



कृषिवानिकी समाचार पत्र



Agroforestry Newsletter

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डॉ. त्रिलोचन महापात्रा, माननीय सचिव, कृषि अनुसंधान शिक्षा विभाग, भारत सरकार एवं महानिदेशक, भारतीय कृषि अनुसंधान परिषद, नई दिल्ली का भ्रमण

डॉ. त्रिलोचन महापात्रा, सचिव, कृषि अनुसंधान शिक्षा विभाग, भारत सरकार एवं महानिदेशक, भारतीय कृषि अनुसंधान परिषद, नई दिल्ली ने 30 जुलाई 2017 को संस्थान का भ्रमण किया। उन्होंने अनुसंधान प्रक्षेत्र, कृषि प्रदर्शनी का भ्रमण किया। इस अवसर पर उन्होंने संस्थान के नवनिर्मित स्वल्पाहार गृह का लोकार्पण किया। तदोपरान्त वृक्षारोपण भी किया। संस्थान के सभागार में आयोजित कार्यक्रम में उन्होंने अपने उद्बोधन में कहा कि हमें अपना अनुसंधान लघु एवं सीमांत कृषकों की आवश्यकता के अनुसार ध्यान में रखकर करना होगा। उन्होंने कहा कि प्रधानमंत्री श्री नरेन्द्र मोदी के मिशन 2022 तक किसानों की आय दो गुनी करने हेतु टिकाऊ एवं सस्ती तकनीकी किसानों तक पहुँचानी होगी, जिससे देश की आर्थिक स्थिति सही होगी। कार्यक्रम के दौरान उन्होंने कर्मचारियों से कहा कि अपनी समस्याएं खुलकर बताएं। जिस पर कर्मचारियों ने अपनी समस्याएं बताई जिसके लिए उन्होंने समाधान हेतु निर्देश दिये।

इससे पूर्व संस्थान के निदेशक डॉ. ओ.पी. चतुर्वेदी ने महानिदेशक महोदय के समक्ष संस्थान की गतिविधियों के बारे में विस्तृत आख्या प्रस्तुत की।

इस अवसर पर डॉ. पी.के. घोष, निदेशक, भाकृअनुप – भारतीय चरागाह एवं चारा अनुसंधान संस्थान, झाँसी, डॉ. मुकेश श्रीवास्तव, रजिस्ट्रार, रानी लक्ष्मीबाई केन्द्रीय कृषि विश्वविद्यालय, झाँसी, डॉ. आर.एस. यादव, अध्यक्ष, अनुसंधान केन्द्र, दतिया, डॉ. निशी राय, अध्यक्ष, के.वी.के., झाँसी तथा संस्थान के वैज्ञानिक, अधिकारी, कर्मचारी, शोध अध्ययता / छात्र-छात्राये उपस्थित रहे।



Performance of gum *Arabic* (*Acacia senegal* L.) based agroforestry models in Bundelkhand: Potential for livelihood option and increasing farmers' income

Acacia senegal (Linn) Wild a member of Mimosaceae, is a small tree of 3-6 m in height with umbrella-shaped crown. It is a typical tree of Sahel in Africa from Senegal to red sea and essentially limited to the area between 11° and 16° North, with a wide range of rainfall 100 to 800mm. It spread widely in tropical Africa from Mozambique, Zambia to Somalia, Sudan, Ethiopia, Kenya, Tanzania and Nigeria, and in South Asia in India and Pakistan. In India it is a typical tree of arid regions with a low rainfall of 100-250mm. It is drought resistant and tolerates prolonged dry period of 10-11 months, with maximum temperature reaching 50°C with strong winds, but susceptible to frost. It occurs mostly on sand stones and skeletal soils and widely distributed as interspersed species in most of the rangelands and grasslands in arid and semi-arid regions of India.

World's 90% gum Arabic is produced from *Acacia senegal*. The quality of gum is very superior as compared to gum from any other species of *Acacia*. Nearly 90% of gum Arabic is produced by Republic of Sudan especially from (Kordafan). Production of gum Arabic is meagre in India, and contribution to the world production is negligible. The total annual output of gum Arabic is only 800 Mt compared to world production and consumption of 60,000-70,000 Mt. The domestic production is insufficient even for domestic consumption and hence, imported from Sudan and Nigeria to meet India's requirements. Gum exudes from cracks in bark of trees, mostly in the dry season. In Sudan the annual yields from young trees ranges from 188 to 2856 g (av. 0.9 kg), and from older trees, 379 to 6754 g (av. 2.0 kg). In India, however, the productivity is low varying from 175 to 550g tree⁻¹ year⁻¹. The main gum producing regions of India where natural as well as planted stands of *A. senegal* occur are in desert and arid region of Rajasthan, Gujarat, Haryana, and Punjab. The gum yield from various *Acacia* trees in their natural habitat is very poor.

