Continued ICFRE Funded Research Projects (2010-11)-AFRI

Sl. No.	Name of Project	PI	Thrust Area	Current status
1.	Characterization and Classification of Forest Soils of Rajasthan. (2007-2012)	N. Bala, Scientist - E	Forest Productivity (Forest Soils and Land Reclamation)	Aim of the project is to characterize and classify forest soils of Rajasthan based on physical, chemical properties, depth of soil and associated species. Soil and vegetation survey carried out in 25 districts to characterize and classify forest soils of Rajasthan. In order to find out physical and chemical (nutritional status), properties of forest soils in different forest types, 400 soil profile studies completed in 25 districts.
2.	Demonstration trial of male and female *Ailanthus excelsa* plants raised through grafting and tissue culture (2007-2012)	Dr. U.K Tomar Scientist E	Genetic Improvement (Tree Improvement)	Aim of the project is to refine grafting technique, establishment and evaluation of growth performance of male and female plants. Male and female plants identified and grafting technique up scaled. Demo trail established of male and female grafted plants in 2008. Data collected on growth performance at six months interval. Female plants are performing better than male plants at the age of two and half years.
3.	Development of a Web Portal for Forestry Research Extension (2007-2011)	A.K.Sinha, Scientist-D	Forest Management (Information and Communication Technology)	The list of publication of all the scientists and the technologies developed by institute has been put on web. The web application for searching the plants database has been developed to 80% and the collection of of remaining of data are under progress.
4.	Development of economically viable and integrated agroforestry models for arid region	Dr. Bilas Singh, Research Officer	Forest Productivity (Social Forestry, Agro-forestry /Farm Forestry)	Trail was maintained on farmer's land. Height & Collar diameter of *Colophospermum mopane* & *Prosopis cineraria* and collar dia of *cordia mixa* was significantly higher in

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	(2006-12)			Agroforestry plots as compared to sole tree plots. Tree crop interaction was not significant.
5.	Development of Tissue culture technology for multiplication of economically important desert plant- *Salvadora persica* (2010-15)	Dr. I. D. Arya	Genetic Improvement (Vegetative propagation)	Aim of the Study is to develop refined protocol for rapid and mass clonal production of plus trees/superior genotypes of *Salvadora persica.* Towards this end, studies were conducted on effect of media, growth hormones and incubation conditions(temperature, light, humidity) for high frequency multiple shoot induction and growth. MS medium supplemented with BAP (7.5 mg/l) proved best and favored multiple shoot induction (2-3 shoots/explants) in 4 weeks at 25^0 C temperature and 12 h photoperiod with 2500 lux intensity of light. In order to achieve high rate of shoot multiplication, studies were conducted on auxins and cytokinins in MS medium, and results revealed that medium consisted 5.0mg/l BAP favored 2.5 fold shoot multiplication in 4 weeks period. Studies are planned to improve quality of shoots, shoot growth and further improvement of multiplication rate, before using shoots for rooting experiments.
6.	Effect of fertilizer application on growth and yield of *Salvadora persica* and *Acacia ampliceps* plantations under silvipastoral system on arid salt affected soil. (2008-11)	Dr Ranjana Arya, Sci E	Forest Productivity (Forest Soils and Land Reclamation)	In *S. persica* initial 57% fruit setting was observed in Dec. 09. However, the final fruits setting was in 36% plants only in April 2010; maximum 78% trees produced fruit in T13 treatment (FYM, Urea, ZnSO4, K_2SO_4 and SSP) and no fruit setting in T_6 (FYM and SSP) and T_{10} treatments. Maximum total fruit yield/treatment (971 g) was

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				obtained in T_{13} closely followed by T_4 (ZnSO4)-681 g and T_7 (urea + $ZnSO_4$) – 668 g treatments. Yield in other treatments vary from 20-123 g. Till now the application of zinc has been found to enhance flowering and fruiting in *Salvadora persica* and *Acacia ampliceps*. Oil yield vary from 35.2-43.1% with no effect of treatment.
7.	Efficacy and economics of water harvesting devices in controlling run-off losses and enhancing biomass productivity in Aravalli ranges (2005-11)	Dr. G. Singh, Scientist –E	Forest Productivity (Forest Soils and Land Reclamation)	Studies carried out to restore degraded Aravalli Hill through rain water harvesting and afforestation, showed an increased in diversity of plant species (39 species in 2005 to 92 species of herbs grasses in 2009) reduced run off losses (no water loss in last two years), enhanced soil water and nutrient status as well as carbon stock. This intervention enhanced the fodder and fire wood production and increased water availability for livestock. V-ditch structure found the best for herbaceous plants whereas, contour trench found best for tree species.
8.	Evaluation of antifungal potential and Identification of broad spectrum fungicidal compound from some trees of arid region of Rajasthan (2009-14)	Ms. Bhawana Sharma Scientist B	Forest Protection (Insects pests, diseases and control)	The samples of the selected plant species *viz*; *Balanites aegyptiaca*, *Tephrosia purpurea* and *Citrulus colocynthis* are screened for their antifungal properties. Seven ethanol extracts and seven water samples have been prepared to see their antifungal effect. Screening of antifungal potential of 14 extract are currently tested on *Rhizoctonia solani, R.bataticola, F. solani* and *Alternaria alternata.*
9.	Genetic Improvement of *Tecomella undulata* (2008-11)	Dr. Sarita Arya, Scientist -E	Genetic Improvement (Tree Improvement)	Under the tree improvement programme of *Tecomella undulata,* 47 CPT's were selected from various areas viz;

