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Agroforestry



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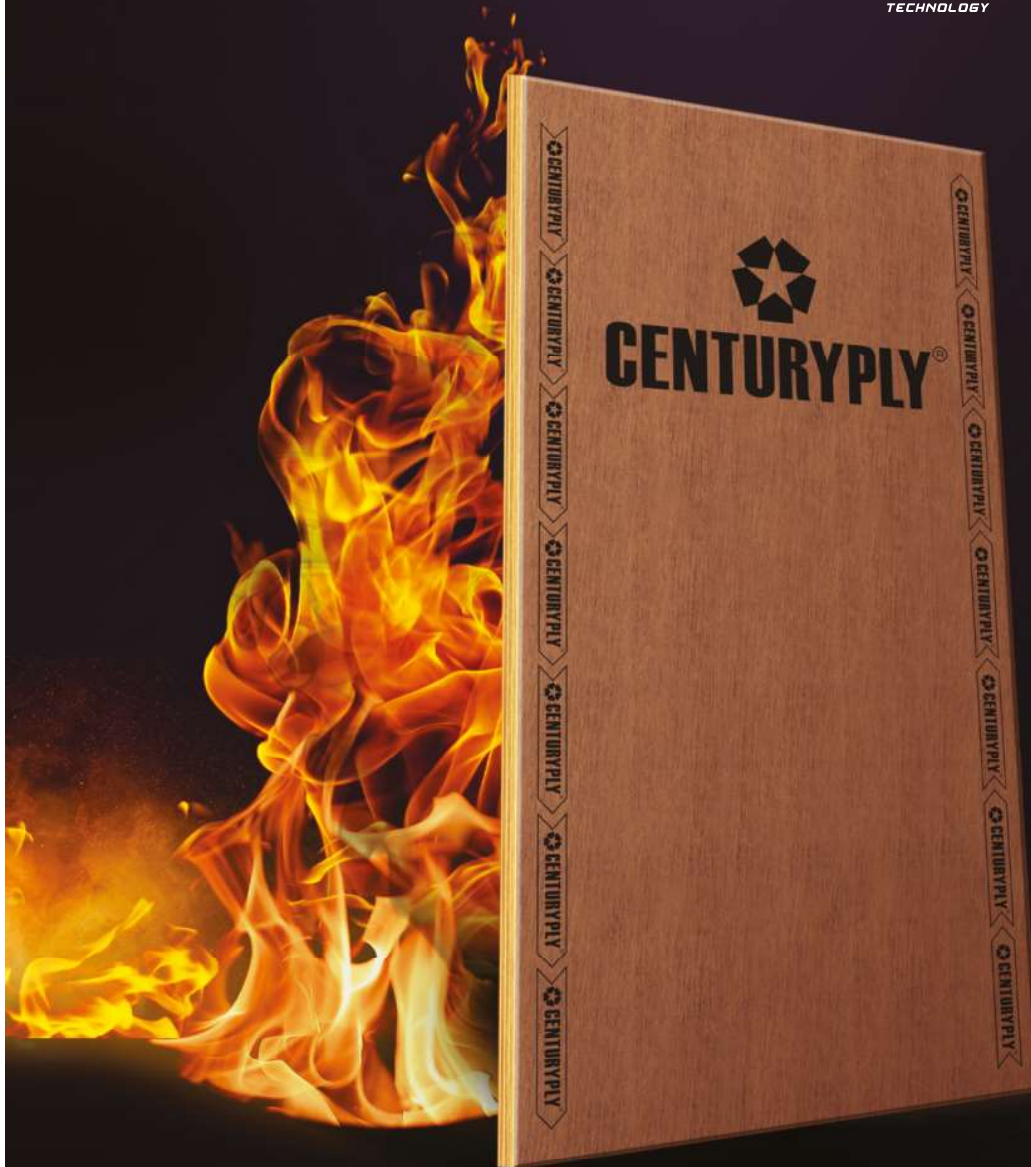
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(An Autonomous Council of Ministry of Environment Forest and Climate Change, Government of India)

VISION

To achieve long-term ecological stability, sustainable development and economic security through conservation and scientific management of forest ecosystems



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To generate, advance and disseminate scientific knowledge and technologies for ecological security, improved productivity, livelihoods enhancement and sustainable use of forest resources through forestry research and education

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Varieties/ Clones developed

- Developed improved germplasm of many forest tree species.
- Released 47 high performing and disease resistant clones of *Eucalyptus*, *Casuarina*, *Shisham*, *Melia* and *Sarpagandha* with an envisaged production gain of more than 20%. The developed germplasm are being made available to the State Forest Departments and farmers for use in plantations.



