PROJECTS ONGOING DURING THE YEAR 2008-2009

PLAN PROJECTS

Project 1: Development of economically viable and integrated Agroforestry models for arid region (AFRI-55/Silvi/2003-09)

Status: Agroforestry model is being maintained at farmer's field at village Harsh, Bilara. Survival, growth and crop production data were recorded and compiled. Performance of *Ziziphus auritiana* (grafted Ber), *Cordia mixa*, was found best as horticultural species and *Prosopis cineraria* and *Ailanthus excelsa* was best as silvicultural species.

Prosopis . cineraria plants obtained average maximum height 155 cm and followed by *Cordia mixa* (150 cm), *Colophospermum. mopane* (149 cm), *Ailanthus. excelsa* (142 cm) and *Ziziphus mauritiana* (130 cm). Similarly, collar diameter was highest in *A. excelsa* (5.09 cm) and followed by *Cordia mixa* (4.79 cm), *Colophospermum. mopane* (3.34 cm) and *P. cineraria* (3.27 cm). The plant growth was higher in agroforestry compared to the control (without crop). The highest survival was observed in *P. cineraria* (98%) followed by *Z. mauritiana* (86%), *C. mopane* (85%) and *Cordia mixa* (77%) and the lowest survival was *Emblica officinalis* (7%) species. Wheat crop production was recorded 19.55 quintal /ha.

Project 2: Market survey on selected species in selected markets (AFRI-24/FRME-1/1994-Continue)

Status: The data regarding prices of various forest produces viz., timber, fuel-wood, bamboo were collected from the markets of Jaipur and Ahmedabad on quarterly basis. Data collected were compiled and submitted to the ADG (Stat.), ICFRE, Dehradun on prescribed format for publication of Timber and Bamboo Trade Bulletin.

Project 3: Survey, selection, performance trial and estimation of yield potential of *Jatropha curcas* in Rajasthan and Gujarat. (AFRI/JU/SILV/2006-07 RPC 25-26th Feb. 2007, 2007-12)

Status: 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 to 13.2cm, respectively. Seed yield was varied from 4.6gm to 189gm. Similarly, height and seed yield/plant at Lekawada nursery varied from 0.92 m to 1.29 m and 14.75 gm to 138.00 gm. Seeds were collected from 14 CPPs 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 for establishing progeny trial.

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 were 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 than chemical treatment. Plants have been raised for mortality replacement. Growth data have been taken and analyzed. Initial plant mean height (28-70.60cm), mean number of branches (1.0-2.40) and collar diameter (0.80-2.20cm) were observed at AFRI, Jodhpur and 37-52.3cm, 1.0-1.20 and 1.30-1.76cm respectively at Haldughati, Udaipur. Preliminary seed yield equation developed, SY=4.0752-1.096*CD, where, SY=seed yield, CD=crown diameter.

Project 4: Studies on seed traits of seeds collected from seed stands / SPAs / SSOs/ CSOs of important species of Gujarat state. (AFRI/JU/SILV/2006-07 RPC 25-26th Feb. 2007)

Status: Due to poor seeding in the Gujarat state, SFD was unable to supply seeds of desired species. Instruction manual for establishing seed certification system has been prepared and submitted to CCF/DCF, Gandhinagar and Rajpipla for implementation.

Seed samples of 12 seed sources (2 seed stands and 10 CPTs) of *Acacia catechu* 14 Jatropha CPTs have been tested for seed parameters. Seeds were 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 41.1% on seed basis.

Project 5: Characterization and classification of forest soils of Rajasthan. (AFRI-85/FED/2007-2012)

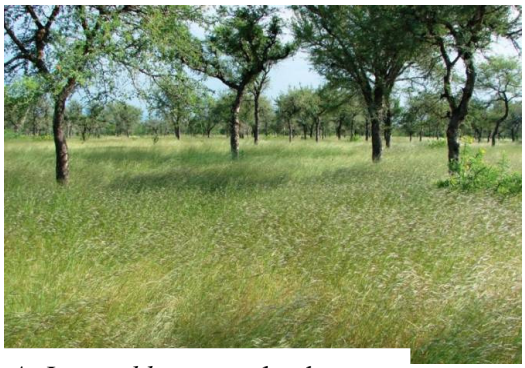
Status: The project has been initiated in September 2007 with the objective to characterize and classify the forest soils of Rajasthan following the USDA classification system. Soil profiles

have been studied at 55 places in Jodhpur, Banswara, Pratapgarh, Dungarpur and Pali districts covering 25 vegetation/forest sub types in the major forest types of Tropical dry deciduous and Tropical thorn forests.

Physico-chemical characterization of the soils has been done in the field as well as in laboratory. Soil structure, consistency, colour, pH, electrical conductivity, organic carbon, NO_3–N and NH_4–N and phosphorus have been estimated for 171 samples. Ecological study in an area of 0.1 ha near each of the soil profile pit has been completed.

