Agroforestry *Newsletter* *ISO 9001:2008*

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Vol. 27, No. (3) **July-September, 2015**

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Forthcoming Events

1. Regional Consultation on "Agroforestry: The Way Forward"
2. National Workshop on TBOs-Way Ahead
3. SAARC Regional Training on Climate Smart Resilent Agricultutre Technologies

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		{ks=Qy ¼gs-½	**{ks=Qy (%)**	**{ks=Qy ¼gs-½**	**{ks=Qy (%)**
1-	— f’kokfudh	12142.25	1.92	43114.81	2.75
2-	Qly Hkwfe	472674.70	74.76	904481.98	57.60
3-	IkkS/ kkjksi.k	2129.24	0.34	4327.97	0.28
4-	Okkfudh	10880.12	1.72	81939.10	5.22
5-	voØfer ou	78780.81	12.46	161183.56	10.26
6-	pkjkxkg	3282.80	0.52	68115.05	4.34
7-	Ckatj Hkwfe	30572.74	4.84	238830.21	15.21
8-	Tky fudk;	12435.55	1.97	30288.76	1.93

9-	fufeZr Hkwfe	9396.35	1.49	38068.18	2.42
dqy {ks=Qy		**632294.55**		**1570349.61**	

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vkadfyr iSjkehVj	**o/kkZ**	**ukfld**
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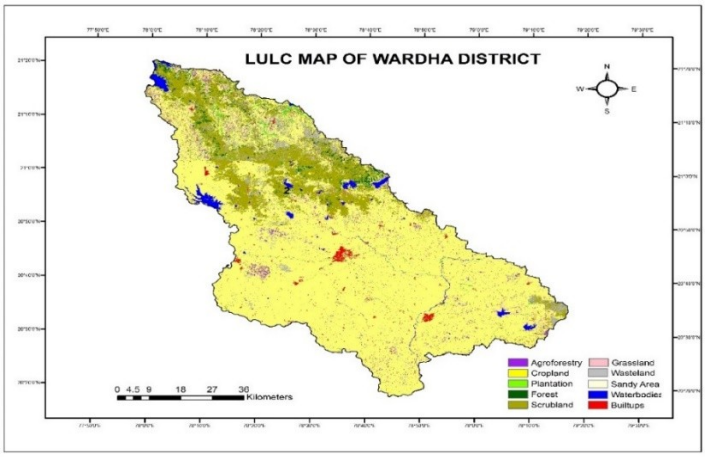
tSoHkkj dkcZu ¼Vu izfr gsñ½	4-32	4-99
Ek`nk dkcZu ¼Vu izfr gsñ½	16-87	14-82
dqy dkcZu ¼Vu izfr gsñ½	21-19	19-81
dkcZu vo”keu {kerk ¼Vu izfr gsñ izfr o’kZ½	0-68	0-60



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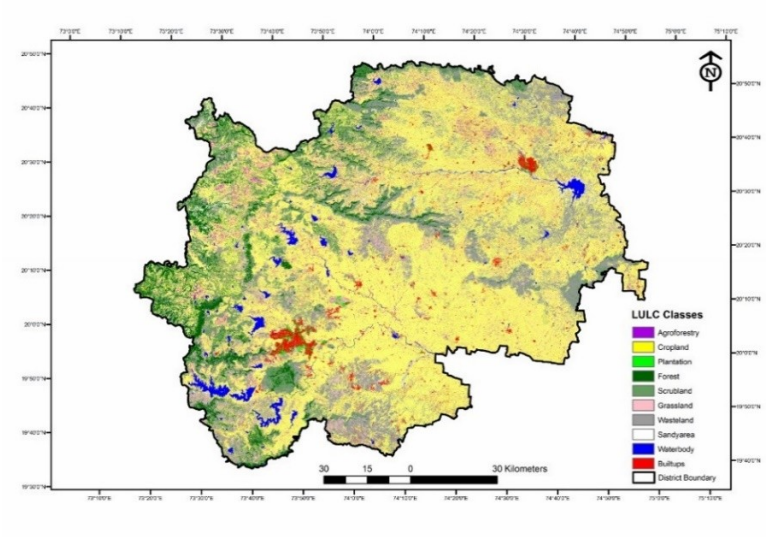

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Genetic diversity of *Pongamia pinnata* germplasm collections at ICAR-CAFRI

