EXTENSION STRATEGY OF ICFRE 2025-30

Indian Council of Forestry Research and Education

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

Dehradun - 248 006, (Uttarakhand)

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Patron:
Smt. Kanchan Devi, IFS
Director General
Indian Council of Forestry Research and Eduction, Dehradun

Prepared By
Dr. Sudhir Kumar, DDG (Extension), ICFRE
Dr. Geeta Joshi, ADG (M&Extn.), ICFRE
Dr. Vishwajeet Sharma, STO, (M&Extn.), ICFRE

Support Rendered by
Sh. Prince, Technical Assistant, (M&Extn.), ICFRE

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सत्यमेव जयते

कंचन देवी, भा.व.से.
महानिदेशक

Kanchan Devi, IFS
Director General

कुलाधिपति व.अ.सं. विश्वविद्यालय
Chancellor, FRI University

महानिदेशक
भारतीय वानिकी अनुसंधान एवं शिक्षा परिषद्
डाकघर न्यू फॉरेस्ट, देहरादून–248006
(आई एस ओ 9001: 2008 प्रमाणित संस्था)

Director General
Indian Council of Forestry Research and Education
P.O. New Forest, Dehra Dun - 248006
(An ISO 9001 : 2008 Certified Organization)

Foreword

ICFRE has long been at the forefront of advancing forestry science, fostering sustainable practices and ensuring the conservation and scientific management of India's forest resources. ICFRE remains committed to bridging the gap between research and field application through its extensive network of research institutes and centers.

The role of forestry extension is critical in translating scientific advancements into practical solutions that benefit diverse stakeholders including state forest departments, forest-dependent communities, farmers, industries, policymakers etc. Recognizing this, ICFRE established the Directorate of Extension in 1994-95 to systematically disseminate research findings and technological innovations. Over the years, three extension strategies have been formulated. The previous strategy 2018-23 (extended to 2024) was successfully implemented through a wide range of initiatives such as Van Vigyan Kendras (VVKs), Demonstration Villages, Tree Growers Melas, Technology Demonstration Centres, trainings, awareness programme digital outreach etc under CAMPA.

Building upon these efforts, the Extension Strategy for 2025-30 has been meticulously developed, incorporating lessons from past strategies, recommendations from NABCON Consultancy Services, consultations including Regional Research Conferences, Brainstorming Workshops on Extension, Agroforestry, Institute Industry Meets and Consultancies of ICFRE Institutions. This strategy aims to enhance outreach mechanisms, improve accessibility of forestry knowledge and strengthen partnerships with industries, local communities and popularization of products/technologies/package of practices.

By focusing on innovation, collaboration and sustainable forestry practices, this strategic roadmap aspires to empower stakeholders with practical solutions, reinforce ecological resilience and contribute to India's broader environmental and economic goals. ICFRE remains dedicated to advancing forestry extension and ensuring that its research continues to serve the nation effectively.

(Kanchan Devi)

पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार की एक स्वायत परिषद्
An Autonomous Body of Ministry of Environment, Forest & Climate Change, Government of India
दूरभाष/ Phone : 135-2759382 (O)
EPABX : 0135-2224855, 2224333 (O)
ई-मेल/ e-mail : dg@icfre.org

डॉ. सुधीर कुमार
उप महानिदेशक (विस्तार)
विस्तार निदेशालय

Dr. Sudhir Kumar
Deputy Director General (Extension)
Directorate of Extension

भारतीय वानिकी अनुसंधान एवं शिक्षा परिषद्
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार की एक स्वायत्त परिषद्)
पो.ओ. न्यूफॉरेस्ट देहरादून- 248 006 (उत्तराखण्ड)

INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION
(An Autonomous body under the Ministry of Environment,
Forest and Climate Change, Government of India)

दूरभाष: 0135-2224830(का.)(O)
फैक्स नं./ Fax. No. 0135-2750693
ई.मेल/ E-mail.ddg_extn@icfre.org

Preface

Forests are an integral part of India s ecological and economic framework, serving as a vital resource for biodiversity conservation, climate regulation and livelihood sustenance. As India progresses toward sustainable environmental management, an effective and inclusive forestry extension system becomes imperative. The ICFRE Extension Strategy for 2025-30 is designed to address these needs by ensuring a more responsive and innovative approach to forestry extension services. This strategy has been developed through the insights from the 2018-23 strategy, consultative process and recommendations from the NABCON report, Brainstorming Workshops, Regional Research Conferences, Institute-Industry Meetings and ICFRE-WINCOIN discussions, ensuring a multi-dimensional perspective on strengthening forestry extension mechanisms. Special attention has been given to agroforestry practices, forest-based livelihoods, medicinal plant value chains and market linkages, reflecting the diverse challenges and opportunities in the forestry sector.

This extension strategy is a significant improvement over the previous one, incorporating various schemes to disseminate knowledge more effectively. Unlike the previous strategy, it emphasizes practical demonstrations through establishment of demo plots showcasing improved varieties and clones. Additionally, it leverages digital outreach through short documentaries and videos, making information more engaging and accessible. Furthermore, the introduction of a forestry helpline and initiatives to popularize technologies provide direct support to stakeholders and promote widespread adoption of new innovations. These enhancements ensure that the latest advancements in forestry research reach the intended audiences efficiently and effectively.

This strategy is not merely a roadmap, but a dynamic framework for navigating the evolving landscape of forest science and its vital role in addressing global challenges. It aims to amplify ICFRE's impact through strategic partnerships, cutting-edge research and innovative knowledge dissemination. This vision is built on a foundation of collaboration, innovation and sustainability, ensuring that ICFRE remains a leading force in shaping the future of forest research and management.

We are confident that this Strategy will serve as a roadmap for sustainable forestry development, fostering stronger stakeholder engagement and promoting ecological resilience in India.

(Dr. Sudhir Kumar)

डॉ. गीता जोशी
सहायक महानिदेशक
मीडिया एवं विस्तार प्रभाग
विस्तार निदेशालय

Dr. Geeta Joshi
Assistant Director General
Media & Extension Division
Directorate of Extension

भारतीय वानिकी अनुसंधान एवं शिक्षा परिषद्
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार की एक स्वायत्त परिषद्)
पो.ओ. न्यूफॉरेस्ट देहरादून- 248 006 (उत्तराखण्ड)

INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION
(An Autonomous body under the Ministry of Environment,
Forest and Climate Change, Government of India)

दूरभाष: 0135-2224814, 2755221 (का.)(O)
फैक्स नं./ Fax. No. 0135-2750693
ई.मेल/ E-mail.adg_mx@icfre.org

Acknowledgement

The successful formulation of the Extension Strategy 2025-30 is a testament to the tireless efforts, deep expertise and unwavering commitment of a dedicated team.

I am extremely thankful to Smt. Kanchan Devi, Director General, ICFRE for providing her valuable guidance, support and other facilities for execution and preparation of this publication. Overall direction and support provided by Dr. Sudhir Kumar, DDG (Extension), ICFRE for execution of activities and bringing out of this publication is gratefully acknowledged.

I extend my heartfelt gratitude to the distinguished members of the review committee, whose insights and contributions have been invaluable in shaping this strategic roadmap. I sincerely acknowledge the leadership of Dr. Nitin Kulkarni, Director, ICFRE-RFRI, Jorhat (Chairperson), whose vision steered the process with clarity and direction. Our deepest appreciation also goes to Dr. Shakti Singh Chauhan, Scientist-G, ICFRE-IWST, Bengaluru; Smt. Richa Mishra, IFS, Head Extension Division, ICFRE-FRI, Dehradun; Dr. Sandeep Sharma, Director, ICFRE-HFRI, Shimla; Dr. Rekha Warrier, Co-ordinator EIACP, ICFRE-IFGTB, Coimbatore; and Dr. Jagmohan Singh Tomar, Principal Scientist, ICAR-IISWC, Dehradun (External Member), for their instrumental roles in refining this extension strategy. The support and cooperation of Directors of all ICFRE institutes and Heads of Extension are gratefully acknowledged.

Furthermore, I extend my appreciation to Dr. Vishwajeet Sharma, STO and the entire team of the Media and Extension Division, whose meticulous efforts, dedication and hard work ensured the successful completion of this crucial strategy. The extension strategy will undoubtedly help in bridging the gap between research and practice, making forestry innovations accessible to stakeholders across the nation.

This strategy is a product of collective wisdom, collaboration and shared passion for sustainable forestry. With this spirit of dedication, ICFRE continues to work towards fostering an ecologically balanced and economically vibrant future for India's forests and communities.

(Dr. Geeta Joshi)

Content

01

CHAPTER

Introduction

01

Introduction

The Indian Council of Forestry Research and Education (ICFRE), an autonomous body under the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India, has been committed to ensuring long-term ecological stability, sustainable development and economic security for over three decades. These commitments are realized through the conservation and scientific management of forests, supported by extensive research across various forestry disciplines.

ICFRE, headquartered in Dehradun, has nine regional research institutes strategically located in diverse bio-geographical zones across the country in Bengaluru, Coimbatore, Dehradun, Hyderabad, Jabalpur, Jodhpur, Jorhat, Ranchi and Shimla. Under the institutes there are five research centers in Prayagraj, Chhindwara, Aizawl, Agartala and Visakhapatnam. The council strives for the holistic development of forestry research through need-based planning, promoting and conducting targeted research, providing education and coordinating extension activities that encompass all facets of forestry science.

Over the years, ICFRE s dedicated research efforts have yielded a numerous innovative technologies, practical solutions and specialized products tailored to unique challenges of forestry in India. These research outcomes are actively disseminated to various stakeholders through multiple forums, ensuring that the latest advancements in forestry science are accessible for application and furthering the council's mission of fostering a sustainable and economically secure forest ecosystem for the nation.

The ICFRE endeavours to transfer and share its forestry technologies through the Directorate of Extension, established in Dehradun in 1994-95 under the World Bank-funded Forestry Research, Education and Extension Project (FREEP). The directorate has developed diverse extension programs to effectively disseminate research outcomes to a wide range of stakeholders. These programs actively involve State Forest Departments and various other institutions, including Self Help Groups (SHGs), Joint Forest Management Committees (JFMCs) and Village Panchayats. The outreach extends to farmers, women, industries, the rural poor and unemployed youth, ensuring broad-based access to forestry innovations. Through this collaborative approach, ICFRE strengthens the link between scientific advancements and practical applications in forestry, enhancing sustainable practices and livelihoods across communities.

In 2000, the Directorate of Extension launched a comprehensive forestry research extension program for ICFRE. This program was both innovative and thorough, incorporating a detailed analysis of then-current extension methodologies, while also allowing flexibility for revision every five years. As the program progressed, a series of workshops were held at the institute level to gather insights and evaluate the practical aspects of its implementation. These insights were then discussed in a national workshop at ICFRE in 2009, where outcomes were reviewed and suggestions were sought from key stakeholders, particularly State Forest Departments. Based on these deliberations, new extension strategies were formulated in 2010 to better address the evolving needs and challenges in forestry extension and outreach, ensuring the program's continued relevance and effectiveness. Unfortunately, due to a financial crunch, many of the extension activities could not be implemented effectively.

In 2018, ICFRE introduced a new extension strategy, drawing on insights from previous programs to meet the evolving needs of forestry stakeholders. This strategy incorporated conventional extension methods

along with centralized schemes, including Van Vigyan Kendras (VVKs), Demonstration Villages (DVs), networking of VVKs with Krishi Vigyan Kendras (KVKs) and Tree Growers Melas (TGMs). Additionally, the strategy launched innovative initiatives such as Technology Demonstration Centres and a Modified Direct-to-Consumer Scheme, aiming to provide stakeholders with ready-to-use solutions and effective technology transfer. The frequency of TGMs was doubled and efforts to enhance outreach through the digital platforms including extension webpage and social media were significantly scaled up. The strategy placed special emphasis on identifying key technologies each year for targeted dissemination, ensuring the transfer of practical, impactful advancements. Each ICFRE institute was encouraged to share technologies developed across other institutes, fostering a collaborative, nationwide approach to forestry innovation and application. Through these initiatives, ICFRE strengthened its commitment to connecting research with field applications, promoting sustainable practices and supporting the forestry sector at multiple levels.

The strategy was formulated for a period of five years from 2018 to 2023, However in 2020 CAMPA funded scheme “Strengthening Forestry Research for Ecological Sustainability and Productivity Enhancement” was implemented and under that in component-06 Operationlization of Forestry Extension and Action Plan of ICFRE activities mentioned in Extension Strategy 2018-23 were implemented and the strategy was extended till 2024.

To foster collaboration, promote sustainable practices and facilitate direct interaction with experts, enhancing forestry livelihoods and encouraging ecological conservation efforts in local communities, ICFRE through its institutes and centres is actively engaged in conducting the following activities:

- Implementing extension programmes through Van Vigyan Kendras, Demo Villages, Networking of Van Vigyan Kendras (VVKs) with Krishi Vigyan Kendras (KVK) of the Indian Council of Agricultural Research (ICAR)
- Organising Tree Growers Mela to connect tree growers, farmers and forestry stakeholders, providing a platform to share knowledge, showcase forestry innovations and address challenges.
- Organizing national and regional level workshops, interactive meetings, symposia seminars, trainings, awareness programmes etc.
- Participation in exhibitions/melas organized at regional/ national level by various agencies.
- Publication of literature, creating awareness through documentaries, radio and TV talks and social media.

The Proposed Strategy

This new Extension Strategy and Action Plan for ICFRE for the period 2025-30 has been developed from a range of insights from previous strategies and a variety of key consultations were thoroughly analyzed. The strategy draws on the experiences gained from implementing the 2018-23 Extension Strategy, focusing on areas for enhancement and identifying new approaches to meet the current needs of forestry stakeholders.

A foundational element in formulating the strategy was the comprehensive evaluation report provided by NABARD Consultancy Services. This report reviewed the effectiveness of ICFRE’s forestry extension system, particularly through its network of Van Vigyan Kendras (VVKs) and offered recommendations for strengthening this system. The feedback from NABARD highlighted areas for improvement, suggesting targeted interventions to increase the outreach and operational efficiency of the VVKs, ensuring that forestry knowledge and resources reach stakeholders effectively.

Another crucial resource was the "Chintan Satra," held in 2022, which outlined a 25-year Research Roadmap for ICFRE. This strategic event provided long-term recommendations that shaped the vision of the 2025-30 Action Plan, aligning it with ICFRE's broader research objectives and ensuring that the forestry extension framework supports India's evolving environmental and sustainability goals. In addition, the roadmap identified key thematic areas where forestry extension can have a significant impact, reinforcing the need for innovation in agroforestry, ecosystem restoration and forest-based livelihoods.

To further enrich the strategy, inputs were gathered from a series of Brainstorming Workshops that covered various critical themes, including the strengthening of India's forestry extension system and the promotion of agroforestry practices. These workshops brought together experts, researchers and practitioners who offered actionable insights on issues such as the availability, sustainability and processing of medicinal plants and the challenges in establishing reliable market linkages for these resources. By addressing these topics, the Extension Strategy aims to enhance the capacity of forest stakeholders to manage and market forest products sustainably, thus contributing to rural economies and supporting biodiversity conservation.

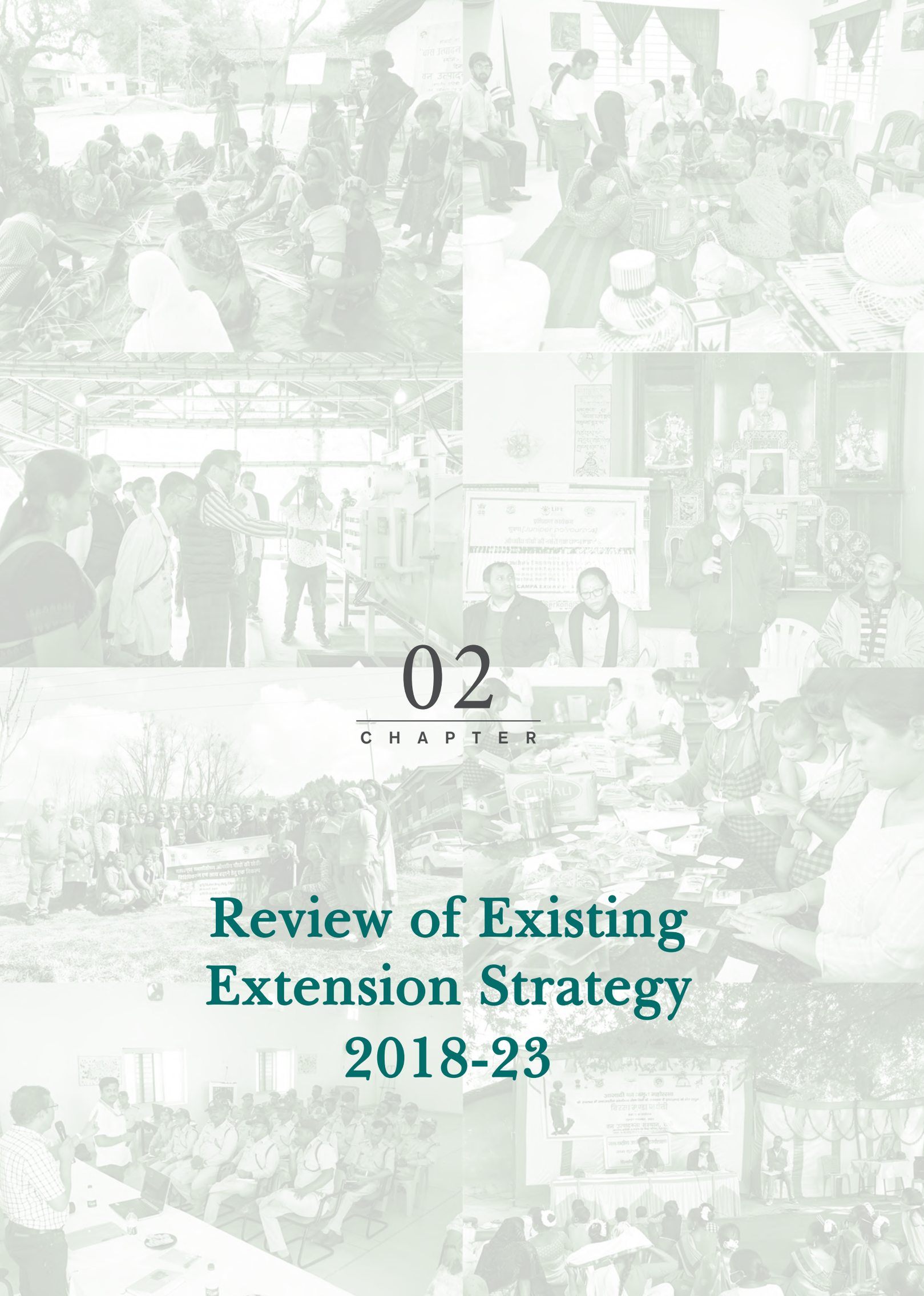
The Action Plan also integrated feedback from targeted Institute-Industry Meetings and ICFRE-WINCOIN meetings., including consultations with paper and pulp industries, which represent a significant sector in forest product utilization Discussions held during these meetings provided insights into industry expectations, particularly regarding the availability of raw materials and sustainable sourcing practices. The 2025-30 plan reflects ICFRE’s commitment to fostering stronger partnerships with industries, recognizing that these collaborations are vital for achieving large-scale impacts in forestry and agroforestry initiatives.

Regional Research Conferences were another important source of guidance, with discussions focusing on innovation, networking and knowledge-sharing across various forestry sectors. These meetings underscored the importance of inter-institutional collaboration to advance ICFRE's research and extension efforts. Insights from Regional Research Conferences were incorporated into the strategy, offering region-specific perspectives and highlighting the need to adapt forestry practices to local ecological conditions.

Significantly, feedback from stakeholders at Tree Growers Melas (TGMs) was also given high priority. These events provided a platform for farmers, forest-based communities and other stakeholders to share their experiences, expectations and challenges. This grassroots feedback helped shape the strategy to better align with the real-world needs of tree growers, ensuring that ICFRE's extension services are accessible, relevant and impactful.

Through this comprehensive approach, the ICFRE Extension Strategy and Action Plan for 2025-30 is designed to be both adaptive and forward-looking. By integrated the lessons from past initiatives with stakeholder-driven insights and expert recommendations, ICFRE aims to build a robust, responsive forestry extension system that supports sustainable forestry practices, strengthens forest-based livelihoods and promotes ecological resilience across India.

Objective: To disseminate ICFRE's research outcomes to diverse range of stakeholders.