In general, forest soils are found to be very shallow to shallow as most of the forests are located on hilly terrain. Presence of calcium carbonate layer at shallow depth was observed in grassland soils. Deep soils are present along narrow strip of valley. Soils on the hilly area of Banswara, Pali, Dungarpur and Pratapgarh are neutral to acidic in nature with low electrical conductivity, whereas, on grasslands in Pali and Jodhpur district, they are basic with high electrical conductivity.

Shallow, well drain soil with pebbles & stones
in *Boswellia serrata* forest at Khed tala,
Udaipur



Shallow soil in *Heteropogon - A. Leucophloea* grassland at Sindarli ghas Jod, Desuri (Pali)

Stony shallow soil

A. pendula forest, Sabla

Project 6: Genetic Improvement of Tecomella undulata. (AFRI-33/FGTB-7/(2002-2009)

Status: Progenies of selected CPTs of *Tecomella undulata* were maintained in the Nurseries of AFRI, Jodhpur and Beechwal, Bikaner. Two progeny trials using 40 progenies were established in the experimental area of AFRI and in the SFD land at Bikaner. These progenies were established in randomized incomplete block design, with a spacing of 3 x 3 m and having 9 plants per plot. The trials were established in the month of August 2008 and fencing was provided to the trial in Bikaner. Regular watering is done for the plants.

A view of the plants in the Trial

7 months old Healthy progeny

Project 7: Screening of high oil and Azadirachtin in Neem (AFRI-34/FGTB-8/2002-2009)

Status: The progeny trial of neem established in Govindpura, Jaipur to study the heritability pattern of selected CPTs for their oil and azadirachtin content had not produced flowers and fruits. This was due to frost and other climatic factors. The trials were maintained and the periodical flowering observations taken. The observations in the month of March 2009 showed flower bud initiations in most of the progenies of the selected CPTs.

Project 8: Multilocational trial of *E. camaldulensis and D.Sissoo* clones in Gujarat state. (AFRI-41/FGTB/2002-09)

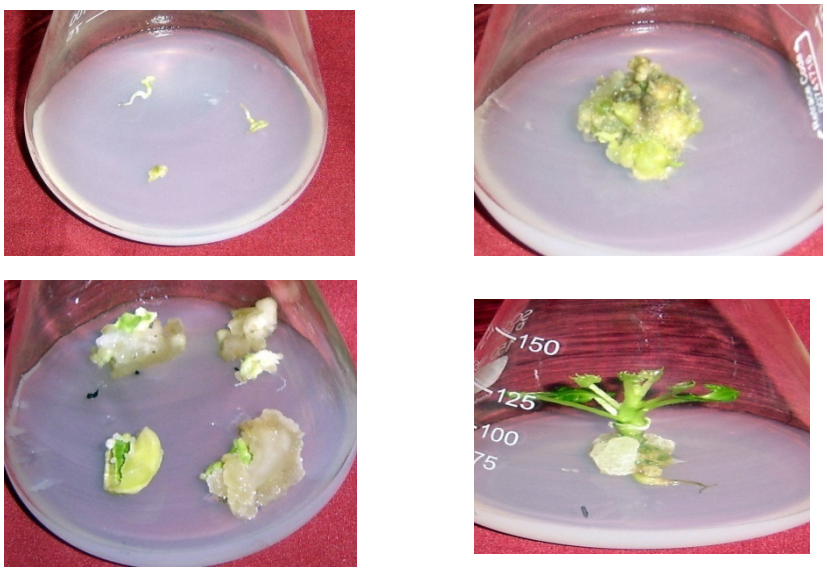
Status: Analysis of variance revealed significant to very highly significant variation between the clones of both the species for most of the traits across the locations. Estimation of genetic parameters showed that the growth traits of *Eucalaptus camaldulensis* are strongly inherited and under the influence of both additive and non additive gene action. Detailed genetic analysis of *D. sissoo* trials is being carried out. As far as the performance of the clones at different sites is concerned, ranking of the clones varies in different sites, however, few *Eucalaptus camaldulensis* clones like G2 and clone No. 15 and 35 showed stable performance across the sites as demonstrated by their better growth. These clones were amongst the top 10 clones in all the sites. Similarly *D. sisso* clone Nos. A3, 10 and 105 were found suitable in all the four test sites.

Project 9: Demonstration trial of male and female Ailanthus excelsa plants raised through grafting and tissue culture. (AFRI-79/FGTB/2006-09)

Status: Demonstration Trial is established with grafted seedlings raised through male and female scions collected from marked trees. Trail is laid in Randomized Block Design in July 2008 in AFRI experimental area. Trial is irrigated and is being maintained well. Survival percentage is about 85%. Data have been recorded on growth parameters as per schedule.

Project 10: *In-vitro* mass propagation of Jatropha curcas L. and optimization of low cost options for Economizing the technology. (AFRI-83/FGTB//2007-2010)

Status: Embryogenic calus cultures have been obtained. Embryogenic callus cultures were multiplied further by repeated subculturings. Part of the embryogenic callus cultures with somatic embryo formation zones was diverted to SE germination medium where somatic embryo germination has been achieved.



