Agroforestry Newsletter

National Research Centre for Agroforestry, Jhansi

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Sustainable Rehabilitation of Degraded Lands through Agroforestry - Short Course

Emphatic efforts were made to offer wide publicitv about the Short Course on "Sustainable Rehabilitation of Degraded Lands Through Agroforestry" (June 21-30,1999) and 175 copies of the circular alongwith the application proforma were sent to the Agricultural Universities, Basic Universities, ICAR Research Institutes, Forest Departments and NGO's. We received 75 applications in response to aforesaid circular. A list of 30 candidates was finalised and invited to participate in the short Course. Thereafter, five more candidates were invited because some candidates expressed their inability to attend. Finally, 25 candidates

representing eleven States *viz.*, Andhra Pradesh, Bihar, Delhi, Gujrat, Haryana, Madhya Pradesh, Maharastra, Nagaland, Punjab, Rajasthan, Uttar Pradesh and belonging to various ICAR Institutes, State Agricultural Universities, Forest Departments and NGO's attended the Short Course. Dr. Gargi, Vice Chancellor, Bundelkhand University, Jhansi inaugurated the Short Course on 21st June, 1999 in a colourful function. Lecture notes in the form of compendium was distributed to the participants.

The topic of the Short Course was classified into 30 titles out of which 29 lectures were delivered to the participants besides two laboratory exercise and field demonstration of equipments, two field visits and one excursion tour.

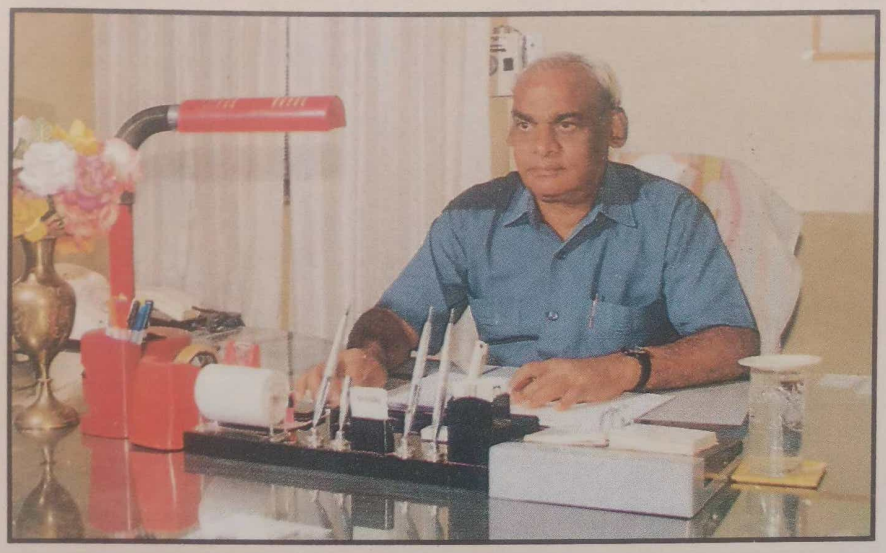
The valedictory function was held on 30th June, 1999 and Dr. S.K. Sharma, IFS, Conservator of Forest, Jhansi awarded certificate to the participants.

All the participants attended lectures, laboratory exercises, field visits and excursion tour enthusiastically. There is a huge demand for the compendium from Universities and Research Institutes.

All the participants appreciated the successful organisation of the Short Course.