02

CHAPTER

Review of Existing Extension Strategy 2018-23

02

Review of Existing Extension Strategy 2018-23

The Extension strategy of 2018-2023 had two parts, A) Present Extension Approaches and B) New Extension Proposals. Brief review of activities carried out is given below:

A) Present Extension Approaches: This include two types of scheme:

a. Centralized Extension Scheme

i. Van Vigyan Kendras
ii. Networking of VVKs with KVKs
iii. Demo Villages
iv. Tree Growers Melas
v. Direct to Consumer

b. Conventional Extension Scheme

i. Awareness campaigns
ii. Extension Trainings
iii. Workshops
iv. Field Visits
v. Radio and TV talks
vi. Publications

B. New Extension Proposals: This also include two types of scheme

a. Updation of existing schemes

i. Establishment of new VVKs
ii. Shifting of DV every third year
iii. Increase in Frequency of TGM

b. Introduction of new extension schemes

i. Modified direct to consumer scheme
ii. Vigyan Rath (Extension Van)
iii. Technology Demonstration Centres
iv. Social Media campaigns
v. Preparation of documentaries
vi. Updation of extension page at ICFRE website

Van Vigyan Kendras:

The council had initiated this extension scheme during 2007-08 with active collaboration of State Forest Departments (SFDs) with the objective of dissemination of various technologies developed by the Council and its institutes and State Forest Departments (SFDs) to the user groups including farmers, women and forest based industries. These VVKs engage in various activities, including the creation of extension materials such as brochures, pamphlets and newsletters, as well as training and capacity building initiatives. Additionally, they focus on establishing Model Nurseries, maintaining nurseries and conducting other extension activities, which encompass procuring and maintaining equipment for training and demonstrations, engaging personnel for VVK-related tasks and covering overhead expenses. Accordingly, till March 2017 ICFRE institutes established 29 **Van Vigyan Kendras (VVKs)** in different states of the country with the active participation of concerned State Forest Departments. Under the scheme, the council also published and distributed 4, 91,950

copies of 441 publications on various topics to the stakeholders, trained 17559 persons through 328 trainings of 799 days, established 26 nurseries and distributed 140829 seedlings of different species to the stakeholders.

After the implementation of Extension strategy of ICFRE 2018-2023, the council has established 11 Van Vigyan Kendras (VVKs). Through the VVKs, during the period the council successfully trained 13,389 stakeholders, including farmers, Self Help Groups (SHGs), Non-Governmental Organizations (NGOs) and others. The training programs covered a wide range of topics such as Non-Wood Forest Products (NWFPs) and Medicinal Plants, Agroforestry, Seed Technology, Integrated Pest and Disease Management, Biofertilizers, Composting, Bamboo Propagation, Cultivation and Utilization etc. The list of Van Vigyan Kendra established from 2007 to 2024 are given in table below.

Table: Van Vigyan Kendra established from 2007-08 to 2023-24

S. No	Name of VVKs	Year of Establishment
1	Guwahati, Assam	2007-08
2	Itanagar, Arunachal Pradesh	
3	Kohima, Nagaland	
4	Aizwal, Mizoram	
5	Agartala, Tripura	
6	Haldwani, Uttarakhand	2008-09
7	Hoshiarpur, Punjab	
8	Pinjore, Haryana	
9	Delhi (UT)	
10	Chandigarh (UT)	
11	Coimbatore, Tamil Nadu	
12	Jabalpur, Madhya Pradesh	
13	Raipur, Chhattisgarh	
14	Hyderabad, Telangana	
15	Koraput, Odisha	
16	Kuthiran, Kerala	2009-10
17	Port Blair, A&N Islands (UT)	
18	Jammu, J&K (UT)	
19	Bikaner, Rajasthan	
20	Rajkot, Gujarat	
21	Margao, Goa	
22	Jalna, Maharashtra	2010-11
23	Silvasa, DNH&DD (UT)	2012-13
24	Ranchi, Jharkhand	2014-15
25	Kharagpur, West Bengal	
26	Manali, Himachal Pradesh	2015-16
27	Hajipur, Bihar	2016-17
28	Leh , Ladakh (UT)	
29	Imphal, Manipur	2017-18
30	Barapani, Umiyam, Meghalaya	2020-21
31	Gorakhpur, Uttar Pradesh	
32	Longani, Mandi, Himachal Pradesh	
33	Gottipura, Bengaluru Rural, Karnataka	
34	MYRADA, Erode, Tamil Nadu	2021-22
35	Salem, Tamil Nadu	
36	ERS-Sukna, Darjeeling, West Bengal	
37	Jagdalpur, Chhattisgarh	
38	Udaipur, Rajasthan	
39	FCRI-Mulugu, Telangana	
40	ICFRE-SDC, Chhindwara, Madhya Pradesh	2023-24

(a) VVK, Rajkot; **(b)** VVK, Longani, Mandi, Himachal Pradesh; **(c)** VVK, FCRI, Mulugu, Siddipet, Telangana; **(d)** VVK, Salem, Kurumbapatti, TamilNadu

Review of Van Vigyan Kendras by NABCON:

NABCON, a subsidiary of the National Bank for Agriculture and Rural Development, is a leading Indian organization focused on rural development and agricultural advancement. It offers consultancy services in various sectors, including banking, multidisciplinary projects, institutional development and training programs for rural communities.

ICFRE under Ecosystem Improvement Project funded by World Bank had engaged NABCON for evaluation of the working/effectiveness of forestry extension system through Van Vigyan Kendras and for providing recommendations for its strengthening. NABCONs have proposed a comprehensive set of suggestions to enhance the establishment, human resource, funding, functioning, extension strategies and networking of Van Vigyan Kendras (VVKs). The recommendations are:

- VVKs should aim to cover multiple districts or areas by collaborating with various institutions for resource creation and extension programs.
- They should identify suitable technologies for trials and demonstrations, establish a needs assessment system for new technologies and utilize major forest nurseries for demonstrating research outcomes.
- VVKs form Memorandums of Understanding (MoUs) with various qualified institutions beyond the State Forest Departments (SFDs) and ensure timely renewal of these MoUs.
- Partnerships should leverage the infrastructure and human resources of SFD's wings, including Research, Training, Extension and Development, for large-scale VVK activities.
- Strengthening extension networking and linkages with KVKs, SFDs and the Skill India Programme is crucial.
- Technical and financial support guidelines should be developed for community groups and systemic linkages between VVKs and other institutions should be established to ensure effective implementation of technologies and practices.
- Krishi Vigyan Kendras (KVKs) in forestry-rich areas should be designated as VVKs. Additionally, more VVKs should be established to serve diverse communities, particularly in underserved regions.
- The use of Information and Communication Technology (ICT) should be expanded for extension purposes and incentives should be provided for the adoption of technologies by communities.
- For human resources, the Extension Division of Institutes requires strengthening with trained personnel.
- Funding for VVKs should be consistent and reliable, with an increase in allocation for extension activities to boost visibility and impact.
- Assured project-mode funding could encourage greater participation from partner institutions.

Networking of VVKs with KVKs:

KVKs are agricultural extension centers in India, established by the Indian Council of Agricultural Research. They serve as a bridge between research institutions and farmers, disseminating technology, providing vocational training, conducting field demonstrations, evaluating the effectiveness of agricultural technologies and serving as knowledge centers. With over 725 KVKs across India, they collaborate with government departments, NGOs and private institutions to improve the agricultural sector.

For wider dissemination of forestry relevant to farmers it was realized that utilizing the platform of KVKs would be useful. The networking between Van Vigyan Kendras (VVKs) and Krishi Vigyan Kendras (KVKs) initiated in 2013 in consultation with Directorate of Extension, ICAR, was a strategic move to strengthen the ties between forestry research and agricultural extension services. This collaboration was marked by a series of activities aimed at promoting sustainable forest management and agricultural practices. Consultative meetings and workshops brought together experts and practitioners to exchange knowledge and address challenges.

Training sessions and demonstrations provided hands-on experience with new technologies, enhancing the skills of farmers and forest managers. The initiative also focused on raising quality seedlings to support afforestation efforts and improve the genetic stock of plantations. Tree Growers Melas and exhibitions offered opportunities for showcasing innovations and exploring market potential. Demonstration plots illustrated the practical application of new techniques in forestry and agriculture. The establishment of VVKs in partnership with KVKs created a network that facilitated the widespread adoption of sustainable practices, contributing to the overall goal of enhancing productivity and conservation in the forestry and agricultural sectors.

Demo Village (DV):

Besides VVKs a parallel scheme of Demo Village was also initiated by ICFRE in 2007-08 with the objective of "dissemination of various technologies developed by the Council and its institutes to the user groups including farmers". The activities and technologies shown are mainly, high tech-nurseries. Technologies demonstrated are vermicomposting, bio-fertilizer, agroforestry models, mushroom cultivation etc. Accordingly, till 2009-10 ICFRE institutes have established 09 Demo Villages (DVs) in different district of the country but due the paucity of fund the scheme was discontinued after that.

After the implementation of Extension strategy of ICFRE and grant received from national authority CAMPA for operationalization of extension strategy of the council, established six new demo villages in different part of the country and the non functional old DV's were closed. Number of demo villages established from 2019 to 2023 are given in table below:

Table: Demo Villages established from 2019 to 2023

S.No	Year	Institute	Location of DV
1	2019-20	ICFRE-IWST, Bengaluru	Attivata, Bangalore Rural District, Karnataka
2	2021-22	ICFRE-AFRI, Jodhpur	Village-1445RD, IGNP area, Mohangarh, Jaisalmer, Rajasthan
3		ICFRE-HFRI, Shimla	Village, Badagoan, Shimla, Himachal Pradesh
4		ICFRE-IFP, Ranchi	Village-Kutam, Topra, Jharkhand
5	2022-23	ICFRE-RFRI, Jorhat	Charingia goan, Jorhat, Assam
6		ICFRE-TFRI, Jabalpur	Village-Samthal Banjari, Seoni, Madhya Pradesh

(a)


(b)


(c)

(d)

(a) DV, Attivata, Karnataka; **(b)** DV, Badagaon, Shimla, HP; **(c)** DV, Samthal, Seoni, MP; **(d)** DV, Mohangarh, Jaisalmer, Rajasthan

Demo Plots:

For showcasing the growth potential of clone/varieties, superior germplasm and agroforestry models to popularize among stakeholders the need to establish demo plots outside demo village was felt. From 2022 onwards 21 demo plots were established, out of which 06 were established in Demo villages and 15 were established in places for easer accessibility to stakeholders under VVKs. demonstration plots of *Commiphora*

wightii, Melia dubia, Poplar deltoides, Bamboo sp., Gmelina arborea, Tamarindus indica, Swietenia mahagony, Santalum album, Callophyllum inophyllum, Tectona grandis etc. were established across the country. The details of demo plots established given in table below:

Demo plots established during 2020-2024

S.No.	Institute	Establish-ment Year	Location	Name of Species
1	ICFRE-IFP Ranchi	2020	Village Sonpurgarh, Kutam Torpa, Khunti	*Melia dubia*
2	ICFRE-IFP Ranchi	2021	N.B farm Chandwa, Latehar, Jharkhand	*Melia dubia*
3	ICFRE-AFRI, Jodhpur	2022	1445 RD, IGNP area, Mohangarh Jaisalmer (Rajasthan)	*Commiphora weghtii*, *Eucalyptus* clones, *Dalbergia sissoo*
4	ICFRE-FRI, Dehradun	2022	Village Sambhalkha, Ambala, Haryana	*Melia dubia*
5	ICFRE-FRI, Dehradun	2022	Village Garhshankar, Hoshiarpur, Punjab	*Melia dubia*
6	ICFRE- IFGTB	2022	MYRADA, Thalamalai	*Tectona grandis*
7	ICFRE- IFGTB	2022	MYRADA, Thalamalai	*Gmelina arborea*
8	ICFRE- IFGTB	2022	MYRADA, Thalamalai	*Tamarindus indica*
9	ICFRE- IFGTB	2022	MYRADA, Thalamalai	*Callophyllum inophyllum*
10	ICFRE-IFP Ranchi	2022	Chitarpur, Ramgarh	*Swietenia mahagoni*
11	ICFRE-IFP Ranchi	2022	KutamTorpa, Khunti, Jharkhand	*Melia dubia*
12	ICFRE-IWST	2022	Attivatta, HosakoteTaluk Bangalore Rural dist.	*Santalum album, Casuarina equisetifolia*
13	ICFRE-HFRI	2022, 2023	Baragoan	*Dendrocalamus strictus*
14	ICFRE-ERC, Prayagraj	2023	Karchhana, Prayagraj	*Melia dubia*
15	ICFRE-HFRI	2023	Trewa, Arnia Jammu	Poplar clones
16	ICFRE-HFRI	2023	Near Badagaonnallah	*Grewia optiva, Celtis australis, Leucaena leucocephala*
17	ICFRE-HFRI	2023	KVK Rohru Farm In collaboration with KVK Rohru	*Angelica glauca, Picrorhizaa kurroa, Valeriana jatamansi*
18	ICFRE-IFP Ranchi	2023	Bharno, Gumla	*Swietenia mahagoni*
19	ICFRE-IFP Ranchi	2023	Barnihar village- Narkatiyaganj W. Champaran, Bihar	Poplar
20	ICFRE-IFP Ranchi	2023	Bhonda, Ranchi	*Melia dubia*
21	ICFRE-IFP Ranchi	2023	Harhad Village- Kundilbaghi, Hazaribagh, Jharkhand	*Melia dubia*

Mahagony demo plot at Bharno


(a)


(b)


(c)

(a) *Melia dubia* demo plot at Chandwa; **(b)** Juniper demo plot at Leh; **(c)** *Melia dubia* demo Plot at Shankargadh, Punjab

Trainings :

ICFRE has made significant strides in enhancing knowledge and skills in forestry through an extensive training program. It plays a pivotal role in addressing the challenges faced by various stakeholders. From year 2018-2024 ICFRE and its institutes conducted 1689 trainings, addressing several critical areas essential for sustainable forest management and ecological balance such as Forest Genetic Resource Management and Tree Improvement, Managing Forests and Forest Products for Livelihood Support & Economic Growth, Biodiversity Conservation and Ecology Security, Forests and Climate Change etc.


(a)


(b)


(c)


(d)


(e)

(a) Training programme on Bamboo and Ringal based Handcrafts at ICFRE-FRI Dehradun; **(b)** Training on NTFP Processing and Value Addition; **(c)** Training on Agroforestry, Soil and Water Conservation in Dry Land by ICFRE-AFRI, Jodhpur; **(d)** Training programme on Bhimal Fibre Extraction at ICFRE-FRI Dehradun; **(e)** Training on Forestry for Productivity Enhancement and Livelihood at Keylong by ICFRE-HFRI, Shimla

Tree Growers Mela:

In ICFRE the research outputs are diverse in nature, for the technologies/ package of practice/ products developed by the institutes and to attract and sensitise a large number of people for the activities and achievements at one platform, Tree Growers Mela (TGM)/ Institute Industry Meet (IIM) are organized periodically involving various stakeholders. Details of TGM/IIM organized during 2018-24, are given in table.

TGMs organised during 2018-2024

2018-19	IFGTB, Coimbatore	Farmers and industries
2019-20	IFGTB, Coimbatore	400 Tree growers, Farmers and industries
	HFRI, Shimla	135 farmers, foresters, NGOs etc.
	IFGTB, Coimbatore	1000 Tree growers, Farmers and industries
2019-20	ICFRE- IFGTB, Coimbatore	985 Tree Growers, wood based industries, QPM producers, NGOs, KVKs, Tamil Nadu State Forest Department.
2021-22	ICFRE -IFGTB, Coimbatore	223 Tree growers, KVKs, Tamil Nadu Forest department, NGOs and Bankers.
2021-22	ICFRE-ERC, Prayagraj	210 Farmers and NGOs
2021-22	ICFRE-IFP, Ranchi	54 Bamboo entrepreneurs and growers
2021-22	ICFRE-TFRI, Jabalpur	450 Farmers, Industry man, SFDs, SHGs
2022-23	ICFRE-HFRI, Shimla	300 Villagers of seven adjoining panchayats of Dharmpur, Forest Department, Horticulture Department, Agriculture Department, Animal Husbandry Department and Dr. Yashwant Singh Parmar Horticulture and Forestry College, Neri-Hamirpur
2022-23	ICFRE-IFP, Ranchi	135 Bamboo entrepreneurs and growers
2022-23	IFGTB, Coimbatore	502 Tree growers, Wood based industries, KVKs, Tamil Nadu Forest department, Tamil Nadu plantation Corporation, NGOs and Bankers.
2022-23	ICFRE-ERC, Prayagraj	More than thousands visitors
2022-23	ICFRE-AFRI, Jodhpur	400 Farmers, environmentalist and tree growers
2022-23	ICFRE-FRI, Dehradun	600 participants, Farmers, NGOs, SHGs and other stakeholders.
2023-24	ICFRE-IWST, Bengaluru	350 Sawmill Owners, Wood based industries and plywood Manufacturing Association
2023-24	ICFRE-IWST, Bengaluru	200 Sawmill Owners, Wood based industries and plywood Manufacturing Association
2023-24	ICFRE -IFGTB, Coimbatore	575 Tree growers, field staff of forest departments, wood based industries and FPO
2023-24	ICFRE-HFRI, Shimla	250 Villagers
2023-24	ICFRE-RFRI, Jorhat	500 Farmers, Tree Growers, JFMC Members, Forest Officials, Students, SHG members, NGO members, members from ATMA &ASRLM, villagers
2023-24	ICFRE-ERC, Prayagraj	Farmer, Villagers and SFDs
2023-24	ICFRE-AFRI, Jodhpur	300 Farmers, environmentalist and tree growers

TGM at AFRI, Jodhpur

TGM at Karaikudi, Sivaganga, Tamil Nadu

TGM at IFP, Ranchi

TGM at TFRI, Jabalpur

Awareness programme:

ICFRE has been actively promoting sustainable forestry practices through its extensive outreach programs. In the last five years, ICFRE has organized 813 awareness programmes across the country, reaching out to diverse stakeholders including Farmers, state forest officials, local communities etc. These programs have focused on topics such as livelihood generations, forest conservation, climate change mitigation, biodiversity management and sustainable forest management practices etc, fostering a deeper understanding and appreciation for the vital role of forests in our ecosystem.

(a) Awareness programme on Biodiversity Conservation by ICFRE-HFRI; **(b)** Awareness programme on Environment Studies and Disaster Management by ICFRE-IFB; **(c)** Awareness programme on Hill Bamboo A means of livelihood by ICFRE-HFRI; **(d)** Awareness programme at Dhaluwala Kalan, Haridwar by ICFRE-FRI

2. NEW EXTENSION INITIATIVES

Establishment of Technology Demonstration Centres (TDC):

The technologies and research achievements of ICFRE needs to be demonstrated effectively for the benefit of stakeholders. For this purpose ICFRE proposed to establish Technology Demonstration Centres (TDC) at each institute in the 2018-2023 extension strategy documents. During the period, council has established seven TDCs across ICFRE institutes. The purpose of these technologies is to showcase the research achievements and technological advancements to farmers, state forest departments and other stakeholders at one place.

At ICFRE-FRI, Dehradun the main technologies displayed in TDC includes working models of Chemical modification of wood, eco friendly preservative-ZiBOC, Paper making from plant biomass, Wood preservation and Wood seasoning, screening and field application of bio-control agents for disease management in forest nurseries, Thermal processing of wood, Wood polymer composite, controlling fugitive dust emission though biological reclamation of fly ash lagoons, Quality planting Stock of Eucalyptus and Casuarina, Eco-restoration of coal mine overburden dumps and Rehabilitation of degraded hills for livelihood, value addition to wood and paper making from *Lanatana camara*, extraction of fibre from *Pinus roxburghii* and making natural Dyes from forest biomass. Apart form this, documentaries on rehabilitation of area with mined overburden dumps, flyash affected land, biological control of pathogenic fungi, eco-friendly preservative and it's testing on wood in different conditions, improvement in quality of wood with value addition are also shown in the TDC.

As a part of TDC a photogallery was also established at FRI campus which was inauguratred in December 2021 and was opened for visitors. Photo gallery of ICFRE-FRI was specifically established to vividly display past and present achievements, advancements in forestry science and the evolution of forestry and the heritage significance of the forestry research to a diverse range of stakeholders. This unique photo gallery is the only gallery where the wholeness of Indian Forestry has been documented in photographs. There are a total of 264 photographs under different sections like Genesis, Personalities, Events, Research, History and Miscellaneous.

In ICFRE-TFRI, Jabalpur TDC various technologies were displayed focusing on non-timber forest products (NTFPs) and bamboo value addition. The NTFP section showcases processing methods for medicinal plants, including different dryers and sustainable harvesting protocols for species like Arjun and Guggul. Additionally, value-added products such as Moringa and Mahua chocolates, mosquito repellents and Agarbatti were presented along with wet preservation techniques for medicinal plants and seed displays of forest species. An animation film on sustainable harvesting methods and essential oil extraction also has been featured. In the bamboo section, a range of products developed through skill development programs for women artisans has been displayed, highlighting the value addition potential of bamboo.

The ICFRE-IWST, Bengaluru Technology Display Centre (TDC) showcases a variety of wood-related technologies to enhance public understanding. It features sections on wood identification, wood drying techniques and wood preservatives, with miniatures of processes like pressure treatment and stacking methods. The centre also highlights advanced technologies such as Transparent Wood, Wood Polymer Composites and Engineered Wood products like Bamboo Corrugated Sheets, LVL, CLT and GLT. Additionally, it demonstrates alternative timbers and their uses in crafts and furniture, offering a comprehensive view of innovations in wood science.

