper* & *G. atroviolaceae.* • Conducted pot & field trials on rhizome genesis, culming intensity, survival & growth of normal and detached BPS to optimise Soil Organic Treatment. Spp. : *B. nutans, B. striata, B. tulda* & *D. strictus.* • Clonal propagation through culm cuttings is possible throughout the year if optimum field condition is maintained. • Better results recorded for Summer (March to May) propagation, lower and mid culm segments and double and triple node cuttings (rather than single node cuttings). Quicker propagation noted in *B. bambos, B. balcooa*, *B. striata, B. vulgaris* (black & green), *B. nutans* and *D. strictus* than *B. tulda & D. membranaceus.* . Slowest mode of propagation was noted in case of *D. membranaceus.* • Application of GPS did not enhance production of plantable propagules from culm segments significantly. However, GPS application facilitated propagation of culm branch cuttings, cuttings of upper culm part and those of 3 year old. • For most successful propagation, optimum age of culms should be between 9 to 21 months. • Rhizome genessis in *Bambusa striata* , *B. nutans* and *D. strictus* was quicker than others. *D. membranaceus* showed slowest rhizome genessis . • Proper Rhizome formation is obligatory for higher field survival. • Conducted trials for early Propagation with BPS developed through culm segments under stress using pots of diff. Sizes containing different types of rooting media & diff. irrigation schedule Spp. : ***B. nutans, B. striata, B. tulda, D. asper* & *D. strictus.*** • Optimised poly pot size & pots of size 16" x 20" favoured better propagation (culming intensity & culm growth) of out planted BPS. • For survival under agro-shade , weekly irrigation is essential for TC raised *D. asper* & Culm raised *B. nutans* in black pots of optimum size. While *D. strictus* can withstand irrigation at 2-3 weeks interval. **Obj. 2: Refinement of micro-propagation t*echniques* for *D. asper*** • Conducted TC Lab trials for early root/shoot initiation using IBA, IAA, NAA, Coumarin etc, as rooting hormone & BAP, Kinetin, TBZ, Zeatin etc. as shooting hormone & generated BPS of *D. asper* .

				• Refined micro-propagation of *D. asper* & better rooting & shoot initiation was recorded with Coumarin & Benzyl amino purine (BAP) respectively. **Obj. 3: Enhancement of field survival through hardening, nutritional supplements and moisture conservation.** • Standardized Hardening Procedure for Tissue culture (TC) raised *D. asper*. BPS of *D. asper* was hardened for diff. duration (50 to 250 days) for June and September Plantation - Two sets of trials accomplished successfully. • Survival and growth (Shoot/tiller /culm numbers, culm & clump parameters, root/shoot biomass etc.) of hardened BPS of *D. asper* in field have been assessed. • *D. asper* hardened for 150 days performed better survival for June planting. For September planting, BPS hardened for 250 days performed better. Survival and growth of hardened BPS of *D. asper* in field have been assessed. • Field Survival study conducted for vegetatively propagated BPS using diff. composition of Soil, Sand, FYM & Saw Dust mixture. Spp. *B. nutans, B. striata, B. tulda & D. strictus*. • Soil with FYM favoured better early growth while saw dust supported late growth due to residual effect and improved soil physical attributes. On growth, *B. nutans* became taller and thicker while culming intensity was much higher in *D. strictus* followed by *B. tulda* and *B. striata.* **Obj. 4: Optimization of nursery gestation period for transplantable plantlets** • Studied the successive stages of propagation in nursery beds for varying duration with culm segments in four diff. seasons. Performance of the developed and out planted BPS have been monitored. Spp. used: *B. bambos*, *B. nutans,* & *D. strictus.* • Vegetatively propagated BPS hardened in nursery for diff. intervals (3 to 12 months) & their field performance have been recorded. Higher survival rate has been for BPS having nursery gestation of 6 months or more.
4	Studies on Collection, Processing, Sale and Utilization of Commercially Important Medicinal Plants & NWFPs and their threat of Extinction in Tribal pockets of Jharkhand **(3 years, July - 2008)**	Dr. Malabika Ray, Scientist - D	NWFPs (Resource Development of NWFPs)	• Market survey of 43 Village markets-'haats'. A databae has been maintained in EXCEL showing the details of the markets, name place quantity and details of the NTFPs sold. • District wise has been compiled on the number of markets surveyed in each of the selected districts and the amount of NWFPs traded by each category of people involved in the trade. The research findings of the project have been presented as scientific papers in three national conferences. • Collected 300 specimens. Based on the annual volumes of NWFPs, collected and traded in the markets some of the plants in that area could be classed as endangered/threatened.
