1. HISTORICAL BACKGROUND

Established: 8th May, 1988

Location: Jhansi-Gwalior Road, Opposite Pahuj Dam,
10 kms from Jhansi Railway Station

Total Area: 86 ha.

Laboratories: Six: Agronomy & Plant Physiology; Soil Analytical; Plant Protection; Tissue Culture & Biotechnology; Horticulture and Agroforestry.

Library: The library has 4428 books including Hindi books, bounded back volumes of research journals and subscribes 16 Indian journal.

Other Facilities: AKMU Cell, Photography Unit, Conference Hall, Committee Hall, Training Hall, Shed House, Mist Chamber etc.

AICRPAF: 37 Centers (11 in ICAR Institutes, 01 in ICFRE and 25 in SAUs), covering all the major agro-ecological zones of the country.

MISSION

To improve quality of life of rural people through integration of perennials on agriculture landscape for economic, environmental and social benefits.

VISION

Integration of woody perennials in the farming system to improve land productivity through conservation of soils, nutrients and biodiversity to augment natural resource conservation, restoration of ecological balance, alleviation of poverty and to mitigate risks of weather vagaries.

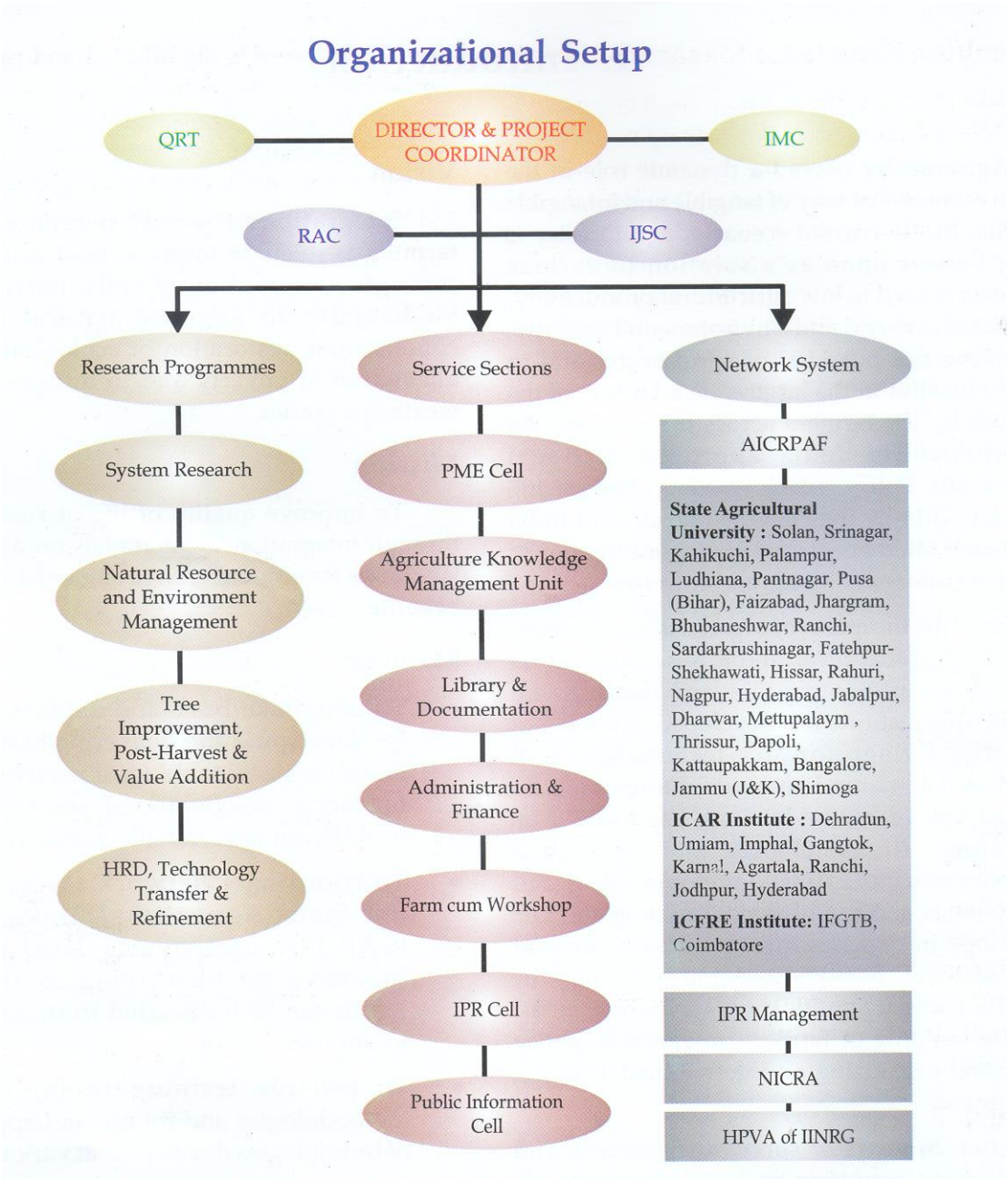
MANDATE

- To undertake basic and applied research for developing and delivering technologies based on sustainable agroforestry practices on farms and wastelands for different agro-climatic zones in India.
- To coordinate agroforestry network Research with the State Agricultural University/ICAR Institutes/other related research Institutes for identifying technologies, which can be transferred from one region to another.
- To provide training in (a) research methodologies, (b) use and application of technologies developed at various levels.
- To develop technological packages of different agroforestry practices for various agroclimatological zones for transfer to farm, field and wastelands.
- To act as repository of information on the subject.
- To collaborate with relevant national and international agencies for achieving the above objectives.
- To provide consultancy.

All India Coordinated Project on Agroforestry (AICRPAF)