TDC at ICFRE-HFRI, Shimla, displays various advanced technologies related to forest and medicinal plant research. These include seed technology for *Juniperus polycarpos*, vegetative propagation of *Trillium govanianum* and micro-proliferation of *Picrorhiza kurroa* and *Valeriana jatamansi*. It also showcases intercropping models for medicinal plants with horticultural plantations, insect-pest management for Chilgoza pine and Salix and the development of HIM MRIDA SANJEEVANI-1. Additionally, artificial inoculation techniques for *Pinus gerardiana* with ectomycorrhizal fungi have also been showcased.

The TDC at ICFRE-IFP, Ranchi showcases a variety of innovative technologies, including the stages of lac production and its by-products, agroforestry models and eco-restoration techniques for degraded areas. It also highlights different bamboo species and their uses, Poplar varieties developed by ICFRE-IFP and a display of Tasar silk and its diverse products, emphasizing sustainable practices in forestry and agro-ecology.

The TDC at ICFRE-RFRI, Jorhat features advanced technologies like the Jagriti Improved Boucherie Apparatus for enhacing durability of Bamboo through seasoning, bamboo charcoal production using brick and drum kilns and a Vacuum Pressure Impregnation unit for enhancing wood durability.

ICFRE-CEC, Visakhapatnam established Marine Interpretation Unit to disseminate knowledge on marine environment, associated organisms, flora etc. to coastal communities as well as to extend research results on controlling marine biofouling agents. Interpretation centre displays approximately ninety-six wood specimens destroyed by the marine biofouling agents. Centre has six display units showing a comparison between wood treated with protective chemicals and untreated and four display units exhibiting damaged wood pieces caused by biofouling agents. Also having samples of wood showing progressive stages of wood degradation by microbials. Display boards exhibiting biodiversity of eastern ghats and one with birds of east coast. It also exhibited dried specimens of corals, bryozoan, barnacles, molluscs etc.

TDC at ICFRE-IFB, Hyderabad showcases a range of innovative technologies, focusing on sustainable forest management and conservation. These include the conservation of forest genetic resources in Telangana and Odisha, efforts to protect the endangered *Pterocarpus santalinus* and sustainable harvesting of bark. The centre also highlights techniques to augment root biomass and reserpine levels in *Rauvolfia serpentina* using seaweed extracts, agroforestry models based on *Wrightia tinctoria* and *Gmelina arborea* and the cultivation of *Acorus calamus* in agroforestry systems. Additionally, the TDC covers topics like Casuarina cultivation with new varieties, forest soil health cards, biological pest control and integrated pest management, showcasing advancements in forest biodiversity and ecosystem health.

Modified Direct to Consumer (MDTC) scheme:

Direct to Consumer scheme was launched in July, 2011 to bring the technological advancements made through research breakthroughs in ICFRE at the doorstep of end-user without loss of time. This scheme was introduced to increase the outreach of research findings and linking the livelihood of people with forestry. Besides State Forest Departments, Farmers, Women, industries and rural communities was benefitted from the Scheme. During the period from 2018-23 over 7 lakh Quality Planting Material of high yielding varieties/clones and improved germplasm *of Melia dubia, Prosopis cineraria, Dalbergia sissoo, Azadirachta indica, Commiphora wightii, Populus deltoides, Santalum album, Valeriana jatamansi, Tectona grandis, Phyllanthus emblica, Swietenia mahagony* etc. and distributed to farmers and other stakeholders. Additionally, the ArborEasy DNA isolation kit and Biofertilizers developed by ICFRE have also been distributed to various stakeholders for increasing the adoption rate of these technologies. Apart from this, one Vacuum Pressure Impregnation Unit was also installed at ICFRE-RFRI, Jorhat.

Documentaries:

During the last six years, ICFRE has prepared 101 documentaries/videos to educate stakeholders about the technologies, products, package of practices etc. of ICFRE through audio-visuals medium. These documentaries/videos are uploaded on ICFRE website and YouTube channel of ICFRE and Institutes for wider dissemination to the stakeholders. The details of Documentaries/videos are given in table :

Documentaries/videos prepared during 2018-2024:

S.N.	Institute	Name of Documentary
1	ICFRE-AFRI, Jodhpur	Arid Forest Research Institute, Jodhpur
2		AFRI contribution in the conservation of Biological Diversity and
3		Traditional Agroforestry : Source & Research
4		Khejri Tree: Mortality, Research & Management
5	ICFRE-FRI, Dehradun	Vaniki Anushandhan Avm Prasar Ke 30 Varsh
6		Agroforestry
7		Ecotourism
8		Biodiversity of FRI Campus
9		Forest and Women
10		Water Harvesting
11		People's participation
12		Floral Diversity of Bihar (Hindi & English)
13		Fungal Diversity (Hindi & English)
14		Insect diversity (Hindi & English)

15		Eco-restoration of Coalmine area (Hindi & English)
16		FRI Profile
17	ICFRE-HFRI	HFRI Documentary
18		Bamboos of Himalaya
19		Cultivation of medicinal plants
20		Cold deserts of North Western Himalayan region
21		Soil Health Booster developed by HFRI Shimla
22		Bio-pesticides products developed by HFRI Shimla
23		Medicinal Plants Varieties of Important High Hill Temperate Medicinal Plants Developed by HFRI Shimla
24	ICFRE-IFGTB	IFGTB Documentary Film – ***"Walking Tall with Trees"***
25		IFGTB Documentary – Tamil version - "*Pesum Marangal*"-
26		Gass Forest Museum Promotional Video
27		Cultivation of Eucalyptus In Rainfed Area
28		Holding the Sky –The Casuarina Story
29		Elegance in every grain – A documentary film on Tissue Culture TEAK
30		Mona -20
31		Tricho K
32		N-Fixer
33		K-Mobiliser
34		Frankia
35		VAM
36		Casuarina Windbreak clones
37		Bio Bacillin
38		RedSander Cultivation
39		Biofertilizers
40		Cadamba cultivation
41		TreeGenie –Digital Platform
42		Tissue culture Teak
43		Cultivation of Calophyllum
44		Cultivation of Melia
45		Biodiversity and Nature Education
46		World Environment Day –Mass Cleaning Drive
47		TreeGrower Melas
48		Webinar Capsule Videos
49		Arbor Easy- DNA Kit
50	ICFRE-IFP, Ranchi	A tour to Institute of Forest Productivity, Ranchi
51		Identification of Bamboo
52		Tissue culture
53		Techniques of Bamboo Propagation
54		Bambusetum in Institute of Forest Productivity, Ranchi
55		An informative short film on lac cultivation and uses
56		Bamboo flowering
57		Wild Edible Fruits
58		Extension of Vermi-compost
59		*Melia dubia*
60		Ecology and Land Management
61		*फलेमिंजिया सेमियालता:* एक उत्कृष्ट लाह उत्पादक झाड़
62		पूर्वी भारत में पॉपलर आधारित कृषि वानिकी द्वारा आर्थिक उन्नती का शंखनाद
63	ICFRE-IWST	Documentary on IWST Activities
64		Thermal Modification
65		Wood Plastic Composite
66		Transparent Wood

67		Micro propagation of bamboo
68		Wood Preservative Treatment
69		Preserving Pollinators
70		Sandalwood ERT
71		Sandalwood Cultivation
72		Sandalwood oil
73		Sandalwood spike Disease
74		Agro and Farm Forestry
75		Wood Identification
76		ICFRE-IWST Research Activities (Post IPIRTI merger)
77		Sandalwood Germination
78		Bamboo Lumbar – An alternative to timber
79		What is Plywood
80		Plastic film as self-adhesive in plywood
81		Lignin Resin
82		Fire Retardant Door
83		Conventional Resin Manufacturing
84		Block Wood Testing
85		Block Wood Manufacturing
86		Bamboo Mat Corrugated Roofing Sheet
87	ICFRE-RFRI	Bamboo Shoot Processing and Value Addition
88	ICFRE-TFRI	TFRI (English)
89		TFRI (Hindi)
90		Fly ash (English)
91		Fly ash (Hindi)
92		TFRI- Trichocard (Hindi)
93		Lac cultivation
94		Bamboo propagation
95		Kitalya
96		Fungarium
97		Mushroom-A source of extra income
98		Arjun ki chhaal ka samvahniya vidohan (*Terminalia arjuna*)
99		Agroforestry
100		Documentary on Charcoal Production
101	ICFRE-IFB, Hyderabad	IFB activities

Prakriti:

A Student-Scientist connect programme was initiated by ICFRE in 2018 for promoting awareness about forest and environment and to inculcate a sense of desire and duty among the school children so that they are actively involved in protection of the forest and environment for overall benefit of the society. Prakrati has been a successful programme of ICFRE and since 2023 Mission LIFE activities are also covered under Prakrati programme. From October 2018 to 2023, 62,000 students were sensitized by organizing more than 790 activities.

(a) Golkonda-II- KVS students visited ICFRE-IFB under Prakriti programme; **(b)** Prakriti programme at JNV, Ranchi; **(c)** Prakriti programme at KV, Ghumarwin, HP; **(d)** Prakriti programme at KV, FRI, Dehradun

Green Skill Development Programme (GSDP):

The Green Skill Development Programme (GSDP) is an initiative by the Ministry of Environment, Forest & Climate Change (MoEF&CC) of the Government of India. It aims to provide skill development in the environment and forest sector to enable India's youth to gain employment or self-employment. The programme focuses on 'green' skills, which contribute to preserving or restoring environmental quality for a sustainable future. These skills include jobs that protect ecosystems and biodiversity, reduce energy consumption and minimize waste and pollution.

The GSDP training programmes are tailored to suit the specific needs with more emphasis on practical skills. The objective was to have various GSDP course modules targeting school and college dropouts across the country through expertise available at ICFRE institutions irrespective of age or profession and to achieve the said objective ICFRE submitted different training proposals to MoEF&CC under the following themes:

- Paralegal Practices: Forestry Act and Policy
- Management of Small Botanical Garden
- Value Addition & Marketing of NTFPs (Plant Origin) Bamboo Crafts
- Propagation and Management of Bamboo
- Value Addition & Marketing of NTFPs (Plant Origin): NTFP Products/Medicinal Plants
- Forest Entomology and Pest Control
- Plant Tissue Culture Techniques and its Applications
- Lac and Tassar Cultivation
- Waste Management

Green Skill Development Programme (GSDP), programme started in the year 2018. From the year 2018-2022 ICFRE institutes across the country conducted 47 training programmes for 644 candidates.

(a) Certificate course on propoagation and Management of Bamboo under GSDP by ICFRE-RFRI; **(b)** Training on Plant tissue culture techniques and its Applications by ICFRE-TFRI; **(c)** Green Skill Development training on Bamboo Shoot Processing and Value Addition by ICFRE-RFRI; **(d)** Green Skill Development on Quality Planting Material Producer by ICFRE-IFGTB

Social Media Campaign:

Social media is an online platform that enables people to connect and share information through interactive platforms. Content sharing is a core aspect of social media, it is a powerful tool for extension by spreading knowledge, fostering interaction, reaching diverse audiences, building communities and raising awareness about issues. Researchers can share their findings in accessible formats, engage with the public and reach specific audiences through platforms like Twitter, YouTube, Facebook, Instagram, Koo etc.

In 2020, ICFRE first went live on social media sites like YouTube, Facebook, Instagram, Koo, Twitter. From then on, continuous efforts have been made to maintain and update these social media channels on a regular basis in order to inform our stakeholders about the various initiatives and activities that are going on within the ICFRE. As a result, more than 520 tweets have been posted so far on Twitter. Additionally, more than 6000 reposts have been made in order to educate and acquaint our stakeholders with the numerous government initiatives and pursuits that have been carried out by ICFRE institutes. 53 videos/documentaries illustrating history, biodiversity and technologies developed by ICFRE and its institutes have been uploaded on YouTube and gained more than lakhs views. More than 450 postings have been made on Metaverse (including Facebook and Instagram) to highlight the work of ICFRE and its regional institutes, as well as to popularize the technologies, package of practices, apps and products developed by ICFRE and its institutes..

Publications:

During the last six years, published 4054 Extension materials in the form of Booklets, Pamphlets, Bulletins, Leaflets, Training manual under Extension Strategy and Action Plan of ICFRE 2018-23. The major publications includes Forest Soil Testing, Bird cherry, Coffee Table Book, Avian Diversity of IFP, Clonal Technique and Clonal Nursery, Bamboo Lumber: A sustainable alternative to solid wood, Thum (*Fraxinus xanthoxyloides*), Poplar of Himalayan Region, AFRI Darpan, Butterfly Richness of IFP, Developing & Popularizing digital interactive platform for Tree Growers & other stakeholders of Tamil Nadu, Genuine Mahogany: Cultivation, Management and Uses etc. The details of Publication are given in table.

Table: Publications during 2018-2024

Publications	2018-19	2019-20	2020-21	2021-22	2022-23	2023-2024
Research papers	334	364	358	388	385	335
Books and Manuals	30	41	23	43	26	14
Pamphlets and Broachers	49	79	132	88	56	80
Popular articles	49	63	76	114	155	221
Chapters Book/ Proceedings	87	97	63	92	117	95

Other extension activities:

Apart from the activities prescribed under extension programme of 2018-2024, additional activities were also carried out based on research outputs and requirement of stakeholders.

Technologies/ package of practices/products: Technologies/ Package of practices/Products developed by institutes are enclosed **(Annexure- I)**. Some of the technologies/ package of practices/products developed are as follows:

(a) Clones/varieties

ICFRE has carried out research for increasing the productivity of commercially important tree species and has developed guidelines for testing and releasing of quality planting materials for commercial cultivation. This was implemented by developing various committees and evaluating and verifying various genotypes

for superiority and authenticity. Since 2010 ICFRE has developed and released 74 clones and varieties for following species:

- **Clones:** Casuarina (19), Eucalyptus (17), Poplar (5), *Dalbergia sissoo* (4), *Calophyllum* (6)
- **Varieties:** *Melia dubia* varieties (10), Neem (6), *Rauvolfia serpentina* (02), *Sinopodophyllum hexandrum* (Bankakdi) (01), *Picrorhiza kurroa* (Kutki) (02) & *Valeriana jatamansi* (Mushkbala) (02)

The technology for producing clones and varieties is extended to the stakeholders/end users through various extension programs and License Agreement for commercial propagation/supply/sale of planting stock has been provided to private companies and nurseries. Quality planting material has been supplied to Indian Farm Forestry Development Cooperative Ltd., State Forest department, Forest Development Corporation, farmers, NGOs, plantation companies and other stakeholders. For creating awareness about these clones and varieties Demonstration plots are established and trainings are provided and dissemination is also done through Tree Growers Melas and awareness programmes.

License agreement/ MoUs: For mass propagation/supply / sale of clones/varieties/ improved planting stock and for other technologies/ Package of practices/ products following Non-exclusive License Agreements has been signed from 2018 to 2024:

- ICFRE-IFGTB, Coimbatore with Seshsayee Paper and Boards Limited Pallipalayam, Namakkal District, Erode 638 007, Tamil Nadu for two clones of *Casuarina* Hybrid
- ICFRE-IFGTB, Coimbatore with International Papers – APPM Limited Rajahmundry East Godavari Dist. Andhra Pradesh for two clones of *Casuarina* Hybrid
- ICFRE-IFGTB, Coimbatore with International Papers – APPM Limited Rajahmundry East Godavari Dist. Andhra Pradesh for untested *Casuarina* Hybrid
- ICFRE-IFGTB, Coimbatore with M/s Anandha Agricultural Solutions, Thoothukudi andhra Paper Ltd., Tamil Nadu Newsprint Paper Ltd., Navsari Agricultural University, Gujarat, College of Forestry, Ponnampetfor windbreak clones of *Casuarina junghuhniana*
- ICFRE-FRI, Dehradun signed Non exclusive license agreement with Bebzini Seedlings, Saharanpur, Uttar Pradesh to extend propagation rights of released varieties of *Melia dubia*.
- ICFRE-FRI, Dehradun signed Non exclusive license agreement with Himachal Pradesh Forest Department, Nahan for transfer of technology on Extraction of fiber from Pine needles.
- ICFRE-RFRI, Jorhat transferred package of practices of restoration of coal mined land to Ministry of Coal, Govt. of India.
- ICFRE-IFGTB, Coimbatore transferred technology on *in vitro* multiplication of selected teak clones to three commercial tissue culture laboratories, Labland Biotech, Mysore; HU Gugle Biotech, Bengaluru and Santhi Clonal Nursery, Cuddalore for commercial production of identified superior performers of teak through tissue culture
- ICFRE-IFGTB, Coimbatore and Karunya Institute of Technology and Sciences, Coimbatore for Studies on Root architecture of Eucalyptus clones using Ground Penetrating Radar (GPR).
- ICFRE-RFRI, Jorhat and Chroma Biotech Ltd., Dibrugarh for selected high yielding genotype of *Bambusa tulda.*
- ICFRE-RFRI, Jorhat and Pro Agro Tech, Jabalpur for mass multiplication of bacterial consortia for commercial use/supply of bacterial isolates bearing strain code: KhAn, MKGB, MKGPf, MKGAz, KHB, KHPf, KHAz.
- ICFRE-RFRI, Jorhat and for mass multiplication of fungal culture for commercial use/supply of fungal isolates bearing the isolate code: *Pestalopsiosis* sp. with Enhanced Bio-Fuels and Technologies (India) Pvt. Ltd., Coimbatore.
- ICFRE-IFP, Ranchi with 7 farmers/nursery growers of Bihar for mass multiplication of poplar clones.

(b) Artificial induction of agar-wood technology

ICFRE-RFRI, Jorhat has released fungal inoculum for artificial inoculation of agarwood in *A. malaccensis* for marketing in the brand name of product "Sasi Inoculant", available in two forms i.e. Liquid and Paste. The process of agar formation starts after one month of inoculation work and after two years the inoculated tree can be harveste. The optimum age for artificial inoculation of Agar trees is 6-8 years old trees. Using Sasi Inoculant, 1000 trees in Tripura (8 districts), 184 trees in Meghalaya (6 districts) and 659 trees were inoculated in North Bengal (2 districts). A few farmers of Tripura and Meghalaya had already sold the artificially inoculated agar trees up to Rs. 90,000/- per tree.

(c) Isolation of Natural Fiber from *Pinus roxburghii* needles

ICFRE-FRI, Dehradun has developed a process for the isolation of natural fiber from Pine needles and the process has been patented. Pine fiber despite being a non-traditional fiber, is fairly long (~20cm) and shiny that can be spun into coarse, strong threads, into ropes, mats, etc. by spinning and is one among the cheapest natural fibers.The cost for isolation of fiber is approximately Rs. 50-90 per kilogram depending on the fineness of fiber. The technology is being adopted by Uttarakhand and Himachal Pradesh Forest Department on a pilot scale.

Pine needles

Pine fiber

Woven Fibre

Yoga chappal

(d) Bamboo Charcoal making using brick and drum kilns

ICFRE-RFRI, Jorhat has developed the technology for bamboo charcoal making through brick and drum kiln. Briquetting is the process of conversion of bamboo charcoal powder into a uniformly shaped products i.e., Briquette, a compressed block of coal dust or other combustible biomass material (e.g. charcoal, sawdust, wood chips) used as fuel. The technology has been proved to be a successful model for generating additional income to the farmers and further improving the associated livelihood. The technology was transferred to Farmers, Entrepreneurs and State Forest Personnel of northeastern region. More target groups from KarbiAnglong district of Assam has accepted this technology and getting benefit within a short period of time.

Image of the kiln during pyrolysis

Brick Kiln with produced charcoal

(e) Improved Cultivation and Management Technique of Broom grass

Thysanolaena latifolia (Broom grass) has a potential for generating local employment and can turn into a profitable enterprise, with a potential to enhance rural income. The grass can be successfully grown in the hilly tracts even in the degraded *jhum* fallow lands in the northeastern region of the country. The brooms made out of this grass are more durable than those from other plants such as *Cocos nucifera* and *Phragmites* species. Broom yield is observed higher in 2nd year cultivation due to increment of productive culms per tussock. Maximum yields are observed in 2m spacing when intercropped with *Cajanus cajan* (Arahar) at 2.5m x 2.5 m. The cultivation model needs an input of Rs. 8320.00 per ha to give an output of Rs. 18240.00 per ha with net income of Rs. 9920.00 per ha per rotation.

The model of Broom Grass based Agroforestry Model was applied in Karbi-Anglong, Assam and turned out to be a big success. The villagers in Machmarra and Depacherra, North Tripura, took up the model and earned profitable returns.

(f) ArborEasy® DNA isolation kit

ArborEasy® DNA isolation kit is a spin column based genomic DNA isolation kit. ArborEasy® is a registered trademark. The isolation Kit provides an indigenous, non-bio-hazardous, low cost pin column based system for isolation of plant genomic DNA from wide range of tissue types, specifically tree tissues.