5	Domestication, mass multiplication and popularization of *Moringa oleifera* genotypes with superior leaf nutritive and	Dr. Sanjay Singh, Scientist - D	Genetic improvement (Vegetative propagation)	• Information on natural populations/growing areas/ plantations of moringa in Jharkhand, West Bengal, Bihar and orissa. • Superior seed sources have been identified at 7 locations of Jharkhand, 7 locations in West Bengal, 6 locations from Orissa and 5 locations in Bihar. • 45 Candidate plus trees have been marked. • A gerplasm bank has been established. • Shoot cuttings (400) planted and data recorded employing

	cytokinin content. **(4 years, July 2008)**			auxin and non-auxin growth regulators in summer, rainy and winter season. • Analysis of leaf nutrients in collected germplasm through spectrophotometer. • Spectrophotometric and HPLC procedure for nutrient analysis standardized.
6	Integrated strategy for evaluation of indigenous fast-growing multipurpose trees of eastern India for plantation forestry. **(5 years, July 2008)**	Dr. Sanjay Singh, Scientist - D	Forest Productivity (Silviculture)	• Collection of information on natural populations and plantations of kadamb and semul • Survey in natural growing areas/provenances in Jharkhand and Bihar some areas in identification of CPTs. • 70 Candidate plus trees have been identified in Jharkhand, Bihar and West Bengal. • Relative analyses of CPTs on physiological parameters. • Experiments designed for evolving clonal propagation procedures. • Experiments on clonal propagation through rooting cuttings. Root trainer experiment conducted both with seeds and cuttings. • Hedge garden/VMG of *Anthocephalus chinensis* and *Bombax ceiba* has been established.
7	Development of dynamic database for forestry discussion forum Information Technology **(2 years, April 2008)**	Mrs. Ruby. S. Kujur, Scientist - B	Forest Management (Information and Communication Technology)	• Literature survey has been done. • An Outline of the possible forms for various internet pages to be included in the Discussion Forum has been completed. • An Outline of the database structure with all possible records and E-R Diagram for inclusion in the Discussion Forum has been completed. • Identification of all possible records, fields and relationships between entities for inclusion in the Discussion Forum has been completed. • The database structure with all possible records, fields, queries and E-R Diagram to be implemented has been finalized. • The design and development of the GUI (Graphical User Interface) has been completed. • The GUI (front end) has been developed using ASP.NET, HTML, VB Script. This involved development of forms required for front end applications and presenting data to the user, accepting information and other functionality. • The server side application layer has been developed using ASP.NET to accomplish the task of receiving the user input from the front end and processing back the required information from the database to the user. This mainly acts as connector between the user and the database and facilitates processing of information. • The Database layer has been implemented using Oracle 8i. Tables, relationships and queries have been designed for information input, storage and retrieval. • The programs/codes are being written (using ASP.NET, HTML, VB Script) and have been tested and processed for information input, storage and retrieval. • Data entry, testing and debugging of the database and programs for bugs and errors have been done using dummy data. The activity is complete. • The preparation of the user manual is in progress.

8	Development of low cost technique of enriched vermicompost for commercial production **(3 years, April 2008)**	Dr. M.V. Durai, Research Officer	Forest Productivity (Forest Soil and Land Reclamation)	• Nutrient content improved in vermicompost by the addition of neem, karanj, cow urine, poultry feed and phospho-bacteria. Quality of enriched vermicompost under different treatments are being analyzed • Field trials on effect of vermicompost on bamboo, sissoo, gamhar, Sarpgandha, potato, Radish and beans were undertaken • Six training orgainsed on vermicomposting & its application to the farmers.