Pongamia pinnnata L. Pierre, commonly known as karanj, karanja, pongam, honge, pungai, kanuga, Indian beech tree, etc., is one of the important tree borne oilseeds, which has multiple uses. Being a member of the family *Leguminosae* and subfamily *Papilionaceae,* it is a preferred species for controlling soil erosion and binding sand dunes because of its dense network of lateral roots. Its ability to fix atmospheric nitrogen in the soil and moderate tolerance to drought, waterlogging and slight frost and high tolerance to salinity, makes it a useful tree for reclamation of waste and degraded lands. The multipurpose uses, such as fodder, shade, biofuel, medicine and nitrogen fixing ability fit pongamia easily into different agroforestry models. The oil has commercial value, as fuel in diesel engines showing a good thermal efficiency; also it is used as a fuel for cooking and lamps, as a lubricant, water-paint binder, pesticide, and tanning industries. In the background of the importance of this tree species as an important source of renewable bioenergy & looking at the potential, ICAR-Central Agroforestry Research Institute, Jhansi had initiated the work on *Pongamia pinnata* a decade ago.

The effectiveness of tree improvement programme depends upon the nature and magnitude of existing genetic variability and also on the degree of transmission of traits or heritability, because genetic variation is the fundamental requirement for maintenance and long-term stability of forest ecosystem. To conserve and assess the genetic variability in the population, ICAR-CAFRI had conducted extensive exploration spread across the latitude of 21°05'N to 29°25'N and longitude of 75°52'E to 88°14'E cutting across seven states of Uttar Pradesh,

Madhya Pradesh, Rajasthan, Haryana, Maharashtra and Chattisgarh. A set of 143 diverse accessions of *Pongamia pinnata* were collected and of which 71 accessions maintained in the field as germplasm collection at ICAR-CAFRI farm, Jhansi (longitude 78° 81E, latitude 24° 26N and altitude 251m from m.s.l) was used for the evaluation.

Characterization and cataloguing of these accessions is a prerequisite to select the superior ones for further crop improvement programmes. Also this species has been recognized for its high commercial value, where Karanj seeds are used for oil extraction in biofuel production (35– 42%). Hence, the National Oilseeds and Vegetable Oils Development (NOVOD) Board, Gurgaon, India, has also promoted tree improvement programme in different states with a mandate for population identification, selection of superior genotypes and establishment of seed orchards to produce high-quality fruits/ seeds for oil extraction. A study of these germplasm revealed that the Pongamia germplasm collection had moderate diversity with respect to their morphometric characters.

The general gestation period of pongamia is 6-7 years and it should be ready to bear economical yield at the age of 9 years. The observation recorded on the flowering pattern reveals variation with respect to the age of bearing. At the 10th year of evaluation, a total of 61 accessions were in flowering and fruiting condition and 10 accessions had not shown bearing yet (Fig.1).

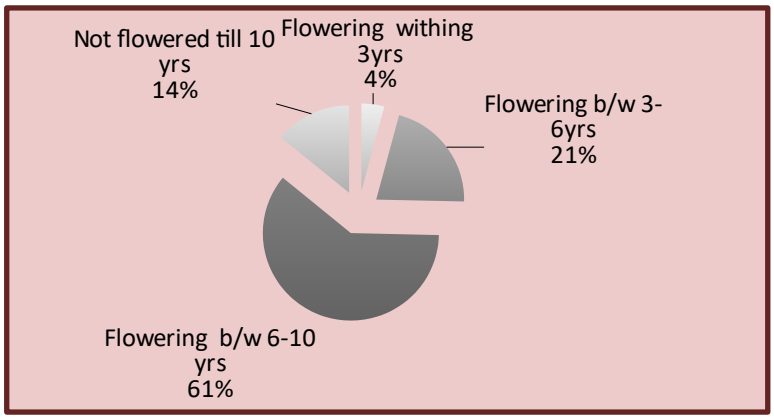

Fig.1: Variations for initial flowering period in *P. pinnata* germplasm

Among 61accessions which had crossed the gestation period, 4 % of the population showed flowering within three years, which is a trait for early bearing; 21 % started flowering between 3-6 years. Of the rest of the 75 % of the accessions, 61 % of them where in flowering stage within 10 years but rest 14 % of them have not yet come to bearing.