K.R. Solanki and A.K. Bisaria
National Research Centre for Agroforestry,
Jhansi-284003, India

From the Director's Desk



Human activities such as urbanization, industrialization, automobile transportation and modern agriculture with indiscriminate use of biocides have been causing various kinds of pollution viz. soil, air, water, noise, radiation, green house effect etc. The problem of environmental pollution has further been aggravated due to indiscriminate faster growth of industries and non-implementation of pollution control measures. The environmental pollution is a global problem. It is established that trees have tremendous potential not only to control soil, water, air pollution and green house effect but also to improve the balance of oxygen, conserve soil, water, air and bio-diversity besides ceasing degradation of land and productive roles. The World Environment Day is celebrated world wide on June 5th every year to create awareness about environmental pollution and its control measures. In this sequence the National Research Centre for Agroforestry, Jhansi organized a short course on "Sustainable Rehabilitation of Degraded Lands Through Agroforestry" during June 21-30, 1999 to create awareness/ publicity about the role of trees in combination with crops in relation to improve the degraded land and highly polluted environment.

It is our first and foremost duty not only to protect trees but also to launch a movement to plant trees on wastelands and farm lands.

K R So Canki

(K. R. SOLANKI)

HUMAN RESOURCE DEVELOPMENT

1. Dr. R.P. Dwivedi attended a summer school on Media Production Skills for Development Support Communication from 10-30 June, 1999 at G.B. Pant University of Agriculture & Technology, Pant Nagar.
2. Sh. R.S. Yadava, attended summer institute on "Use of Advanced Analytical Techniques in Soil Science" at PAU, Ludhiana during 15-24 June, 1999.
3. Er. Ramesh Singh, attended short course on "Sustainable Rehabilitation of Degraded Lands through Agroforestry" at NRCAF, Jhansi during 21-30 June, 1999.

NATIONAL DEFENCE FUND

Director, Scientists, Officers and all the staff members of NRCAF Jhansi donated their one day salary amounting to Rs. 22,151=00 (Twenty two thousand one hundred fifty one only) to National Defence Fund.

WORLD ENVIRONMENT DAY

World Environment Day was celebrated on 5th June, 1999 at the Centre.

Effect of *Dalbergia sissoo* Roxb. Leaves and Root (aqueous) Extracts on Germination, Seedling Growth and Biochemical Changes of *Vigna radiata*

Effect of aqueous extracts of leaves and root of *Dalbergia sissoo* along with *Rhizobium* and nitrogen fertilizer was studied on germination, growth, yield and chemical changes of *Vigna radiata*. 10% extracts were prepared by boiling the material with distilled water for 48 hours. Distilled water was considered as control. *Rhizobium* was isolated from nodules of *Vigna radiata*, maintained on yeast extract mannitol agar for 3 to 4 days. Pure culture were prepared for mass multiplication. Surface sterilization of seeds of *Vigna radiata* was done and treated with 1 ml of 4-5 days old *Rhizobium* isolate containing 8x107 cells/ml. Urea was given @ 20 mg/L or @ 20 mg/kg soil along with extract or alone. Fifty seeds of *V. radiata* were placed in petri plates lined with double sheet filter papers moistened with 5 ml extracts of leaves and root of *D. sissoo* with nitrogen or without nitrogen fertilizer. Similar experiment was also conducted in poly-bags. Extracts were applied once in 15 days. First treatment was given after one week of establishment of seedlings and subsequently four treatments were given and plants were harvested one week after last treatment.

Germination percentage was recorded on third day after onset of germination. Leaf extract with *Rhizobium* or leaf and root extract alone promoted germination up to 63% more as compared to control while nitrogen treatment reduced it. Root length of *V. radiata* seedling were reduced by all treatments except *Rhizobium*. *Rhizobium* and nitrogen treatments along with extracts promoted shoot length. Production of Vigna radiata seeds/plant was increased by all treatments and maximum increase was observed by *Rhizobium* with root extract. All treatments produced lighter weight seeds. All treatments, except extracts with nitrogen, promoted seed protein. Leaf protein was reduced, soluble sugar of leaves increased, total chlorophyll was reduced by extracts. Nodulation was promoted by all treatments. *Rhizobium* caused 42% more nodulation while nitrogen reduced 40% nodulation in plant. Nitrate reductase activity of *V. radiata* leaves was not influenced by leaf and root extracts alone. Leaf and root extract along with *Rhizobium* reduced the NR activity. Leaf and root extracts were analyzed chemically and substantial amounts of flavonoids, terpenoids, phenols and carbohydrates were present. It is presumed that presence of these groups in extracts might be responsible for the activity. Hence, *D. sissoo* leaf and root extracts have stimulatory effect on growth, nodulation, production of seed protein and lighter weight seeds. *Rhizobium* further promoted stimulatory effect while nitrogen have inhibitory effect on parameters studied.

