



T.F.R.I.



ANNUAL REPORT

2021-2022

75
आज़ादी का
अमृत महोत्सव



जहाँ हरियाली, वहाँ खुशहाली।
जहाँ हरियाली, वहाँ खुशहाली।



TROPICAL FOREST RESEARCH INSTITUTE, JABALPUR

TFRI, JABALPUR
Annual Report 2021-22

Overview: Please indicate most important achievements/new initiatives (not more than 200 words) during the period under report.

- 57 Phenotypically superior trees of *Tectona grandis* (44 Plus trees in M.P. and 13 in Chhattisgarh) were selected for assessing their genetic diversity.
- Teak Clonal Seed Orchard representing 15 clones and 12 ramets of each of Madhya Pradesh was established.
- FRC-SD developed herbal value added food product “Energy Bars”, cream and toothpaste from Mahua and value added product “Hand Wash” from *Cassia tora* leaves extract-
- 10 different herbal mosquito repellent compositions used for making agarbatti sticks. Mosquito repellent activities fo agarbatti was certified by NABL accredited lab.
- Results reflect that *C. furcellata* could safely be used as potential bio-control agent in pest management programme of major larval defoliator pests in teak and Chick pea.
- DPR on Rejuvenation of River Narmada through Forestry Intervention in the riverscape area with the aim to achieve Aviral Dhara and Nirmal Dhara with a total financial outlay of Rs 2127.28 crore under Rejuvenation of thirteen Major Rivers through Forestry Interventions programme.
- Collected data on tree parameters of important species of C.G. to revise Form Factors and Form Quotient and standardized methodology for estimation.
- Rs.1.027 crore revenue generated, out of which Rs. 68.58 lakhs received from consultancies and EAP projects and Rs. 22 lakhs received as dissertation testing charges and transferred to ICFRE by TFRI, Jabalpur.

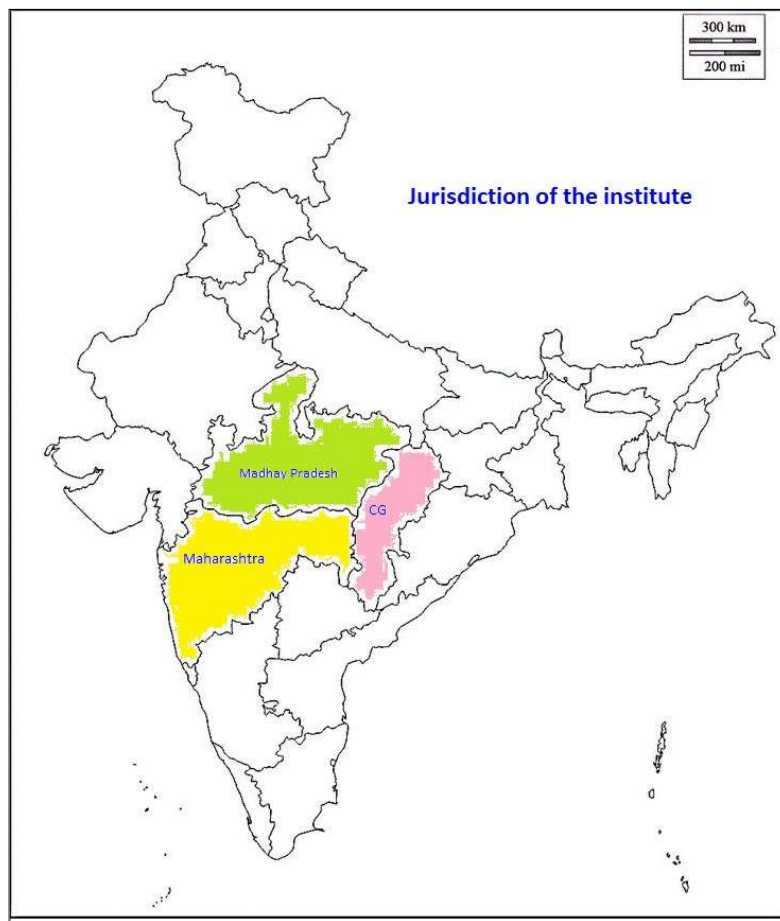
Summary of projects Yr. 2021-2022 :

Project	Completed Projects	Ongoing Projects	New projects initiated during the year
Plan	05 and ID(193- iv component)	04	04
Externally aided	09	13	04

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1. Introduction:

Tropical Forest Research Institute (TFRI), Jabalpur (M.P.) with its satellite research centre, named FRC-SD, Chhindwara provides research support to State Forest Departments of Madhya Pradesh, Chhattisgarh and Maharashtra and other stakeholders since 1973/1988. The institute is spread over an area of 109 ha and maintain constant liaison with state forest departments, NGOs working in the field of forestry and allied areas, universities imparting education in forestry and forest based industries.



Details of MoUs :

S No.	Year		For	Duration	Amount (in Lakh)
1)	2021	CEO,CAMPA, CHHATTISGARH, RAIPUR	Monitoring and evaluation of CAMPA works executed by Chhattisgarh Forest Department under APO 2015-16, 2016-17 and 2017-18, which have been furnished vide D.O. No.- 242/CAMPA-02 dt. 3-07-2017 by the Addl. PCCF (CAMPA), Chhattisgarh	18 months	Rs 120.00 lakhs
2)	2021	PCCF, HoFF, CGFD, RAIPUR	Developing synergy in forestry research and extension	05 years	--
3)	2021	ICAR-DWR, JBP and CGSFD Under CAMPA-CEO APO- YEAR 2018-19 & 2019-20	Removal of invasive alien species Research output for " Impact assessment of <i>Lantana camara</i> removal in Chhattisgarh State".	2 year	31.95
4)	2021	Mangalayatan University, Jabalpur	For cooperation in applied research programs, capacity building and knowledge sharing on forest, biodiversity conservation, ecosystem, climate change vulnerability, climate change mitigation and adaptation and livelihood of forest dependent communities.	5 year	--
5)	2021	Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), Jabalpur	For cooperation in applied research programs, capacity building and knowledge sharing on forest, biodiversity conservation, ecosystem, climate change vulnerability, climate change mitigation and adaptation and livelihood of forest dependent communities.	5 years	--
6)	2021	National Institute of Agricultural Extension Management (MANAGE)' Hyderabad	For capacity building, strengthen Extension approaches, promotion of adaptation and mitigation to Climate change. Agroforestry, Biodiversity, Watershed development, carbon sequestration, carbon finance, participatory Forest Management' Minor Forest Products, Formation and nurturing of User Groups,, Incubation, Startup and other sustainable practices in forest management.	--	--
7)	2021	DFO, Morena (MP)	To achieve objectives under AICRP project "combating desertification by enhancing vegetation cover and people livelihoods in degraded lands and deserts of India,, along with other institutes of ICFRE viz. Arid Forest Research Institute' Jorhat; Himalayan Forest research Institute, Shimla, Forest Research institute' Dehradun: Institute of Forest Genetics and Tree Breeding, Coimbatore and Institute of Forest Productivity, Ranchi.	5 year	Rs. 2174121.00
8)	2021	INDIAN FARM FORESTRY DEVELOPMENT COOPERATIVE LIMITED (IFFDC), GURUGRAM	For facilitating academic and Research activities for Natural Resources Management, Forestry, Eco-restoration Environment Conservation, Agro-	5 years	--