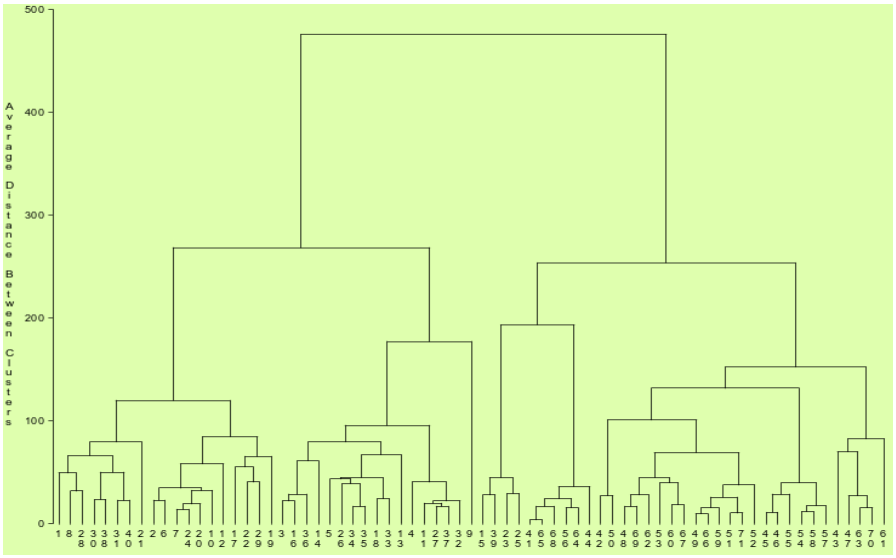

Fig.2: Dendrogram based on morphometric characters in *P. pinnata* germplasm accessions

Phenotypic evaluation of the 71 accessions was done for the following phenotypic traits: tree height (m), clean bole height (m), diameter at breast height (dbh), canopy diameter, number of primary branches and bearing/non-bearing. The data were used to generate the diversity existing in the population based on the Principal Component Analysis (PCA) using mean values of the morphological characters. Cluster analysis was performed based on significant principle component (PC) using SAS- Version 8.1using SAS and dendrogram was generated for all the 71 accessions.

A

Main cluster	Sub cluster	Accessions
I	1	1 8 28 30 38 31 40 21
	2	2 6 7 24 20 10 12 17 22 29 19
II	1	3 16 36 14 5 26 34 35 18 33 13 4 11 27 37 32
	2	9
III	1	15 39 23 25
	2	41 65 68 56 64 44
IV	1	42 50
	2	48 69 62 53 60 67
	3	49 66 59 51 71 52
	4	45 46 55 54 58 57
	5	43 47 63 70 61

dendrogram (Fig.2) constructed using cluster analysis for the total pongamia germplasm collections, grouped 71 accessions into four well differentiated clusters at the average distance of 3.0. Each main cluster is divided into sub clusters of 2 to 5. Some accessions like 4(NRCP 10), 9(NRCP 16), 13 (NRCP 21), 21 (NRCP 56), 43 (NRCP 95), 44 (NRCP 99), 52

(NRCP 123) and 61 (NRCP 138) stand distinctly diverse within their clusters indicating the genetic distance. The analysis indicates a moderate diversity both within and outside the geographical region based on the morphological characters. Further analysis to assess the diversity at molecular level is being carried out at the institute.

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ICAR-Central Agroforestry Research Institute, Jhansi

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laLFkku }kjk 14 tqykbZ 2015 dks cchuk Cykd ds varxZr ijklbZ&fla/k ty lesV xkWoksa &ijklbZ] Nriqj ,oa cNkSuh esa i"kq LokLF; f"kfoj dk vk;kstu fd;k x;kA LokLF; f"kfoj dk mn~?kkVu djrs gq, laLFkku ds dk;Zdze izeq[k& tylesV ,oa ekuo lalk/ku fodkl Mk- vkj- ds- frokjh us dgk fd fdlku HkkbZ;ksa dks vius eosf"k;ksa dk LokLF; ijh{k.k le;≤ ij djkrs jguk pkfg,A mUgksus fdlku HkkbZ;ksa ls vkOgku fd;k fd cjlkr ds ekSle esa eosf"k;ksa tSls xk;] HkSal] HksM+] cdjh] cSy bR;kfn dks ladze.k okyh chekfj;ka T;knk gksrh gSaA vr% lgh le; ij i"kqvksa dk LokLF; ijh{k.k vfr vko";d gSA dk;Zdze ds izkjaHk esa MkW- jes"k flag] iz/kku vUos'kd ty lesV ifj;kstuk us lHkh vfrfFk;ksa ,oa fdlku HkkbZ;ksa dk Lokxr fd;kA