9	Conservation of medicinal plants through commercial cultivation and value addition by Joint Forest Management Committees / panchayats and farmers in eastern Himalaya and its socio- impact **(4 years, April 2008)**	Sanjeev Kumar Bhatia, Scientist - B	NWFPs (Resource Development of NWFPs)	• Visited North Bengal University, Darjeeling Govt. College, Lokh Sikha Parishad, Narendrapur, NTFP Division, Siliguri; Silviculture Division, North Bengal & Darjeeling and collected required information & literature.Siliguri Horticulture Department, Panchavati Greentech Research Society, Darjeeling. • Visited different areas of Darjeeling hills & foot hills and collect germ plasm & conserved in the seed garden • Established a seed garden in an area of 0.5 hectare. • Routine maintenance of seed garden done properly. • 38 nos. of cemented nursery beds prepared under Agro Net Shed with M.S. Angle & G.I. Wire. • Routine maintenance of nursery carried out time to time. • Seeds collected from seeds garden for production of QPM time to time (Sarpagandha, Satavar, Latakasturi, Ulatkambal, Tulsi etc.) and also collected the seeds of Gloriosa superb from Panchavati Greentech Research Society, Darjeeling and Withania somnifera from Indigo overseas, Shivmandir, Siliguri. • Total QPM created 260983 nos. as on date. • QPM distributed for cultivation 77200 nos. to the JFMC members through State Forest Deptt. And Farmers for commercial cultivation on free of cost for motivation and supplied 43800 QPM to the farmers for commercial cultivation at minimum rate of Rs.1/- and utilizes 25442nos. of QPM for seed garden at USJ Research Plot and IFP, Ranchi and trail plot during the year 2009-2010 • Seven Workshop/Training programme were organized and motivated 130 farmers of Mangalkata Village, Banarhut; Angrabhasa Grampanchayat, Jalpaiguri Distt.; Lingsay Village, Kalimpong Sub-Division, Darjeeling Distt.; Rangbhang Village, Darjeeling Distt,; for commercial cultivation of medicinal plants through NTFP Division, North Bengal; Divisional Forest Officer, Jalpaiguri. Foolbari, Village no. 2, Sukna. • Technical assistant was provided to the cultivators time to time. • *Rauvolfia serpentine. , Withamia somnifera ., Stevia rebaudiana. , . Asparagus racemosus., . Gymnema sylvestre., . Abelmoschus moschatus.* • Maintenance is done properly and data is collecting as per requirement.
10	Effect of potassium application on diseases and pests in *Gmelina arborea roxb.*	Dr. S. Nath, Scientist - E	Forest Protection (Insect pests, disease control)	**Obj. 1: To identify major diseases and pests associated with *G. arborea* in nursery and plantations** • Established Pathological and Entomological laboratory at IFP • Nursery Surveyed : Chakulia, Bokaro (DVC), Kurukpania, Gahrkhatanga, Mahilong, Chandwa, Lalgutwa & Mandar - total 8

	*g*rown under Chhotanagpur plateau soils **(2 years, April 2009)**			• Plantation Surveyed : Districts of Khunti, Ranchi, Gumla, Bokaro, Dhanbad, East Singhbhum, Latehar, Ramgarh, Palamu & Chatra – total 69 sites in 10 districts • Collected Plant components (infested & infected Leaf, bark, stem, branches etc.), soil & plant samples & Insect specimen from above mentioned sites • Identified Insects – Defoliator, shoot borer, leaf miner & the prominent sap suckers (aphids). *Tingis beesoni* (Hemiptera) , other bugs of order Hemiptera,Lady bird beetle of order Coleoptera, Other species of Family: Alucitidae [Order: Lepidoptera, Symptom: Insect eating in mid-rib region, Aug to March] & Black Flies of Order Hemiptera are the common identified species • Identified Diseases : Root rot, stem canker, stem rot, leaf & shoot blight & the widespread Leaf spot. Identified fungi are : Alternaria, Phoma and Fusarium spp. • Seasonal variation in insect and pest in plantations at Mandar and Lalgutwa,Ranchi have been undertaken as detailed study on the species. **Obj. 2: Assessment of occurrence of disease and pest infestation in relation to soil and plant nutrient status with special reference to potassium** • Assessed severity index for pathogen attack & insect infestation based on area of host part effected, burnt fed area, number of insects/unit area, No of exit holes, tunnels formed, No & area of spots, rots etc., % of the plant affected & other parameters. Severity scoring was assigned to plants from each site in order to correlate with soil and plant analytical results. • Analyzed 110 soil samples for physio-chemical & nutritional parameter including K & 220 plant samples from 55 sites for N, P & K. Analysis for rest of the samples are in progress. • Correlation study between analyzed parameters of soil & plant samples and the severity of damage caused by insect & pathogens are in progress.
11	Application of GIS/RS for identification and monitoring of lac host belts in Chotanagpur area **(3 years, April 2009)**	Mrs. Ruby. S. Kujur, Scientist - B	Forest Management (Information and Communication)	• Literature review is being carried out. • Preliminary survey for selection of pockets in Chotanagpur region- in the districts of Ranchi, Ramgarh, Hazaribagh, Chatra, Khunti, East Singhbhum, Saraikela Kharsawan, Gumla, Lohardaga, Simdega have been carried out. The survey have been conducted for ground truth verifications and ground inventory. • Selection of 5-6 pockets as a cluster have been carried out in Ranchi, Ramgarh, Hazaribagh, Chatra, Khunti, East Singhbhum, Saraikela Kharsawan, Gumla, Lohardaga, Simdega . • The selection of pockets in a district have been done through the use of GPS. Records of latitude and longitude have been documented for identifying the areas on the imagery obtained through remote sensing. • Documentation of information regarding selection of trees based on phenotypic characters have been carried out for the districts of Ranchi, Ramgarh, Hazaribagh, Chatra, Khunti, East Singhbhum, Saraikela Kharsawan, Gumla, Lohardaga, Simdega . The trees in a pocket have been selected based on the height, DBH (Diameter Breast Height), and starting point (base) of the crown.