High performing and disease resistant clone of *Melia* sp.



CYCUS v. 1.0

- Casuarina Yield Calculator Utility Software (CYCUS v1.0) software has been developed to facilitate the farmer and other user agencies in yield estimation which requires only observations on girth of 100 sample trees per acre of plantation.

Wood Welding

Wood welding is new to our country. In this technique wood joints can be made without using nails and adhesives making them more natural and chemical free. A wood welding machine has been designed and fabricated at Forest Research Institute, Dehradun. Success has been achieved in spin welding of wood pieces of few species.



Wood Welding Machine



Indian Council of Forestry Research and Education

New Initiatives

- Transparent wood- a flexible and biodegradable transparent wood has been fabricated using poplar wood veneer and water soluble polymer- polyvinyl alcohol. The transparent wood exhibited high optical transmittance, high haze and light diffusing property.



Natural wood (Left most), Lignin modified wood (middle) and Transparent wood (right most) placed on a paper with letters "IWST"

Heat storage based modified Solar Kiln

- Solar heat storage system based solar kiln has been developed by Forest Research Institute, Dehradun for timber drying. The solar heat is trapped using suitable phase change material (PCM). The New solar kiln is able to trap 39 % more heat in winters as compared to traditional green-house based traditional FRI solar kiln developed during 1970.



Head based storage Solar Kiln

Xylarium

- Collection of authentic wood samples both from India and other countries, depicting wood biodiversity of the country like lightest, heaviest, sweet-smelling, foul smelling, smoothest, streaked, variegated wood and wood of different colours, etc. The collection of wood cross sectional discs depicting variation in sapwood and heartwood colour is a unique feature of the xylarium.
- Wood identification services.



Xylarium- Collection of Authentic wood samples

Tree hollowness detection technique based on ultrasonic waves

- Forest Research Institute, Dehradun has developed ultrasonic techniques (Non-destructive testing) to detect the location and magnitude of the hollowness of the standing tree. This will help to remove the potential human hazards by way of falling down of such trees during a high wind regime in Urban Forestry.



Measurement of hollowness in a tree using ultrasonic detector

Agroforestry models

- Various agroforestry models (Poplar, Eucalyptus, Melia, Casuarina and Babool) have been developed to improve green cover, enhance farmers income and to mitigate climate change.



Poplar based agroforestry model with wheat

Innovative Bamboo Bottles

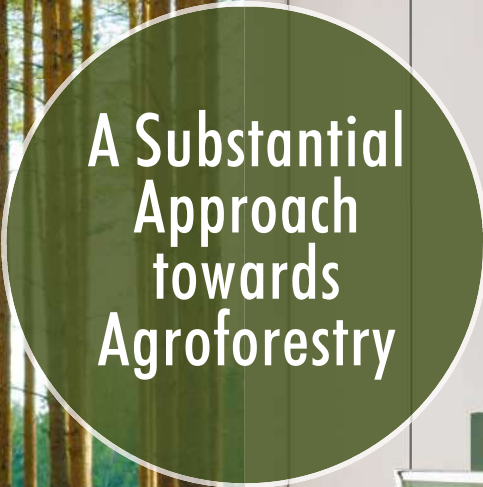
- Techniques for making bamboo bottles by using Bamboo Treatment Technologies of ICFRE. Most suitable bamboo species for making bottles are Shil Barak (*Bambusa salarkhanii*) & Barak (*Bambusa balcooa*). One full bamboo is sufficient for making 21 full size bottles and 12 small bottles.



Bamboo bottles

For further details please contact :

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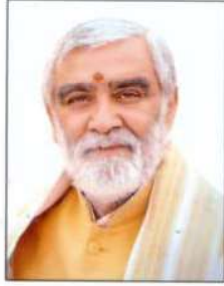
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अश्विनी कुमार चौबे
Ashwini Kumar Choubey



प्राक्कथन

जलवायु परिवर्तन जैसी वैश्विक चुनौती से निपटने एवं वायु प्रदूषण की रोकथाम में यह अति आवश्यक है कि वनावरण के संरक्षण एवं संवर्धन के साथ-साथ वनों के बाहर भी वृक्षारोपण को अधिक बल दिया जाए। निजी भूमि, शहरी क्षेत्रों, सड़कों, नहरों एवं रेलवे लाइनों के किनारे, सरकारी और अन्य संस्थानों की भूमि पर वृक्षारोपण के साथ साथ कृषि वानिकी पर अधिक बल दिया जाए, क्योंकि भारत की कुल भूमि का तकरीबन 60.3% भूमि कृषि भूमि है। इस अपार भूभाग में खेतों के किनारे वृक्षारोपण की असीम संभावनाएँ हैं।