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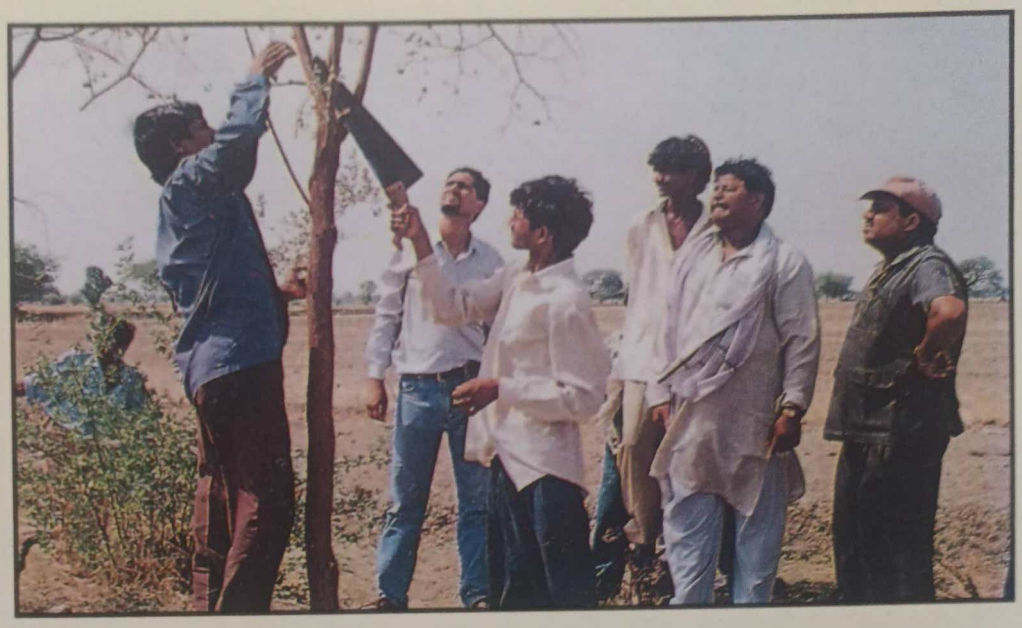
Farmer's Training for Self Employment



A four days training programme (19-22 May, 1999) on pruning of Ber (*Zizyphus mauritiana*) was organised at village Baral of block Chirgaon in Jhansi district with the following objectives: (i) to impart skills of pruning (ii) to create interest among the farmers for self employment through pruning and (iii) to encourage exchange of knowledge among farmers and farm youths. The lectures, group discussion and demonstration methods of training were followed. The training was attended by 25 farmers including village youths. Each and every trainer was provided with pruning tools to have practical exposure.

A large number of Ber trees grow naturally on farm land and on field boundary in Bundelkhand region. These plants can be converted into highly profitable Ber trees yielding quality fruits by pruning and top working with improved cultivars of Ber (*Zizyphus mauritiana*) like Banarasi Karaka, Gola, Seo, etc. Thus, the economic returns from the marginal and degraded lands of Bundelkhand region can be increased with these efforts. Director of the Centre emphasised the importance of pruning as well as budding and also the role of improved variety of Ber in socio-economic upliftment of farmers, particularly small and marginal farmers. This will provide employment opportunities to the farmers and unemployed rural youths, he added. The methods of scientific pruning were demonstrated by Scientist (Horticulture) at farmers field. The farmers were interested to learn the skill of pruning of Ber. The Training programme was convened by Scientist (Agril. Extension). The farmers have shown their keen desire to have similar type of training programme in future also. A visit to Centre's on farm as well as demonstration trails was also organised.

