Agroforestry

Newsletter

National Research Centre For Agroforestry, Jhansi-284 003

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ANNUAL GROUP MEETING OF AICRP ON AGROFORESTRY

The Annual Group Meeting of the All India Coordinated Research Project on Agroforestry was organized at JNKVV, Jabalpur from 19-21st May, 2012. Dr. D.N. Tiwari, Ex Member, Planning Commission, GOI and Ex Director General, ICFRE, Dehradun was the Chief Guest, Dr. P. K. Shukla, PCCF, Madhya Pradesh was the Guest of Honour and Prof. Gautam Kalloo, Vice Chancellor, JNKVV, Jabalapur presided over the inaugural session. Dr. S.S. Tomar, Director of Research, JNKVV welcomed the dignitaries and delegates. Dr. S.K. Dhyani presented the Coordinators Report and the brief summary of the research achievements of the project for the last year. A bulletin on *Transferable Agroforestry Technologies for Odisha* compiled by OUAT, Bhubaneswar coordinating centre was released on the occasion. Dr A. K. Singh, Deputy Director General (NRM), ICAR graced the occasion on second day of the group meeting. In his address to the delegates, he stressed upon to compile the information on transferable agroforestry technologies and the mechanism for their upscaling. He informed that in the next five year plan emphasis will be on fodder tree improvement and to launch Agroforestry mission. In addition to review of progress report of the centres there were two special lectures in the technical sessions. Dr. A. R. Sharma, Director, DWSR, Jabalpur delivered a plenary lecture on important weeds and their management in different perennial crop and plantations. On second day, Dr V.K. Gaur, Senior Scientist, JNKVV presented the work of JNKVV on Jatropha an important biofuel species. During the meeting there were seven technical sessions including inaugural and plenary sessions in addition to field visit to the agroforestry experiments of University and visit to KVK, Jabalpur. The presentations of the coordinating centres were divided into different session namely; Himalayan, Indo-Gangetic; Humid & Sub

Forthcoming Events

1. IRC/ IVth QRT Meeting
2. Institute Joint Staff Council/ Women Cell's / PME Cell meetings.
3. Celebration of Hindi Saptah

Issues Highlights

humid; Arid & semi-arid and Tropical zones. The progress of each centre was critically reviewed. The centres were asked to document the Success Stories of farmers adopting the agroforestry. The event got wide coverage in the print and electronic media.

Research Findings

Sericulture and Lac Cultivation Based Agroforestry Interventions: Potential and Initiatives in Bundelkahnd Region

Bundelkhand region spread over 7.08 million ha in north central plateau. This region has limited option for intensive agriculture due to undulating topography, shallow soil depth, low water holding capacity, intense radiation and low relative humidity. Bundelkhand has predominantly an agrarian economy; over 80% of population is dependent on agriculture, livestock, usufructs from forest and outsourcing income by seasonal migration after Rabi harvest. On an average, 96 % of the farmer's income is earned from the crop and livestock enterprise alone. About 58% of geographical area is cultivated and there is vast area (14.388 lakh ha) available which can be put under alternative land use such as agroforestry for promotion of horticulture, medicinal plants, bamboos, biofuel species, animal husbandry, rearing small ruminants, sericulture, apiculture, lac, gum cultivation etc. This land may belong to revenue, *Panchayats,* community or private individuals. The programme may be linked up with ongoing schemes of IWMP, Horticulture Mission, Bamboo Mission, MENREGS and others. Experience of NRC for Agroforestry, Jhansi at Garhkundar-Dabar and Domagor–Pahuj watersheds have shown that promoting agroforestry along with soil and water conservation measures in conjunction with efficient utilization of available water is the viable option in the region as far as water availability is concerned.

Sericulture is being practiced in different parts of the country since time immemorial. On the basis of climate, edaphic conditions, host plants and insect species, four types of sericulture is practiced in India *viz.* i) mulberry, ii) tasar- [a] tropical tasar, [b] oak tasar, iii) eri, and iv) muga. Dhyani et al. (1996) successfully developed and demonstrated mulberry and muga sericulture based agroforestry systems for the north-eastern hill region. Three systems *viz.* i) with fruit trees and fodder grasses, ii) with field (upland) crops, and iii) with lowland rice, were developed as models with sustained productivity and frequent returns. Sericulture with fruit plants and grass model was highly preferred by farmers, followed by sericulture with field (uplands) crops.