				• Documentation of information regarding information on production of lac during the season has been carried out for the districts surveyed. The production in an area has been documented for a general assessment of the areas where the lac hosts are being used for lac production. In some of the areas the lac hosts are not being used for lac production due to excessive heat or cold, non-availability of broodlac, lack of assistance and training on improved methods of lac cultivation etc. • Marking of pockets of lac yielding belts through GIS/RS have been initiated for the districts already surveyed. • Three types of data are being used: - Remotely sensed data using IRS 1D LISS III in the scale of 1:50,000. -Toposheets of the areas in the scale of 1:50,000. -Ground data as obtained through survey.
12	Standardization & dissemination of complete package of cultivation & marketing in relation to principal active ingredient of ten selected medicinal plants of Jharkhand, Bihar, West Bengal and Orissa **(3 years, July 2009)**	Sanjeev Kumar Bhatia, Scientist - B	NWFP (Resource Development of NWFPs)	• 23 companies has been surveyed in Jharkhand & West Bengal & adequate data has been collected from them • Surveyed companies are contacted for their grading system • On 24th February one awareness training to 35 farmers on selected medicinal plants was organized in ERS, Sukna & also practical demonstration of cultivation of selected medicinal plants was given • All the planting material has been raised in Uday Singh Jote nursery, ERs Sukna for further trial plantation at different States. • Experimental plot has been laid in two States i.e. Jharkhand & West Bengal in open & agronet conditions
13	Selection and improvement of natural dye yielding plants **(4 years, April 2009)**	Sh. H.C. Sindhu Veerendra, Scientist - B	Genetic Improvement (Tree Improvement)	▪ Seventeen *Mallotus philippensis* CPTs are selected. ▪ Seeds from 15 trees are collected to study variability in fruit characteristics and dye yielding capacity. ▪ Shoot cuttings from five trees are trying for rooting of cuttings. ▪ Dye from 15 trees is extracted for studies ▪ Five trees of *Wrightia tinctoria* are selected. ▪ Shoot cuttings are trying for induction of rooting for vegetative multiplication. ▪ Seeds are being collected from 10 trees for raising seedlings. ▪ Laboratory protocol is being developed for dye extraction from leaves.
14	Ecological dynamics of vegetation structure and assessment of morphological adaptive variation to create baseline data in selected species in Dalma Wildlife Sanctuary **(3 years, April 2009)**	Sh. H.C. Sindhu Veerendra, Scientist - B	Ecosystem conservation and Management (Biodiversity)	● A total of 16 Sample plots are laid out in the sanctuary covering four ranges ● Plant specimens are collected and herbariums are prepared. ● So far 66 plant species are identified and authenticated. ● Few species of elephant food like *Mallotus philippensis* is collected for bark and leaf nutrient estimation.

15	Effect of humic acid on rooting behaviour in selected tree species **(2 years, April 2009)**	Dr. M.V. Durai, Research Officer	Genetic Improvement (Vegetative propagation)	• Humic acid extraction method has been standardized using classic alkali/ acid fractionation method. (Valdright et al 1996). About 350g of purified humic acid extracted in the lab. • Effect of humic acid on cuttings of *Dalbergia sissoo Gmelina arborea, Tectona grandis and Schleichera oleosa* are being studied • The preliminary results of the study shown that humic acid had positive effects on rooting of cuttings collected from young trees/saplings sissoo & gamhar.
16	Selection and Evaluation of potential seed sources and/ clones of selected species from Jharkhand and adjoining States **(4 years, April 2009)**	Dr. M.V. Durai, Research Officer	Genetic Improvement (Tree improvement)	• Field survey conducted in 21 districts (12 dist. in Jharkhand, 4 in Orissa and 5 dist. in West Bengal) • Ninety plus trees of shisham and ghamhar were identified. • Progenies trial of sissoo and ghamhar plus trees (6 trees). • Clonal progenies trial of 10 Gmelina plus trees and 5trees of sissoo is being in progress.