AICRPAF was initiated in 1983. This year a new Centre at IFGTB (ICFRE) Coimbatore has been approved. The total is now 37 Centers (11 in ICAR Institutes, 01 in ICFRE and 25 in SAUs), covering all the major agro-ecological zones of the country.

Organizational Setup



2. RESEARCH PROGRAMMES

Institute code	Title	Duration	Principal investigator	Associates
Systems Research: (Programme Leader: Dr. Anil Kumar)				
AF02.12	Effect of irrigation on performance of aonla under agroforestry systems	2005-2015	Dr. R K Tewari	Dr. Ramesh Singh
AF02.14	Nutrient management in ber based agri-horti system	2010-2020	Dr. Sudhir Kumar	Dr. Anil Kumar, Dr. Rajendra Prasad & Dr. Inder Dev
AF03.9	Initiation of pruning and its intensity on productivity of *Albizia procera*	2006-2020	Dr. Inder Dev	Dr. K B Sridhar
Observational Trial	Development of bamboo based agroforestry systems	2007-2014	Dr. Inder Dev	Dr. K B Sridhar
Natural Resource & Environment Management: (Programme Leader: Dr. Ram Newaj)				
AF01.16	Evaluation of shade tolerance of crop species for agroforestry systems	2007-2016	Dr. Badre Alam	Dr. Ram Newaj
AF01.24	Studies on arbuscular mycorrhizal fungi of important MPT's	2008-2016	Dr. Anil Kumar	Dr. Rajendra Prasad
AF01.25	Development of soil quality index for assessing soil health of different agroforestry systems.	2008-2015	Dr. Rajendra Prasad	Dr. Ram Newaj & Dr. Ramesh Singh
AF 05.6	Model watershed project on natural resource management through agroforestry interventions at Garhkundar, Tikamgarh, M.P.	2005-2016	Dr. R K Tewari	Dr. Ramesh Singh, Dr. R P Dwivedi & Dr. R H Rizvi
AF 05.11	Multi-source inventory methods for quantifying carbon stocks through generalized volume/ biomass equations for prominent agroforestry species in India	2011-2019	Dr. Ajit	Dr. A K Handa & Dr. R H Rizvi
AF 05.12	Agroforestry based conservation agriculture for sustainable land use and improved productivity	2013-2018	Dr. Inder Dev	Dr. R K Tewari, Dr. Ramesh Singh, Dr. Asha Ram, Dr. K B Sridhar, Dr. Anil Kumar, Dr. Mahendra Singh & Sh. A R Uthappa
NICRA	Assessment of carbon sequestration potential of agroforestry systems (National Initiative on	2011-2017	Dr. Ram Newaj	Dr. Rajendra Prasad, Dr. A K Handa, Dr. Badre Alam, Dr. Ajit, Dr. R H Rizvi &