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				Jaiselmer, Barmer and Jodhpur districts, which are natural growing area. CPT's were selected based on the quantitative traits (height, girth, clear bole and crown diameter) and qualitative traits (straightness, roundness and health). Seeds were collected from 47 CPT's and kept for germination with family identity. Out of 47 CPTs, seeds of 40 CPT's were germinated in nursery. Progeny trials were established using seedlings of 40 CPT's at Bikaner and Jodhpur in Aug, 2008 using 3m x 3m spacing at Jodhpur (1.5 ha) and 4m x 4m spacing at Bikaner (2.5 ha.) in RBD. In both the trials, 9 plants of each family were used in one replicate and replicated 4 times. At family level, highest survival (97.2%) was recorded in CPT-7 (Mohangarh), CPT-15 (Daichu), and CPT-20 (Chohten) and minimum (75%) was in progencies of CPT-23 (Chohten). Where as, in Bikaner CPT-3 (Mohangarh) exhibited highest survival rate of 77.7% and minimum in progenies of CPT-4 (Mohangarh) at the age of 2 years. Based on the height of progenies of CPT-19 (Chohten) exhibited maximum height, 77.5 cm and minimum (56.0 cm) in CPT-2 (Mohangarh) at Jodhpur. Considering collar diameter, CPT-23 (Chohten) proved the best (1.17 cm) and CPT-40 (Baytu) exhibited minimum CD (0.62 cm) at Jodhpur. In general, growth performance was poor at Bikaner as compared to Jodhpur at the age of two years.

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10.	*In vitro* Mass Propagation of *Jatropha curcas* L. and Optimization of Low Cost Options for Economizing the Technology (2007-11)	Dr. Tarun Kant Scientist D	Genetic Improvement (Vegetative Propagation)	The endophytic infection problem has been controlled by systemic antibiotics. Axillary bud based shoot multiplication standardized. Shoot formation (organogenesis) from callus cultures standardized. Plantlet production through somatic embryo genesis has been standardized. Tissue culture raised plants are undergoing hardening. Current focus is on economizing micropropagation through use of low cost options in *Jatropha curcas*.
11.	Investigation on Genetic variation and inheritance of Western Indian Teak (*Tectona grandis*) (2009-14)	Dr. P. H. Chawhaan	Genetic Improvement (Tree improvement)	Ten new CPTs were selected from different areas of Gujarat. Data from two existing progeny trials located in the state of Gujarat have been analysed. Analysis revels that the families exhibited significant variation for growth traits. In Rajpipla progeny trial individual heritability values ranged from 4 to 26 and family heritability values ranged from 12 to 43 percent. Height and CBH exhibited moderately high, GBH and volume exhibited moderate and basal area and apical dominance showed low estimates of narrow sense heritability. Similarly, genetics of seed and fruit parameters have also been investigated. Investigation revealed that stone length, treated stone length (mm), stone weight (gm), treated stone weight and seed weight were highly heritable. The heritability estimates for different traits ranged from 14 to 86 percent and genetic gain estimates ranged from 0.31 to 21. In addition to this, new progeny trial comprising of 28