			forestry, Rural Livelihood Development, Community Institutions Development, Women Empowerment etc.		
9)	2021	MoU between TFRI Jabalpur and KFRI Peechi	For scientific support for decision making on matters related to forestry, with particular emphasis on conservation, sustainable utilization and scientific management of natural resources.	5 years	--
10)	2021	MoU between TFRI, Jabalpur and Dr. Y.S.R. HORTICULTURE UNIVERSITY, Venkataramannaguden- 534 101, West Godavari distt., Andhra Pradesh	For scientific support and projects requiring expertise and logistics from both the parties.	--	--
11)	2021	With CCF R&E CGSFD through DFO (Res. & Ext.), Jagdalpur (CG)	To achieve approve objectives of VVK funded by ICFRE	5 years	--
12)	2021	MoU between TFRI, Jabalpur and RLBCAU, Jhansi	For cooperation in applied research programs, capacity building and knowledge sharing on forest, biodiversity conservation, ecosystem, climate change vulnerability, climate change mitigation and adaptation and livelihood of forest dependent communities.	5 years	--
13)	2021	MoU between TFRI, Jabalpur and ICAR-ATARI, Zone-IX, Adhartal, Jabalpur	To achieve objectives as approved by ICFRE for Networking with KVKs programme	5 years	--
14)	2021	MoU between TFRI, Jabalpur and RVSKVV, Gwalior	For cooperation in applied research programs, capacity building and knowledge sharing on forest, biodiversity conservation, ecosystem, climate change vulnerability, climate change mitigation and adaptation and livelihood of forest dependent communities.	5 years	--
15)	2021	MoU between TFRI, Jabalpur ICFRE & ICAR- Central Agro. Res. Ins., (CAFRI) Jhansi	For cooperation in applied research programs, capacity building and knowledge sharing to develop sustainable agroforestry practices for farms, marginal land and wastelands in different agroclimatic zones of India; Coordinate network research for identifying agroforestry technologies for inter-region; Training in agroforestry research 'for ecosystem analysis and Transfer of agroforestry technology in various agroclimatic zones. CAFRI has developed robust agroforestry models and package of practices for different agro-climatic conditions covering small and marginal farmers for suitable production of food, fodder, fuel, fibre and fertilizers .	5 years	--
16)	2021	MoU between TFRI, Jabalpur and BUAT, Banda	For cooperation in applied research programs, capacity building and knowledge sharing on forest, biodiversity conservation, ecosystem, climate change vulnerability, climate	10 years	--

			change mitigation and adaptation and livelihood of forest dependent communities.		
17)	2021	MoU between TFRI, Jabalpur and ICAR- IGFRI, Jhansi	The parties having discussed fields of common research interests and allied activities between the two institution, have decided to enter into long-term collaboration for promotion of Research, training and consultancy services in cutting edge areas in accordance with the provisions contained in the Guidelines issued vide letter No.2-8I2012-HRD dated 11th December 2012 or as revised from time to time..	5 years	--
18)	2021	MoU between TFRI, Jabalpur and Vikram University, Ujjain	For cooperation in applied research programs, capacity building and knowledge sharing on forest, biodiversity conservation, ecosystem, climate change vulnerability, climate change mitigation and adaptation and livelihood of forest dependent communities and advanced research in subject of plant science, animal science, chemical science and environment sciences.	5 years	--
19)	2022	MoU between TFRI, Jabalpur and ICAR-IIWCRC, Datia	To participate jointly in the projects requiring expertise and logistics from both the parties.	5 years	--
20)	2022	MoU between TFRI, Jabalpur and The International Centre for Research in Agroforestry of P.O. Box 30677-00100 Nairobi, Kenya,	For financing of a Project Agreement between ICRAF and United States Agency for International Development (USAID) with regard to "Tree Outside Forests in India (TOF)"	5 years	--
21)		MoU between TFRI and Rajmata Vijaya Raje Sindhiya Krishi Vishwa Vidyalaya, Gwalior	Terms of payment signed between TFRI and Rajmata Vijaya Raje Sindhiya Krishi Vishwa Vidyalaya, Gwalior for raising plantation on Chambal ravines	-	-

Visit of dignitaries :

- 1 Dr. Somendra Singh Parihar, Senior Manager (P&S and NI), NTPC Limited, Vindhyanager, Singrauli (M.P.) was visited to FRC-SD Centre, Chhindwara on 18.8.2021.
- 2 Mr. C.L. Agrawal, Director, Achanakmar, Amarkantak Biosphere Reserve, Chhattisgarh visited TFRI on 5th October, 2021.
- 3 Shri Siddharth Bahuguna, Superintendent of Police, Jabalpur delivered a lecture on 1st November, 2021 occasion of Vigilance Awareness week closing ceremony at TFRI, Jabalpur
- 4 Dr. V.K. Bahuguna, Ex-Director General, ICFRE a special guest on 5th November, 2021
- 5 Lt. Gen (Dr) A K Misra, AVSM(Retd) Vice Chancellor of Manglayatan University was visited at Insects repository, Arachnarium and Insectary on 17th December, 2021.

- 6 Dr.Panjab Singh, Chancellor of Rani Laxmibai Bundelkhand Agricultural University, Jhansi visited TFRI on 31.12.2021.
- 7 Shri Bal Krishan Pathak, President of Medicinal Plant Board, Chhattisgarh visited TFRI on 18th February, 2022.
- 8 Shri H. V. Girisha, Joint Director “Wildlife Crime Control Bureau” New Delhi, visited TFRI on 23/02/2022.
- 9 Head, Bio research Development, Dabur research development center Ghaziabad visited TFRI and interacted with Director for various research carried out in the field of medicinal plant in TFRI 08/03/2022

New initiatives:

1. TFRI Newsletter has been published and 1st issue was released on 5th January by Sh. Faggan Singh Kulaste, Hon'ble Minister of State for Steel & rural Development, Governemnt of India, New Delhi.

2. Research Highlights

A CAMPA Activities

CAMPA Activities: 1. AICRPs 2. NFGRs 3. CAMPA Extension – Material for this section will be compiled and edited by the NPCs of concerned AICRPs/NGFRs and material to be sent by their respective institute.

At TFRI, Jabalpur total (23+3)= 26 AICRP's, funded by CAMPA, New Delhi are being executed.

B Plan and External Projects

2.1 Ecosystem Conservation and Management

2.1.1 Overview

2.1.1.1 Projects under the Theme

Projects	Completed Projects	Ongoing Projects	New Projects Initiated During the Year
Plan	-	-	-
Externally Aided	-	01	-

2.1.2 Climate Change

2.1.3 Ecology & Environment

2.1.4 Biodiversity

“Quantitative assessment of land degradation in forests of three western districts of Madhya Pradesh and suggest mitigation measures”.

Status of forest land degradation is being quantified in three western districts (Dhar, Jhabua and Mandsaur) of Madhya Pradesh. Carbon stock in soil and vegetation were measured as indicators to assess the level of degradation. Collected data on vegetation in ten 0.1 ha quadrats in each of the Beat/Compartment. A spatial map on severity of degradation in forests of these 3 districts is being prepared.