	Climate Resilient Agriculture) **Lead Institute: CRIDA, Hyderabad**			Sh. S B Chavan
MoRD, New Delhi	Model watershed for sustaining agricultural productivity and improved livelihoods. a) Domagor-Pahuj b) Parasai-Sindh **Lead Institute: ICRISAT, Hyderabad**	2009-2015 2011-2016	Dr. Ramesh Singh Dr. Ramesh Singh	Dr. R K Tewari & Dr. R H Rizvi Dr. R K Tewari, Dr. Inder Dev, Dr. R H Rizvi, Dr. K B Sridhar & Dr. R P Dwivedi
Inter Institutional project	Evaluation of aonla based horti-pasture system under different soil & water conservation practices in Central India. **Lead Instt.:IGFRI, Jhansi**	2007-2017	Dr. Sunil Kumar	Dr. Ramesh Singh, Dr. Sunil Tiwari & Dr. A K Shukla
Observational trial	Weed dynamics studies in different agroforestry systems	2012-2015	Dr. Inder Dev	---
AF 04:Tree Improvement, Post-Harvest and Value Addition (Programme Leader: Dr. A K Handa)				
AF01.23	Comparative studies on seedling and clonal plants of *Pongamia pinnata* with special reference to their adaptability to rainfed dry agroclimate	2007-2017	Dr. Badre Alam	Dr. A K Handa & Dr. S Vimala Devi
AF 04.1b	Exploration, evaluation and conservation of germplasm of *Acacia nilotica*	2002-2016	Dr. S Vimala Devi	Dr. Badre Alam
AF 04.5	Genetics and breeding of *Jatropha* species	2004-2017	Dr. S Vimala Devi	Mr. S B Chavan
AF 04.9	Assessment of candidate genes for oil biosynthesis in *P. pinnata* using eco-tilling approach	2012-2015	Dr. S Vimala Devi	Dr. A K Handa & Dr. Sudhir Kumar
AF 05.10	Lac based agroforestry in Bundelkhand region: Introduction and evaluation	2008-2015	Dr. K B Sridhar	Dr. Sudhir Kumar, Dr. Rajendra Prasad, Mr. Rajendra Singh, Dr. S Ghosal, Dr. Md. Monobrullah, Dr. Mahendra Singh & Dr. R P Dwivedi
ICAR, IINR&G, Ranchi	Development of agroforestry models based on gum yielding trees for livelihood	2008-2017	Dr. Rajendra Prasad	Dr. A K Handa, Dr. Ajit, Dr. Ramesh Singh & Dr. Badre

	security and horizontal dissemination of technologies			Alam
NOVOD Board Project	National network on integrated development of Jatropha and Karanj	2005-2015	Dr. S Vimala Devi	Mr. S B Chavan
AF 05: HRD, Technology Transfer & Refinement (Programme Leader: Dr. R K Tewari)				
Concluded Projects				
AF01.17	Analysis of Eucalyptus based agroforestry for crop-lands in Jhansi	2003-2014	Dr. A K Handa	Dr. Ram Newaj, Dr. Badre Alam, Dr. Anil Kumar, Dr. Ajit & Dr. Ramesh Singh
AF01.22	Studies for augmenting pistillate flowers with exogenous application of growth regulators and chemicals in *Jatropha curcas*	2007-2014	Dr. Badre Alam	Dr. Sudhir Kumar
AF 04.6	Age- age correlation model for juvenile selection of trees in agroforestry	2004-2014	Dr. R H Rizvi	Dr. Ajit & Dr. K B Sridhar