(g) Bioformulations

- **Tree PAL^{H}** formulation is developed by ICFRE-IFGTB, Coimbatore from seed oil of *Hydnocarpus pentandra*, *Pongamia pinnata, Azadirachta indica* and essential oil of *Lantana camara*. Seed oils of *P. pinnata, A. indica, H pentandra* and essential oil from *L. camara* were found to possesses pesticidal properties based on our preliminary screening against insect pests of Ailanthus, Casuarina and Teak both in the laboratory and field conditions. The formulation showed effectiveness in managing the insect pests in terms of larval mortality; *Hyblea purea* (80-90%), *Indarbella quadrinotata* (60-80%) and *Eligma narcissus indica* (45-55%). The formulation is also found to act as feeding deterents, growth inhibitors, repellents (or) oviposition inhibitors against the target species. As a result the formulation is named as ***Tree PAL*** ^{H}.

Tree PAL ^{H}

- **Crawl clean (Green insecticide):** ICFRE-IFGTB, Coimbatore developed botanical pesticide from leaf powders of *Melia dubia, Pongamia pinnata, Aristolochia bracteata, Adhatoda vasica* and *Vitex negundo* against the invasive alien insect pest, the papaya mealybug (PMB), *Paracoccus marginatus* causing extensive damage to agricultural, horticultural, floricultural and forestry crops in Tamilnadu.

Crawl clean

- **MONA 20:** MONA 20 is biocontrol product developed by ICFRE-IFGTB, Coimbatore it contains Micromonospora an actinomycetous bacteria that controls bacterial wilt disease in Casuarinas. *Micromonospora maritima* controlled the soil borne pathogen *Ralstonia solanacearum* by secretion of secondary metabolites and its antagonistic activity.

- **N-Fixer (Frankia):** ICFRE - IFGTB, Coimbatore brought out a technology on culture and multiplication of N Fixer Frankia that improved the growth and biomass of *Casuarina equisetifolia* 25% higher than the trees without inoculation of Frankia. The Casuarina tree inoculated with Frankia will attain the yield of 20 tonnes/ha within 3 years because of the improved growth and biomass.

N-Fixer (Frankia) for Casuarinas

- **Him Growth Booster Formulation:** Him Growth Booster is a growth enhancing formulation developed by ICFRE-HFRI, Shimla for Conifer seedlings. The cultures of ectomycorrhizal fungi –*Ramaria formosa*, which get in a symbiotic relationship with conifer roots were multiplied on Raagi (*Eleusine coracana*) grains and encapsulated by using talc based carriers. The Shelf life of formulation is six months at room temperature The application of formulation will reduce the nursery period of conifer seedlings and also helps in better field establishment of the seedlings. The formulations performed well when inoculated to the seedlings of *Abies pindrow* and *Picea smithiana*


Him Growth Booster

- **Him Mrida Sanjeevani-1:** Him Mrida Sanjavani-1 is an AM biofertilizer developed by ICFRE-HFRI, Shimla. It increases the availability of phosphorus from soil by 60-80%. It also increases the activity of nitrogen absorption and other minerals. The formulation was prepared by using roots, rhizosphere soil of host plant and vermiculite. It is a Soil and vermiculite carrier based formulation. This formulation can be used for the organic cultivation of medicinal plant, vegetables and broad leaved crops. The dosage required is 3-4 kg/ acre. It has shelf life of 6 months. Application of Him MridaSanjavani-1 formulation in nursery and in field can enhance biomass production of host plants and can also increase the active ingredients in medicinal plants.

- **Him Tricho Kawach:** Him Tricho Kawach developed by ICFRE-HFRI, Shimla is a bio-fungicide effective against soil borne and foliar pathogens. By utilizing natural antagonists like *Trichoderma asperellum*, bio control offers a sustainable approach to combat fungal diseases, ensuring the longevity and vitality of trees, thus safeguarding our environment for future generations. Its Shelf life is six month at room temperature. It can be applied 4-5g/kg for seeds, for root treatment 40-50g formulation in one litre slurry of cow dung water for drenching.

Him Mrida Sanjeevani-1

Him Tricho Kawach

- **Tree Rich Biobooster (An alternate media for potting mixture):** Tree rich biobooster, a growth promoting product has been developed by ICFRE-IFGTB, Coimbatore for the production of quality planting stock for farm and plantation forestry. It is a waste based potting mixture developed using coir pith waste compost along with bio waste compost, flower waste and

Tree Rich Biobooster

vegetable waste composts for application in kitchen garden, terrace garden and other similar applications. The developed product may be used as an alternate to potting media to raise nursery. It is used for growth improvement of fast growing trees species such as *Casuarina, Gmelina, Ailanthus, Melia and Eucalyptus*. Demonstrated the bioproduct to the tribes and farmers in the trainings organized by Tamil Nadu Forest Department, Madurai and Tamil Nadu Adi Dravidar Housing and Development Corporation (TADHCO), Madurai. For production of Tree Rich Biobooster a 5Kg TRB production machine was installed and handed over to WSHGs of Rayaroothpathi Tribal settlement, Periyanaickanpalayam Range, Coimbatore.

Installation of TRB production machine at tribal settlement, Coimbatore

(h) Sustainable land and ecosystem management

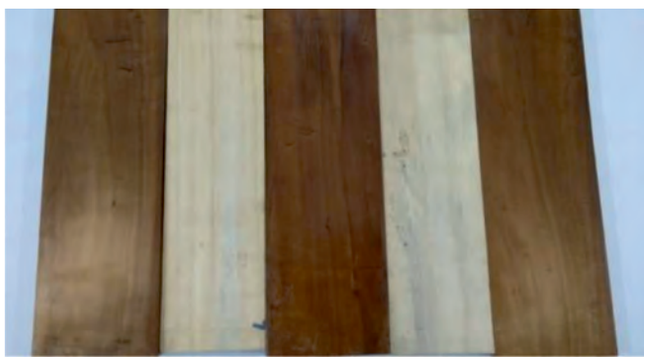
ICFRE implemented the World Bank funded Ecosystem Services Improvement Project in the states of Chhattisgarh and Madhya Pradesh on Scaling up sustainable land and ecosystem management (SLEM) in selected landscapes of Madhya Pradesh and Chhattisgarh with the objective to prevent land degradation and desertification and to increase above-ground forest carbon stocks. Following activities were carried out:

- Direct beneficiaries of ESIP includes about 25,000 people, comprising of forest dwellers, small landholders and marginal farmers in the selected landscapes of Madhya Pradesh and Chhattisgarh.
- ICFRE has scaled up the following SLEM best practices:
  - Rain water harvesting for augmentation of ground water recharge
  - Integrated farm development for sustainable land productivity – vermicomposting, preparation and application of biopesticides and biofertilizers, use of vegetable seeds of improved varieties
  - Lac cultivation for livelihood generation and biodiversity conservation
  - Climate proofing Fish Farming
  - Use of Improved Cookstoves
  - System of Rice Intensification
  - WADI: a tree-based farming system
  - Azolla cultivation
- Capacity of the local communities has been built on scaling up of best practices on sustainable land and ecosystem management through organizing number of trainings and awareness programmes.
- Communication tools viz. demonstrations, wall paintings, posters, hoardings; capacity building programmes and workshops; preparation and printing of pamphlets, flyers, brochures and success stories etc.; media outreach, folk media, use of audio-visuals, door-to-door contact campaigns have been used to communicate the SLEM messages to the target beneficiaries and other stakeholders.

- Developed a **Roadmap for Institutional and Policy Mainstreaming of Sustainable Land and Ecosystem Management in India**. This roadmap has provided specific guidelines to different Ministries/ Departments/ Research Organizations/ Civil Society Originations involved in restoration of degraded lands and to combat land degradation and desertification.
- Developed **'SLEM Knowledge Sharing and Reporting System'**, an online National Reporting portal **(https://nrdp.icfre.gov.in/)** for Capturing Trends and Status of Key Progress Indicators on Land Degradation and Desertification and for up-scaling and mainstreaming SLEM best practices to help in strengthening the India's national reporting to United Nations Convention to Combat Desertification.
- The resource manual and brochures on **'Measurement of Forest Carbon Stocks'** have been developed by ICFRE for capacity building of the State Forest Departments and Joint Forest Management Committees. For building the capacity of State Forest Departments and Joint Forest Management Committees for measurement of forest carbon stocks, several trainings for the State Forest Departments and Joint Forest Management Committees of Madhya Pradesh and Chhattisgarh were organized.

(i) Thermo-Hygro-Mechanical (THM) modification of plantation grown timbers for value addition

Densities of plantation timbers are lower than the traditional furniture and joinery timbers of India. Despite of their suitable grain, color, texture, drying, wood working properties, the plantation species are underutilized due to unsuitability of their properties for solid-wood industry. The density and other properties of the species can be enhanced with the help of thermo-hygro-mechanical methods to make it suitable for higher end products like furniture, flooring etc. A patent application titled 'A process for wood quality enhancement of plantation grown *Melia dubia* for furniture and joinery (No. 202111001559 dated 13 January 2021)' has been by ICFRE-FRI filed.



THM densified P. *deltoides*

(j) Fire Resistant Doors shutter through construction method

Manufacturing process of FRD shutters with a combination of materials such as timber, calcium silicate boards and ceramic blankets etc was demonstrated along with training to M/s United plywood industries, by ICFRE-IWST, Bengaluru. Both the door leaf and the door frame met the requirements of IS-3614/ BS-476 standards for 120mins fire rating.

(k) Transparent Wood

ICFRE-IWST has developed a method to fabricate transparent wood composite with wood veneers (Poplar, Melia, Silver oak etc.) using synthetic (Epoxy resin and PMMA) and biodegradable polymer (Polyvinyl alcohol). The transparent wood exhibited optical transmittance as high as 80% and haze of 90% with optical and mechanical anisotropy. A patent on biodegradable flexible transparent wood-polymer composite has been granted.

(l) Biodegradable packaging material

Biodegradable packaging material developed from nanocellulose networked composite materials made from areca nut shell, jute and banana fibers by ICFRE-IWST, Bengaluru.

(m) Combi-ply

Combi-ply from *M. dubia* and poplar combination plywood of 3-ply, 5ply, 7-ply and 9-ply by ICFRE-IWST, Benglauru.

(n) Currency briquettes replacement with wood particles for the manufacture of particle board

The currency briquettes received and the poplar particles were dried to requisite moisture content for the manufacture of particle board. Urea formaldehyde resin of weight ratio 1: 2.3 (Urea to Formalin) was synthesized in the laboratory. The flow properties of the resin were characterized. The currency briquettes were replaced by 30%, 40% and 50% for wood particles in the particle board making. Single layered and multilayered particle board with varying combination of the currency briquettes and wood particles were made. Panels made using 30% replacement conformed to physical and mechanical properties as per IS 3087 for grade 2 particle board.

(o) Vacuum Pressure Impregnation Unit

Vacuum Pressure Impregnation Unit under TDC was procured and installed at ICFRE-RFRI, Jorhat campus for preservative treatment of Bamboo. The Unit is operated through PPP mode.

Vacuum Pressure Impregnation Unit

(p) Products developed

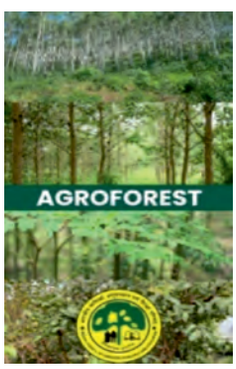
ICFRE has pioneered the development of a diverse array of natural products sourced from forestry species and medicinal plants. This initiative focuses on value addition of lesser-known plants, promoting their use in industries like pharmaceuticals, cosmetics and food. By emphasizing organic and sustainable practices, ICFRE aims to meet the growing demand for eco-friendly products while supporting local communities with alternative income sources. These products can be categorized into areas:

- **Pharmaceuticals:** A formulation for treating & management of diabetes mellitus, Hand Wash and cream from Cassia tora leaves extract.
- **Cosmetics:** Dye as hair colorant gel from *Soymida febrifuga,* Gel Soap from *Butea monosperma* flowers, Skin care cream from *Pterocarpus santalinus*, Royal Seema – ICFRE Red Sander Soap, cream and toothpaste from Mahua
- **Dyes:** Fabric dye using Eucalyptus leaves and bark waste material dye from weeds.
- **Edible Products:** Energy Bars from Mahua, Herbal tea from powder of *Taxus wallichiana, T. serpyllum, Viola* sp. and *Urtica dioica.*
- **FSSAI Certified products:** Mahua chocolates, Moringa bars, Moringa Biscuits, Tara Red Jam.
- **Value addition:** For artificial inoculation of agarwood in A*quilaria malaccensis*, relesed a fungal inoculum in the brand name "Sashi Inoculant", Eucalyptus & Jigat Incense stick, Feronia limonia

Murraba, Pickle, *Tamarindus indica* squash, *Madhuca longifolia* Jaggery, *Carissa carandas* Energy Drink, Jam, Candy, Iron capsule, Pickle, Pyrus pashia Jam, Pickle, Candy, Murabba, *Ficus palmata* Jam, Candy, Squash, *Semecarpus anacardium* Sweet Candy, Pickles, *Diploknema butyracea*: Mosquito repellent incense Sticks.

(q) Mobile Apps developed

- 'Forest Tree Diseases' which deals with 16 major forest nursery and plantation diseases. Diseases caused by fungi, bacteria and viruses have been detailed in the mobile application for ready reference. The app has been developed by ICFRE-IFGTB, Coimbatore.
- "CYCUS" – which stands for Casuarina Yield Calculating Utility Software developed by ICFRE-IFGTB, Coimbatore. In this App only 5% of sampling need to be done by measuring only girth of every 20th trees in the field by walking all along the tree rows so that entire plantation is covered and representative trees are measured for estimation of yield of standing crop. This farmer's friendly mobile app is available in Google Play Store as
  - Poplar insect-pests identification and management system by ICFRE-FRI, Dehradun.
  - App developed for Yield estimation of *Melia dubia*, *Ailanthus excelsa* and *Gmelia arborea by* ICFRE -IFGTB, Coimbatore.
  - Android and iOS Mobile Application "TreeGenie" and Web Portal was developed by ICFRE-IFGTB, Coimbatore. The digital platform would bring tree growers, planting stock suppliers, wood-based industries, research institutions and state forest departments at one platform and would integrate information flow on research and markets for benefit of the tree growers.
  - Lesser Known Plants, Bamboo and its Uses, Eco Rehab, Agroforest by ICFRE-FRI, Dehradun
  - Forest Seed Science & Technology by ICFRE-IFGTB, Coimbatore.



Constraints: In the implementation of extension strategy 2018-23 following constraints were encountered:

- The infrastructure and human resources necessary for successful execution were inadequate.
- The inconsistent availability of funds. The funds provided under plan budget of ICFRE was not sufficient for implementing all the activities. From 2020 onwards budget for extension activities was provided through CAMPA funds.

03

CHAPTER

Issues, Challenges, Strategies and Action for strengthening of Forestry Extension

03

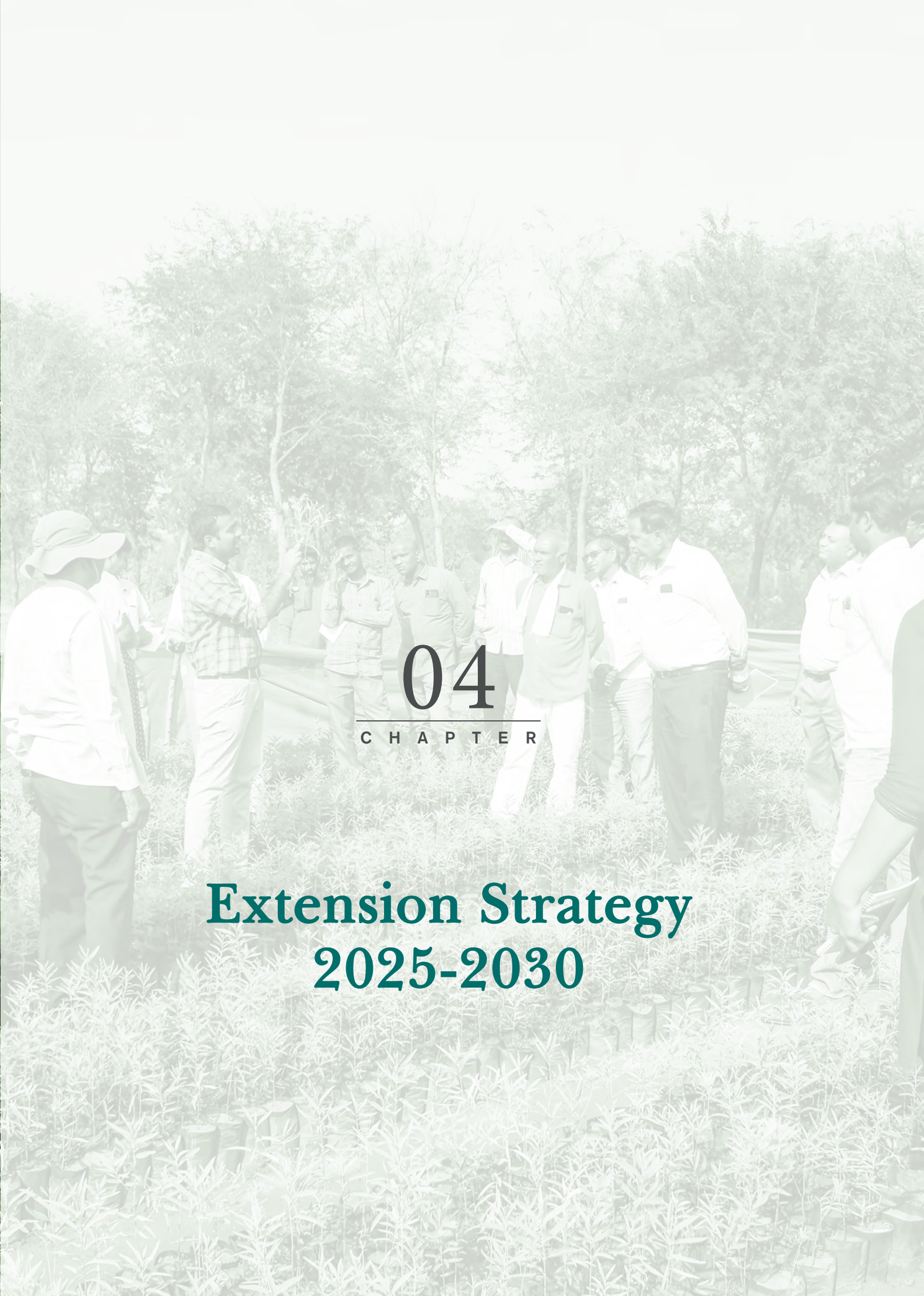
Issues, Challenges, Strategies and Action for strengthening of Forestry Extension

ICFRE should leverage its strengths, address weaknesses, capitalize on opportunities and mitigate threats to enhance its extension strategy and benefit stakeholders in the forestry sector. In the workshop held on "Strengthening of Forestry Extension System in India", the researchers from ICFRE and other organizations like ICAR, CSIR, Universities, Forestry colleges, administrators and various stakeholders like SFDs, farmers, forest-dependent industries, entrepreneurs, etc., discussed and identified the issues, challenges, Strategies and Action for strengthening of Forestry Extension:

Issues and Challenges for Strengthening of Forestry Extension	Strategies for Strengthening of Forestry Extension	Action for strengthening of Forestry Extension
1). Strengthening of Infrastructure, manpower and lack of capacity building of the staff for forestry extension of SFDs and ICFRE Institutes		
• Policy for transfer of technologies/practices in the field of forestry	• Policy Guidelines to be in place for transfer of technologies/package of practices	• Action for transfer of technologies/ practices in the field of forestry as per the policy guidelines. • Development of a proper communication platform for transfer of technologies/package of practices.
• Insufficient infrastructure for forestry extension activities	• Development of infrastructure (modern, nurseries, demonstration plots, testing laboratories, incubation centres etc.)	• Setting up of Technology Demonstration Centres, Technology Incubation Centres with appropriate funding at research institutes. • Establishment/strengthening of modern nurseries and demo plots at ICFRE institute and State Forest Departments (SFDs). • Laboratory accreditations like NABL, BIS, etc.
	• Strengthening of Van Vigyan Kendras	• Some of the recommendations of report of NABCON has been considered while preparing Extension strategy
• Non-availability of land for research and for technology demonstrations (forestry extension)with research institutes	• Provision for providing lands for forestry extension to the research institutions by SFDs	• Allotment of lands to the research institutes for the purpose of forestry extension activities. • Collaborating with SFD's research wing with setting up research trials.