Fig.1. Laying quadrats for vegetation studies and collection of soil samples in Mandsaur Forest Division

2.1.5 Forest Botany

2.1.6 Tribals and Traditional Knowledge System

2.2 Forest Productivity

2.2.1 Overview

2.2.1.1 Projects under the Theme (in table as given at 2.1.1.1)

Projects	Completed Projects	Ongoing Projects	New Projects Initiated During the Year
Plan	02	-	01
Externally Aided	-	05	02

2.2.2 Silviculture

“Development of form factors for important tree species of Chhattisgarh”.

Data on tree height, tree girth at different height segments from standing as well as felled trees of varying girth classes of economically important species viz. *Terminalia tomentosa*, *Pterocarpus marsupium*, *Dalbergia sissoo*, *Tectona grandis*, *Adina cordifolia*, *Terminalia arjuna*, *Bridelia retusa*, *Ougenia dalbergiodes*, *Gmelina arborea* and *Mitragyna parviflora* had been collected from Rajnandgaon, Balod and South Kondagaon forest divisions to compute form factors using “Volume of frustum method”.



Fig.2. Measurement of tree diameter at different height segments of *Terminalia arjuna* at Balod forest division, CG using Basal Area Finder (BAF) Scope.



Fig.3. Measurement of tree diameter of *Tectona grandis* in Rajnandgaon forest division, Chhattisgarh.

"Study on ecophysiology of seed germination and seedling survival for restoration of natural regeneration of two threatened species of Central India".

Effect of various ecological factors on the ratio of flowering and fruiting were evaluated with reference to total seed production and seed viability of *Dalbergia latifolia* and *Litsea glutinosa*. It is found that seed germination is not affected by forest density. *D. latifolia* germinates better in mixed soil in comparison to sandy soil or clayey soil whereas *L. glutinosa* seeds germinate better in sandy soil in comparison to mixed and clayey soil. Seeds of both species are orthodox and didn't lose viability, up to 5-7% moisture content and at ambient temperature. Seeds of *D. latifolia* started germination at last stages of maturation when seed moisture content was approx 43%. Seed fall before this maturation stage could not produce any viable seedlings. In *L. glutinosa* only fully mature seeds can produce seedlings after few months (they are dormant). No loss of seeds of *L. glutinosa* and *D. latifolia* was found due to predation. Loss of moisture during early stage of growth affected *D. latifolia*, whereas *L. glutinosa* seedlings were more tolerant to drying.

"Studies on quality of nursery seedlings and their relation to outplanting performance of *Dalbergia latifolia* and *Pterocarpus marsupium*".

Seeds of *Dalbergia latifolia* and *Pterocarpus marsupium* were collected from Jabalpur and Chhindwara districts. Seeds were sown in, Polythene bags and root trainers filled with soil, sand and FYM in the ratio of 1:2:1. Approximately 4000 seedlings of each of two types of culture: bareroot and root trainer was prepared. After 1-1½ year of sowing of seeds of *D. latifolia* and after 6 months of sowing of *P. marsupium*, seedlings were grouped into four shoot height categories. Data on stem diameter, no. of first-order lateral roots, root volume, chlorophyll content, height: diameter ratio, form, no of leaves, carbohydrate content of four groups were estimated in representative of

25 percentiles within the shoot height distribution of each species. Seedlings were then outplanted into a replicated experimental design on a field planting site. More seeds of *D. latifolia* and *P. marsupium* were collected in March' 2022 for production of seedlings.

" Impact of Silviculture systems on the natural forests of Chhattisgarh with special reference to Sal and bamboo".

Selected 8 Sal forest compartment in Dhamtari Forest Division, Chhattisgarh and collected data on growth parameters, regeneration status, dominant, co-dominant trees etc. from 3 sites. Yield and productivity of Sal have been worked out with reference to different silvicultural systems.

2.2.3 Social Forestry, Agro-forestry/ Farm Forestry

"Development of *Buchanania lanzan* Spreng. based agroforestry system in Central India" was under progress due to non availability of fund .

Project initiated in April, 2022

" Tree outside forests of India " .

Project initiated in April, 2022.

'Development of *Gmelina* based agroforestry system in M.P".

Developed *Gmelina arborea* based agroforestry system for Madhya Pradesh with some shade loving medicinal crops viz. *Asparagus racemosus*, *Curcuma longa*, and *Zingiber officinale* and *Piper betle* as an intercrops. Nutrients status was also found changed under the adopted system during the study period. Maximum Nitrogen content was increased upto (27.5 kg ha^{-1}) than that of sole – 18 kg ha^{-1} . Similarly, Organic carbon contents was also increased from 0.64% to 1.13%. Based on yield data, Economic analysis of the system was calculated and found the B:C ratio 2.72:1 as compared to sole 2:1. Findings was extended through online and offline training programmes to the various stakeholders





Fig. 4. Training programmes for various stakeholders and field visit

"Promotion of Bamboo based Agroforestry System for economic upliftment and livelihood security of farmers in Madhya Pradesh".

Bamboo based agroforestry systems established and maintained in 15 farmer's field. Tools were also provided to maintain and manage the bamboo culms for pruning, inter culture operations for healthy culms. A training programme on 12 th March,2021 organized at Farmer's field to demonstrate the harvesting and management techniques of bamboo culms.

"Popularization of Improved var. of *Leucaena leucocephala* (Lam.) de Wit. Based Agroforestry system".

Leucaena based agroforestry system with intercropping of *Zea mays* (Kharif) and *Brassica juncea* and *Cymopsis tetragonaloba* (Rabi) has been promoted and distributed to farmer's of Chandiya and Umariya village under MoU with wood based industry to buy back the wood material from the farmers, established at farm field. For successful programme high yield seeds of *L.leucocephala* cv.- K 636 procured from CRIDA, Hyderabad (Telangana).

Recorded growth and yield data of the tree as well as crops. *L.leucocephala* performing better with intercrops and attains height of 3.5mt within two years as compared to the sole crop.

"Capacity building on seed and nursery technology and Plantation techniques for prioritized species of Chhattisgarh state".

Prepared extension material on 'Seed and Nursery techniques of commercially important tree species' for distribution among forest officials and other stakeholders. Conducted online training programme on "Seed handling techniques, plantation and management of commercially important forest species" for the forest officials of Durg, Raipur, Bilaspur, Ambikapur and Jagdalpur circles of Chhattisgarh.

- 2.2.3 Social Forestry, Agro-forestry/ Farm Forestry
- 2.2.4 Forest Soils & Land Reclamation
- 2.2.5 Watershed Management

2.3 Genetic Improvement

2.3.1 Overview

2.3.1.1 Projects under the Theme (in table as given at 2.1.1.1)

Projects	Completed Projects	Ongoing Projects	New Projects Initiated During the Year
Plan	02 + 193(iv)	04	01
Externally Aided	02	04	01

2.3.2 Conservation of Forest Genetic Resources

"Selection and evaluation of natural population of *Terminalia bellirica* (Gaertner) Roxb. for its active ingredient content".

58 phenotypically superior trees on the basis of height, girth, spreading pattern of the tree and length and breadth of leaves and morphology of *T. bellirica* were marked alongwith GPS location in Amravati, Gondia and Bhandara forest divisions in Maharashtra, Chhindwara, South Balaghat and West Betul forest divisions in Madhya Pradesh and Dhamtari forest division in Chhattisgarh .