3. SALIENT RESEARCH ACHIEVEMENTS

Effect of irrigation in tree basin on performance of aonla under agroforestry system in red soil was studied in 19 year old plantation. Growth parameters and fruit yield data indicated that plants receiving year round watering in basin (at monthly interval in summer and bimonthly interval in winters) recorded maximum growth and fruit yield. Crop yield in interspaced was reduced by 23% (grain) and 16% (straw). Cropping in interspaces accompanied with summer irrigation in tree basin is recommended for aonla based agroforestry system.

In nutrient management in ber based agri-horti system and observations recorded on different characters (plant growth, pruned material and fruit) of ber were found non-significant except number of fruits and fruit yield plant^{-1}and found significantly higher in treatment T_8 (Ber +75% RDF) and T_1 (Ber + 100% RDF), respectively. Sesame grown in *kharif* revealed that the treatments T_{10} (pure crop) and T_6 (Ber- 75% RDF + VAM + sesame + lentil) recorded highest seed yield of 1192 and 1018 kg ha^{-1} and was significantly higher with respect to other treatments. Lentil grown in *rabi*, 2013-2014 revealed that treatments T_{10} (pure crop) and T_6 (Ber- 75% RDF + VAM + sesame + lentil) recorded highest seed yield of 1184 and 1101 kg ha^{-1} and was significantly higher with respect to other treatments.

In *Albizia procera* based silvipastoral system the pruning of tree component was done at 25, 50 and 75% intensity (during 2nd, 3rd, 4th, 5th and 6th year pruning initiation treatments) during December. Growth parameters of tree and pasture components were not affected significantly due to age of pruning initiation and its intensity. *A. procera* gained height in the range of 11.85 to 13.94 m, dbh (14.98 to 16.78 cm), canopy spread (1.95 to 3.94 m). The growth parameters of *C. fulvus* varied in the range of 1.27 to 1.42 m (height), 27.45 to 30.14 cm (tussock dia), 49.75 to 53.44 tillers tussock^{-1}, whereas *S. seabrana* gained 1.14 to 1.25 m (height) and 49.75 to 53.44 branches plant^{-1}. Total biomass production from the silvipastoral system varied in the range of 6.93 to 7.94 D.W t ha^{-1} and was significantly affected by the levels of pruning intensity.
Growth and biomass potential of eight year's old *Ailanthus excelsa* and *Grewia optiva* on alfisol recorded average height of 5.62 m (*A. excelsa*) and 5.34 m (*G. optiva*); dbh of 11.83 cm (*A. excelsa*) and 7.03 cm (*G. optiva*). Biomass production from understorey *Stylosanthes seabrana* was recorded as 2.18 D.W. t ha^{-1} (*A. excelsa*) and 2.34 D.W. t ha^{-1} (*G. optiva*).

In bamboo based agroforestry system average height was recorded 7.74 m (*Bambusa vulgaris*), 5.78 m (*Dendrocalamus strictus*) and 3.27 m (*B. tulda*). *B. vulgaris*, *D. strictus* and *B. tulda* recorded 4.13, 3.28 and 2.63 cm dbh, respectively. New culms emergence was less in *B. tulda* (1.8 culms clump^{-1}) and *B. vulgaris* (6.36 culms clump^{-1}) as compared to *D. strictus* (7.48 culms clump^{-1}). Average number of internodes (old culms) was found 12.83 (*B. vulgaris*), 14.58 (*D. strictus*) and 7.93 (*B. tulda*). The average internodal length recorded in new culms was 22.37 cm (*B vulgaris*), 19.86 cm (*D. strictus*) and 15.12 cm (*B. tulda*), respectively. *Bambusa vulgaris* planted at village Hastinapur as boundary plantation was also evaluated for various growth parameters. It was revealed by the farmers that he is earning about ₹ 25,000 to 30,000 per annum by selling the bamboo obtained from selective thinning.