Photoplate: *Jatropha* curas: 1. Somatic Embryo (SE) formation from callus; 2. Germination of SE; 3: Callus showing formation of multiple shoot buds; 4. Multiple shoot formation

Apical bud explants when cultured on different combination of BAP & IAA supplemented MS medium resulted shoot formation (organogenesis).Cultures with bud break response and shoot morphohenesis were further multiplied and the microshoots were transferred to rooting media.

Project 11: Management of potential insect pests and diseases of important medicinal plants grown in arid and semi-arid regions. (AFRI-72/FPD/2006-09)

Status: Isabgol (*Plantago ovata*) crop was found severely attacked by downy mildew disease at Sojat (Pali). The incidence of the disease was noticed about 35-40%. The fungus was identified as *Peranospora* sp. The treatment-8 comprising Rattan (1.5%) + Monocrotophos 0.05%) was

found very effective against downy mildew disease, whereas, treatment -7 (Bavistin (1.5%) + Monocrotophos (0.05%) was found the best against aphid attack on Isabgol at Sojat. The combination of Bavistin (1.5%) + Monocrotophos (0.05%) reduced pest incidence from 30% to 3.5% after the treatment.

Combination of Rattan (1.15%) and Monocrotophos (0.05%) reduced disease incidence from 43 to 13% after the treatment.

- The life cycle of *Achaea janata,* defoliator of mehndi crop has been completed.
- In Mehndi crop, incidence of one species of semilooper, one species of whitefly, mite and blister beetles were recorded. Termite damage caused maximum injury to the plants. A few other symptoms like yellowing and shedding of leaves were also recorded but were due to early sprouting of lower leaves which can be explained as physiological disorder.
- An aphid species (*Aphis gossypii) i*s the major insect pests attacking isabgol.

A field experiment was laid out on Mehndi for the managment of economic important pest (semi-looper larvae) and charcoal root rot /leaf spot/blight disease. The experiment was laid out in randomized Block Design and four treatments by using biopesticides viz., T-1: Soil treatment (Trichoderma +Vermicompost+Phorate) foliar spray Pratirodh;T-2: Neem ban +Bavistin +Wonderlife ;T-3 Terminator +Wonderlife ;T-4: Control (untreated). The replication were three with the block size of 5mx5m Soil treatment (Trichoderma + Vermicompost + Phorate) was found the best amongst other three treatments, wherein, Mehndi yield was increased from 1.5 to 2.1 Kg per sq meter in treated plots.

Project 12: Mycorrhizal Dependency and productivity of economically important medicinal plants (Mehndi & Ashwagandha) of arid zones. (AFRI-84/FP/2007-2010)

Status:

- AMF genera like Glomus, Scutellospora, Sclerocystis and Acaulospora and Seven species of Glomus viz., G. fasciculatum,G. aggregatum, G. mosseae, G. macrocarpum G. intraradices, G. reticulatum, and G. constrictum were isolated and identified.
- The distribution of different VAM species viz., Glomus aggregatum (35%); G. mosseae (15%); Glomus fasciculatum (20%); G. macrocarpum (10%); Glomus sp.(15%); Scutellospora (3%) and Acaulospora (2%) were recorded.
- The AM spore population of Rhizosphere soil collected from ashwagandha plants under the Albizia lebbeck and Khejri trees from Nagour and Jharali The spore population was

recorded 320 spores per 100 gm of soil from Nagour and 270 spores per 100 gm of soil from Jharali.

- Both the species Mehndi and Ashwagandha were found highly mycorrhizal in nature. The root infection was found in the form of intercellular, intracellular hyphae, vesicles and arbuscular structures in the roots.

- A field experiment on Mehndi & Ashwagandha was laid down in Randomised Block Design (RBD) with six treatments including control. The treatments were, T-1= **G. intraradices, T-2 = G. reticulata, T-3 = G. fasciculatum, T-4 = G. mosseae, T-5 = G. constrictum,T-6= Control (untreated).** About 90 percent survival percentage was recorded in Mehndi, whereas, in Ashwagandha it was only 35 percent. Initial observations have been taken.

Project 13: Development of web portal for forestry research extension. (AFRI-82/ITCELL/2007-2011)

All the required softwares namely MS-Visual Studio 2008 and MS-SQL Server 2008 have been procured during this year. The first activity of the purchase of the software has been completed.

Out of the three scheduled trainings, two trainings on "Web Designing " and "Programming in C Language" has been completed and the third and final training is undergoing and likely to be completed soon.

the selection of the fields for the database has been finalized and the structure of the underlying database has been finalized. The Database could not be created physically as the MS-SQL Server 2008 software has been supplied during March 2009.

The collection of data for 50 important Tree Species has been started according to the fields finalized and fed into the excel sheet for further entry into the database.