In Bundelkhand, there is a good scope for extending area for large- scale plantation for

production of gum Arabic. The area covered under forest, barren and uncultivable pastures, and community grazing land can be used for commercial plantation of *A. senegal*. The Bundelkhand region typically represents semi-arid climate and is prone to frequent drought. Most of the terrain is undulating with rocky and gravelly surface. Cultivation of gum Arabic can provide an alternative livelihood option to the poverty stricken farming community. Assuming average yield of 250g per tree, a farmer can harvest about 25kg gum per year by planting 100 trees/ ha on field boundary or at spacing of 10 x 10 m. This would generate revenue of Rs 12500 ha⁻¹ year⁻¹ if, gum is sold at a minimum price of Rs. 500 kg⁻¹. In addition, systematic commercial plantation of *Acacia senegal* can also provide employment to millions of people towards various planting activities and gum collection. According to an estimate of FAO, gum collection sustains about 0.3 million people and has huge potential of employment.

Integration of *Acacia senegal* in traditional grazing grounds such as *orens* and *gochars*, systematically raised silvopastoral systems and other agroforestry landuse for production of gum Arabic can be a profitable proposition. It will not only provide alternative livelihood options to local people but also increase economic viability of the land use. In consideration of wide variations in gum production in respect to sites, annual rainfall and geographical locations, it is imperative to study growth performance of *A. senegal* in different eco-regions and develop site specific models for optimizing production of gum Arabic. Research efforts are being made at Central Agroforestry Research Institute, Jhansi, a co-ordinating centres in the ICAR-network project on Natural Resin and Gums; to introduce and evaluate performance of *Acacia senegal* in agroforestry models. The main objective is to develop suitable agroforestry models based on gums and resins yielding trees for Bundelkhand region.

The study site – Jhansi is located at 24° 11' N- 78° 17' E with an altitude of 271 m above msl. Mean annual rainfall is 960 mm with an average of 52 rainy days

per year. Mean maximum temperature ranges from 47.4°C (June) to 23.5°C (January) and mean minimum temperature from 27.2°C (June) to 4.1°C (December). The main soil types in the region are red (Alfisol) and black (Vertisol). *Acacia senegal* was planted in five agroforestry models (3 at research farm and 2 at farmer's field) in 2009. The models represent either agri-horti-silviculture or horti-silviculture system of agroforestry. In these models, *A. senegal* is planted either on boundary or as row plantation. One block plantation of *Acacia senegal* was also done at research farm. The performance of *A. senegal* has been evaluated for variation in plant height and collar diameter and exudation of gum at various sites in different models.



Plate 1. *Acacia senegal* based agroforestry models on research farm and farmer's field

Survival of *A. senegal* varied from 86 to 96% in agroforestry models established at research farm while from 54 to 78% on farmers field. Plant height, girth at breast height (gbh) and canopy of trees respectively ranged from 3.28 to 4.59m, 9.2 to 26.0cm, and 7.1 to 16.5m² in models raised at research farm. The respective values on farmers' field varied from 2.3 to 3.5m, 6.1 to 22.5cm and 3.4 to 6.4m². In general, survival and growth performance of *A. senegal* was better in agroforestry models raised at research farm than that on farmers field. Findings also revealed that *A. senegal* performed better in semi- arid region of Bundelkhand than arid region of western Rajasthan wherein after 12 years of age plants reported to attain height of about 3.0m on rocky and gravelly soil. Comparatively lesser survival and growth in terms of plant height, gbh and canopy on farmers field than on research farm appears to be due to grazing hazards to saplings as *annapratha* is practised in the region (Fig 1). In *annapratha* the cattle are let loose, which openly graze and trembles growing saplings planted on farmers' fields. The planted seedlings require to be protected from moving cattle in beginning for 2-3 years.