Experiments conducted to evaluate shade tolerance of crop species for agroforestry importance by growing lentil (*Lens esculenta*) and pigeon pea (*Cajanus cajan*) under different regimes of shade and without shade (in open field) revealed detrimental impacts of deep shade (50% shade and above) on the phenological, photosynthetic and biochemical traits. Impacts of varying shade on functional processes namely CO_2 assimilation, photochemical efficiency and some other related indices were conspicuous. Reduction in the

activity of the physiological traits was reflected in the crop productivity as well.

Factorial experiments were conducted on integration of DAP with bio-fertilizers in chickpea, lentil and pea, under field conditions. All bio-fertilizers based treatment combinations significantly increased yield plant^{-1} in chickpea, lentil and pea. Plant yields were significantly higher at 100 than 50% of recommended dose of DAP. Interactions between DAP and treatments were non-significant.

From the functional scores of each observed indicator values, a unified value of Soil Quality Index was calculated. The increase in tree density of *H. binata* showed favorable effect on values of the most of the studied indicators. In comparison to baseline, the improvement in SQI was minimum (29.5%) in control and maximum (46.2%) in agroforestry plot having density of 800 tree ha^{-1}. All the tree density treatments showed higher value of soil quality index as compared with control. The improvement in soil quality over control ranged from 8.5% in tree density of 200 ha^{-1} to 22.9% in density of 800 tree ha^{-1} with mean value of 17.8%.

Soil health indicator values and their respective functional scores from 21 year old *H. binata* based AF System (red soil) showed that the increasing levels of pruning from 25 to 75% also influenced indicator values positively. The improvement in soil quality over baseline ranged from 33.6% in control to 39.6 in 75% pruning plot. On an average, more SQI value (0.49) has been observed in pruning plots than control (0.45). The SQI value increased with increase in pruning levels and the improvement in SQI brought by pruning treatments ranged from 5.3to 8.9% with a mean value of 7.4% over control.

A total of 16 equations on timber volume of poplar species were found in the literature out of which 8 equations were for Punjab state, 6 for Haryana state and 2 for Uttarakhand. Dataset on diameter at breast height and volume were generated from these equations for developing generalized volume equations. The fitted models $V = 0.00257\ D^{1.65236}$ ($R^2 = 0.819$) and $V = 0.0002\ D^{2.1102}$ ($R^2 = 0.910$) were developed for states of Punjab and Haryana, respectively and may be used for estimating timber volume of poplar trees at state level. For country level generalized volume equation, the simulated data for states was pooled and analyzed. The model $V = 2.8443\ [1 + e^{(3.1012-0.0689\ D)}]$ was proposed to be used for predicting or estimating the timber volume of poplar tree for the dbh range of 14.0 to 41.0 cm.

The Agroforestry based Conservation Agriculture for sustainable landuse and improved productivity project was laid out during 2014. Bael (CISH B-2) was transplanted during July, 2014 in bael based conservation agriculture system. The survival of the bael at six months of transplanting was 84.92%. Grain yield of greengram (PDM-139) varied in the range of 0.879 to 0.952 t ha^{-1} and grain yield of blackgram varied in the range of 0.635 to 0.719 t ha^{-1}. Teak (MHEM-R-2) was transplanted during August, 2014 in teak (*Tectona grandis*) based conservation agriculture system. The survival of the teak at six months of transplanting was 97.22%. Grain yield of greengram varied in the range of 0.737 to 0.811 t ha^{-1}, while grain yield of blackgram varied in the range of 0.631 to 0.689 t ha^{-1}.

Bael and teak were transplanted during July and August, 2014 in Bael + Teak based conservation agriculture system, respectively. The survival of the bael and teak at six months of transplanting was 96.03 and 96.83%, respectively. Grain yield greengram and blackgram varied in the range of 0.834 to 0.954 t ha^{-1} and 0.638 to 0.681 t ha^{-1}, respectively. Residue management had significant effect on grain yield in all the three experiments.