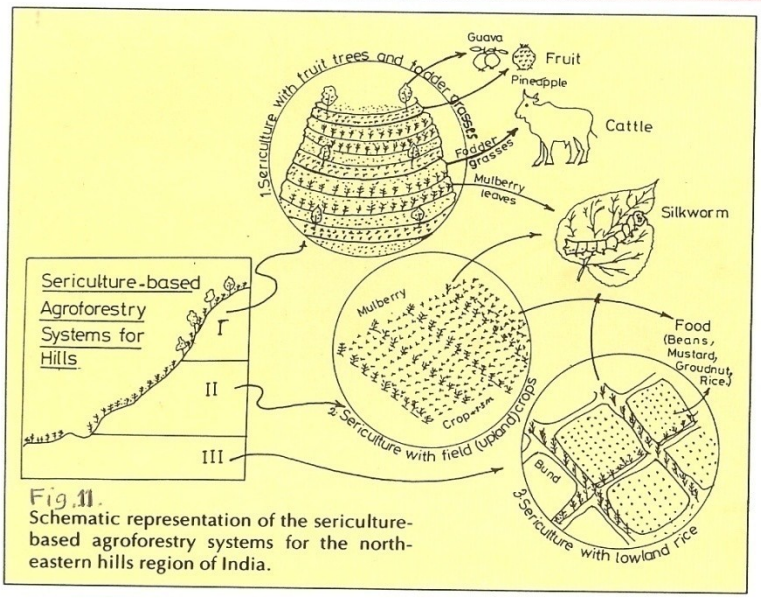

Fig.11.
Schematic representation of the sericulture-based agroforestry systems for the north-eastern hills region of India.

Calender of events for cocoon-rearing and crop-raising in hilly areas of the north-eastern India

Although, mulberry and tasar sericulture was being practised in the different districts of Uttar Pradesh and Madhya Pradesh on the basis of climate and topography, but now, tasar sericulture is being promoted in Bundelkhand region,

particularly in Jhansi and Lalitpur districts. In this area tasar sericulture insect *Antheria mylata* is being reared on arjun (*Terminalia arjuna*) which is common tree species of the forest area. Arjun can also be cultivated under dense plantation (2800 plants per ha at 6' x 6' spacing) and intensive management for economic tasar cultivation. The plantation is ready for rearing tasar silkworm within 3-4 years. As per the information of Sericulture Directorate, Uttar Pradesh, one ha dense plantation of arjun can generate an income of ` 30,000 to 50,000/ annum from tasar cultivation. There is scope of tasar sericulture under agroforestry.

On 5th January, 2012, a **Farmer's Meet cum Exhibition** was organized by the Central Tasar Research & Training Institute, Research Extension Centre (Central Silk Board) at Block Development Office, Talbehat, District Lalitpur (U.P.). 26 officers from different departments and 104 farmers' including 37 women farmers from nine villages in and around Talbehat participated. Scientists from NRCAF facilitated in farmers' training for successful tasar, lac, gum and resin cultivation in the region.

To promote livelihood opportunities for the farmers, NRCAF introduced lac based agroforestry system for the semi-arid Bundelkhand region on palas (*Butea monosperma*) and ber trees which are very common in this region. Success of lac cultivation in katki crop (rainy season) was observed in the region. The preliminary results indicate good possibility to promote livelihood through lac cultivation in the region. Lac insect was successfully established on *Butea* in the forest in Talbehat with collaboration of the Forest Department, Talbehat.

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Trees Species Identification Using Resources at -1, LISS IV Multispectral Data

Remote sensing images are widely used for vegetation cover mapping like agriculture crops, forest cover, mangroves, etc. Identification and delineation of different vegetation is possible with high resolution images (better than 6m). High resolution or hyper-spectral images give distinct spectral reflectance for distinct features, whether it is tree species or different age plantations, etc. Various classification approaches like fuzzy, maximum likelihood, minimum distance to mean classifiers are applied for vegetation covers identification. All these methods use the pixel values of the image and certain criteria for grouping the pixels into desired classes.