कृषि वानिकी के महत्व को देखते हुए इसको बढ़ावा देने के लिए कई महत्वपूर्ण कदम उठाए जा रहे हैं। कृषि वानिकी मॉडलों को समझने और उसमें सुधार लाने हेतु वैज्ञानिक प्रयास किए जा रहे हैं।

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय द्वारा राष्ट्रीय वन नीति, राष्ट्रीय कृषि-वानिकी नीति, भारतीय वन अधिनियम और वन (संरक्षण) अधिनियम के बीच नीतिगत सामंजस्य स्थापित करने हेतु एक कार्यबल का गठन किया गया है। इसके अलावा, देश में कृषि-वानिकी तथा वनों के बाहर वृक्षों के विस्तार के लिए प्रोत्साहन प्रदान करने हेतु संभव समाधान उपलब्ध कराने के उद्देश्य से मंत्रालय द्वारा वरिष्ठ वन अधिकारियों को शामिल करके एक संयुक्त कार्यकारी समूह का भी गठन किया गया है, जिससे भारत में कृषि वानिकी को और अधिक बढ़ावा मिलेगा।

मुझे आशा है कि "वुड इज़ गुड" पत्रिका के इस अंक से कृषि-वानिकी अनुसंधान और विकास कार्य में लगे अनुसंधान संस्थानों, वैज्ञानिकों, शिक्षाविदों और उद्योगों को अपने लक्ष्यों को नए सिरे से उन्मुख करने तथा कृषि-वानिकी से संबंधित समस्याओं का समाधान करने में मदद मिलेगी। मैं काष्ठ विज्ञान और प्रौद्योगिकी संस्थान को इस पत्रिका को प्रकाशित करने हेतु उनके प्रयासों के लिए साधुवाद देता हूँ।

(अश्विनी कुमार चौबे)

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Preface

Agroforestry is one of the most sustainable farming practices that greatly helps in making agriculture more resilient. It also helps in increasing farmer's income, reducing pressure on natural forests and boosting shared prosperity of the community in terms of environmental benefits. In India, agroforestry alone meets about 80% of the raw material consumed by various wood based industries, whereas natural forests contribute just about 3.5% of the total timber requirement of the country. With the growing demand for industrial wood, area under commercial agroforestry is expanding. As per the Forest survey of India estimate, Tree Outside Forest area produces about 74.00 million cubic meter of wood annually. It has a potential of producing 100.00 million cubic meter of timber/pulp wood, 150.00 million tonnes of firewood and sequester about 60.00 million tonnes of carbon. Hence, agroforestry has a huge potential to meet the wood requirement of the country along with coproduction of many environmental goods and services like carbon sequestration.

Realizing the potential benefits of agroforestry, in the Annual General Body meeting of ICFRE Society held on 28th April 2022 Hon'ble Union Minister, Ministry of Environment, Forest, and Climate Change emphasized that, to give boost to the agroforestry sector, ICFRE should give special focus for research on agroforestry issues. He also directed ICFRE to organize research conferences across the country to identify the problems associated with agroforestry. Pursuant to the directions of Hon'ble Union Minister, ICFRE through its institutes organized five Regional Research Conferences (RRCs) across the country. These Regional Research Conferences (RRCs) were well represented by the states, research wings of State Forest Departments (SFDs), universities, research institutions working in these thematic areas, NGOs, industrial representatives, young researchers, scientists and various other grassroot level institutions. Special sessions were held on the theme of "Promotion of agroforestry" as well as issues and challenges in promoting agroforestry.

The deliberations and key recommendations of the RRCs are published in this issue of "Wood is good" magazine along with popular articles related to agroforestry with an intention to seek the attention of stakeholders representing wood based industries, research institutions working on agroforestry, academicians, farmers, traders, and policy makers on various issues related to promotion of agroforestry in the country. It is hoped that all the stakeholders associated with the agroforestry sector come forward to work together with ICFRE institutions in addressing various issues associated with agroforestry in India to make India "Atmanirbhar Bharat" in terms of production of wood and wood products.

(Arun Singh Rawat)

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