It can be concluded that these training programme will bring desirable skills among the farmers and rural youths for their self employment. Once the farmers and farm youth are convinced, they will take part in pruning themselves on and around their farm lands which will result in providing self employment to them. This will go a long way in enhancing economic returns from degraded lands of Bundelkhand region of central India.

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Training on Budding

A three days training programme on budding in Aonla (*Emblica officinalis*) and Ber was organized during 9-11 Aug., 1999 at village Baral, District Jhansi (U.P.). The objective of the training was to improve the skill of the farmers, rural youth and farm women. Total 63 trainees participated of which 38 farmers were from village Lautana and Singhpur (adopted by NGO - Development Alternative) of District Tikamgarh (M.P.). The consequence of the training programme will be upliftment in the socio-economic conditions of the clients/stockholders. The improvement of local and/or indigenous Ber (*Zizyphus mauritiana*) by improved Ber (*Zizyphus mauritiana*) will result in more economic return to the farmers. The unemployed rural youth will get the opportunity for self employment. The various sessions organized were lectures, question-answers, demonstration of budding and visit to Centre's research farm and demonstration trials at farmers field. A wide coverage of the programme was carried out by daily newspapers.

R.P. Dwivedi, K.R. Solanki and S.K. Shukla
National Research Centre for Agroforestry, Jhansi-284003, India

PROMOTIONS

Sh. C. Sivadasan, Senior Stenographer and Sh. A.K. Chaturvedi, Jr. Stenographer were promoted to Senior PA and Stenographer respectively. Sh. U.P. Singh, Senior Technical Assistant (T-4) was promoted to Technical Officer (T-5).

We wish them all the best in future.

PERSONALIA

KIDWAI AWARD FOR AGROFORESTRY SCIENTIST

The Indian Council of Agricultural Research (ICAR), New Delhi has selected Dr. Gurbachan Singh, Principal Scientist (AF), National Research Centre for Agroforestry, Jhansi for the prestigious "Rafi Ahmed Kidwai Award : 1996-98" for his outstanding research contributions in the field of agroforestry. This highest award for agricultural research was presented to Dr. Singh by the Hon'ble Union Minister of Agriculture Sh. Sompal Ji at a special ceremony in the Vigyan Bhawan on July 16th, 1999.

Dr. Singh has been awarded for developing sustainable and eco-friendly agroforestry technology for the rehabilitation of alkali lands. The significant research contribution of Dr. Singh include : Identification of salt - tolerant promising forest and fruit species, Standardization of planting technique, Agronomic practices for tree plantation in alkali soils and Evolving a silvipastoral model (*Prosopis juliflora - leptochloa fusca*) for firewood and forage production. He also developed *Populus, Acacia* and *Eucalyptus* based agrisilviculture system for reclaimed alkali soil and pit augerhole technology for fruit cultivation in highly alkali soils. Dr. Singh's research, acknowledged in science, has proved that high pH soils can be reclaimed successfully be tree plantations for growing agricultural crops. For improving genus Prosopis for better bole and throneless canopy, he introduced nearly 40 *Prosopis* species from abroad, screened them for salt tolerance, multiplied promising ones and established seed/clonal orchards. Introduction of edible cactus (fruit, vegetable and forage clones), screening for sodicity tolerance, germplasm multiplication and distribution of germplasm to research centres engaged in rehabilitation of arid lands are other areas of Dr. Singh's research. Before joining at the NRC for Agroforestry on August 19, 1998 at Jhansi, Dr. Gurbachan Singh worked at the Central Soil Salinity Research Institute, Karnal for about 20 years.