An attempt has been made to distinguish tree species found in North Dinajpur district using single scene of Resourcesat-1, LISS IV. Multispectral data in three spectral bands *viz*. Green, Red and NIR was used for the scene no. 066 (date of pass: 10-Jan-2009). Among these four bands, near-infrared (NIR) band is the most useful in case of vegetation cover analysis as this band gives maximum spectral reflectance for vegetation. For identification of species like Bamboo, Arjun and other mixed plantations, the spectral values were determined on this scene with the help of GPS points taken from the field. The spectral values found in three bands for Bamboo and Arjun are:

Bamboo: R (0.534-0.550) G (0.477-0.496) NIR (0.556-0.614)
Arjun: R (0.551-0.568) G (0.521-0.540) NIR (0.572-0.666)

It can be observed that the highest spectral values were found in NIR band for both the species and also distinct values were found in three bands for two species. With the help of these spectral values, the spectral signatures were created and the scene was classified using maximum likelihood classifier. This classification has the accuracy of 82.4 per cent. The area

under Bamboo, Arjun and mixed plantation came out to be 2.4, 2.7 and 30.7 per cent, respectively (Table 1).

Table 1: Estimated area under different tree species/ agroforestry systems

S.N.	Land uses/Land covers	Area (in ha)	Area (%)
1.	Mixed species (Eucalyptus, Mango, Tejpatra)	24251.20	30.7
2.	Bamboo plantation	1861.32	2.4
3.	Arjun plantation	2134.57	2.7
4.	Other land uses/ land covers	50562.48	64.2
	Total Area	78809.57	

Although LISS IV data has spatial resolution of 5.8 m, yet there is limitation that it has only three spectral bands. More number of bands help in making distinction between vegetation covers as well as identification of tree species. Moreover narrow spectral bands like hyperspectral image would be more appropriate in species classification as they distinctly identify the species by their canopy size and structure.

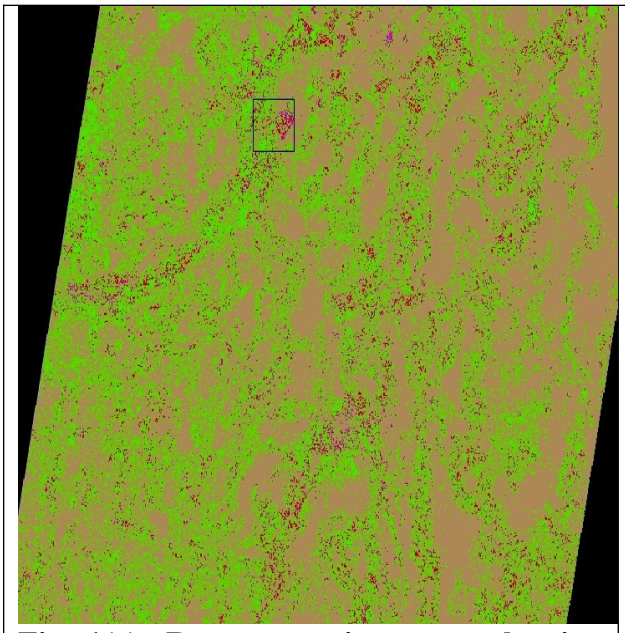

Fig. 1(a): Remote sensing scene showing vegetation covers

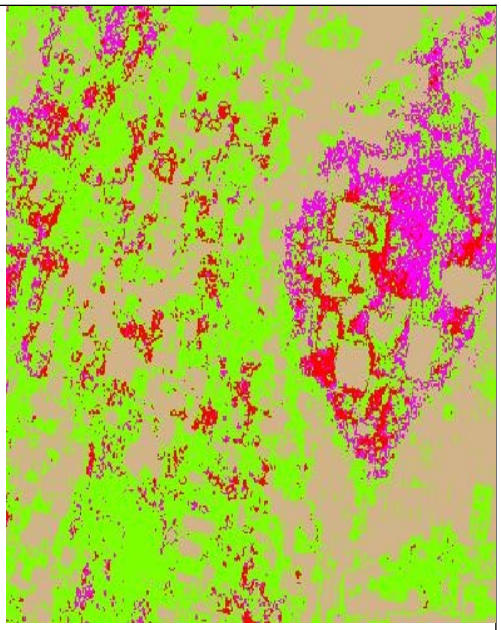

Fig. 1(b): Bamboo and Arjun species identified on the scene

Figure 1(a) & 1(b) depicts the two species and mixed plantation in different colours, bamboo in red colour, Arjun in magenta colour and mixed plantation in green colour.