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				half sib families has been established at Sajjangarh, Udaipur.
12.	Market survey on selected species in selected markets (1994 -)	Dr. Sunil Kumar, Scientist –E	Forest Management (Forest Economics)	Data of timber ,fuel wood poles and bamoos are collected regularly from the selected markets of Jaipur and Ahemdabad. These data are sends to the ICFRE headquarter for the publication of Bulletin on timber and poles.
13.	Multilocation trial of *Eucalyptus camaldulensis* and *Dalbergia sissoo* (2007-11)	Dr. U.K.Tomar Scientist E	Genetic Improvement (Tree Improvement)	Multilocational (four locations) clonal trials of *Eucalyptus camaldulensis* (35 clones) and *Dalbergia sissoo* (35 clones) were established in 2003 in Gujarat at the spacing of 5m x 5m in both the species in RBD. Data on growth performance were collected yearly on height, clear bole and DBH. 280 wood samples from 35 clones of *E. camaldulensis* were collected for studies on wood properties. Four best performing clones of *E. camaldulensis* and *D. sissoo* were identified based on the height, girth and clear bole.
14.	Screening of High Oil and azadirachtin in Neem (2002-11)	Dr. N. Ravi (Transferred to RFRI), Dr. U.K. Tomar, Sci-E	Genetic Improvement (Tree Improvement)	Progeny trial of 17 CPTs of neem having higher azadirachtin content was established in August 2002 at the spacing of 4m x 4m. Survival percentage is 89% at the age of 8 years. Variation in growth has been observed between families. Trial is still not yielding sufficient amount of seeds for chemical estimation of azadirachtin.
15.	Studies on carbon sequestration in different forest types of Rajasthan (2008-12)	Dr. G. Singh, Scientist –E	Ecosystem Conservation & Management (Climate change)	The basic objective of the project is carbon stock assessment of forests in Rajasthan, forests of 27 districts have been surveyed and sampled for above ground biomass (tree, shrubs, herbs

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				and grasses litters and coarse woody debris) and below ground root bio-mass and soil carbon. Data on *Leptadenia pyrotechnica* showed greater carbon accumulation below ground as compared to above ground. Dominance of shrubs are relatively greater than tree in Arid regions.
16.	Studies on seed traits of seeds collected from seed stands / SPAs / SSOs / CSOs of important species of Gujarat state. (2007-12)	Dr. D.K. Mishra	Forest Productivity (Silviculture)	Seed samples of 12 seed sources (2 seed stands and 10 CPTs) of *Acacia catechu,* 14 Jatropha CPTs collected have been tested for seed parameters. Seeds wre examined physically and none was defective. All seeds were healthy. Seeds of *A. catechu* were golden brown in colour. *Acacia catechu* seedlot no.2557 showed 77.5% germination and 143.38% vigour index, while seeds collected from outside area(accession no.2558) showed 77.5% germination and 145.7 of vigour Index. Seeds of 10 CPTs of *A.catechu* showed variation in 100 seed weight from 3.79-5.48g. seed germination from 69 to 91.5% and vigour index from 88.14 to 152.73. Removal of seed coat from seeds of *T.chebula* enhanced percent germination from 10% control to 72% after kernel removal. Number of seeds in 10g. of seed weight in 14 CPTs of Jatropha varied from 17-23 and oil from 27.6 to 41.4% on seed basis.
17.	Survey selection performance trial and estimation of yield potential of *Jatropha curcas* in Rajasthan and Gujarat	Dr. D.K. Mishra, Scientist E & Dr. V.P. Tewari, Scientist F (IWST,	Non-wood Forest Products (Biofuels and Bioenergy)	Carried out measurement in the two sample plots of *J.curcas* laid out at Motiya Research Farm, Rajpipla (Gujarat). Total height, crown width and collar diameter varied from 1.3m to 2.6m, 0.4m to 2.5m and 5.7cm

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	(2007-12)	Bangalore)		to 13.2cm, respectively. Observation on the seed yield was also taken which varied from 4.6gm. to 189gm. Similarly, height and seed yield/plant at Lekawada nursery varid from 0.92 m. to 1.29m and 14.75 gm to 138.00 gm. Seeds were collected from 14 CPTs planted in Lekhawada nursery, Gandhinagar. Total seed weight, seeds per 10g. kernel and oil content were estimated. Number of seeds per 10g. varied from 17 to 23 and percent oil from 27.6 to 41.1 percent. Progeny of 20 CPTs from Rajasthan and 10 CPTs from Gujarat have been raised. Two progeny trials one with 5 replications having single plant per replication at AFRI, Jodhpur and another with 15 replications in RBD at Haldughati, Udaipur was established in July-2008. Initial survival varied from 95-100 percent. Rodent infestation was observed at Udaipur site and a total of 30 plants were damaged by rodents. Mechanical treatment by protecting collar with wire mesh was found superior then chemical treatment. Growth data have taken and analyzed. Initial plant mean height (28-70.60cm.), mean number of branches (1.2-2.40) and collar diameter (0.80-2.20cm) were observed at AFRI, Jodhpur and 37-52.3 cm, 1.0-1.20 and 1.30-1.76cm respectively at Haldughati, Udaipur.