Dr. Singh is well known for his contribution in the field of agroforestry and agronomy at the

National and International level. He is one of the youngest fellow of the National Academy of Agricultural Science (NAAS), India and also the scientific advisor to the International Foundation for Science (IFS), Sweden. In 1996, Dr. Singh was invited as a keynote speaker at the International Conference on *Prosopis* in Washington DC, USA where he was also chosen to moderate a session. Recently, the American Biographical Institute has invited Dr. Singh to become a member of its Research Board of Advisors.

Heartiest Felicitations to Dr. Singh from the Director & Staff.

VISITORS

Distinguished visitors visited the Centre during April - June, 1999.

1. Dr. Panjab Singh, Vice Chancellor, JNKVV, Jabalpur
2. Dr. Gargi, Vice Chancellor, Bundelkhand University, Jhansi
3. Dr. P.S. Tomar, Director, IGFRI, Jhansi
4. Dr. N.P. Melkania, PC (FC), IGFRI, Jhansi
5. Dr. L.P. Mishra, Head, (Seed technology), IGFRI, Jhansi
6. Dr. P.S. Pathak, ADG (AF), ICAR, New Delhi
7. Dr. Vinod Shankar, Head (GSM), IGFRI, Jhansi
8. Dr. A.S. Faroda, Director, CAZRI, Jodhpur
9. Dr. A.K. Sharma, Officer Incharge, CSWCR & TI Research Centre, Datia
10. Dr. R. Deb Roy, Ex. Director, NRCAF, Jhansi
11. Dr. C.L. Acharya, Director, IISS, Bhopal
12. Dr. R.P. Singh, Ex. Director, CRIDA, Hyderabad
13. Dr. K.C. Kanodia, Haritika (NGO), Jhansi
14. Sh. S.K. Sharma, Conservator of Forest, Jhansi Division, Jhansi
15. Dr. N.P. Singh, Zonal Coordinator for the Zone-IV, Kanpur.
16. Dr. K.P. Singh, Project Officer, CSAU & T, Kanpur.
17. Dr. R.A. Singh, Principal Scientist (Plant Pathology), IIPR, Kanpur.
18. Sh. M.K. Khare, DFO, Jhansi.
19. Dr. Rakesh Mohan, Head, Deptt. of Forestry, North-Eastern Hill University, Aizawal alongwith five students of NEH University namely Mr. Masdoen M. Sangma, Miss. Lalchandami, Mr. Lalrenawama, Ngurrinsanga Saib and Mr. Markordor Khonglah.

Agroforestry : A Boon for Tijju

This is the success story of a farmer, Tijju, residing at village Karari, in Jhansi district of Uttar Pradesh (Bundelkhand region). He is a marginal farmer with 4 acres of land predominantly red soil (locally known as Rakkar and Parwa) and used to cultivate only kharif (monsoon) season crops. He is literate only and his family comprises of 14 members including his wife, three sons, three daughters in law, and six minors. He has no other source of livelihood. Tijju was the target of an extension programme, initiated by the National Research Centre for Agroforestry (NRCAF), Jhansi, India, in the year 1993-94. The organization approached Tijju and decided to help him in adoption of agroforestry technologies in his 2.5 acres of land through on farm trial for higher production and profit. In this trial, three fruit tree species namely Guava (*Psidium gujava*), Aonla (*Emblica officinalis*), Pomegranate (*Punica granatum*) were introduced. Whereas a separate trial with Ber (*Ziziphus mauritiana*) was laid out. The multipurpose tree species were planted on field boundaries. He was provided training on management of fruit trees and care of multi-purpose tree species (MPTS). In the initial two years, NRCAF has provided the facilities such as saplings of fruit tree species, namely Ber, Guava, Aonla, Pomegrante, Papaya (*Carica papaya*) and multipurpose tree species such as Subabul (*Leucaena leucocephala*), Safeda (*Eucalyptus tereticornis*). Incentives like tractor, labour, seed, fertilizer, insecticides and pesticides were also provided. Fruit trees were planted in association with agricultural crops, while multipurpose trees were planted on the field boundaries. Fruit plants were planted at the spacing of 6x6m, while MPTS were planted at the spacing of 2 meter on field boundaries.