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RESEARCH ADVISORY COMMITTEE

15th RAC meeting of NRCAF was held on 3rd & 4th April, 2012 under the chairmanship of Dr. V. P. Singh, Regional Representative for South Asia, WAC, New Delhi. Dr. J. C. Dagar, ADG (AF & Agron.), ICAR, New Delhi; Dr. S. D. Kashyap, Dean, Dr. Y.S. P. U. of Horti. & Forestry, Solan; Dr. D. K. Das, Former Head, IARI, Pusa, New Delhi; Prof. S.B. Nahatkar, Division of Agriculture Economics, JNKV, Jabalpur and Dr. V. K. Gupta, Ex-Principal Scientist, Bangalore and Dr. S. K. Dhyani, Director, NRCAF, Jhansi (Members of RAC) participated. At the outset, Dr. S. K. Dhyani, Director, NRCAF presented the action taken report on the earlier RAC and other activities of the Centre. After that, all the programme leaders of NRCAF presented significant research findings of their programmes and actively participated in the discussions.

INSTITUTE MANAGEMENT COMMITTEE (IMC)

Sixteenth IMC meeting was held on 8th June, 2012 at NRCAF Jhansi under the chairmanship of Dr. S. K. Dhyani, Director, NRCAF, Jhansi. Members (Dr. D.R. Malviya, Head, Seed Tech, IGFRI, Jhansi; Sh. Bhairam Singh, Dy. Director (Hort.), Jhansi; Dr. R. K. Tewari, Pr. Scientist, NRCAF; Dr. Rajendra Prasad, Pr. Scientist, NRCAF; Dr. S. N. Pandey, Project Coordinator, Taragram, Jhansi) of IMC participated in the meeting. Dr. Ram Newaj, Pr. Scientist presented brief research achievements of NICRA project and Dr. R. K. Tewari Pr. Scientist presented HRD activities of the Centre during 2012. Thereafter, the agenda items were placed and discussed in the meeting.

BER PRUNING TRAINING

Centre organized Ber Pruning Training from 22nd to 24th May, 2012 at village Ganeshgarh, block- Babina of district Jhansi.

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5-	14&16 ebZ] 2012	^^tykxe ds vk/kkj ij izkÑfrd lalk/kuksa dk izcU/ku ,oa Ñf'kokfudh fodkl**	Hkwfe fodkl ,oa ty lalk/ku foHkkx] pj[kkjh&II] egksck	MkW0 vkj-ds- frokjh] MkW0 jes"k flag] MkW0 Mh-vkj- iylkfu;k] MkW0 lq/khj dqekj
6-	28&30 ebZ] 2012	,dk.V ys[kk ds lEcU/k ,oa dS"k cqd ds j[k&j[kko rFkk dk;ksZa dk ekiu djkuk vkfn	Hkwfe fodkl ,oa ty lalk/ku foHkkx] pj[kkjh&II] egksck	MkW0 vkj-ds- frokjh] MkW0 jes"k flag] Jh ,l-ch- "kekZ] Jh ,-ds- prqosZnh] Jh chjsUnz flag
7-	7&9 twu] 2012	^^tykxe fodkl ;kstuk dk fu;kstu ,oa fØ;kUo;u**	Hkwfe laj{k.k vf/kdkjh] jk'Vªh; tykxe] pj[kkjh] egksck	MkW0 ,l-ds- /;kuh] MkW0 vkj-ds- frokjh] MkW0 jes"k flag] Jh jktsUnz flag] Jh f"k"kqiky flag ;kno
8-	11&13 twu] 2012	^^tykxe ds vk/kkj ij izkÑfrd lalk/kuksa dk izcU/ku ,oa Ñf'kokfudh fodkl**	Hkwfe laj{k.k vf/kdkjh] jk'Vªh; tykxe] pj[kkjh] egksck	MkW0 ,l-ds- /;kuh] MkW0 vkj-ds- frokjh] MkW0 jes"k flag] Jh jktsUnz flag] Jh f"k"kqiky flag ;kno
9-	13&15 twu] 2012	^^tykxe fodkl ;kstuk dk fu;kstu ,oa fØ;kUo;u**	Hkwfe laj{k.k vf/kdkjh] dqyigkM+& II] egksck	MkW0 ,l-ds- /;kuh] MkW0 vkj-ds- frokjh] MkW0 jes"k flag] Jh jktsUnz flag] Jh f"k"kqiky flag ;kno