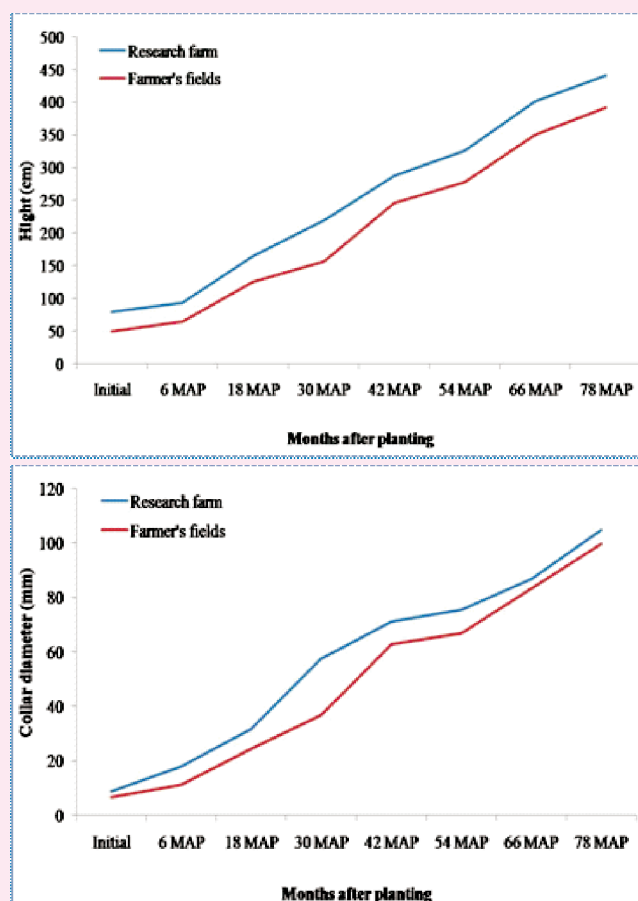


Fig 1. Comparative performance of *A. senegal* at research farm and farmer's fields

Oozing of gum has been observed in model on research farm after five years whereas it was not noticed on farmer's field. The gum yield on research farm varied from 26.1 to 134.7 g/tree with mean of 58.7 g/ tree. The number of gum tears varied from 3 to 7 per tree (Plate 2).



Plate 2. Gummosis and yield of gum Arabic at research farm of ICAR-CAFRI, Jhansi

Despite constraint of *annapratha* in Bundelkhand, the farmers of the region are getting attracted toward Gum arabic (*A. senegal*) based agroforestry models developed at CAFRI Jhansi and many farmers have planted *Acacia senegal* on their fields. The Institute is helping farmers and providing seedlings free of cost. In last five years about 8000 seedlings of gum Arabic (*A. senegal*) have been planted in parasai, chhatpur, bachouni (Jhansi in U.P.) shivrampur, dabar and garkundar (Tikamgarh in M.P) villages on farmers's field mainly as boundary plantation. The farmers preferred this species as it act as live fence besides yielding gum Arabic.

Conclusively, the results indicate that growth of *A. senegal* is very good in semi-arid region of Bundelkhand, and plantations are expected to yield good quantum of gum. This will create an opportunity for farmers to earn extra income for their family.

Acknowledgement

The authors are thankful to the farmers of different villages for extending cooperation and adopting gum yielding tree plantations on their fields. The financial help extended by Indian Council of Agricultural Research, New Delhi in the form of ICAR-Network Project on HPVA of NRG is thankfully acknowledged.

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Swachh Bharat Abhiyan

Various awareness programmes about cleanliness were conducted during 17th September to 1st October, 2017. Cleanliness drive programmes were organized in the Institute campus as well as in the villages. Farmers were motivated for tree plantation, organic farming and cleanliness.



Visits of Sh. Swatantra Dev Singh

Hon'ble Swatantra Dev Singh, Minister of State with Independent Charge for Transport & Protocol and Minister of State for Power in the Government of Uttar Pradesh visited the Institute on 25th September, 2017.



राजभाषा कार्यान्वयन समिति की बैठक

संस्थान की राजभाषा कार्यान्वयन समिति की बैठक दिनांक 14.09.2017 को संस्थान के निदेशक डा. ओ.पी. चतुर्वेदी की अध्यक्षता में सम्पन्न हुई। बैठक में सर्वसम्मति से निर्णय लिया गया कि संस्थान में 14-20 सितम्बर, 2017 के मध्य हिन्दी सप्ताह का आयोजन सुनिश्चित किया जाय इसके साथ ही हिन्दी को बढ़ावा देने के लिए विभिन्न प्रतियोगिताओं का आयोजन किये जाने के संबंध में विस्तार से चर्चा की गयी। हिन्दी सप्ताह के दौरान सप्ताह भर चलने वाली विभिन्न प्रतियोगिताओं की रूप-रेखा तैयार की गयी।