Selected districts from Rajasthan, Madhya Pradesh and Karnataka were surveyed and data on

existing agroforestry systems were collected. Land use and land cover analysis for the selected districts in three agro-climatic regions *viz.* lower gangetic plains, middle gangetic plains and central plateau & hill region was done using RS2/ LISS-3 data. Area under agroforestry in these regions was estimated to be 0.47, 0.85 and 1.13 million ha, respectively. The major tree species existing on farmer's field in three districts of Rajasthan (Bikaner, Dausa and Pali) were *Prosopis cineraria, Acacia tortilis, Prosopis juliflora, Azadirachta indica, Dalbergia sissoo* and *Ziziphus mauritiana.* The contribution of *Prosopis cineraria* in Bikaner and Pali districts was about 45 to 54% in total tree species, but the contribution of *Azadirachta indica* was 31% in Dausa district. It clearly indicated that tree species varied from one district to other district. Tree density also varied from 1.4 to 14.9 trees ha^{-1} in these districts. The Bikaner districts having 1.40 trees ha^{-1} on farmer's field but in Pali district, it was 14.9 trees ha^{-1}. Similarly in four districts (Guna, Panna, Hoshangabad and Jabalpur) of Madhya Pradesh, the major trees existing on farmer's field were *Eucalyptus tereticornis, Acacia nilotica, Leucaena leucocephala, Azadirachta indica* and *Tectona grandis.* The tree density in these districts also varied 4.37 to 29.49 trees ha^{-1}. In Dharwad district of Karnataka, the dominant tree species existing on farmer's field were *Glyricidia sepium, Tectona grandis, Acrus sapota, Mangifera indica, Moringa oleifera, Tamirindus indica* and *Leucaena leucocephala* with the tree density of 5.83 trees ha^{-1}.

The biomass, biomass carbon, total carbon and net carbon sequestered in existing agroforestry system at district level in Karnataka, Rajasthan, and Madhya Pradesh was estimated by using CO_2FIX model and extrapolated for next 30-years. The tree biomass, soil carbon and total carbon in baseline was 1.85 t DM ha^{-1}, 9.89 t C ha^{-1} and 14.97 t C ha^{-1}, respectively in Dharwad district of Karnataka. It was expected that corresponding value of these parameters would increase up to 4.95 t DM ha^{-1}, 10.88 t C ha^{-1} and 17.64 t C ha^{-1}, respectively over the simulated period of 30-years. Net carbon sequestered in agroforestry systems over the simulated period of 30-years would be 2.67 t C ha^{-1} in the Dharwad district. In case of Pali, Dausa and Bikaner districts of Rajasthan, the total carbon stock available in baseline varied from 9.0 to 24.45 t C ha^{-1} and it is expected that over 30-years period the total carbon stock in agroforestry in these districts would be 13.32 to 35.39 t C ha^{-1}. Net carbon sequestered over the simulated period of 30-years would be 4.32 to 10.94 t C ha^{-1}**.** The tree biomass, soil carbon and total carbon available in existing agroforestry system in different districts of Madhya Pradesh (Guna, Hoshangabad, Panna and Jabalpur) is 3.57 to 7.39 DM ha^{-1}, 12.04 to 23.38 t C ha^{-1} and 16.10 to 27.61 t C ha^{-1}, respectively and its corresponding values over the simulated period of 30-years would be 7.75 to 11.99 t DM ha^{-1}, 12.74 to 24.80 t C ha^{-1} and 20.83 to 32.39 t C ha^{-1}, respectively.