10-	15&17 twu] 2012	^^tykxe ds vk/kkj ij izkÑfrd lalk/kuksa dk izcU/ku ,oa Ñf'kokfudh fodkl**	Hkwfe laj{k.k vf/kdkjh] dqyigkM+& II] egksck	MkW0 ,l-ds- /;kuh] MkW0 vkj-ds- frokjh] MkW0 jes"k flag] Jh jktsUnz flag] Jh f"k"kqiky flag ;kno
11-	18&20 twu] 2012	^^tykxe fodkl ;kstuk dk fu;kstu ,oa fØ;kUo;u**	Hkwfe laj{k.k vf/kdkjh jk'Vªh; tykxe] egksck	MkW0 ,l-ds- /;kuh] MkW0 vkj-ds- frokjh] MkW0 jes"k flag] Jh jktsUnz flag] Jh f"k"kqiky flag ;kno
12-	23&25 twu] 2012	^^tykxe fodkl ;kstuk dk fu;kstu ,oa fØ;kUo;u**	Hkwfe laj{k.k vf/kdkjh] jk'Vªh; tykxe] >k¡lh	MkW0 vkj-ds- frokjh] MkW0 jes"k flag] Jh jktsUnz flag] Jh f"k"kqiky flag ;kno

HUMAN RESOURCE DEVELOPMENT

Dr. A. K. Handa, Dr. Inder Dev, Pr. Scientists; Dr. R. P. Dwivedi, Sr. Scientist; Sh. K. B. Sridhar; Sh. K. Rajarajan, Scientists and Sh. S.B. Sharma, AF&AO participated in the Annual Group Meeting of the All India Coordinated Research Project on Agroforestry during 19th to 21st May, 2012 held at JNKVV, Jabalpur (M.P.).
Dr. R. K. Tewari, Pr. Scientist; Dr. Ramesah Singh, Sr. Scientist and Dr. D. R. Palsaniya, Scientist attended three days Review and Planning Meeting of Model Watershed Projects at ICRISAT, Hyderabad (A.P.) during 23rd to 25th May, 2012. The Centre is a consortia partner in developing model watershed "Domagor- Pahuj Watershed" in Jhansi. Other consortia partner in this project is ICRISAT and Development Alternatives, an NGO.

Dr. Rajendra Prasad, Pr. Scientist and Dr. R. H. Rizvi, Sr. Scientist attended First Review Workshop of NICRA project at CRIDA, Hyderabad during 11th to 13th June, 2012 and presented a progress report.

NEW SCIENTIST/ STAFF

- Dr. S. Vimla Devi, joined the Centre as Sr. Scientist (Plant Breeding).
- Sh. Jai Janardan, joined the Centre as Assistant.

VISITORS

- Dr. V. P. Singh, Regional Representative for South Asia, WAC, NASC Complex, New Delhi.
- Dr. S. D. Kashyap, Dean, College of Forestry, Dr. Y.S. P. U. of Horti. & Forestry,

Solan (H. P.).

- Dr. D. K. Das, Former Head, Indian Agriculture Research Institute, Pusa, New Delhi.
- Dr. Brahma Singh, Advisor, World Noni Research Foundation, Chennai (Tamilnadu).
- Dr. J. C. Dagar, ADG (AF & Agron.), ICAR, New Delhi.
- Dr. V. K .Gupta, Ex-Principal Scientist, Bangalore, (Karnataka).
- Prof. S. B. Nahatkar, Division of Agriculture Economics, J NKV, Jabalpur (M. P.).