It was observed that maximum germination percentage were recorded in CPT number 2 (86%) followed by CPT no. 13(66%).

Analysis of gallic acid from *Terminalia bellirica* fruits has been carried out. It was observed that the highest gallic acid content (0.98%) was found in Karegaon range under Dhamtari forest division (Chhattisgarh) and lowest gallic acid content (0.6%) was found in Mouda range under Betul forest division (Madhya Pradesh).

"Variability for Growth, wood traits and natural regeneration status of *Hardwickia binata* a multipurpose tree species in Madhya Pradesh"

12 populations of *H. binata* were identified in Khandwa, Barwah and Burhanpur forest divisions of Madhya Pradesh and seeds were collected, physical parameters of fruits/seeds were recorded.

Poor regeneration of *H. binata* observed in Khandwa, Burhanpur & Barwaha Forest Division sites.

"Introduction and evaluation of *Melia dubia* in Central India".

50 improved genotypes of *Melia dubia* has been established in five selected sites viz. Morena and Chhindwara (Madhya Pradesh), Nagpur and Amravati (Maharashtra) and Durg (Chhattisgarh) with three replications in a randomized block design. 80-90 percent survival has been recorded in all the planted sites.

"Genetic improvement and conservation of Chironji (*Buchnanania cochinchinensis* Lour.) in Central and Eastern India".

Surveyed the potential areas of Chironji and selected 139 phenotypically promising trees in three different categories i.e. Spreading, Semi-spreading and Upright marked in Betul, East

Chhindwara, West Chhindwara, Katni forest divisions of Madhya Pradesh and Marvahi, Chhattisgarh. Data as per DUS (Distinctness Uniformity and Stability) guidelines notified by Protection of Plant Varieties and Farmers Rights Authority, (PPV & FRA), New Delhi had been recorded. Among the marked trees, tree height ranged from 3.6 to 26m, number of branches 2 to 9, panicle length 7.6 to 26 cm and fruits per panicle 16.73 to 47.7 cm. Progenies of all the marked CPTs were raised for the establishment of progeny trial.

"Assessment of diversity and natural regeneration status of *Sterculia urens* Roxb. for development of conservation strategy in Madhya Pradesh".

Surveyed Khandwa, South Seoni, North Seoni, Jabalpur, Rewa, Chhatarpur, Tikamgarh, Jhabua, Shivpuri, Gwalior and Sheopur Forest Divisions for *S. urens*. Recorded morphometric data along with GPS coordinates and natural regeneration at these sites. Natural regeneration of this species is observed very low despite profuse flowering and fruiting.

"Conservation of *Litsea glutinosa* Lour. through population establishment in Madhya Pradesh".

To reduce extinction risk and increase the long-term security *L. glutinosa*. One block plantation was established in Bargi Range, Jabalpur Forest Division in 2021 and three sites were finalized in Chhindwara Forest Division [one each at Compt. No. P-104, Dellakhari range; Compt. No. P-45, Jhirpa range and Compt. No. P-97, Dellakhari range.

For awareness activities, leaflets in vernacular languages (Hindi, Marathi) were prepared and will be distributed.

"Conservation of RET species of Chhattisgarh – *Plumbago zeylanica* and *Celastrus paniculatus* and production of quality planting material".

Germplasm bank of plants of *Plumbago zeylanica* from 10 locations and plants of *Celastrus paniculatus* from 14 locations of Chhattisgarh was established at TFRI, Jabalpur. Oil extraction from seeds of *C. paniculatus* collected from Pendra, Chhattisgarh was carried out. Peroxidase, flavonoid and carbohydrate contents were estimated in leaves of *C. paniculatus*. Biochemical analysis in roots (carbohydrates, tannins, flavonoids) and leaves (carbohydrates, chlorophyll, flavonoids) of *P. zeylanica* was done. *Ex vitro* rooting was achieved in the shoots of *Celastrus paniculatus* and plantlets were produced after hardening. Seed sowing of *C. paniculatus* was carried out in the nursery. *In vitro* shoots of both the species were maintained.



Fig. 5. Cuttings of *Plumbago zeylanica* planted in root trainers



Fig. 6. Establishment of germplasm bank of *Celastrus paniculatus* and *Plumbago zeylanica* at TFRI, Jabalpur

"Development of value chain for bamboos for mass multiplication, popularization in farmers field and industrial linkages in central India".

Species trial of six bamboo species viz., *Bambusa nutans*, *Bambusa vulgaris* var. green, *Bambusa balcooa*, *Bambusa tulda*, *Bambusa burmanica* and *Pseudoxystenantha stocksii* was established in RBD design with spacing of 5m x 4m with four replications in farmer's field at Manpur, M.P. to introduce new bamboo species in Central India.

A plantation of *Bambusa bambos* in 3 ha was established at Kachharwar, Umariya as row plantation at spacing of 5m x 5m. Survival of plants 75% has been recorded.

In vitro cultures of *Pseudoxystenantha stocksii* was established and shoot multiplication was carried out on MS medium supplemented with 4 mg l⁻¹ BA and 0.25 mg l⁻¹ NAA. Rooting was achieved on MS liquid medium supplemented with 1mg l⁻¹ NAA. [MS- Murashige and Skoog , BA- Benzyl adenine, NAA- Naphthalene acetic acid). Macropropagation is being continued through culm cuttings and cavity method.



Fig. 7. Establishment of species trial of bamboos at Manpur and Umariya, Madhya Pradesh



Fig. 8. Bamboo species trial at Kundam, Jabalpur



Fig.9. *In vitro* shoot multiplication and rooting in *Pseudoxystenantha stocksii*

"Preliminary assessment of Indian Sandalwood population in Chhattisgarh for growth, heartwood, oil and regeneration status".

Growth data from the plantation in Manendragarh Forest Division and adjoining areas has been recorded. Recorded thickness of bark, sapwood and heartwood.

Core sample of Sandalwood trees collected. and oil percentage in collected samples was estimated.

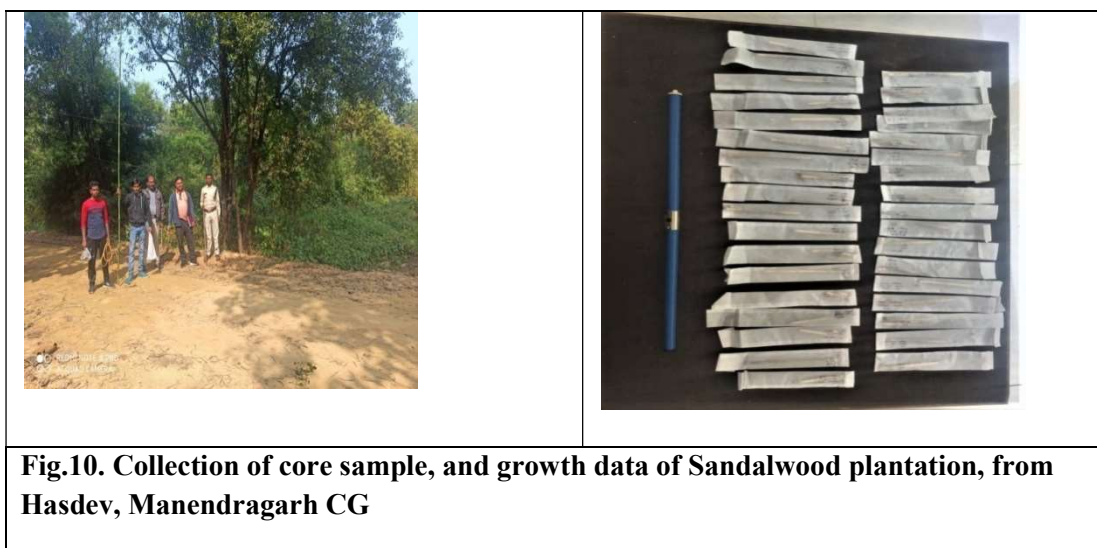


Fig.10. Collection of core sample, and growth data of Sandalwood plantation, from Hasdev, Manendragarh CG

2.3.3 Tree Improvement

"Improvement of Teak for Higher Productivity in Central/Peninsular India".