i"kq LokLF; f"kfoj mn~?kkVu mijkar ty lesV Vhe ds lkFk MkW- vkj- ds- oekZ] i"kq fpfdRld] Hkkjrh; pjkxkg ,oa pkjk vuqla/kku] >k¡lh us xzke ijklbZ] Nriqj ,oa cNkSuh esa vk;ksftr f"kfojksa esa fdlkuksa }kjk yk;s x;s eosf"k;ksa dk LokLF; ijh{k.k djds mudh chekjh ds bykt gsrq vko";d nok;sa forfjr dhA i"kq LokLF; f"kfoj esa fdlku HkkbZ;ksa us c<&+p< dj Hkkxhnkjh dh ,oa vius eosf"k;ksa dks f"kfoj LFky ysdj vk;sA fdlku HkkbZ;ksa us bl rjg ds i"kq LokLF; f"kfojksa ds vk;kstu izfr frekgh djkus gsrq vkxzg fd;kA dk;Zdze esa ty lesV Vhe ds lnL; MkW- banz nso] MkW- ds-ch- Jh/kj] Jh jkts"k JhokLro] Jh f"k"kqiky flag ;kno] Jh vkuan] Jh ohjs"k ,oa Jh vej falg us viuk egRoiw.kZ ;ksxnku fn;kA dk;Zdze dk la;kstu ,oa lapkyu MkW- vkj-ih- f}osnh] iz/kku oSKkfud ¼d`f'k izlkj½ ,oa vkHkkj MkW- jes"k flag] iz/kku oSKkfud us O;Dr fd;kA

The Annual Group meeting of All India Coordinated Research Project on Agroforestry was inaugurated by Dr. Javed Rizvi, Regional Director, South Asia Programme, World Agroforestry Center, on 25th of July, 2015 at Nund Reshi Convention center SKUAST-K, Shalimar, Srinager. Prof. K N Qaisar, Dean Faculty of Forestry welcomed the guests and highlighted the programme of AICRP-Agroforestry. He said that it was a dream come true that this event was being organized in the university.

Prof. Shafiq A Wani, Director Research, SKUAST-K deliberated upon the importance of Agroforestry Systems in the valley context. This land use system has the potential to bridge the gap between demand and supply of fodder, fuel wood and timber. Dr. S. K. Dhyani, former Director CAFRI, presented the Coordinator's report. Dr Dhyani appreciated the efforts of the Hon'ble Vice Chancellor Dr Tej Pratap for world class infra-structure at Shalimar and other campuses. Dr. Dhyani informed that two more centers are being added one at Shvamong and another at SKUAST-Jammu in the AICRP group besides, National Mission on Agroforestry is being launched very soon. Silvipasture Systems and boundary plantations need to be promoted and one third of the land should be put under the fodder for the livestock and the remaining under AF Systems.

Dr. S. Thiliagar, Vice Chancellor Tamil Nadu University of Veterinary and Animal Sciences, Chenai as Special Guest gave the remarks about the group meeting. He applauded the scientific community and asked them to work for farming community so that they can live in a sustainable way.

Manual on Plantation Forestry, Important trees and shrubs of Kashmir valley, Research Abstracts of Faculty of Forestry and Agroforestry system in Tamil Nadu and a Marathi book were released on this occasion.

Dr. Tejwani Award Excellence in Agroforestry Research and Development was announced and was conferred upon Dr. A. Arunachalam, Principal Scientist & Scientific Officer, Office of the Secretary DARE & DG, ICAR, Krishi Bhawan, New Delhi and Dr. Rajendra Prasad, Principal Scientist (Soil Science), Central Agroforestry Research Institute, Jhansi (U.P.) India.

Chief Guest, Dr Javed Rizvi, stressed that India should be used as technological hub and help neighbouring countries and people in need. He announced that Regional consultation meeting

is going to be held in October this year and he invited the scientists to take part in the meeting. He told that the brain storming sessions will be multi-disciplinary and all the streams will be involved.

Dr. Tej Pratap, Vice chancellor delivered the presidential address and exhorted upon the scientists to work for the farming community in the state.