Adoption of Agroforestry

Fruit trees were subjected to annual training and pruning to give them desired canopy. Ber trees were pruned every year in the month of May to encourage new shoots during rainy season. Multi-purpose trees were also pruned every year as per requirement for fodder and fuel wood. Papaya was given with a view to earn income in initial years when other fruit trees

are not giving any imcome. He also improved naturally existing *Zizyphus numularia* (Jharberi) in his field boundaries with improved variety of *Zizphus mauritiana* namely Banarasi Karaka through ring budding. According to Tijju's perception, there is a lot of improvement in soil conditions which might be due to increased organic matter resulting from decomposition of litter fall.

Incease in Income

In the year 1997-98, on an average yield of groundnut and wheat was 1.00 and 2.40 tonnes/ha which gave imcome of Rs. 16,000 and Rs. 12,000, respectively. Production obtained from guava and aonla was 748 and 415 kg/ha which again gave imcome of Rs. 3,740 and Rs. 2,490, respectively. Papaya planted on one side of the field gave the total income of Rs. 8,000 from 1,000 kg of fruits sold in Jhansi market. Fuel wood obtained through pruning of Ber was 200 kg/ha which amounted Rs. 200 although bearing in Ber was not obeserved. *Eucalyptus* trees worth Rs. 15,000 are being maintained on field boundaries. Subabul planted on boundaries gave fodder and fuel wood worth Rs. 1,800. The total annual returns during fifth year excluding *Eucalyptus* trees was Rs. 44,230 and the cost of cultivation for understorey crops as well as maintenance of fruit trees was Rs. 22,515. Thus, the annual net income obtained by the farmer was Rs. 21,715/ha.

Elevated Living Standard

After five years of adoption of agroforestry, Tijju started obtaining fuel wood, fodder, fruit, small timber and food grains from the same peice of the land while before 1993-94, his wife used to walk 2 to 3 kilometers in the search of fuel wood collection. His standard of living increased considerably. He got food and clothing, constructed a cemented house of two rooms and cemented well, cemented irrigation channels and purchased a moped bike. Recovered himself from the loans taken from Regional Rural Bank, Jhansi and from village land lord for his daughter's marriage. Full time employment was provided to Tijju and his wife. The social participation of Tijju and his family was drastically reduced as they did not get enough time for visiting any of their relatives. But he was very much regular in attending the extension activities such as Kisan Mela and demonstration.

Thus, in the last two years so many visitors including farmers and farm women from different villages, scientists of ICAR institutes and state agricultural universities, foreign visitors, government and non-government organisations, personnel and media persons from New Delhi and Jhansi visited his field. In his community Tijju is being referred as rich man now by villagers. This type of extension efforts are needed to make agroforestry system as an eco-friendly alternative for sustainable rural livelihood (food security) and for sustainable land management to uplift the small and marginal farmers and rural poor, so that they can join the main stream of the society.

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अतर सिंह साईकिल रेस में प्रथम

भारतीय कृषि अनुसंधान परिषद, नई दिल्ली के अन्तर मण्डलीय खेलकूद में कृषिवानिकी, झाँसी के श्री अतर सिंह, 5 कि.मी. की साईकिल रेस में प्रथम आये। गोवा स्थित जवाहर लाल नेहरू स्टेडियम में दिनाँक 14-17 मई, 1999 के मध्य आयोजित भा.कृ.अनु. परिषद के अन्तर मण्डलीय खेलकूद के अन्तर्गत सम्पन्न 5 कि.मी. की साइकिल दौड़ की दूरी 8 मिनट 38 सेकण्ड 22 पल्स में पूरी कर श्री अतर सिंह ने अपना विशिष्ट कीर्तिमान स्थापित करते हुये झाँसी का नाम परिषद् पटल पर ला दिया है। भारतीय कृषि अनुसंधान परिषद, नई दिल्ली के महासचिव श्री बी.के. चौहान महोदय ने पारितोषक वितरण उद्‌बोधन में इस कीर्तिमान का विशेष उल्लेख करते हुये अभिनन्दन किया है।