Sub Project (IV): Studies on population structure, linkage disequilibrium and marker-trait association mapping of Indian teak.

The possibility of marker-trait relationship was assessed using genome-wide association mapping to investigate genetic diversity and population structure of teak of central India. Analysis of natural teak populations samples, collected from 13 agroclimatic zones of central India revealed significant differences among sampled populations for tree height, clear bole height, girth at breast height, wood density, fibre length and fibre width. Overall, tree height ranged from 7.62m to 38m, clear bole height from 2.21m to 32m, girth at breast height from 70cm to 265cm and wood density ranges from 401.51 kg/m³ to 792.96 kg/m³ with CV of 12.56%.

"Documentation and assessment of the status of Permanent Preservation Plots (PSP), Seedling Seed orchards (SSO) and Clonal Seed Orchards (CSO) in Chhattisgarh".

Surveyed various CSOs, SSOs and SPAs of different species viz. *Tectona grandis*, *Gmelina arborea*, *Albizia procera*, *Dalbergia sissoo*, and *Azadirachta indica* etc. in Bilaspur R&E circle of

Chhattisgarh. Data recorded on growth parameters like height and diameter (GBH), flowering and fruiting status and other information like spacing, existing management practices, seed productivity etc, along with their GPS location for documentation.



Fig. 11. CSO of Teak at Ghasipur (CG) Fig.12.SSO of Khmer at Dhelwapur

"Improvement of Teak for Higher Productivity in Central/Peninsular India".

Sub project I: Selection of plus trees, raising their progeny trials and establishing germplasm bank.

Recorded morphometric data of newly selected 57 plus trees (44 in MP and 13 in CG) of Teak along with the GPS coordinates. Germplasm bank (31 accession) and progeny trial (29 families) respectively of Teak raised in institute campus is being maintained regularly. Growth performance of different progenies from Chhattisgarh and Odisha were found better than the progenies of Madhya Pradesh and Maharashtra.



Fig. 13. Selected Plus Trees in Betul forest division of Madhya Pradesh



Fig. 14. Progeny Trial of Teak in TFRI campus

"Development of Management Practices of Teak Seed Production Areas, Seedling seed orchards and Clonal seed orchards".

Surveyed Seed Production Areas (SPAs) in Sagar, Dewas and Betul forest divisions of M.P. and Pali and Chatuabhauna area of Bilaspur circle in Chhattisgarh and recorded seed status and management practices. Seed productivity status of CSOs and SSOs of Sagar, Betul forest divisions of M.P. and Ghasipur in Bilaspur circle of Chhattisgarh were recorded and management practices suggested to field staffs. Established a Clonal Seed Orchard (CSO) representing 15 clones of Madhya Pradesh and planted 12 ramets (bud grafted) of each clone.



Fig. 15. Seedling Seed Orchard in Institute campus



Fig. 16. Clonal Seed Orchard established in August 2021

"Evaluating the impact of tree improvement activities on seed quality of *Tectona grandis* in Madhya Pradesh and Chhattisgarh".

Surveyed and selected 6 SPAs, 2 CSOs and 1 SSO in Madhya Pradesh and 5 SPA, 2 CSO and 2 SSO in Chhattisgarh and collected seeds. Seeds were also collected from unimproved sites also. In Madhya Pradesh, seeds of SPA, Tikaria (West Mandla) found superior in morphological parameters in terms of fruit length, diameter and fruit weight. Emptiness was minimum (59.24%) in seeds of SPA, Moeya Nala (West Mandla) and maximum (73.48%) in SPA Podhi (Umaria) in Madhya Pradesh. In Chhattisgarh, seeds of SPA, Pali were found superior in morphological parameters in terms of fruit length, diameter and fruit weight. Emptiness was minimum (64.29%) in seeds of SPA, Pali (Bilaspur) and maximum (75.78%) in seeds of SPA, Amaruva (Raipur).



Fig. 17. Seed Production Area at Hathni (Damoh) in M.P. and Pali in Chhattisgarh

"Selection of pest and disease free CPTs of *Gmelina arborea* and production of clonal planting material".

Branch cuttings were collected from CPTs selected in Betul (Sonaghati), Chhindwada, Katni (Saraswahi), Damoh (Nohta, Sanga) and Jabalpur (Moiyanala, Barha) in Madhya Pradesh and semi-hardwood cuttings were prepared from them after treating them with 1500 IBA solution for

production of rooted plants. New CPTs at different locations were also selected and propagation is being carried out with branch cuttings after treating them with different concentrations of IBA, NAA and IAA respectively. Rooting was also achieved in soft-wood cuttings of selected CPTs by planting them in vermiculite in root trainers after treatment with IBA. Scions were collected from selected trees and cleft grafting on rootstocks was carried out. Around 60-70 % success was achieved during grafting.



Fig. 18. Rooting of softwood cuttings of *Gmelina arborea*

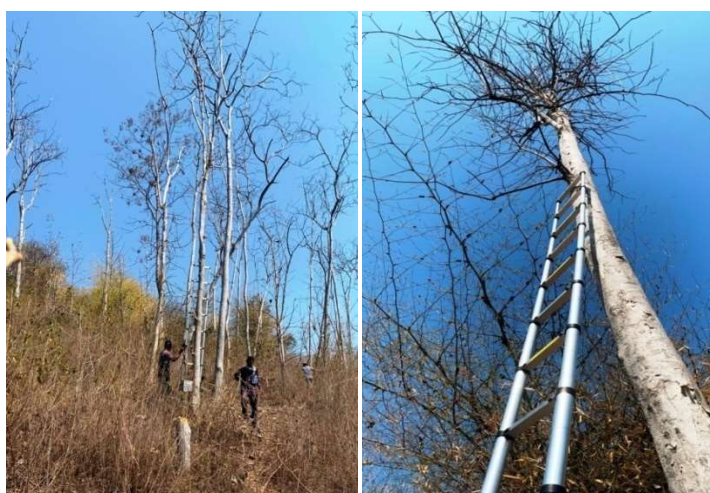


Fig. 19. Collection of cuttings from selected CPTs of *Gmelina arborea*



Fig. 20. Cleft Grafting in *Gmelina arborea*

"Selection and evaluation of *Haldina cordifolia* for higher wood productivity".