Issues and Challenges for Strengthening of Forestry Extension	Strategies for Strengthening of Forestry Extension	Action for strengthening of Forestry Extension
• Man-power constraints; Limited extension specialists/social scientists and staff and lack of regular capacity building programmes for the frontline staff in ICFRE and SFDs	• Organisation of Capacity building programme for the extension staff of ICFRE and Frontline staff of SFDs • Strengthening of Extension Division/Wings of SFDs and research institute • Engagement of extension experts/ professionals and social science expert and staff • Building of institutional support for forestry extension programmes	• Conduct of training need assessment exercise • Develop training modules for strengthening the capacity of extension staff in research institutes and SFDs • Hiring/Inviting extension specialists from ICAR and other relevant organization for training of Scientist/ staff on extension methods and strategies. • Develop online training modules for i-GOT karmyogi as well as youtube platform • Provision for recruitment of expert/ professionals and social science scientists in ICFRE
2). Awareness generation, communication & knowledge sharing and networking for forestry extension		
• Poor community participation in the forestry programmes	• Motivating stakeholders for taking up new technologies, package of practices and best practices in forestry	• Documentation of success stories, package of practices and best practices (in multilingual formats) in the field of forestry for sharing with stakeholders. • Implementation of ToT (Training of Trainers) to develop local experts for communication with local community in regional languages.
• Limited awareness in SFDs and local communities about new and innovative technologies and practices in forestry	• Awareness generation and developing effective mechanism for knowledge sharing • Application of Information and Communication Technology (ICT) as modern extension tool • Documentation and dissemination of extension best practices and sharing	• Exposure visits of nurseries producing QPM including collection of seeds • Knowledge sharing in public domain through social media platform (ICT extension platforms) • Publication of extension material in simple vernacular languages • Publication of findings of forestry research project in journals
• Lack of effective communication and coordination mechanism between SFDs, research institutions, academic institutions, training institutions and industries for sharing of knowledge	• Two-way communication (Lab to land and vice versa)for strengthening forestry extension • Development of roadmap for networking of research, academic and training institutes for knowledge sharing and transfer of technologies	• Participation of research institutes in business expos, trade fairs etc. • Organization of regular Silviculture Conference • Organization of Annual Forestry Extension Conference • Organization of regular stakeholders meet to discuss the forestry research and extension needs and sharing of research finding. • Participation in Trade fairs and Business exhibitions such as India Wood. • Annual Research Workshop of all ICFRE Institutes with stakeholders.

Issues and Challenges for Strengthening of Forestry Extension	Strategies for Strengthening of Forestry Extension	Action for strengthening of Forestry Extension
	• Mechanism for sharing of ICAR extension Infrastructure facilities for forestry extension. • Networking of Van Vigyan Kendras and Krishi Vigyan Kendras.	• Effective implementation of MoU for utilization of ICAR extension facilities including networking of KVKs and VVKs for forestry extension by ICFRE and SFDs. • Periodical monitoring and reviews (indicator based) of the extension activities.
3). Funding mechanism for forestry extension		
• Lack of sufficient fund for forestry extension and capacity building.	• Provision of sufficient regular funding for forestry extension activities and capacity building programmes • Provision of compulsory extension component with sufficient funds in a research project for implementation of the extension activities.	• Annual activities calendar to be framed for dissemination of technologies and capacity building programmes. • Execution of the extension activities of the research project as per the work plan.
4). Production of quality planting materials		
• Non-availability of quality Planting materials (QPMs) of forestry species	• Development of QPMs of forestry speices	• Standard operating procedure and standards for production of QPM of forestry species. • Establishment of modern nurseries.
5). Marketing mechanism of forest products for forestry extension		
• Lack of proper markets and value chain for NTFPs • Lack of value addition and proper packaging of the forest products • No provision for Minimum Support Price (MSP) for NTFPs and other forest products	• Policy guidelines for marketing of NTFPs. • Policy guidelines for introduction of MSP for NTFPs and other forest products.	• Development of value addition for NTFPs and forward and backward market linkages for NTFPs and other forest products in line with Pradhan Mantri Van Dhan Yojana • Online platform for marketing NTFPs and other forest products.



04

CHAPTER

Extension Strategy 2025-2030

04

Extension Strategy 2025-2030

The research outputs of ICFRE are useful for different stakeholders therefore the strategy for extension is to be formulated accordingly. The research outputs can be broadly classified into:

1. Forest Productivity
2. Livelihood Support/ Value Addition
3. Wood Based Technologies/Products
4. Forest Protection
5. Biodiversity management and conservation

1. **Forest Productivity:** Under forest productivity the outputs related to Clones/ Varieties/ improved germplasm, Agroforestry models, package of practices for production of Quality Planting Material through seed, vegetative propagation (Macro and Micro propagation), other technologies/techniques pertaining to genetics/tree improvement/ silviculture/ FGR and allied aspects.

2. **Livelihood Support/ Value Addition:** Research outputs pertaining to agroforestry, non timber forest products, medicinal plants, bioprospecting and allied aspects.

3. **Wood Based Technologies/Products:** Research outputs on Wood identification;Wood properties & uses; Wood processing viz. drying , preservation;Weathering of Wood and its protection; Wood Based Panels viz Plywood, MDF, Particle Board; Wood Polymer Composites; Modified woods; Adhesives for wood and composites; Bamboo and Bamboo based composites; Fire-retardant doors; Nano-technology in wood processing etc.

4. **Forest Protection:** Research outputs on integrated insect pests and diseases management; Development of bio-pesticides and bio-fertilizers; Assessment of health status of avenue trees, Phytosanitation and Quarantine issues; Technical advice for upkeep and maintenance of heritage trees etc.

5. **Biodiversity Management, Conservation and Eco-restoration:** Research outputs on conservation of biodiversity, management of forests, eco-restoration, sustainable land management and allied aspects.

Extension of Research Outputs:

The research outcome-based extension programme along with action plan is to be prepared annually for promoting the dissemination of specific technology/package of practices/ products to stakeholders through various platforms. For dissemination of research outcomes for the four thrust areas, target groups and activities for dissemination are broadly as follows:

Thrust Areas	Target Groups	Activities for Dissemination of research outcome
Managing Forest and Forest Products for livelihood support and economic growth	Farmers, tree growers, forest dependent communities, SFDs, tribals, SHGs, forest/wood based industries & entrepreneurs etc.	Trainings, TGMs, IIM demonstration plots, products, apps, publications, documentaries, consultancies etc.
Biodiversity Conservation and Ecological Security	SFDs, PSUs (Mining, Hydropower etc.).	Trainings, consultancies, publications, documentaries etc.
Forest and Climate Change	SFDs, NGOs and Govt. agencies.	Trainings, consultancies, Awareness campaigns, publications, documentaries etc.
Forest Genetic Resource Management and Tree Improvement	SFDs, forest/wood based industries & entrepreneurs,farmers, tree growers, forest dependent communities, etc.	Trainings, TGM, demo plots, Technology transfer, products, apps, publications, documentaries, consultancies etc.

The research outputs can be disseminated/ transferred to stakeholders through different approaches as per suitability. The various extension activities are as follows:

- Trainings
- Transfer of technology (patented or others) at specified cost including License agreements/ MoUs
- Transfer of technology/Package of practices without cost
- Demonstration plots
- Establishment / upgradation of TDC
- Dissemination material (Documentaries/ short Videos/ Posters/ Handouts/ samples/ prototypes/ QPM)
- Tree Growers Mela/ Institute Industry Meet/Trade Fairs/Business Exhibitions
- Awareness programmes
- Technical advisory/ Consultancies
- Publications/Books/Manuals/Booklets/ Technical bulletins/ Brouchers
- "Prakriti" an environment programme for youth
- Green Skill Development Programme
- Activities under Government's initiatives e.g. Mission Life
- Interactive websites; Social Media Platforms and mobile applications

Institutional Arrangements for Implementation:

As per observations of NABCON, the extension activities for diverse research outcomes are to be disseminated to stakeholders under one umbrella. Extension Divisions of the Institute would be the focal point of all the extension activities carried out in the institute and would spread awareness about technological advancement in the field of forestry, wood science and other relevant fields. The Directorate of Extension at ICFRE will coordinate the extension activities of the institutes.

Role of Directorate of Extension , ICFRE Headquarter

- For the research outcomes of completed projects every year, the recommendations of institute level review committee would be examined by ICFRE level committee for further directions.
- Evaluation and approval of annual extension action plan of the institutes
- Approval from competent authority for proposal on New VVKs/ DVs/ Infrastructure
- Coordinating the extension activities of Institutes/Centres
- Coordinating social media activities

- Assessment and approval of human resource required for extension activities
- Training for updating of skills of scientists/officials/staff/extension workers.
- Six monthly review of activities performed by institutes/centres
- Coordinating collaboration with ICFRE Institutes and other institutes/organizations outside ICFRE for extension of research outcomes.

Role of Extension Division of Institutes

- Review of completed projects for extension of research outcomes
- Coordination within the institute
- Liaisoning with stakeholders
- Identification and preparation of extension literature
- Wider dissemination of research outcomes through various means
- Recording and analysing the feedback of extension activities
- Upgrading the existing extension infrastructure
- Conducting extension activities in collaboration with ICFRE institutes and other institutes/organizations outside ICFRE

Extension Approach:

The research outputs will be disseminated/ transferred to stakeholders through different approaches as per suitability. The various extension activities are broadly categorised as:

Effective Communication Channels

- **Workshops and Trainings:** Conducting need based workshops, seminars and training sessions for forest officials, researchers and community members.
- **Publications and Reports:** Support to publishing research findings, technical reports, policy briefs and articles in scientific journals and popular media.
- **Online Platforms:** Effective use of websites, social media, webinars and online courses to disseminate information related to ICFRE activities and interact with stakeholders.
- **Collaborative Efforts:** Partnering with other research institutions, government agencies and international organizations to reach out ICFRE activities to a wider network through gatherings, conventions, assemblies, conferences, symposiums, congresses, workshops.
- **Demostration plots:** Scope for stakeholders to observe, interact with and learn from. It would encompass models for agroforestry demonstration, appropriate silvicultural practices, restoration, community based forest management, etc.
- **Exhibition/ Trade Fairs:** Participating in Trade fairs, Regional and National Exhibitions to showcase the technologies and commercialization of products of ICFRE institutes.

Capacity Building

- Develop clientele based technical trainings in various aspects of forestry such as forest management techniques, biodiversity conservation, silviculture and forest restoration to build the capacity of stakeholders in applying research findings and sustainable practices.
- Providing technical assistance and facilitating knowledge exchange on advanced research methodologies and data analysis techniques in forestry.

- Skill Development initiatives for enhancing technical skills. **Training for entrepreneurs and** forest-dependent communities,tailored for sustainable forest management practices, alternative livelihoods and biodiversity conservation.
- Developing guidelines and training materials in accessible formats.

Public Awareness Campaigns

Raise awareness among the general public through educational campaigns, nature trails and interactive exhibitions highlighting the importance of forests and environmental conservation. Nature education (Prakriti) camp can be arranged for students to inculcate conservation values.

Proposed Extension Strategy:

1. Review of research outcomes of projects for identifying technologies/ PoP / Success stories

To have synergy in research and extension, in the second Extension Strategy of ICFRE in the strategy statement it was decided that all research activities should have inbuilt extension component with an objective to prepare research project based on stakeholders need. To take up need-based projects, it was proposed to have pre–project liaison meetings with stakeholders. In National Forestry Research Plan (NFRP 2020-2030), the project format was revised and action plan for extension was included. It is proposed that extension strategy of research projects should be thoroughly reviewed in the RAG and RPC while approving the research projects. For effective implementation of extension activities, a committee at institute and ICFRE has been suggested.

To review the status of extension of research outputs, committee has been constituted at Institute and ICFRE level. The composition of committee at Institute and ICFRE is as follows:

Institute level committee

- Director
- Group Coordinator (Research)
- Head, Extension/In-charge (Member Secretary)
- External Experts (2)

ICFRE level committee

- DDG (Extension), ICFRE
- DDG (Research), ICFRE
- ADG (M&E), ICFRE
- ADG (Media &Extn.), ICFRE (Member Secretary)
- External Experts (2)

The above committee shall examine the research outcome at Institute and ICFRE level respectively and facilitate to accelerate the extension mechanism for better and fast delivery of the research outcomes to the end users. The institute level committee headed by Director would examine the findings of research results of the projects and explore the suitable extension strategy for implementation, every six months and submit a detailed report with action plan to ICFRE level committee for review and directions. Finally, technology specific strategy and action plan for technology demonstration and capacity building of stakeholders is to be prepared by the institute.

2. Coordination within institute

For regularly updating the research outputs, Head extension should regularly coordinate with GCR and all Head of divisions in the institute and include the activities in action plan. Coordination is required for:

- Mapping of technologies/package of practices and research outcomes suitable for different stakeholders.
- Finalizing suitable activity for dissemination of research outcome
- Preparation of Quarterly and Annual action Plan
- Facilitating implementation of extension activities
- Feedback and requirement of stakeholder to be communicated to concerned researcher for further refining of research output as per stake holder need.

3. Liaising with stakeholders

The stakeholders are prospective takers/buyers of the research outcome. The detailed plan to effectively communicate with various stakeholders is to be prepared. The plan should be specific to each stakeholder and following points are to be considered:

- The requirements of stakeholder to be documented on regular basis for formulation of need based research projects and of extension action plan.
- Preparation of stakeholder profiles and regular update.
- Identification of Community based institutions (like JFMCs, Social Forestry Committees, Farmer Producer Groups SHGs, etc.) and Forest based private enterprises (private companies, producer companies, cooperatives, industry associations, individuals or producer groups etc.) for dissemination of research outcome.

4. Activities for dissemination of research outcomes

a. Trainings: Dissemination of research outcomes is to be carried out through trainings.

Activities proposed:

- Identification of topics for training based on research outcomes
- Stakeholder specific, need based and focused trainings to be conducted
- Hands on trainings for skill development
- Training of Trainers
- Preparation of annual training calendar
- Demand based unpaid/paid trainings
- Each institutes should conduct atleast three trainings in each quarter
- *The trainings may be conducted under VVK, Existing VVKs, Networking with KVKs, Demo Village, Existing Demo Village and other suitable components.*

Budget Outlay for Organising one day Training for 30 participants:

S.No.	Particulars	Proposed Rates (₹ in lakh)
1.	Boarding and Lodging Charges	Rs. 0.03x30 = 0.90
2.	i.) TA/DA for resource persons including honorarium. ii.) TA of participants restricted to Bus/Train fare including part compensation for loss of wages for non government persons (Lumpsum)	Rs. 0.50 Rs. 0.75
3.	Expenses towards field trips (if required)	Rs. 0.45

4.	Training material with Kit @ Rs. 1000 per participants	Rs. 0.30
5.	Banners and other required advertisement needs	Rs. 0.17
6.	Miscellaneous Expenditure for printing and local arrangements	Rs. 0.18
	Total	**Rs. 3.25**

Note: Budget would vary as per number of days and number of participants

b. Demo plots: For demonstration of growth potential of improved germplasm identified and clones/ varieties /Agroforestry models developed to the stakeholders, demonstration plots to be established in areas accessible to stakeholders.

Activities proposed:

- Identification of suitable area accessible for stakeholders
- Establishment of demo plots
- Maintenance of plots
- Demonstration programme to be regularly conducted
- Documentation of impact of establishment of demo plot/ success story

Budget outlay for 01 ha Demo Plot:

S.No	Name of Items	Proposed Rates (in lakhs)
1.	Field visits (POL, site selection, meetings, discussions etc.), raising of seedling etc.	Rs. 0.65
2.	Preparatory work, plantation establishment, fencing	Rs. 1.00
3.	Maintenance of plots from 2nd year onwards @ Rs. 20000/ year upto 5th years	Rs. 0.80
4.	Establishment of signage	Rs. 0.25
5.	Other miscellaneous expenses including TA/DA	Rs. 0.50
	Total	**Rs. 3.20**

c. Van Vigyan Kendra: VVK is an initiative taken by ICFRE to promote forest education, awareness and dissemination of research-based technologies to farmers, SFDs and other stakeholders, as well as to generate a knowledge of the role of forests in livelihood generation.

(i) Establishment of new VVKs:

- New VVKs to be established as per requirement of the respective State and stakeholders and also as per request of local authorities.
- Apart from SFDs, new VVKs to be opened in collaboration with Universities imparting forestry education or government institutions.
- Detailed proposal to be submitted to headquarters for approval of the new VVK
- MoU to be signed with collaborating organization **(format enclosed in Annexure – II)**
- Infrastructure and other facilities can be obtained from other collaborating agencies. Maintenance of the same however needs to be met from ICFRE funds.
- Deployment of one supervisory staff and one helping staff on contract basis at each VVK.
- Development/strengthening of existing nursery for tree/medicinal species suitable for agroforestry, farm forestry.
- Establish permanent technology demonstration units, including tree cultivation and agro-forestry plots, an arboretum with species of interest to the stakeholders of the region, forest products (NTFP, medicinal plants) processing units, etc.

Budget Outlay:

Sl.	Activity	Budget (in lakhs)
1.	**Van Vigyan Kendra (VVK)**	
	Field visit including site selection, meetings, discussions etc.	1.00
1a	Providing literature for VVK, printing of brochures, newletters etc. @ Rs. 3.00 lakh per VVK per year.	3.00
1b	One day Training/Capacity building @ Rs. 3.25 lakh per training for 30 participants	Budget for training is provided separately under the training head
1c (i)	Model Nurseries: One for each VVK@ Rs. 10.00 lakh per nursery (first year)	10.00
1d	Other Extension Activities, Equipments for Extension etc. @ Rs. 4.00 lakh per VVK per year	4.00
1e	HR Support Supervisory staff @ 25,000/ month	3.00
1f	Contingencies/overheads @ Rs.1.00 lakh per VVK per year.	2.00
1g	TA/DA and other expenses	0.20
	Total	**23.20**

Note: Amount of training would vary as per the numbers of days.

(ii) Activities under existing VVKs: The performance of existing VVKs to be assessed regularly. Only those VVKs which are functional and effectively disseminating the research outcomes to be continued.

Activities proposed under VVKs : Annual action plan for each VVK should be prepared by the respective institute and submitted to the Headquarter. Activities performed under the VVK should be as per the action plan. The activities are as follows:

- Training
- Raising of QPM for demonstration and as per stakeholder's demand
- Establishment of Demo Plots
- Produce technological inputs and products like seeds, planting material, bio-products etc
- Awareness programme
- Maintenance of VVK
- Toll free number for each VVK may be obtained for providing free access to VVKs through phone

Budget outlay:

S.No	Activities	Proposed Rates (₹ in lakh)
1.	One day trainings for 30 participants	Budget for training is provided separately under the training head
2.	Raising of QPM (for 5000 seedlings @ 30 per seedling)	Rs. 1.50
3.	Establishment of Demo Plots	Rs. 3.20
4.	Produce technological inputs and products like seeds, planting material, bio-products	Rs. 2.00
5.	Awareness programme	Rs. 0.10
6.	Maintenance of VVK @Rs. 1.0 lakhs per VVK	Rs. 1.00

7.	HR Support Supervisory staff @ 25,000/ month	Rs. 3.00
8.	TA/DA for site visit and other expenses	Rs. 0.20
	Total	**Rs. 11.00**

(iii) Networking with KVKs: Considering the limitations of VVKs to cater the needs of the country to supply the information pertaining to forestry practices and creating environmental awareness, networking of Van Vigyan Kendras (VVKs) with Krishi Vigyan Kendras (KVKs) of Indian Council of Agricultural Research (ICAR), New Delhi was initiated in consultation with Directorate of Extension of ICAR in 2013. The Council entered in an MoU with ICAR and institutes are expected to enhance the activities in accordance with the MoU. Guidelines of networking with KVKs is attached as (**Annexure- III).**

Activities proposed :

- Establishment of new VVKs in collaboration with KVKs
- Training Programmes
- Awareness programme
- Establishment of Demo Plots
- A Forest/Tree cell may be created at KVKs.

Budget:

S.No	Activities	Proposed Rates (₹ in lakh)
1.	Establishment of new VVKs	Rs. 23.20
2.	One day trainings for 30 participants	Budget for training is provided separately under the training head
3.	Awareness programme	Rs. 0.10
4.	Establishment of Demo Plots	Rs. 3.20
5.	Forest cell	Rs. 0.50
	Total	**Rs. 27.00**

d. Demo Village (DV): DVs aims at showcasing the latest technologies, high-yielding clones/varieties and agroforestry models developed over the years by ICFRE Institutes. These are established to promote sustainable forestry practices and educate local communities on the benefits of using latest technologies. Direct interface with communities on sustainable forest management and strengthening of forest based livelihood is the key focus of DV. At present there are 11 demonstration villages across India actively involved in showcasing the latest technologies.

Activities proposed under DVs :

- Convergence of available sources at the village for demonstration of ICFRE technologies
- Involvement of gram panchayat, individual farmers and local industries
- Establishment of new DVs
- Training Programmes
- Awareness programme
- Demonstration of Biofertilizers/biopesticide/Vermicomposting. Establishment of units for production of Vermicomposting/biofertilizers, processing of NTFPs etc. with the help of locals.
- Raising of QPM of commercially important species.
- Establishment of Demo Plots of high-yielding clones/varieties and agroforestry models

- Promote green practices for environmental amelioration
- Shifting of Demo Village in every 5th year to maximize outreach.
- Integration of forestry with horticulture, floriculture and agriculture for promoting organic farming.