Exhibition

Institute participated in three days Antyodaya Mela/exhibition during 18th-20th September, 2017 at Jhansi, U.P. In the exhibition, agroforestry technologies, biodiesels and watershed management technologies exhibited to the farmers, students and other stakeholders. Sh. Ravi Sharma, MLA (Sadar), Sh. A. Dinesh Kumar (IAS and CDO, Jhansi) and Sh. Karn Singh Chauhan (District collector, Jhansi) visited the CAFRI stall and appreciated CAFRI efforts. The exhibition was very successful and increased awareness about benefits of agroforestry in the era of climate change. Dr. Asha Ram, Dr. Dhiraj Kumar and Sh. Lal Chand, ICAR-CAFRI participated in the exhibition.



हिन्दी सप्ताह (14-20 सितम्बर, 2017)

दिनांक 14.09.2017 को कार्यक्रम की शुरुआत आई.सी.ए. आर. कुलगीत से हुई। प्रभारी अधिकारी राजभाषा डा. आर.पी. द्विवेदी ने सभी का स्वागत करते हुए “हिन्दी सप्ताह” के अन्तर्गत सप्ताह भर होने वाले कार्यक्रमों की विस्तृत रूप-रेखा प्रस्तुत की। हिन्दी सप्ताह उद्घाटन के अवसर पर हिन्दी को बढ़ावा देने के लिए माननीय केन्द्रीय कृषि मंत्री, भारत सरकार का संदेश डा. आर.के. तिवारी, प्रधान वैज्ञानिक एवं भारतीय कृषि अनुसंधान परिषद, नई दिल्ली के महानिदेशक डा. त्रिलोचन महापात्रा जी की अपील डा. अनिल कुमार, प्रधान वैज्ञानिक द्वारा पढ़कर उपस्थित सभी



लोगों को अवगत कराया गया। इस अवसर पर डा. राजेन्द्र प्रसाद, डा. मधुलिका श्रीवास्तव, श्री एस.बी. शर्मा एवं डा. के.बी. श्रीधर ने हिन्दी को बढ़ावा देने के लिए अपने विचार व्यक्त किये। उद्घाटन सत्र के उपरान्त दूसरे सत्र में हिन्दी कार्यशाला का आयोजन भी किया गया। हिन्दी सप्ताह : राजभाषा कार्यान्वयन समिति की बैठक में लिए गये निर्णय के अनुसार पूरे सप्ताह भर विभिन्न प्रतियोगिताओं को सफल बनाने हेतु निदेशक महोदय द्वारा प्रत्येक प्रतियोगिता के लिए अलग-अलग निर्णायक मण्डल का गठन किया गया। प्रतिभागियों को प्रोत्साहित करने के लिए प्रत्येक प्रतियोगिता में प्रथम, द्वितीय एवं तृतीय पुरस्कारों का वितरण किया गया। इसके साथ ही साथ यह भी निर्णय लिया गया कि सरकारी कामकाज में राजभाषा को बढ़ावा देने हेतु प्रशासनिक, तकनीकी एवं वैज्ञानिक वर्ग से जिन अधिकारियों एवं कर्मचारियों द्वारा पिछले एक वर्ष के कार्यकाल में 20,000 या उससे अधिक शब्द हिन्दी में लिखा गया हो उनको प्रथम पुरस्कार रु. 1000-00, द्वितीय पुरस्कार रु. 600-00 तथा तृतीय पुरस्कार रु. 300-00 दिया गया। इसके मूल्यांकन के लिए निदेशक महोदय द्वारा एक समिति का गठन किया गया।

हिन्दी सप्ताह का समापन कार्यक्रम दिनांक 20.09.2017 को मुख्य अतिथि डा. आर.वी. कुमार, प्रभारी निदेशक, ग्रासलैण्ड ने अपने उद्बोधन में कहा कि शोध कार्यों में विशेषकर प्रकाशन, संदर्भ-संग्रह, कृषि उपयोगी जानकारी इत्यादि में हिन्दी के प्रयोग को बढ़ाये जाने की आवश्यकता है। उन्होंने कहा कि फ्रांस, जर्मनी, रूस, जापान तथा चीन ऐसे उदाहरण हैं जो कि अपने अनुसंधान कार्य के लिए राष्ट्रभाषा का प्रयोग करते हैं, इसी कारण दूसरे देशों में विज्ञान एवं अनुसंधान जन-जन तक राष्ट्रभाषा के माध्यम से पहुँचा है। हमारे देश भारत में हिन्दी को राजभाषा से राष्ट्रभाषा करने हेतु प्रयास की जरूरत है तभी आम आदमी को विज्ञान एवं अनुसंधान कार्य हिन्दी में समझने में आसानी होगी।