Physio-biochemical indices as emerged from the ongoing experiments with MPTs of agroforestry importance were utilized to assess the growth, carbon assimilation and its association with thermotolerance with respect to temporal variation in the tree seedlings. Differential trend in leaf temperature with respect to ambient air temperature were recorded through infrared thermometer in the MPTs and the Canopy Temperature Depression (CTD) was estimated. Various physiological indices like PPFD saturated rate of CO_2 assimilation (A_{max}), CCM index, CTD, index of cellular lipid peroxidation including some spectral indices like NDVI and their association with thermotolerance were studied. Higher CTD of *Albizia procera* indicated its relatively better thermotolerance capacity than *Butea monosperma*.

Total 26 WSHGs has been formed in Nayakheda, Dhikoli and Domagor villages of Domagor Pahuj model watershed area comprising 269 members. All WSHGs was linked with bank. Total saving of WSHGs was about ` 6.00 lakh. They were mainly involved in goat rearing and vegetable cultivation. These WSHGs were linked with Federation of SHGs for better livelihood options. Out of 26 SHGs, 20 SHGs were helped through revolving fund to start

their activities. On an average each member of 10 SHGs involved in goatary is earning more than ₹ 8000.00 per annum. Open shallow dug wells are the only means of irrigation to the crops in Domagor Pahuj model watershed. The average water column during April, August and December was recorded 5.72, 5.60 and 5.42 m, respectively. About 147 % higher water column was recorded in open wells during the month of December for post-interventions scenario as compared to pre-interventions. Water column buildup improved the water yield of the open wells.

To improve the productivity, 105 trials on different crops were conducted during this year. Due to delayed monsoon, groundnut was sown in limited area and its productivity was 236 kg ha^{-1}. To assess the general productivity of different crops during *rabi,* 2013-14, 72, 24, 24, 24 samples of wheat, chickpea, lentil and pea, respectively were taken and processed. Productivity of wheat, chickpea, lentil and pea was 2125, 536, 60 and 958 kg ha^{-1}, respectively. Productivity of wheat was lower than previous years due to lodging of crop.

To develop agroforestry interventions in the Parasai-Sindh Watershed, 2928 seedlings of different species were planted on 92 farmers' fields during 2013-14. Survival of different species varied from 66 to 95 % by the end of November 2014. Apart from this, total 45 desi ber were budded with improved varieties and survival was about 39 % by November 2014. A total number of 76 participatory demonstrations (14-Parasai; 44-Chhatpur; 18-Bachhauni) during 2013-14 (*rabi* season) were laid out at farmers' fields with improved varieties. About 28% increase was observed in barley (RD-2552), while 17% increase was observed in mustard (Maya) over local varieties. During 2014-15 (*kharif* and *rabi*) a total of 65 participatory demonstrations 28-Parasai; 33-Chhatpur; 04-Bachhauni) were laid out at farmer's fields. About 18% higher yield was observed in case of greengram as compared to local varieties.

Chenopodium album, *Digitaria sanguinalis* and *Physalis minima* among many other were some of the most dominant weeds prevalent in different agroforestry systems during *rabi* season. During *kharif* season *Commelina benghalensis* and *Echinochloa crusgalli* were some of the most dominant weeds observed in different agroforestry systems. Under wasteland conditions *Chenopodium album, Cirsium arvensis, Euphorbia hirta* and *Fumaria parviflora* (*rabi* season); *Ageratum conyzoides, Borreria hispida*, *Cyperus rotundus, Cynodon dactylon* and *Parthenium hysterophorus* (*kharif* season) were some of the wasteland weeds observed.

Comparative studies of clonal and seedling plants of P*ongamia pinnata* under rainfed dry agroclimate were conducted with various physio-biochemical parameters including some spectral indices. Clonal plants have shown better adaptability in dry hot summer conditions. As leaf level spectral studies were initiated and from the primary observations some important spectral indices like Normalized Difference Vegetation Index (NDVI) and Photochemical Refelectance Index (PRI) are being analysed. Physiological functioning as in rate of CO_2 assimilation and thylakoid electron transport rate were low in seedling plants in comparision to clonal plants in peak hot summer conditions. Total number of flowering bunches and number of pods $plant^{-1}$ were higher in clonal plants due to its better adaptibility.