24 CPTs, 12 each in MP and CG of *Haldina cordifolia* were identified.



Fig. 21. CPT of *Haldina cordifolia* (Haldu) tree at Balodabazar Divison, Chhattisgarh

Consultancy Project:

"Development of SOP for developing Quality Planting Material (QPM) of forestry species in Odisha"

A consultancy was awarded for working on the development of standard operating procedures for 30 forestry species given by Odisha Forest Department. Draft SOP manual was submitted to Nodal Institute i.e. IFP, Ranchi.

2.3.4 Vegetative Propagation -

2.3.5 Biotechnology –

2.4 Forest Management

2.4.1 Overview

2.4.1.1 Projects under the Theme (in table as given at 2.1.1.1)

Projects	Completed Projects	Ongoing Projects	New Projects Initiated During the Year
Plan	Nil	Nil	Nil
Externally Aided	Nil	Nil	Nil

2.4.2 Sustainable Forest Management (SFM)

2.4.3 Forest Economics

2.4.4 Forest Biometrics

2.4.5 Participatory Forest Management

2.4.6 Policy and Legal Issues

2.4.7 Information and Communication Technology (ICT)

2.5 Wood Products

2.5.1 Overview

2.5.1.1 Projects under the Theme (in table as given at 2.1.1.1)

Projects	Completed Projects	Ongoing Projects	New Projects Initiated During the Year
Plan	Nil	Nil	Nil
Externally Aided	Nil	Nil	Nil

2.5.2 Wood and other Lignocellulosic Composites

2.5.3 Wood Processing

2.5.4 Value Addition and Utilization

2.5.5 Wood Chemistry

2.5.6 Pulp and paper

2.6 Non-wood and Forest Products (NWFPs)

2.6.1 Overview

2.6.1.1 Projects under the Theme (in table as given at 2.1.1.1)

Projects	Completed Projects	Ongoing Projects	New Projects Initiated During the Year
Plan	-	-	02
Externally Aided	04	03	-

2.6.2 Resource Development of NWFPs

"Evaluation of hydroponics techniques for the cultivation of medicinal plants- *Bacopa monnieri*, *Centella asiatica*, *Acorus calamus* and *Stevia rebaudiana*".

Prepared nutrient solution and started experiment in bottles. Developed and established 3 different mini hydroponic systems to initiate trials of targeted species at FRI, Dehradun and trial of

Bacopa monnieri (Brahmi) and *Acorus calamus* has been initiated in Laboratory. Hydroponics system established in TFRI, Jabalpur and species *Centella asiatica* and *Stevia robundiana* plantlets procured to start experiment.



Fig. 22 Mini Hydroponics system and trial of *Baccopa monerri* (FRI, Dehradun)



Fig. 23. Mini Hydroponics system (FRI, Dehradun)



Fig. 24 Hydroponics systems established at TFRI, Jabalpur

2.6.3 Sustainable Harvesting and Management

2.6.4 Chemistry of NWFPs, Value Addition and Utilization

"Conservation of *Stereospermum suaveolens* (Roxb.) DC. – A rare species in Madhya Pradesh".

Survey ten different districts of Madhya Pradesh and mapping was done for populations of rare dashmool species *S. suaveolens* HPTLC of Root bark samples reveals chemical variations (Triacontanol content) in the range of $0.126 \pm 0.01\%$ to $0.545 \pm 0.03\%$. Morphological traits were also recorded. Highest amount of triacontanol ($0.545 \pm 0.03\%$) was found in root bark collected from Khandwa Forest division of Nimar (MP). It is revealed that *S. suaveolens* have a high level of morphometric variation for tree height, girth at breast height, clear bole height, crown diameter, number of primary branches and leaf area and significant positive association of triacontanol with tree height, girth at breast height and clear bole height.



Fig.25. Germplasm bank of *S. suaveolens* established at TFRI, Jabalpur

"Investigation on variations and domestication of *Curculigo orchioides* Gaertn. (*Kali Musli*) in Madhya Pradesh".

Tubers (apical, distal, end, segments and full part) of *Curculigo orchioides* Gaertn. (*Kali Musli*) were sown in the field to identify and standardize the tuber part for propagation purposes. Samples of *C. orchioides* were collected from nursery experimental beds and morphological data (rhizome length, rhizome thickness, number of rootlets, length of rootlets and rootlet thickness) were recorded. Rhizome and rootlets samples were quantified for Curculigoside content through HPLC technique which revealed the presence of Curculigoside both in rhizomes as well as in rootlets. Phytochemical contents i.e., phenolic, flavonoid, alkaloid and tannin contents were also analyzed.



Fig.26. Propagation through tuber segments



Fig..27. Collection of seeds of *C. orchioides*

"Standardization of harvesting time and post harvesting techniques of *Helicteris isora* (Marorphali) and *Mucuna pruriens* (Kaunch)".

Studies revealed that optimum storage time in term of bioactive compounds lupeol and L-Dopa respectively is 06 months for *Helicteris isora* (Marorphali) and 10 months *Mucuna pruriens* (Kewnach). The suitable containers for storage were found the glass containers, polythene bags and plastic containers. Harvesting time of *Helicteris isora* (Marorphali) and *Mucuna pruriens* (Kewnach) had been standarised i.e. January and February, respectively.



Fig.28.Collection of *Mucuna* fruits with ruptured bamboo stick



Fig. 29. Destructive processing of *Mucuna* fruits

"Identification of prominent locations and best populations of *Terminalia chebula* (Harra) and *Anogeissus latifolia* (Dhawda) in Madhya Pradesh in terms of their active chemical ingredients".

Morphological data (length, width and weight) of fruits of *Terminalia chebula* (Harra) collected from 16 ranges of 02 forest divisions South Balaghat and North Balaghat of Madhya Pradesh were recorded. Harra fruits were processed to make “*Kachariya*” and powdered. Powdered fruit samples were analyzed for tannin and gallic acid contents. Total tannin content through spectrophotometer and gallic acid content through HPLC were evaluated for Harra fruits of 44 locations. The content of gallic acid in 44 samples varied from 0.83 ± 0.01 to 26 ± 0.18 . The gum of *Anogeissus latifolia* (Dhawda) was collected from Alirajpur forest division and categorized into grades for further phytochemical study.

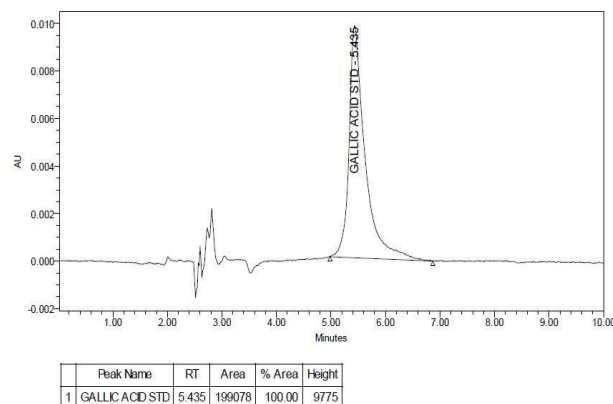


Fig.30. HPLC chromatogram for gallic acid



Fig.31.Oozing of Dhawda gum

"Selection of CPTs, standardization of collection practices and quality evaluation of Gum karaya (*Stercularia urens*) in Chhattisgarh state".