Budget Outlay:

Sl. No.	Activities	Amount (₹ in lakh)	Subsequent years
1.1	Establishment of Model/Hi-tech Nursery	8.00	-
1.2	Extension of Technologies: Transfer of Simple Technologies Developed, Hands-on Demonstration etc.	2.00	2.00
1.3	Training :Capacity building, workshops, training programs for local communities (for one day)	Budget for training is provided separately under the training head	
1.4	Convergence of available sources at the village	-	1.00
1.5	Involvement of gram panchayat and individual farmers (Including meetings, discussions etc.)	0.30	0.30
1.6	Awareness programmes	0.10	0.10
1.7	Raising of QPM (for 5000 seedlings @ 30 per seedling)	-	1.50
1.8	Establishment of Demo Plots and agroforestry models	-	3.20
1.9	Establishment of units for production of Vermicomposting/ biofertilizers etc.	-	2.00
1.10	TA/DA	0.20	0.20
	Total	**10.60**	**10.30**

e. Transfer of technology/ package of practices/ products: The output of research projects as technology / package of practices/ products are to be documented on regular basis and a comprehensive list is to be prepared and updated. Technology specific action plan to be prepared encompassing following activities as per suitability.

Activities proposed:

- Regular evaluation of completed projects to identify potential technology/ package of practices/ products as outcomes or outputs.
- Conducting practical trainings and experience-based learning.
- Participatory research for technology verification.
- Production of QPM for clones/Varieties/ Improved germplasm of Tree sps, Medicinal plants and Bamboos.
- Filing of Patent for Technologies/products developed.
- Registration of varieties developed.
- Transfer of Clones/Varieties/ Improved germplasm/technology/ Package of practices through License agreement/ MoUs etc.
- Production of prototype of products, demonstration to stakeholders and / or sharing/sale through License agreement/ MoUs etc.
- Extending the findings of projects in the form of technical advisory.
- Conducting awareness programmes etc.
- Providing consultancy to interested stakeholder.
- Establishment of incubation centres for upscaling, financing and commercialization of technologies.
- Liasoning with plantation companies, forest corporation etc.

Budget outlay :

Sl. No.	Activities	Amount (₹ in lakh)
1	Production prototypes/products*	50.00
2	Production of QPM(for 5000 seedlings @ 30 per seedling)	1.50
3	Filing and and maintenance of patent	3.00
4	Awareness programmes	0.10
5	Development of incubation centres (seed money)	2.00
	Total	**56.60**

** Maximum 50 lakh budget (subject to actual) would be allotted depending on the type of prototype/ products.*

f. Dissemination material : The research outcomes are to reviewed regularly for preparation of dissemination material. The extension needs of stakeholders are to be assessed and accordingly the dissemination material is to be prepared. Regular updating of existing extension materials is also required. The technologies/Package of Practices (PoP) developed by sister institutes relevant to local needs are also to be disseminated. Preference to ICFRE technologies/Package of Practices (PoP) etc., however technologies from outside ICFRE environment may be roped in for the benefit of stakeholders.

Activities proposed:

- Preparation of Documentaries/Short Videos
- Printing of extension literature in local language as Posters/ Handouts/Flyers/Pamphlets/ Brochure/ Technical bulletins etc.
- Printing of Manuals/Books
- Preparation of samples/prototypes
- QPM for distribution to stakeholders.
- Parcipitation in melas
- Social media posts

Budget outlay:

Sl. No.	Activities	Amount (₹ in lakh)
1	Preparation of Documentaries a. Short Videos b. long videos	 Rs. 2.50 Rs. 10.00
2	Printing of Posters/ Handouts/Flyers/ literature/Books/ Updation of extension materials.	Rs. 3.00
3	Preparation of samples/prototypes	Rs. 50.00
4	Raising of QPM (for 5000 seedlings @ 30 per seedling)	Rs. 1.50
5	Participation in melas/ exhibitions	Rs. 4.00
	Total	**Rs. 71.00**

g. Documentaries/ Short videos

Short videos: ICFRE aims to disseminate knowledge and create awareness about the importance of forests and the need for their conservation through these documentaries. In the last three years, 63 documentaries/ short videos on various forestry-related topics. These documentaries cover various aspects of forestry, including forest conservation, biodiversity, climate change, forest management, forestry research and technological advancements in the forestry sector.

Activities proposed:

- Documentation of success stories
- Preparation of short videos of research outcomes of completed projects
- Preparation of documentaries/ short videos in regional language
- Sharing with all institutes
- Uploading in website/You Tube and other social media platforms for wider dissemination

Budget Outlay:

For 5-6 minutes Documentary		
S.No.	**Particulars**	**Budget (₹ in lakh)**
1.	Script Development, experts consultation etc.	Rs. 2.00
2.	Filming, recording, field visits etc.	Rs. 3.50
3.	Editing, visual effects, Voice over, sound design and distribution.	Rs. 3.50
4.	Contingency fund	Rs. 1.00
	Total	**Rs. 10.00**
For 2-3 minutes Short Videos		
S. No.	**Particulars**	**Budget (₹ in lakh)**
1.	Script Development, meeting with experts etc.	Rs. 0.30
2.	Filming, recording, field visits etc.	Rs. 1.00
3.	Editing, visual effects, Voice over, sound design and distribution.	Rs. 1.00
4.	Contingency fund	Rs. 0.20
	Total	**Rs. 2.50**

h. Technology Demonstration Centres (TDCs): TDC's are intended to showcase ICFRE's research achievements and technological advancements to farmers, state forest departments and other stakeholders. They provide an opportunity for stakeholders, students and general public to engage with experts, understand innovative technologies and their applications and share their success stories and experiences.

Activities proposed:

- Upgrading of TDCs with latest technologies developed
- Display of new success stories
- Review of research outcomes of completed projects for displaying the relevant information in TDC
- Displaying the related technologies of sister institutes/ organizations

Budget for maintenance and upgrading: Rs 5.0 Lahks per year:

i. Tree Growers Melas (TGMs): ICFRE has made significant progress in sensitizing a large number of stakeholders about its activities and achievements through organization of Tree Grower Melas. Apart from TGM, for wood-based industries it is proposed to conduct Institute-Industry Meets (IIM) twice a year to enhance the linkages between ICFRE research institutes and wood-based industries. This will help to showcase our technological advancement by organizing a demonstration and training programme for a group of wood-based industrialists and other allied end-user groups.

Further, ICFRE- Wood Industries Committee of India (ICFRE-WINCOIN), a unique Committee comprises of wood industries, industry associations along with officials & scientists of ICFRE to bring synergy in the field of wood science, tree improvement and other relevant fields to bring benefits to the

wood industry, farmers and other stakeholders. The WINCOIN platform may be used to strengthen the linkage with industry and demonstrate the research outcomes to industry. The guidelines for organizing TGM is attached as **(Annexure-IV)**.

Activities proposed:

- Creating awareness about the importance of forestry and its linkages with sustainable livelihoods.
- Share information about research findings, innovations and best practices as well as sensitizing different stakeholders.
- Conducting workshops, exhibitions, demonstration, lectures by subject experts, tree planting, film screenings etc.
- *TGM may also be conducted under existing VVKs and Networking with KVKs.*

Budget: Maximum Rs. 10 lakhs per year

j. Prakriti: ICFRE has been actively engaged in promoting environmental awareness and education through its Prakriti: A Scientist-Student Connect programme. One of the major achievements of the programme was the signing of Memorandums of Understanding (MoUs) with Kendriya Vidyalaya Sangathan and Navodaya Vidyalaya Samiti., which have enabled ICFRE to reach out to a larger number of students across the country. ICFRE is committed to continuing its efforts in promoting environmental conservation through such initiatives. The activities for strengthening of prakriti programme as follows:

Proposed Activities:

- LiFE (Lifestyle for environment) to be incorporated in all the activities.
- Promote LiFE habits through different modules.
- To inculcate LiFE habits and active participation of individual student is to be ensured.
- Training Modules to be developed for junior and senior level students.
- Activities of prakriti are to be designed in such a way that these help students to understand their curricula.
- Conducting Awareness programme through exposure visit to institute, screening of documentaries, celebration of days relevant to forestry, environment and biodiversity.
- Conducting lectures, Quiz, Painting, Essay, Declamation, planting programme, etc.
- Hands on trainings.
- Distribution of extension material.
- Rewards are to be given to the best performing students.

Budget: Rs. 5 lakhs per year

k. Digital Initiative: In today's digital age, it is essential to leverage technology to reach out to a wider audience and promote environmental conservation. The ICFRE recognize this need and propose to establish digital initiatives to extend its technologies to stakeholders. These initiatives will use digital platforms such as websites, social media and mobile applications to disseminate information and knowledge about environmental conservation. The aim is to make ICFRE's technologies easily accessible to stakeholders, including policymakers, researchers, NGOs and the general public and encourage them to adopt sustainable practices. This proposed activity is a significant step towards promoting environmental education and conservation in India and will contribute to achieving the country's sustainable development goals.

Proposed Activities:

- Identification of success stories
- Review of research outcomes of completed projects for preparation of short videos
- Preparation of material for dissemination of information as per requirement of different media
- Development of Application (Apps)
- User-friendly IT based extension and mobile based advisories

- Dissemination through various Social Media platforms
- Dissemination through FM Radio, AIR, various TV channels

Budget Outlay:

S. No	Particulars	Budget (₹ in lakh)
1.	Social Media Management a. HR Support b. Content Creation c. Social Media Advertising	 Rs. 3.00 Rs. 2.00 Rs. 1.00
2.	Mobile App Development, Maintenance and Promotion	Rs. 2.00
3.	Trainings (latest social media trends and best practices)	Rs. 1.00
4.	Contingency fund	Rs. 1.00
	Total	**Rs. 10.00**

l. **General Extension:** As per the directives of Government of India activities are often carried out for celebration of important days and events like World Forestry Day, Earth Day, World Environment Day, Biodiversity Day, Van Mahotsava, Wildlife Week etc. and also Government Flagship programmes like LiFE.

Budget: Rs. 2 lakhs per institute.

m. **Farmers exchange Visit:** Dissemination of technologies will be justified only by the practices of endusers in their day to day occupational activities. Group of progressive farmers from a state can be exposed to agroforestry models practiced in other districts of the state. Exposure visits to other states can also be arranged with the collaboration of other ICFRE organizations of the jurisdiction states.

Budget: Rs. 5 lakhs for intrastate visit for 50 farmers/ 7 days visit

5. Forestry/Tree Helpline

It is proposed to develop a Forestry/Tree Helpline to provide a platform for stakeholders to seek assistance and solutions to their forestry/agroforestry/tree-related problems. It is an effort to disseminate the correct information to people, which is vital to maintain ecological balance and preserve our natural resources. . The helpline provides everyone with easy access to information, making it an inclusive platform that bridges the gap between society and forestry experts.

6. Institute Specific Extension proposals

The institute specific programme is directly concerned with the mandate of institute and requires a broad spectrumprogrammes covering different scientific aspects under the mandate of the institute. The subject matter under institute specific extension programmes is the outcome of the research being done in the institute under various research projects on different aspects of forestry as per mandate of the institute. For specific fields which have not been covered under above extension activities specific proposals along with action plan to be prepared by institute and submitted to headquarters for approval.

7. Extension Van

Though, thousands of people visit ICFRE institutes every year and participate in our programmes, the reach has yet to be extended. A large section of people still need to be addressed. The people below the poverty line living in remote areas are to be educated. ICFRE technologies can provide them an opportunity to raise/enhance livelihood. This can be achieved through Extension Van. The Extension Van will reach to the doors of these marginalized people and sensitize them towards green livelihood options leading to sustainable and inclusive growth.

Budget: Rs. 27 lakhs/Van and Rs. 1.00 lakhs for maintenance

Note: Maintenance budget would be released for 2nd year onwards

05

CHAPTER

Human Resource

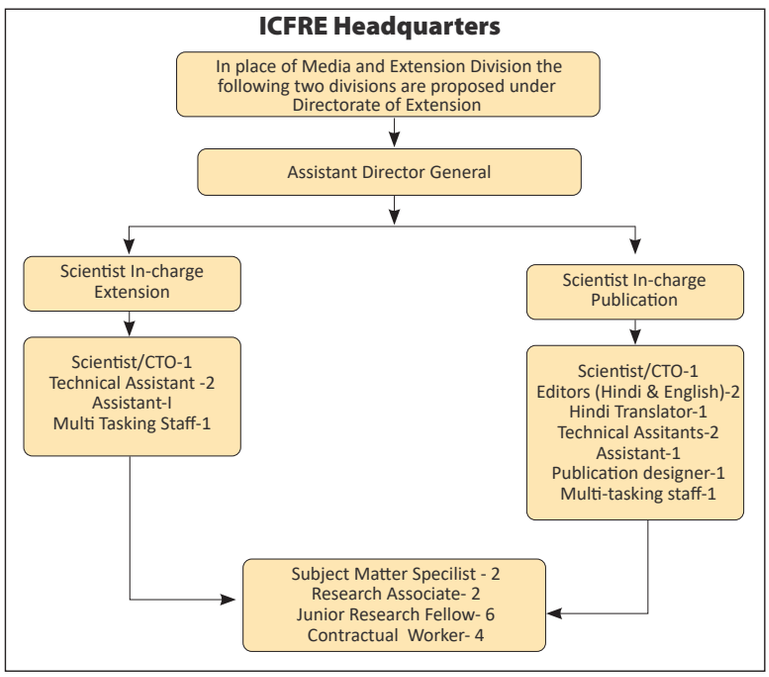
05

Human Resource

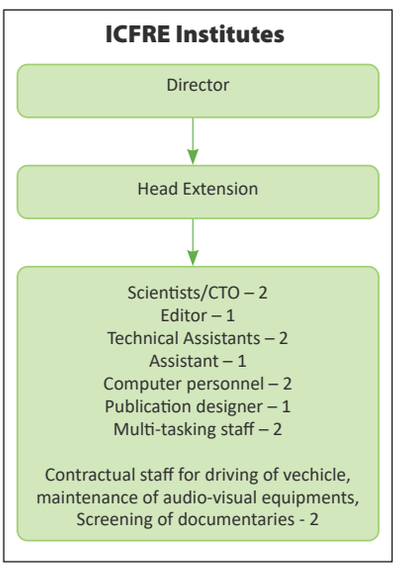
Human resource plays an important role in extension processes. A suitable person can realize the goals with desired impact. Therefore, it is very important to deploy appropriate personnel at Headquarters and at institutes and centres.

Presently, at Headquarters DDG (Extension) coordinates the extension activities of the Council with the help of ADG (Media and Extension). Media and Extension has one STO to handle the tasks of the Division.

At institute level, the task of extension being performed by the Extension Divisions.



Structure : There is a need of restructuring to obtain desired impact of our achievements and create a positive image of the Council. For this, the following is suggested:



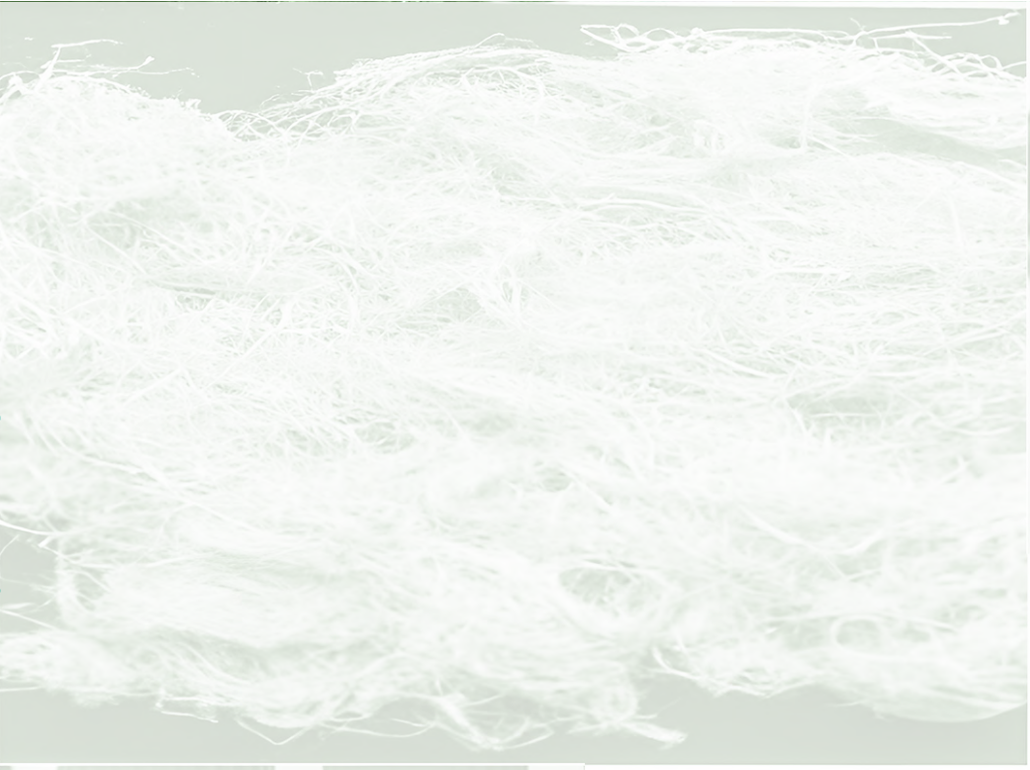
Apart from regular staff for effective implementation of ICFRE's extension strategy it is required to hire subject matter specialist, Research associates, Junior Research Fellows and skilled and semi skilled workers at headquarters. Their roles are essential to ensure successful dissemination of technologies, maintyaing of database, impact assessment of different extension activities etc.

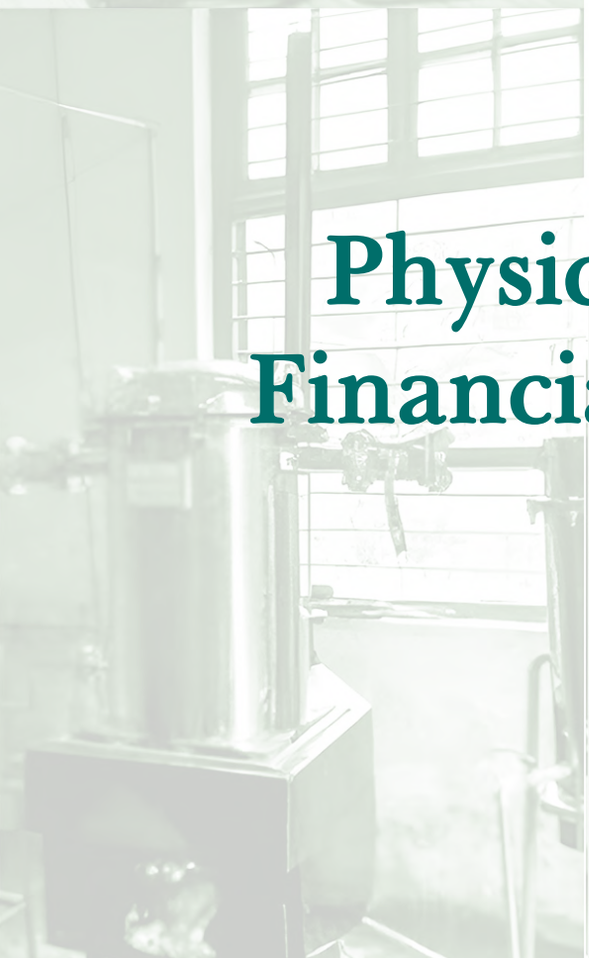
Functioning : All the above, personnel will form a group. An email group will be created at ICFRE level to facilitate communication in one go.

All these persons will undergo training for updation of extension methodologies in ICAR and other organizations in phased manner. The regular personnel will also take an induction course having details of extension material available at various institutes.

The technologies identified will be made available through suitable medium to the group.

Head Extension will be responsible for devising appropriate extension programme for identified technologies. He/she will also be responsible for submission of action plan, evaluation reports and updation of database.