कार्यक्रम की अध्यक्षता करते हुए संस्थान के कार्यवाहक निदेशक डा. अनिल कुमार ने राजभाषा के व्यवहारिक प्रयोग पर बल दिया। उन्होंने समस्त वैज्ञानिकों, अधिकारियों एवं कर्मचारियों से अपील भी किया कि हिन्दी में पत्राचार को बढ़ाने में अपना सहयोग प्रदान करें जिस से राजभाषा विभाग द्वारा दिये गये लक्ष्यों को पूरा किया जा सके। अन्त में हिन्दी सप्ताह को सफल बनाने के लिए सभी को धन्यवाद ज्ञापित किया गया।

आर.पी. द्विवेदी एवं ओमप्रकाश

भा.कृ.अनु.प.—केन्द्रीय कृषिवानिकी अनुसंधान संस्थान, झाँसी

ICAR- ICRAF Work Plan Meeting

An exposure visit and a meeting were held for Formulation/development and implementation of “National Agroforestry Policy” for Nepal during 11th -12th August, 2017. In this meeting Senior officials from different Ministries, Government of Nepal, officials from ICRAF and ICAR- CAFRI participated. This interaction meeting was conducted by ISAF, ICAR- CAFRI and ICRAF (New Delhi Centre) under ICAR- ICRAF Work plan.

Human Resource Development

- Dr. Dhiraj Kumar, Scientist (Soil Science) participated in the Training programme on “Advanced Remote Sensing and GIS Applications in Integrated Land Resource Management” from July 17-29, 2017 at ICAR-NBSS & LUP, Nagpur.
- Dr. A K Handa, Pr. Scientist participated in the Standard Development Group meeting of Trees Outside Forest on 5th August, 2017 in New Delhi organized by Network for Certification and Conservation of Forests.
- Dr. A K Handa participated in Regional Workshop on Development of SAARC Regional Project on Community based Non Wood Forest Product Enterprise: A sustainable business model during 24th-26th August, 2017 at Thimpu, Bhutan.
- Dr. Sudhir Kumar and Sh. Lal Chand participated in the International Conference on “Horticulture: Priorities & Emerging Trends” during 5th-8th September, 2017 held at IIHR, Bengaluru.
- Dr. R. H. Rizvi participated in the National Symposium on “Application of Remote Sensing & GIS in Indian Scenario with Special Reference to Agriculture & Forestry” during 15th-16th September, 2017 at UAS, Dharwad held at College of Forestry, Sirsi.
- Dr. Inder Dev and Dr. Naresh Kumar participated in the National Conference on “Alternate Farming Systems to Enhance Farmers' Income” during 19th-21st September, 2017 held at Y.S. Parmar, UHF, Nauni, Solan (H.P.).

- Dr. Naresh Kumar participated and delivered a lecture on the topic “Effect of growing media and arbuscular mycorrhizal fungi on seedling growth of *Leucaena leucocephala* (Lam.) de Wit” in National Conference on Alternate Farming Systems to Enhance Farmers' Income during 19th-21st September 2017 organized by Indian Ecological Society- Himachal Chapter, Directorate of Research, YSP University of Horticulture and Forestry Nauni, Solan (HP) at Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan 173230, H.P.

Awards

- Dr. Naresh Kumar got the 3rd Best paper presentation award in National Conference on “Alternate Farming Systems to Enhance Farmers' Income” during 19th-21st September 2017 organized by Indian Ecological Society- Himachal Chapter, Directorate of Research, YSP University of Horticulture and Forestry Nauni, Solan (HP) at Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, H.P.
- Dr. Naresh Kumar got the “Distinguished Service Award – 2017” from Society of Biological Sciences & Rural Development, Allahabad – 211019, U.P.

Independence Day

Independence Day (15th August, 2017) was celebrated at ICAR-CAFRI, Jhansi. Flag hoisting ceremony was observed on this occasions. Cultural programmes and sport events were organized for the staff along with their family members on the occasions.



एक कदम स्वच्छता की ओर

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