Experiments were laid out on trees of 03 girth classes (Group A- 90to 140 cm; Group B- 141 to190 cm and GroupC- > 191 in Janjgir -Champa and Manendragarh forest areas of Chhattisgarh state. Trees were tapped mechanically with different techniques i.e.traditional and semi-arc blaze techniques to standardize the sustainable harvesting technique in the months of March, April, May and June. Observations shows that the yield of gum is directly proportional to the girth of the tree. A validated HPTLC Method was developed for quantitative evaluation of glucuronic acid in gum samples which can be used to quality standardization of gum Karaya along with BIS parameters such as pH, viscosity, volatile matter, ash and foreign matter.



Fig. 32. A: Blazing the tree with die , B&C: Length, width and depth of initial blaze on *Sterculia urens* tree, D: Refreshing of blaze (1.5 – 5 mm), E: Gum oozing from the blaze, F: Filling of the blaze.

"Investigations on active chemical ingredients and propagation of critically endangered species *Dillenia pentagyna* Roxb. for its conservation in Madhya Pradesh".

Populations of critically endangered *Dillenia pentagyna* Roxb. was identified in 07 forest divisions of Madhya Pradesh. 10 different seed treatments (GA3 – 100 ppm; GA3 – 300 ppm; GA3 500 ppm; Hot water; cold water, Cow-dung slurry; Conc. H₂SO₄; Conc. H₂SO₄ – 40% and control) and 5 potting media (Soil: Soil: FYM – 2:1:1; Soil: Sand – 2:1; Cocopeat: Soil: Sand – 1:1:1; Soil: Sand – 1:1) were used. Preliminary results shows 12% germination of seeds treated with GA3 300 ppm for 24 hours. Experiments for vegetative propagation were also laid out to standardize the propagation technique. Preliminary study reveals 20% rooting if treated with IAA 500ppm for 4 hr and IAA 1000 ppm for 2 hr. Total secondary metabolites i.e. alkaloids, phenols & flavonoids were also estimated in all collected plant parts of the species. A validated HPTLC method was developed for simultaneous determination of betulinic acid, β -sitosterol and lupeol in fruits, leaves, roots and stem bark of *Dillenia pentagyna* Roxb.



Fig. 33. Adventitious rooting in *Dillenia pentagyna*

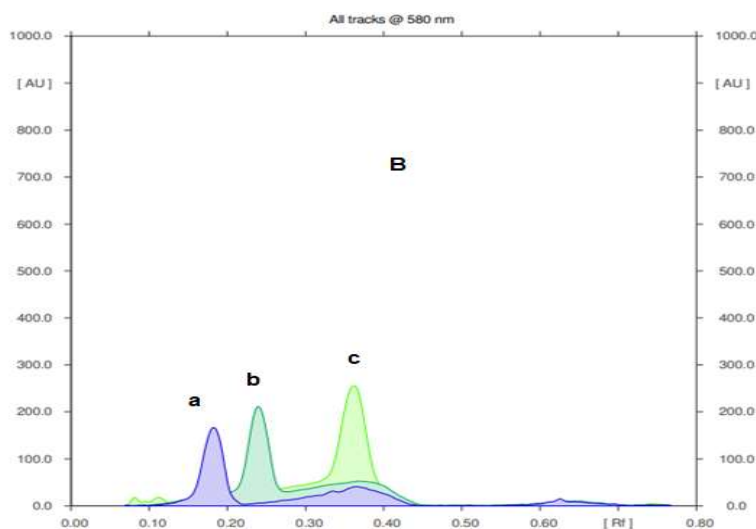


Fig. 34. HPTLC Chromatograms of BA (a), BS (b) and LU (c) standards

"Exploration of adhesive materials for incense sticks from the plant species".

Leaf of *Delbergia latifolia*, Bark of *Bombax cieba* and Seed of *Cassia tora* found good for alternate source for preparation of Jiggat.



Fig. 35. Preparation of Jiggat

"Exploration and utilization of natural forest resources for formulation of mosquito repell and their evaluation".

Herbal Mosquito repellent were developed and results were validated by NABL accredited lab. More than 90% repellency was observed in 10 different samples. Further work on testing of standard parameters is under progress.

2.6.5 Bio-fuels and Bio-energy

2.7 Forest Protection

2.7.1 Overview

2.7.1.1 Projects under the Theme (in table as given at 2.1.1.1)

Projects	Completed Projects	Ongoing Projects	New Projects Initiated During the Year
Plan	01	00	-
Externally Aided	03	00	01

2.7.2 Insects pests, diseases and control

"Development of delivery system for field application of *Canthecona furcellata* as biological control agent against major insect pests"

A field experiment was conducted to evaluate the predatory potential of *Canthecona furcellata* against *Hyblaea puera*, *Eutectona macheralis* and *Helicoverpa armigera* in Teak

nursery at Kanchangaon range (Mandla) and Chick pea crop at Para village (Bargi), Jabalpur. M.P. Results revealed that the first instar larvae were not feeding on all the three hosts due to their zoophytophagous nature. At fifth nymphal instar maximum per cent predation of 84.95 per cent was observed in *E. machaeralis* larvae followed by on larvae of *H. armigera* with 83.39 per cent predation and minimum per cent predation 74.37 per cent on *H. puera* larvae. Results reflect that *C. furcellata* could safely be used as potential bio-control agent in pest management programme of major larval defoliator pests in teak and Chick pea.

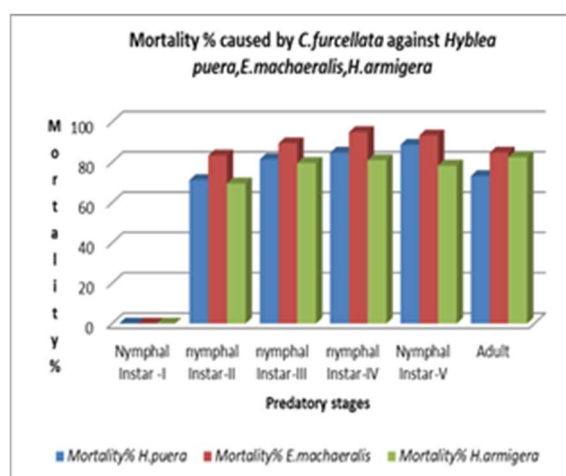


Fig. 36. Field release of *Canthecona furcellata* against key defoliator pest of teak



Fig. 37. Recorded larval consumption of *C. furellata* on *E. machaeralis* under field conditions



Fig. 38 Mass multiplication of host Culture of *C. cephalonica* & *C. furcellata*

“Extension of biological control of Teak defoliator and skeletonizer through egg parasitoid, *Trichogramma raoi* (TFRI- Trichocards) in plantation” .

Host rearing of biological control agents *Canthecona furcellata* and egg parasitoid *Trichogramma raoi* production for the preparation of TFRI- Trichocards were prepared for requirements raised by the stakeholders and 7 Lakhs egg parasitoids were released in experimental site against Teak defoliator and skeletonizer. 12 trainings programmes to popularize biorational and ecofriendly insect pest management and to improve the environmental quality, on “Biological Control of Teak Skeletonizer / Defoliator insects” were organized for the Frontline Staff of six forest division (Korba, Katghora, Sarguja, Ambikapur, Khairagad and Rajanandagaon) of CG State Forest Department.