06

CHAPTER

Physical Targets and Financial Requirements

06

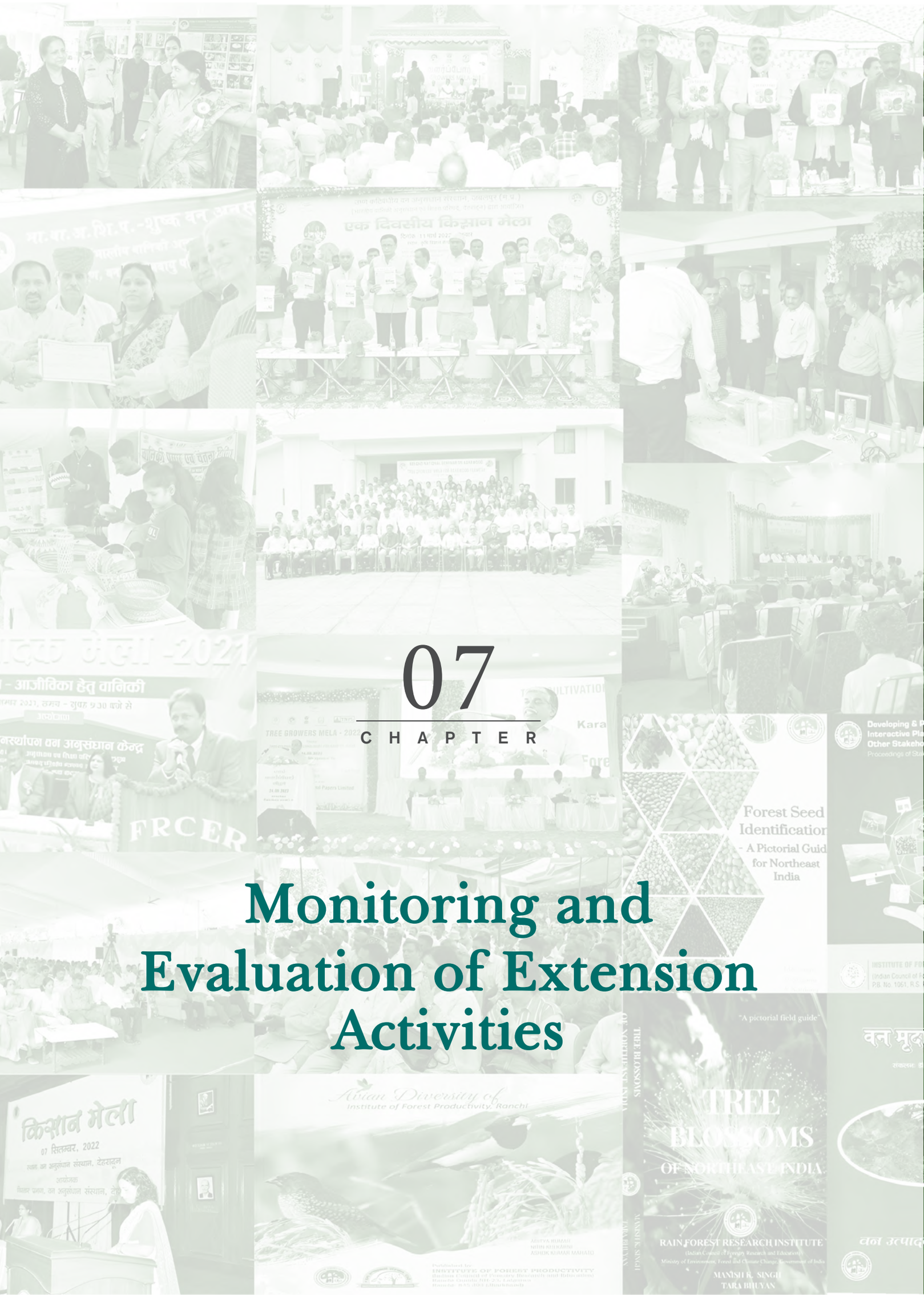
Physical Targets and Financial Requirements

Finance is one of the essential requirements of extension endeavour. In the past due to paucity of funds, extension activities could not sustain. Therefore, it is imperative to make sufficient financial provisions for extension activities. Financial requirement for conducting different activities based on the norms of the different components is as follows:

Physical Targets						
Components/Quarters		**Ist Year**	**IInd Year**	**IIIrd Year**	**IVth Year**	**Vth Year**
Van Vigyan Kendras	**Establishment of New VVKs** (for 04 VVK in a year)	04 VVKs	04 VVKs	04 VVKs	04 VVKs	04 VVKs
	Activities under existing VVKs (for 41 functional VVK)	40	45	50	55	60
	Networking with KVKs (with 09 KVK's in a year)	09	09	09	09	09
Establishment of New Demo Villages (DVs) (Two in a year)		02	02	02	02	02
Activities under existing Demo Village (for six functional DVs)		10	15	20	25	30
Trainings (12 trainings by each institutes in a year)		108	108	108	108	108
Transfer of technology/ package of practices/ products (For five institutes in a year)		05	05	05	05	05
Dissemination of material		45	45	45	45	45
Documentaries /videos (for two long and two short videos in a year)		04	04	04	04	04
Tree Growers Melas (TGMs)/ Institute Industry Meet (IIM) (nine per year)		09	09	09	09	09
Technology Demonstration Centres (TDCs) (for maintenance and upgradation only)		07	07	07	07	07
Prakriti		216	216	216	216	216
Digital Initiative		45	45	45	45	45
Farmers Exchange Visit (for four interstate visit in a year)		04	04	04	04	04
Extension Van		09	-	-	-	-
Extension (General Activities)		90	90	90	90	90

Components/Quarters		Budget (in Rs. Lakhs) Ist Year	IInd Year	IIIrd Year	IVth Year	Vth Year	Total
Van Vigyan Kendras	**Establishment of New VVKs** (for 04 VVK in a year)	92.80	92.80	92.80	92.80	92.80	464.00
	Activities under existing VVKs (for 41 functional VVK)	451.00	495.00	539.00	583.00	627.00	2695.00
	Networking with KVKs (with 09 KVK's in a year)	243.00	243.00	243.00	243.00	243.00	1215.00
Establishment of New Demo Villages (DVs) (Two in a year)		21.20	21.20	21.20	21.20	21.20	106.00
Activities under existing Demo Village (for six functional DVs)		61.80	82.40	103.00	123.60	144.20	515.00
Trainings (12 trainings by each institutes in a year)		351.00	351.00	351.00	351.00	351.00	1755.00
Transfer of technology/ package of practices/ products (For five institutes in a year)		283.00	283.00	283.00	283.00	283.00	1415.00
Dissemination of material		639.00	639.00	639.00	639.00	639.00	3195.00
Documentaries/videos (for two long and two short videos in a year)		25.00	25.00	25.00	25.00	25.00	125.00
Tree Growers Melas (TGMs)/ Institute Industry Meet (IIM) (nine per year)		90.00	90.00	90.00	90.00	90.00	450.00
Technology Demonstration Centres (TDCs) (for maintenance and upgradation only)		45.00	45.00	45.00	45.00	45.00	225.00
Prakriti		45.00	45.00	45.00	45.00	45.00	225.00
Digital Initiative		90.00	90.00	90.00	90.00	90.00	450.00
Farmers Exchange Visit (for four interstate visit in a year)		20.00	20.00	20.00	20.00	20.00	100.00
Extension Van		243.00	09.00	09.00	09.00	09.00	279.00
Extension (General Activities)		18.00	18.00	18.00	18.00	18.00	90.00
Human Resorce (for Headquarter only)		113.76	113.76	113.76	113.76	113.76	568.80
Grand Total							**13872.80**

Note: Detailed budget breakup under each respective heading is provided in chapter 04 and 05.


07
CHAPTER
Monitoring and Evaluation of Extension Activities
Forest Seed Identification
- A Pictorial Guid for Northeast India
TREE BLOSSOMS
OF NORTHEAST INDIA
RAIN FOREST RESEARCH INSTITUTE
किसान मेला
07 सितम्बर, 2022
Avian Diversity of
Institute of Forest Productivity, Ranchi

07

Monitoring and Evaluation of Extension Activities

The extension activities performed at different ICFRE institutes and centres need to be monitored and evaluated on regular basis to ensure the implementation in right direction with proper attention following the action plan submitted by the concerned institute.

Formats for submission of annual action plan extension and formats for reporting the activities under different approaches has been devised and are enclosed.

- Every institute will submit an Action Plan of all its extension activities in the prescribed format and submit to the Directorate of Extension at ICFRE in the month of February.
- The competent authority will review the extension activities of all the institutes every month through video conferencing and the six monthly report has to be submitted by each institute in the prescribed format.
- Annual status report of VVK, DV etc. will be submitted as practiced.

Monitorable indicators:

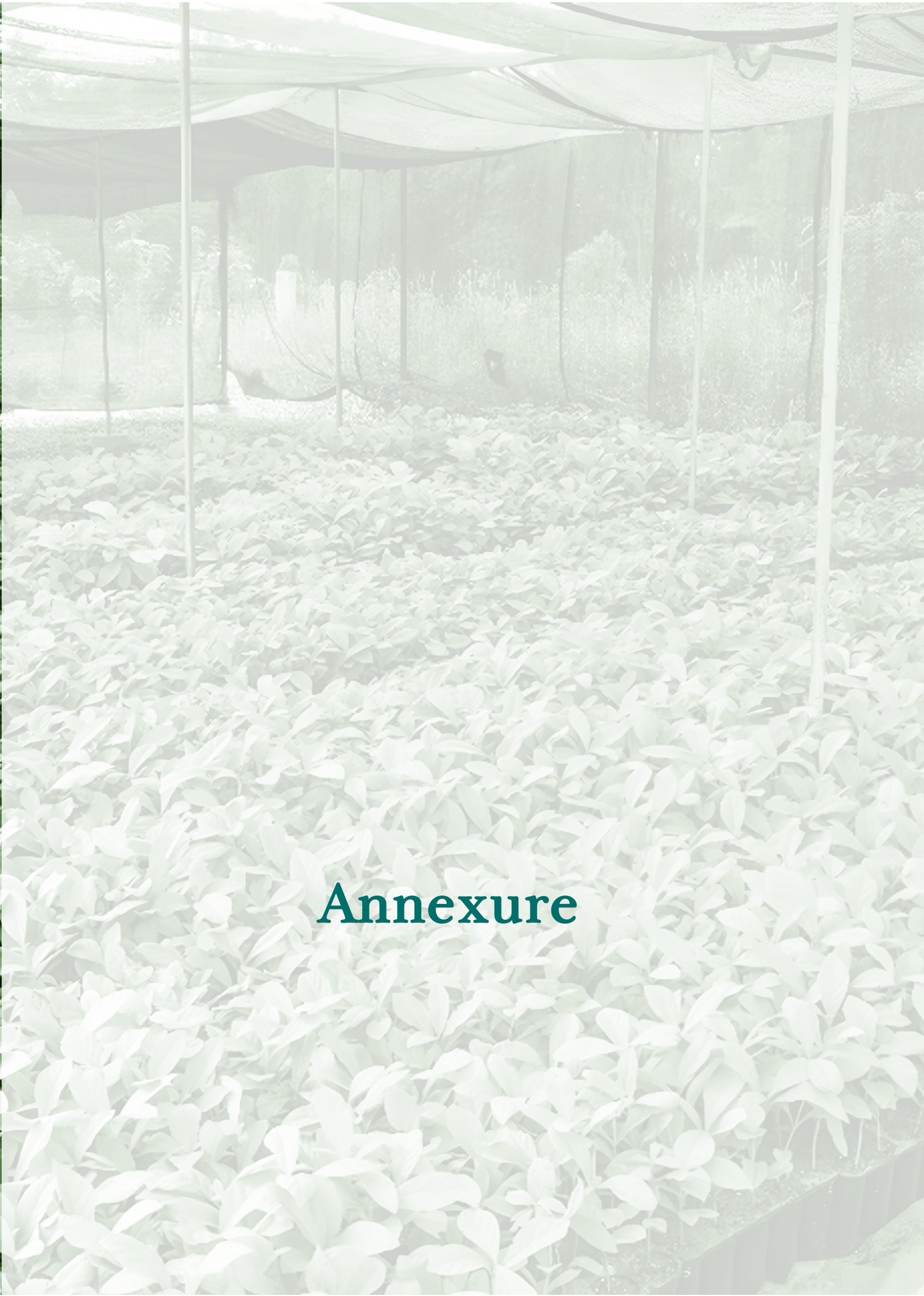
- Number of trainings conducted
- Feedback from stakeholders for impact assessment of trainings
- Quantity of QPM raised
- Number of QPM supplied to stake holders or used in awareness or plantation programme by institute
- Feedback from stakeholders for impact assessment of trainings, QPM provided
- Number of Demoplots established
- Demonstration visits to Demo plots
- New technologies/ package of practices/ products
- Popularization of technologies/ package of practices/ products
- Feedback from stakeholders for the technologies/ package of practices/ products etc.
- Adoption of technologies/ package of practices/ products etc.
- Organization of National level conference every year with the aim of having an interface between VVKs and the policy makers, administrators, technocrats and stakeholders
- Visits to industries/factories
- Linkages with other institutions

Format for Annual Action Plan

Activities Proposed					
Components/Quarters		**Ist Quarter**	**IInd Quarter**	**IIIrd Quarter**	**IVth Quarter**
Van Vigyan Kendra	-	Physical (P) & Financial (F)*	Physical & Financial	Physical &Financial	Physical &Financial
	Establishment of New VVKs	P)			
		F)			
	Activities under existing VVKs	P)			
		F)			
	Networking with KVKs	P)			
		F)			
Demo Villages (DVs)		P)			
		F)			
Transfer of technology/ package of practices/ products		P)			
		F)			
Dissemination of Extension material		P)			
		F)			
Documentaries/ Short videos		P)			
		F)			
Tree Growers Melas (TGMs)/ Institute Industry Meet (IIM)		P)			
		F)			
Technology Demonstration Centres (TDCs)		P)			
		F)			
Dissemination of research outcomes of projects		P)			
		F)			
Prakriti		P)			
		F)			
Digital Initiative		P)			
		F)			
Farmers Exchange Visit		P)			
		F)			
Extension (General Activities)		P)			
		F)			
Grand Total					

Format for Six Monthly Progress Report

Component		Budget Available	Cumulative Budget Alloted	Expenditure		Physical progress of activities conducted
				Six Monthly Expenditure	Cumulative expenditure	
Van Vigyan Kendra	Establishment of New VVKs					
	Activities under existing VVKs					
	Networking with KVKs					
Demo Villages (DVs)						
Transfer of technology/ package of practices/ products						
Dissemination of Extension material						
Documentaries/ Short videos						
Tree Growers Melas (TGMs)/ Institute Industry Meet (IIM)						
Technology Demonstration Centres (TDCs)						
Prakriti						
Digital Initiative						
Farmers Exchange Visit						
Forestry/ Tree Helpline						
Dissemination of research outcomes of projects						
Extension (General Activities)						



Annexure

Annexure

Annexure-I

List of Technologies Developed by ICFRE

	Wood Science and Technology	
1	Hollowness detection of standing trees by ultrasonic stress waves	ICFRE-FRI
2	ZiBOC	ICFRE-FRI
3	Modified FRI solar timber dryer with thermal energy storage system	ICFRE-FRI
4	A Solar Vacuum Dryer Integrated with Thermal Energy Storage System	ICFRE-FRI
5	A Microwave Vacuum Dryer for round wood logs of short rotation plantation grown timbers and Bamboo	ICFRE-FRI
6	Thermal Energy Storage assisted improved design solar wood dryer for uninterrupted drying throughout the day and the night time.	ICFRE-FRI
7	Rill Method of Resin Tapping	ICFRE-FRI
8	Handmade paper production from lignocellulosic waste	ICFRE-FRI
9	Wood quality enhancement of plantation grown *Melia dubia*	ICFRE-FRI
10	A technique of wood plasticization for making bentwood furniture	ICFRE-FRI
11	Wood Polymer Composites	ICFRE-IWST
12	Thermal Modification of Wood	ICFRE-IWST
13	Chemical Modification of Wood	ICFRE-IWST
14	Bio based adhesive for wood based panel products	ICFRE-IWST
15	Hybrid Veneer- WPC reinforced panel products	ICFRE-IWST
16	Estimation of Heartwood in standing trees of *Santalum album* and *Peterocarpus santalinus*	ICFRE-IWST
17	Discriminating woods of *Dalbergia latifolia* and *D. sissoo* through DNA barcodes	ICFRE-IWST
18	Preservative treatment of bamboo using Boucherie process, employing simplified pressure treatment machine (Jagriti & Pragati)	ICFRE-RFRI
19	Pyrolysis system for thermal decomposition of Biomass	ICFRE-RFRI
	Silviculture	
20	Nursery and Plantation Technique of *Juniperus polycarpos* C. Koch	ICFRE-HFRI
21	Criteria and Indicators (C & I) of fruit and seed maturity in selected forestry species of central India	ICFRE-TFRI
22	ETPs plantation technique in *Melia dubia*	ICFRE-IFP
23	ROBUSTREE	ICFRE-TFRI
24	Macro propagation techniques for selected bamboo species	ICFRE-IWST
25	Macro-proliferation technique for Kutki Multiplication	ICFRE-HFRI
26	Macro-proliferation technique for Mushakbala Multiplication	ICFRE-HFRI
27	Intercropping of temperate medicinal plants with horticultural plantation	ICFRE-HFRI
28	Artificial induction of agar-wood in *Aquilaria malaccensis* Lamk. through fungal technology.	ICFRE-RFRI
29	Salix species as potent and alternative host plant of Lac insect	ICFRE-IFP
30	Package of Practices for cultivation of medicinal plant species: a. *Gymnema sylvestre b. Withania somnifera c. Celastrus paniculatus d. Asparagus racemosus. e. Cissus quandrangularis. f. Rauvolfia serpentina g. Pterocarpus marsupium*	ICFRE-IFP

31	Micropropagation of *Rauvolfia serpentina* & bamboos	ICFRE-TFRI
32	Air layering technologies in Rudraksh (*Elaeocarpus ganitrus*) tree for clonal.	ICFRE-IFP
	Integrated Pest Management	
33	EuGalLure	ICFRE-IFGTB
34	Integrated Pest Management of Deodar Defoliator (*Ectropis deodarae* Prout)	ICFRE-HFRI
35	Management of Seed borer of Chilgoza pine, *Pinus gerardiana*.	ICFRE-HFRI
36	Integrated Pests Management of Seed borer of Juniper, *Juniperus polycarpos*	ICFRE-HFRI
37	Eco-friendly technology to control the insect- pest, *Heterocrasa expansalis*, a defoliator of Moru Oak (*Quercus floribunda*) in NW Himalaya	ICFRE-HFRI
38	Bio-control of *Yponomeuta padella*(Ermine Moth), a defoliator of *Prunus cornuta* (Birdcherry) using green technology	ICFRE-HFRI
39	Integrated Pest Management of White grubs in forest nurseries.	ICFRE-TFRI
40	Biological control insect-pests through release of native parasitoid *Trichogramma raoi* (TFRI Tricho Card)	ICFRE-TFRI
41	Biocontrol of key insect pests of teak using indigenous *Trichogramma* wasps from Telangana	ICFRE-IFB
	Mycology	
42	Preservation of wild edible mushroom (*Astraeus hygrometricus*)	ICFRE-FRI
43	Cultivation of edible mushrooms.	ICFRE-FRI
44	Cultivation of medicinal mushroom (*Ganoderma lucidum*)	ICFRE-FRI
45	Endo-mycorrhizal inoculation technology in Forestry	ICFRE-FRI
	Non Timber Forest Products	
46	Sustainable harvesting of *Terminalia arjuna* (Arjuna) bark.	ICFRE-TFRI
47	Protocol for raising seedlings of *Litsea glutinosa* Lour. (Maida Chaal)	ICFRE-TFRI
48	Non Destructive harvesting of *Commiphora wightii* (Guggul)	ICFRE-TFRI
49	Sustainable harvesting practices of *Bauhinia vahlii* (Mahul Patta)	ICFRE-TFRI
50	DHOOPWELL	ICFRE-FRI
51	A facile and eco friendly process for natural fibre extraction from *Agave sisalana* (Sisal) leaves	ICFRE-FRI
52	Samriddhi-A herbal product for silk productivity enhancement	ICFRE-FRI
53	Natural Dyes from Forest Biomass	ICFRE-FRI
54	Advance technology for extraction of bhimal (*Grewia optiva)* fibre	ICFRE-FRI
55	Isolation of Natural Fiber from *Pinus roxburghii* needles	ICFRE-FRI
56	Tara Red- Natural pigment	ICFRE-IFGTB
57	Royalseema : ICFRE-Red Sanders Soap	ICFRE-IFGTB
58	Value Addition of lesser known fruits (*Leptadenia reticulata, Cordia gharaf, Grewia tenax, Momordica dioica*) of arid and semi arid zones	ICFRE-AFRI
59	Sustainable harvesting of *Diospyros melanoxylon* leaves	ICFRE-TFRI
60	Value addition of underutilized fruits of *Schleichera oleosa*	ICFRE-TFRI
61	Value addition of underutilized Wild Edible Fruits of *Semecarpus anacardium* L.f	ICFRE-TFRI
62	Value addition of underutilized Wild Edible Fruits of *Flacourtia indica* (Burm.f.) Merr.	ICFRE-TFRI
63	Protocol for raising seedlings of Wild Edible Fruiting (WEF) species *Semecarpus anacardium* L.f (Bhilwa)	ICFRE-TFRI
64	Protocol for raising seedlings of Wild Edible Fruiting (WEF) species Flacourtia indica (Burm.f.) Merr.	ICFRE-TFRI
65	Cleft grafting in Kusum (*Schleichera oleosa*) – an important lac host	ICFRE-IFP
66	Augmenting root biomass productivity and reserpine level in *Rauvolfia serpentina* by foliar application of seaweed extracts	ICFRE-IFB