In *Acacia nilotica* one provenance progeny trial (20) and two candidate plus tree trial (22 + 11 CPTs) were evaluated. The 20 provenance selections fall into four different clusters based on the Principal Component Analysis using the mean data. The 33 candidate plus trees which were evaluated at uniform age for morphological traits, fall into four clusters at an average distance of 1.0. These reflect the diversity present in germplasm collections at both intra and inter geographical regions of collection.

In Jatropha breeding program, the mean performance of the hybrids showed better performance over the parents in terms of secondary and productive branches. This trend was observed after pruning to a height of 50% during February month. This indicates that the hybrids response to the management practices was better than parents and hence for effective selection in hybrids, management of Jatropha crop is essential.

Molecular characterization of *Jatropha curcas* with RAPD primers resulted in one or more polymorphic bands in 20 primers out of 40 primers used in fifteen germplasm accessions.

In the candidate gene based analysis of the *Pongamia* genotypes, for the current year the phenotypic analysis was carried out for all the morphological traits, seed and oil related traits and significant range of variation was found for most of the traits. These data will be used after generating the molecular data and analysis will be done for identifying allelic variation in the germplasm.

Growth of established gum yielding tree based AF models was monitored. Besides, a gum garden of *Acacia senegal* was planted and depth of knotching or incision for tapping gum-butea standardized. The growth of existing plantation of *A. pendula* and *A. latifolia* was also monitored. The observations were recorded on survival of lac insect on butea trees in summer in relation to temperature and relative humidity.

The field trial on naturally occurring 15-20 years old trees of *Butea monosperma* consisted of three depths of cuts *viz*. 0.5 cm, 1.0 cm and 1.5 cm each replicated on three trees. Maximum gum-butea was obtained when knotching was done up to 1.0 cm depth on stem bark of the trees. The knotching done up to depth of 0.5 cm yielded minimum gum-butea.

4. Infrastructure

Academic and Laboratories

CAFRI has a main office-cum laboratory building with conference hall, computer laboratory, library, 40-seat-capacity air-conditioned committee room with video-conferencing facility and one air-conditioned conference room of 100 sitting-capacity. Institute has been recognized by the Bundelkhand University as a study Institute to conduct Ph. D. programme. The Institute conducts M. Sc. dissertation and Ph. D. courses in Agroforestry, Horticulture, Environmental Sciences, Plant Protection, Soil Science, Biotechnology and Soil &Water Conservation from different recognized Universities. The Institute has six well-equipped laboratories.

Agriculture Knowledge Management Unit

The Institute has its own web server and regularly updated website (www.nrcaf.res.in). The entire network administration of computers, internet and website management is looked after by the Agriculture Knowledge Management Unit (AKMU), which also accommodates a fully developed GIS laboratory. New domain "nrcaf.res.in" has been registered with ERNET India, New Delhi for Institute website. 10 Mbps leased line internet connection has been obtained from BSNL, Jhansi and Email/ Web servers have been configured.

Research Farm

CAFRI research farm possess about 86 ha land. Major area is rocky and degraded land which was gradually developed. About 15% area has been occupied for office infrastructure, residential complex, roads etc. and arable land have been utilized for various agroforestry experiments and block plantations and crop cultivation. Research farm possess seven shallow dug wells but their recharge is very poor due hard pan (3-5 m below ground).

Library

The Institute's library has more than 4428 books (including Hindi books), bounded back volumes of research journals and subscribes 16 Indian journals. It also maintains a CD-ROM server with a bibliographic database from the CERA (Consortium for E- Resources in Agriculture). These databases are accessible to an individual scientist through LAN.

Photography, Meetings and Training

A well-equipped photography unit meets the day-to-day photographic and reprographic needs of the scientists. Provision also exists for the preparation of charts and posters. Conference hall /committee/training room with modern facilities are available for scientific meetings and group discussions.