Dr A. H. Mughal, Organizing Secretary, of the programme thanked all the dignitaries and the participant scientists who came from different parts of the country in the event. He thanked ICAR, CAFRI, Dean and members of Forestry of Forestry for their help. All the Centres presented their progress report and also presented the technical progreamme for the forthcoming year. Seventy one participants from different parts of the country participated in the national event under 37 centres.

During the AICRPAF annual group meeting a plenary lecture was delivered by Dr. R.K. Tewari, CAFRI on Agroforestry based watershed intervention. He emphasized about the work done by CAFRI at Garhkundar Dabar watershed and Parasai Sindh watershed. General Body Meeting of the Indian Society of Agroforestry was also held on 26th July, 2015 wherein various issues were also discussed.

The plenary session was organized on the last day of group meet. Dr. S. A. Wani was the Chairman of the session. Dr. K. N. Qesar was the Guest of Honour and Dr. S. K. Dhyani presided over the session. The plenary session was conducted by Dr. Inder Dev.

Dr. Inder Dev welcomed all the dignitaries on the dias and briefed the dignitaries and the delegates and other participants about the deliberations held during three days. There were 30 presentations made by the delegates that includes 27 presentations by the different centres and 02 presentations were made by (SKUAST-Jammu and Shivmoga University).

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HUMAN RESOURCE DEVELOPMENT

- Dr. Mahendra Singh, participated in Refresher course on Agriculture Research Management during 13th -27th July, 2015 held at NAARM, Hyderabad.
- Dr. R. K. Tewari, Dr. Sudhir Kumar, Dr. R. P. Dwivedi, Dr. Inder Dev and Dr. K. B. Sridhar, Dr. Asha Ram, Sh. S. B. Chavan & Sh. A. R. Utthappa participated in the Annual Workshop of All India Coordinated Research Project on Agroforestry from 25th to 27th July, 2015 at SKU AST(K), Srinagar.
- Dr. R. H. Rizvi participated in training on “Hyperspectral Remote Sensing” at National Remote Sensing Centre, Hyderabad during 27th to 31st July, 2015.
- Dr. Ram Newaj, Dr. R. H. Rizvi and Sh. S. B. Chavan attended 4th NICRA Review Meeting held at Central Marine Fishries Institute, Cochin during 12th to 14th August, 2015.
- Dr. Dhiraj Kumar attended 3 months attachment training on “Estimation of some soil properties through alpha- MIR Spectroscopy” from 11th May to 10th August, 2015 at IISS, Bhopal.
- Dr. Ramesh Singh participated in one day training programme organised by district administration, Jhansi to train District Technical Resource Team (DTRT) of Jhansi, Lalitpur

and Jalaun districts under MGNREGA scheme on 19th August, 2015 at Vikas Bhawan, Jhansi. He has delivered lecture on "Cost-effective design of rainwater harvesting structures".

- Sh. A. R. Uthappa attended 21 days Summer school on "Conservation agriculture for enhancing resource use efficiency and arresting land degradation" during 19th August to 8th September, 2015 held at ICAR RC NEH, Umiam.

Dr Inder Dev attended International Training Programme on "Conservation Agriculture: (CA): Developing Resilient Systems" during 2nd to 11th September, 2015 held at CSSRI, Karnal.

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VISIT ABROAD

- Dr. S. Vimala Devi, Sr. Scientist participated in the Regional Workshop on Development of Communication Strategies for Adoption of Agri-Biotechnology in Asia on 28th to 29th September, 2015 held at Chiangrai, Thailand.

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Exhibitions

Institute participated in Agricultutre Exibition on 21st August, 2015 at Piprakothi, Motihari district of Bihar. In the exhibition agroforestry technologies and work related Garhkundar watershed was showcased. Dr. S Ayyappan, Secretary, DARE and Director General, ICAR, New Delhi, Dr. A. K. Sikka, Deputy Director

General (NRM), ICAR, New Delhi and Directors and Farmers also visited the ICAR-CAFRI Stall. The Exibition at Piprakothi, Motihari was very successful and increased the awareness of farmers about agroforestry.

Seminar

Dr. R P Dwivedi, Pr. Scientist delivered the Seminar on 27th August,2015 on the topic entitled " Mera Goan- Mera Gorav: Krishi Vegyanikon aur Kisano ke Beech Majboot Sambandh Ke Kadi " and all Scientist, Technical Officer, RA and SRF participated in the seminar.

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