67	Herbal Hair Coloring Composition and Method for Preparation There Of	ICFRE-IFB
68	A Process for Recovery of Natural Dye from *Soymida febrifuga* Bark	ICFRE-IFB
	Tree Improvement	
69	Release of *Dalbergia sissoo Roxb*. Clone for commercial cultivation (FRI-DS-14)	ICFRE-FRI
70	Release of productive clones of *Eucalyptus tereticornis* sm.	ICFRE-FRI
71	Release of 10 Productive species of *Melia dubia* Cav.	ICFRE-FRI
72	Release of six variety of neem.	ICFRE-FRI
73	Clonal hybrid of *Eucalyptus cameldulensis* × *E. teretecornis* variety FRI-EH-1	ICFRE-FRI
74	Development of tissue culture protocols ofCorymbia hybrids (*Corymbia torelliana* and *C. citriodora*); FRI-CH-1 and FRI-CH-2 for rapid clonal propagation.	ICFRE-FRI
75	Tissue culture propagation protocol of selected *Bambusa balcooa* clone 585 for cultivation	ICFRE-FRI
76	Tissue culture propagation protocol of selected *Bambusa vulgaris* clone First Selection for cultivation	ICFRE-FRI
77	In vitro propagation of *Hymenodictyon orixense*.	ICFRE-FRI
78	In vitro propagation of *Aristolochia elegans*	ICFRE-FRI
79	Clonal Propagation of Neem clones using Tissue culture	ICFRE-FRI
80	Mini-cuttings clonal propagation technology of *Pistacia integerrima* (Kakarsinghi)	ICFRE-FRI
81	Black Bamboo 'Shyama' furnitures	ICFRE-FRI
82	ArborEasy® DNA Isolation Kit	ICFRE-IFGTB
83	Release of Eucalyptus clone – IFGTB-EC4	ICFRE-IFGTB
84	Windbreaks + Red gram based agroforestry system	ICFRE-IFGTB
85	*In vitro* multiplication of selected teak clones	ICFRE-IFGTB
86	High Yielding Clones of Shisham (*Dalbergia sissoo* Roxb. ex DC.)	ICFRE-IFGTB
87	Development of two improved varieties of *Rauvolfia serpentine*	ICFRE-TFRI
88	Release of 5 clones of Poplar	ICFRE-IFP
89	Identification of *Avicennia marina* using molecular markers	ICFRE-IWST
	Eco- Rehabilitation	
90	Bio remediation Technology for mine spoils	ICFRE-IFGTB
91	Technology for Afforestation of Arid Salt Affected Soils	ICFRE-AFRI
92	Reclamation/rehabilitation of waterlogged soil in canal command ./area of IGNP using principle of biodrainage	ICFRE-AFRI
93	Biodrainage of water logged sites	ICFRE-TFRI
94	Eco-restoration of mine dumps	ICFRE-TFRI
95	Package of practices for restoration of coal mined land	ICFRE-RFRI
	Bio-Formulations	
96	N- Fixer (Frankia) (A Liquid based Bio fertilizer for Casuarinas)	ICFRE-IFGTB
97	Tree PAL H– Biopesticide/biostimulant/Phytotonic.	ICFRE-IFGTB
98	Growth promoting product – "Tree Rich Biobooster" (An alternate media for potting mixture)	ICFRE-IFGTB
99	Crawl clean (Green insecticide)	ICFRE-IFGTB
100	Use of Biofertilizers and Biopesticides for Quality Planting Material	ICFRE-AFRI
101	Compost using fallen leaves of *Azadirachta indica* (Neem) and other species	ICFRE-AFRI
102	Production and distribution of biofertilizers of microbial origin	ICFRE-TFRI
103	Low cost aqueous and alcoholic *Moringa oleifera* Lam. leaf extract for productivity enhancement of vegetable crops under organic cultivation	ICFRE-IFP
104	HIM-ALBIWASH (A Plant Based Biopesticide Product)	ICFRE-HFRI
105	HIM-BIO KIL-I (A Plant Based Biopesticide Product)	ICFRE-HFRI

106	HIM-Mrida Sanjevani-1	ICFRE-HFRI
107	HIM Growth Booster	ICFRE-HFRI
108	HIM TrichoKawach	ICFRE-HFRI
	Agroforestry	
109	*Gmelina arborea*	ICFRE-TFRI
110	*Bambusa tulda*	ICFRE-TFRI
111	*Acacia mangium*	ICFRE-TFRI
112	*Leucaena leucocephala*	ICFRE-TFRI
113	*Bambusa vulgaris*	ICFRE-TFRI
114	Teak Tumeric Silvi Medicinal Model	ICFRE-TFRI
115	*Casuarina equisetifolia*	ICFRE-IFGTB
116	*Populus deltoides*	ICFRE-FRI
117	*Dalbergia sissoo*	ICFRE-FRI
118	*Dendrocalamus strictus*	ICFRE-FRI
119	*Dendrocalamus stocksii*	ICFRE-IWST
120	*Salix alba*	ICFRE-HFRI
121	*Populus nigra*	ICFRE-HFRI
122	*Aquilaria malaccensis*	ICFRE-RFRI
123	*Prosopis cineraria – Zizyphus mauritiana* based Agroforestry system	ICFRE-AFRI
124	*Hardwickia binata* based Agroforestry system	ICFRE-AFRI
125	*Colophospermum mopane* based Agroforestry system	ICFRE-AFRI
126	Khejri tree density based Agroforestry system	ICFRE-AFRI
127	*Tecomela undulata (Rohida)* tree density based Agroforestry system	ICFRE-AFRI
128	*Cordia gharaf – Cenchruc ciliaris* based silvipastoral system	ICFRE-AFRI
129	*Zizyphus mauritiana – Cenchruc ciliaris* based silvipastoral system	ICFRE-AFRI
130	*Senegalia senegal* (Kumat) tree density based agroforestry system	ICFRE-AFRI
131	Babul Paddy agroforestry model	ICFRE-TFRI
132	Bach Paddy agroforestry model	ICFRE-TFRI
133	Agri Lac culture model	ICFRE-TFRI
134	*Flemingia* based Silvi agri lac model	ICFRE-TFRI
135	*Flemingia semialata* – Marigold based agroforestry model	ICFRE-IFP
136	Poplar-Maize-Jute agroforestry model	ICFRE-IFP
137	Gamhar-Groundnut-Wheat-Millet-Urd+Til	ICFRE-FRI
138	Aonla-Melia-Sarpgandha-Masoor	ICFRE-FRI
139	Kadam+Wheat +Finger millet +Sesame	ICFRE-FRI
140	Kadam+Maiz+Sugarcane+Wheat	ICFRE-FRI

Annexure-II

Format of MoU for establishment of VVK

(To be typed on Rs. 100/- Non Judicial Stamp Paper)

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MoU) is made on the _____day of _____, 2008 between (name of the institute) **an institute of the Indian Council of Forestry Research and Education (ICFRE), Dehradun, through Shri**

_____

(hereinafter referred to as the (name of the institute) and called the "First Party") which expression shall unless excluded by or repugnant to the context, include its successors, assigns etc., of the one part :

AND

(name of the institute) **State Forest Department through**

Shri_____

(hereinafter referred to as the ***SFD** and called the "Second Party") which expression shall unless excluded by or repugnant to the context, include its successors, assigns etc., of the one part :

WHEREAS the objective of the First Party is to establish "**VAN VIGYAN KENDRA**" (VVK) in each State/ UT during XI Five year plan to disseminate various technologies developed by the Council and its Institutes and State Forest Departments (SFDs) to the user groups including farmers and forest based industries.

AND WHEREAS Second Party is keen to establish the Van Vigyan Kendra in its State for promotion and extension of appropriate Research by organizing training camp and demonstrations, field trials, establishment of nursery etc.

AND WHEREAS the First Party has approached the Second Party for this purpose and Second Party has consented to provide the necessary help establishing Van Vigyan Kendra on the following terms and conditions :

1. That the First Party will equip the VVKs with
   a) Literature in the form of brochures, pamphlets, newsletters etc. and wherefor a budget of Rs. 3.0 Lacs per year has been proposed.
   b) Trainings/Capacity Building- Two one-week trainings will be organized each for a group of about 20 persons including farmers from State. The purpose will be to train the stakeholders with agroforestry and other land use based techniques. This component has been provided with a budgetary support of Rs. 0.50 Lac per trainings.
   c) Establishment of Model Nursery – As per requirement. An amount of Rs. 7.50 Lacs has been proposed for the purpose.
   d) Maintenance of Nursery – Rs. 0.50 Lac per year from 2nd year to ___ year has been earmarked.
   e) Other extension activities including equipments – Rs. 3.30 Lacs is proposed for these activities.
2. * SFD will appoint Nodal Officer to keep coordination with the (name of the institute).

3. * SFD will provide basic infrastructure for the establishment of VVK. This includes, providing of building, fixtures, electric and water supply, appended land for nursery and demonstration purpose etc.
4. *SFD will help in maintaining model nursery, execution of field demonstration trials land display centre upto 2012in the first instance.
5. Demonstration/field trials will be laid out jointly by (name of the institute) and *SFD.
6. Personnel will be provided by the *SFD. Part of the expenses on personnel can be met from the financial assistance from ICFRE as mentioned in clause number 01 above, provided the personnel concerned is outsourced for specific items of work listed in clause number 01 above.
7. That the implementing authority will be Director (name of the institute).
8. That any dispute, differences or questions which may arise between *SFD and (name of the institute) will be referred to Director General, ICFRE, Dehradun who will be the sole arbitrator.
9. That all legal matters will fall under the territorial jurisdiction of (name of the institute) Courts.
10. That this MoU will be initially valid for the period of _____ years from the date of signing this MoU. The time period can be extended by the mutual consent of the parties.

IN WITNESS whereof the FIRST PARTY and SECOND PARTY have put their signatures on this MoU on the day, month and year first above written.

SIGNED BY SIGNED BY

FIRST PARTY SECOND PARTY

WITNESS :-

1. _____ 2. _____

_____ _____

_____ _____

*denotes name of the State where VVK is being established.

Annexure-III

Drafts Guidelines for Networking of VVKs with KVKs with KVKs

The institute through its VVK will equip the KVKs in the State with

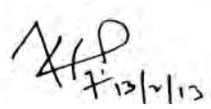
1. Literature in the form of brochures, booklets, pamphlets and newsletters etc. on various themes, topics, tree species etc. for display and sensitization.
2. Model plantations/Demonstration plots of Tree Species in different KVKs for farmers sensitization.
3. Establishment of Seed Orchards of important tree species in selected KVKs.
4. Establishment of Nursery in KVKs for training, demonstration and production and distribution of Quality planting materials.
5. The technology inventory developed by the institute for transfer and application of technologies.
6. The products developed viz. seed orchard seeds, seedlings, clones biofertilizers, biomannures, insecticides, pesticides etc. to enhance direct to consumer efforts.
7. Participate in the Scientific Workers Conference of KVK.
8. Establish Nursery in VVK for producing seedlings.
9. Nominate one expert at the scientist level Kisan Call Centre of TNAU as an level II expert to answer the queries of farmers.
10. Sensitization programme for all the Programme Coordinators of KVKs on the technologies, products, services.
11. Contribute in the plantation and agroforestry component under the Integrated Farming System (IFS) advocated by KVK.

The Institute through the VVK and KVKs will jointly organize

1. Training programme to farmers and other stakeholders on Nursery management. Plantation Management, Seed Collection, Seed handling and Seed processing of tree species. Establishment and management of seed orchards, clonal forestry, pest and disease management.
2. Exposure visits to learn the best practices.
3. On Farm Trails (OFTs) to decide the applicability of the technology, its suitability to different district, assessment and refinement of technology.
4. Plantation and agroforestry related works under the Integrated Farming System(IFS).
5. Take up various successful agroforestry models.
6. Organize joint programmes at district level.
7. Participate in the Annual Agri and Horticulture Fair/Tree Melas.
8. Raising of the seedlings and distribution to farmers.
9. Organize Entrepreneur Programme to attract the youth towards Agriculture/Forestry.

KVKs in turn

1. Provide land for raising agroforestry models, demonstration plots and seed orchards.
2. Include forestry programmes in the KVK annual action plan.
3. Disseminate the technologies and products developed by ICFRE through newsletter, brochure, A & V programmes of KVK.
4. Maintain the seed orchards and nursery.
5. They will share ICAR technologies, findings to enhance Agroforestry/Plantations and integrated farming models.



Annexure-IV

INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION, DEHRADUN

Guidelines for organizing Tree Growers Mela (TGM)

Indian Council of Forestry Research and Education (ICFRE), Dehradun along with its nine regional research institutes in different bio-geographical regions of the country located at Dehradun, Shimla, Ranchi, Jorhat, Jabalpur, Jodhpur, Bengaluru, Coimbatore and Hyderabad and four research centres situated at Allahabad, Chhindwara, Aizwal and Agartala are striving for the holistic development of forestry research through need based planning, promoting, conducting and coordinating research, education and extension covering all aspects of forestry.

As a result of years of research work the council has a rich tally of innovative technologies/processes to its credit. Some of these technologies are being transferred to the stakeholders through various fora. The Council is regularly organizing and participating in various workshops, seminars, trainings and occasional events. Besides, it has also launched a number of schemes to disseminate the research outputs to the end users. Establishment of Van Vigyan Kendras, Demo Villages, Direct to Consumer scheme etc. are such efforts. However it has been observed that some event might be conducted on regular basis to attract and sensitize a large number of people to our activities and achievements.

IFGTB, Coimbatore has taken an initiative in this regard with organizing Tree Growers Melas since 2009. It has become a regular feature in the curriculum of extension activities of IFGTB. These Melas have attracted large number of stakeholders, farmers, industries and experts. Keeping in mind the success of TGM at IFGTB, Coimbatore, ICFRE has decided to replicate this event at all of our institutes.

With the view to help organizing TGM at each ICFRE institute, guidelines regarding various aspects of TGM have been prepared as follows:

1. ORGANIZATION

1.1. Date, duration and venue: Every institute depending upon the local convenience has to decide a proper date, duration and venue for conducting TGM yearly.

1.2. Constitution of various committees: An Executive Committee under chairmanship of Director of the Institute needs to be constituted. Further Committees and sub-committees may be constituted as per the requirement by the Executive Committee.

1.3. Chief Guest: An eminent personality capable of attracting large number of participants may be requested to preside over the function as Chief Guest.

1.4. Participants: Committee has to decide the number and category of the participants. The participants may be Farmers, Farmers Association, Academic and scientific institutions, Forest Departments, Social Forestry, Extension and research wings of the Forest Department, Districts Forest Officers and Conservator of Forests, Forest Development Corporations, Wood Based Industries, NABARD sponsored farmers club, All District Agriculture, Horticulture and Animal Husbandry officers, All KVKs in the State, Directorate of Extension in the University of Agricultural Science, State Biodiversity Authority, Leading NGOs working in environment, rural development , water and soil conservation, producer companies, micro irrigation etc. and FDAs.

1.5. Invitees: Indira Priyadharshni Vriksha Mitra Awardees, Banks/ financial institutions.

1.6. Publicity: Publicity is very important aspect for successful organization of any event for wider publicity of the event following tools may be considered:

1.6.1. **Advertisement:** Advertisement may be published in local newspapers, magazines, pamphlets, banners etc.

1.6.2. Announcements through All India radio, FM, Community and Farm radios, Electronic media especially the DD and other local television channels may be tapped.

1.6.3. Various events may be organized as precursor of TGM such as awareness campaigns for schools and college children on the importance of tree farming, exposure visits of farmers to various research and farm field etc.

1.7. **Safety and Security:** As the gathering of large number of people is expected during the TGM, it is mandatory to ensure proper and updated working safety and security measures. For achieving a safe event it is expected to keep liaison with Local Administration, Police, fire Fighters, Medical Authorities and Sanitary services providers for adequate arrangements.

2. ACTIVITIES UNDER TGM

There are a number of activities can be placed under the purview of TGM. It is to be decided at Institute level considering local requirements and expectations. However, two possible components are as follows:

2.1 **Workshop:** A workshop may be organized during the TGM. To organizing the workshop the following may be kept in mind:

2.1.1 After deciding a suitable theme for the workshop a committee may be constituted to execute the workshop. The committee may decide the sessions, resource persons, experts, panelists, chair, co-chair etc. for conducting different sessions.

2.1.2 As far as possible the resource persons may be selected from local institutions such as State Forest Department, forest Development Corporations, Agriculture, Horticulture, Power, Animal Husbandry Departments, Pollution Control Boards, Water Resources and irrigation, Bioenergy, Biofertilizers, Medicinal plant Board, Non Governmental Organizations working in Agroforestry, Waste Management, Land and Water Conservation etc. besides academic and scientific institutions.

2.2 **Exhibition:** An exhibition may be organized during the TGM. This may be the centre of attraction to a large number of participants. To organizing the exhibition the following steps may be considered:

2.2.1 A committee may be constituted to plan and execute the exhibition. The Committee may decide the participants, places, topics, facilities, participants fee, designing etc. of the exhibition.

2.2.2 The Wood based industries, departments dealing with land and water resources, line departments, academic and scientific institutions, financial institutions, industries, NGO, self help groups, rural artisans, farmers dealing with planting stock, seed etc. may be contacted for putting up stalls in exhibition.

2.2.3 Appropriate participation of women should be assured.

2.2.4 An award may be instituted for best Tree Grower of the year.

2.2.5 Films on successful stories be also shown.

2.2.6 **Tree information Centre:** A Tree Information Centre should be set up in the Mela. It may be equipped with information on selling prices of tree species grown in agro and farm forestry and harvesting age which would encourage farmers to take up tree cultivation. The Centre may also provide information on working groups of different species, name and contact number and the area specialization of the scientists identified by institute for disseminating different information to the farmers. Information on conservation of rain

water and improvement in the ground water table using ponds in agricultural fields and planting the suitable species in bunds etc. may also be provided.

2.2.7 **Special focus on extension:** Extension schemes as Van Vigyan Kendras, Demo Village and Direct to Consumer scheme should be highlighted during the Mela.

2.2.8 The technologies/processes developed at different ICFRE institutes may be showcased in TGM at every institute.

2.2.9 Herbaceous and medicinal plants may be included as an ancillary activity, if required so.

2.2.10 **Fees and Charges:** No charges should be levied for Government stalls, token charges for covering sundry expenses like electricity etc. may be taken from private/industry.

2.2.11 Prize for best stall may be given.

3. OTHER MEASURES TO MAKE TGM MORE MEANINGFUL

Experience from the earlier TGMs including recommendations are given below for providing background information for more target oriented planning.

1. Establishment of seed orchards for production of quality seeds to ensure continuous supply to farmers. For this purpose provide information on superior trees of species of interest.
2. Working groups of different species to be constituted comprising scientists from the institute. These groups would provide detailed information on the species for adoption in the State/Locality.
3. The concept of community seed orchards to be popularized among tree farmers.
4. Action to be taken for certification of quality trees seeds and nurseries producing Quality Planting Material (QPM).
5. Provide solutions for region specific problems and take up research on species suited to that region.
6. Model Demonstration plots of important species should be established on farmer's land for greater adoption for farming community.
7. Attention should be given to create awareness among marginal farmers about tree cultivation.
8. Species suitable for each district should be identified instead of doing it agroclimatic zone wise since there is lot of variation within agroclimatic zones.
9. Form species network involving scientists, farmers and forests department for selected species of economic value suitable to the area.
10. Linkages between industries, farmers and research institutes has be established and strengthened.
11. Publication of material about cultivation and management of various tree crops suitable to the area should be published in vernacular.
12. Tree planting activities should be organized during rainy season.
13. Short rotation crops should be introduced and encouraged.
14. Awareness on CDM and carbon credits species for farmers.

4. **BUDGET:** A suitable budget not less than Rs. 10 lakh per institute per year should be allotted and released in the beginning of the financial year.

5. EVALUATION OF TGM

Evaluation of any extension activity pr programme is an important component to quantify the effectiveness of the programme and feelings of the stakeholders as it provides valuable feedback.

5.1 Physical: The effectiveness of the TGM can be evaluated through;

- Feedbacks of stakeholders/participants.
- Number of participants.
- Number and variety of activities.
- Media coverage and
- Level of dignitaries present

5.2 Fiscal: Prior Budget allotment to each activity should be done at institute level and a report on expenditure incurred must be added in the final report of the TGM of a particular year.

6. **DOCUMENTATION:** A final report including evaluation of the TGM should be recorded at institute level with a copy to the Hqs. This report, on the basis of the experience of the TGM, must contain the future programme and suggestions for further improvement in the guidelines for organizing TGM.

Review Committee

Dr. Nitin Kulkarni
Director,
ICFRE-RFRI, Jorhat (Chairperson)

Dr. Shakti Singh Chauhan
Scientist-G,
ICFRE-IWST, Bengaluru (Member)

Smt. Richa Mishra, IFS
Head Extension Division,
ICFRE-FRI, Dehradun (Member)

Dr. Sandeep Sharma
Director (in-Charge),
ICFRE-HFRI, Shimla (Member)

Dr. Rekha Warrier
Co-ordinator EIACP, ICFRE-IFGTB,
Coimbatore (Member)

Dr. Jagmohan Singh Tomar
Principal Scientist,
ICAR-IISWC, Dehradun (External Member)

Dr. Geeta Joshi
ADG (Media and Extension),
ICFRE (Member Secretary)

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