हिन्दी दिवस

राजभाषा हिन्दी के स्वर्ण जयंती वर्ष के उपलक्ष्य में दिनाँक 14.9.99 को हिन्दी चेतना मास का शुभारम्भ डा. के. आर. सोलंकी, निदेशक, राष्ट्रीय कृषिवानिकी अनुसंधान केन्द्र, झाँसी की अध्यक्षता में हुआ। इस अवसर पर हिन्दी के प्रचार एवं प्रसार हेतु विभिन्न वक्ताओं ने अपने-अपने विचार प्रस्तुत किये। अपने अध्यक्षीय भाषण में डा. सोलंकी ने कहा कि राजभाषा के प्रयोग में हमें गर्व एवं स्वाभिमान का अनुभव करना चाहिए। उन्होंने कहा कि कृषिवानिकी तकनीकी को किसानों तक पहुँचाने के लिए हिन्दी ही एक सशक्त माध्यम है जिससे वैज्ञानिक अपनी बात किसानों तक पहुँचा सकते हैं। समारोह का संचालन डा. अभय कुमार बिसारिया, वरिष्ठ वैज्ञानिक तथा कार्यक्रम के संयोजक डा. राम नेवाज, वैज्ञानिक (वरिष्ठ वेतनमान) एवं प्रभारी अधिकारी हिन्दी ने समी का आभार व्यक्त किया। हिन्दी चेतना मास के अन्तर्गत दिनाँक 30.9.99 को विचारमाला का आयोजन डॉ. के. आर. सोलंकी की अध्यक्षता में किया गया जिसमें वैज्ञानिकों ने अपने विचार व्यक्त किये।

Independence Day

Independence Day was celebrated at the Centre. Dr. K.R. Solanki hoisted the National flag. On this occasion, Outdoor sports were also organized.

IJSC MEETING

A meeting of IJSC was held on 15th April, 1999 under the chairmanship of Dr. K.R. Solanki, Director, NRCAF, Jhansi

After election of IJSC on 4/9/99, New IJSC was constituted by the Director for the period 1999-2000 at the Centre.

Staff side :

1. Sh Deepak Vij, Jr. Steno — Secretary - IJSC
2. Sh C.K. Bajpai, T-5 : Tech. Officer — Member - CJSC
3. Sh S.P.S. Chauhan, T-5 : Tech. Officer
4. Sh K.P. Sharma, Senior Clerk
5. Sh Nathu Ram, SSG-II
6. Sh Atar Singh SSG-II

Office side :

Dr. P. Rai	Pri. Sci.
Dr. A.K. Bisaria	Sr. Sci.
Dr. Ram Newaj	Sci. (Sr. Sc.)
Smt. Chitra Shanker	Sci.
Sh B. Singh	Sr. FM
Sh. N. Raja, AAO	Member Secretary

Newly elected IJSC meeting was held on 23/9/99 under the Chairmanship of Dr. K.R. Solanki, Director, NRCAF, Jhansi.

New Cess Fund Schemes

- Eco-physiology of regeneration in MPTs of semi-arid tropics-Principal Investigator - Dr. A.K. Handa.
- Tree crop Interaction in *Albizia procera* based agroforestry systems for moisture Light and Nutrients - Principal Investigator - Dr. Ram Newaj.

NATP Project

- Collection evaluation and maintenance of some agroforestry species from Central India - Principal Investigator - Dr. V.K. Gupta.

Supervision and Guidance : Dr. K.R. Solanki, Director, NRCAF, Jhansi

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