Fig. 39. Mass culturing of *T. raui*



Fig. 40. Field demonstration of management of Teak defoliator /skeletonizer through TFRI Trichocard

Teak Defoliators
Hyblaea puera and *Eutectona machaeralis*

Egg Parasitoid- *Trichogramma raui*
Released site

Trichocard
developed
by TFRI

Field release of *Trichogramma raui*

Non-released site
Experimental site

“Monitoring and dissemination of knowledge to manage sal heartwood borer. *Hoplocerambyx spinicornis* in Chhattisgarh”.

Surveyed and monitored the status of sal heart wood borer *Hoplocerambyx spinicornis* infestation in sal forest at Kondagaon, Keskai, Bhanupratppur, Ghariyaband and Kawardha forest divisions of C.G. The enumeration of borer affected trees was done in all the selected sites where sal forests and borer occurred, based on the types/categorization and girth size. Information on borer incidence was also collected from different related forest divisions. Laid tree traps in the selected sites and demonstrated categorization of borer affected trees and trap tree operation for management of borer beetles.

Data on sal borer incidence revealed that a total of 1070 sal trees were affected during the year 2021. Eight trainings on “Management of Sal heart wood borer *H. spinicornis* ” Conducted for the Frontline Staff of six forest division (Korba, Kawardha, Kondagaon, East bhanupratapur, Sarguja, Ambikapur, and Rajanandagaon) State Forest Department of Chhattisgarh wherein 200 peoples were trained. Feedback was also taken from the participants of the training programme to compile the valuable and important suggestions in future training.



Fig. 41. Survey and monitoring of sal heart wood borer at sal forest, Compt. no. RF/353, Beat- Supkhar, Range – Rengakhar, Division- Kawardha



" Capacity building of nursery staff on preparation of organic fertilizer and its application".

Conducted 35 hands on practical trainings entitled" Preparation and application of biofertilizers in forestry" for field staffs of six circles, Chhattisgarh and 921 officials attended the training programme.



Fig:42. Powerpoint presentation and Practical Demonstration During training program.

2.7.3 Mycorrhizae, rhizobia and other useful microbes

2.7.4 Weeds and Invasive species

"Impact of *Lantana Camara* removal in Chhattisgarh State".

To assess the impact of *Lantana camara* removal on local biodiversity, regeneration status, soil physical and chemical properties, micro fauna and seed bank status in soil, NTFP/medicinal plants collection, fire incidents, three forest divisions viz., Balrampur (Northern Hilly zone), Marwahi (Chhattisgarh plains zone) and Bastar (Bastar Plateau zone) have been selected as representative divisions of three agro-climatic zones of Chhattisgarh and established permanent plots with high, medium and low infestation areas and collected detailed information of the sites. Soil samples from each site have also been collected from three depths (0-15, 16-30 and 31-45 cm) and analyzed the chemical properties (EC, pH, N, P, K and Organic Carbon).



Fig. 43. Laying quadrats for vegetation sampling



Fig. 44. Collection of Soil Samples from selected site



Fig. 45. Field Site Evaluation : TFRI team with Chhattisgarh Forest Department

2.7.5 Forest Fire and Grazing

3.	Education Vistas/Activities
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3.1 FRI University (Applicable for FRI, Dehradun only)

3.2 HRD Trainings Organized : Topics must be indicated in annexure while providing numerical information in the table given below:

Sl. No.	No. of Trainings	Duration (in days)	No. of participants
1	02	10	57

Note: Please indicate in numerals i.e. 1, 2, 3...n only. Please DO NOT write oneweek, six months etc.

★ Please provide details of HRD trainings in the given format as annexure -6 (HRDTrainings)

3.3 Visits Abroad - Nil

3.4 Participation in Seminars/Symposia/Workshops/Trainings

No of Seminars/Symposia/ Workshops/Trainings	Duration (in days)	No. of participants
163	315	14413

★ Please provide details in the given format as annexure-7 (participation in Workshops etc.)

4.	Extension Panorama/Activities
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- **National Forest Library and Information Centre (NFLIC)** (Applicable for FRI, Dehradun only)
- **Environmental Information System (ENVIS)** (Applicable for FRI, Dehradun & IFGTB, Coimbatore only)

4.1. Trainings Organized : Topics must be indicated in text while providing information in the table given below

No. of Trainings	Duration (in days)	No. of participants
a. Trainings under VVK		
-	-	-
b. Trainings under DV		
-	-	-
c. Trainings under GSDP		
-	-	-
d. Other trainings (excluding HRD trainings)		
43	74	1696
Grand Total	Grand Total	Grand Total
43	74	1696

Note: Please indicate in numerals i.e. 1, 2, 3...n only. Please DO NOT write one week, six months etc.

★ Please provide details of trainings in the given format as annexure -6 (A) (Extension Trainings)

4.2 Report on the activities performed under following:

4.2.1 Van Vigyan Kendras (VVKs) –

1. MoU sign between TFRI, Jabalpur and State Forest Department, Chhattisgarh for smooth functioning of newly established Van Vigyan Kendra at Metaguda Nursery, Jagdalpur (C.G.) on 14/09/2021.
2. Extension material published by TFRI has been handed over to VVK, Jagdalpur.



Fig. 46. श्री सौरभ सिंह ठाकुर वन मंडलाधिकारी (अनु. एवं विस्तार) एवं डॉ. एस. सर्वानन, प्रभागाध्यक्ष, वन विस्तार प्रभाग उवअसं, जबलपुर समझौता ज्ञापन (MoU) हस्ताक्षर करते हुए



स्थल निरीक्षण करते एवं वन प्रचार सामग्री वन मंडलाधिकारी को सौंपते

3. VVK Raipur has been inspected by the Head, Forest Extension Division, TFRI on 15/09/2021.
4. Rs. 13 Lakhs were released to VVK at Jagdalpur develop model nursery and procurement of equipments.



Fig. 47. वन विज्ञान केन्द्र छत्तीसगढ़ रायपुर में उपलब्ध सुविधाओं का निरीक्षण करते डॉ. एस. सर्वानन, डॉ. एस. एन. मिश्रा एवं श्री एच.डी.बी. एन्थोनी

4.2.2 Demo Village (DV) - Nil

4.2.3 Tree Growers Mela (TGM) - Interaction with farmers in Kisaan Mela

Institute	Participated/organized	Duration	Place
TFRI, Jabalpur and FRC-SD, Chhindwada	TFRI Organized Kisan Mela in collaboration with NABARD &ICFRE at KVK, Mandla (M.P.)	01 day 11/03/2022	Krishi Vigyan Kendra, Mandla (M.P.)
TFRI, Jabalpur and FRC-SD, Chhindwada	TFRI, Jabalpur and FRC-SD Chhindwara actively participated in ' International Herbal Fair ' Bhopal Organized by M.P. State Minor Forest Produce (Trading & Development) Cooperative Federation.	22 - 26 December, 2021	Bhopal (MP)
TFRI, Jabalpur and FRC-SD, Chhindwada	TFRI, Jabalpur and FRC-SD Chhindwara actively participated in 'Agro-vision' at Nagpur, Maharashtra.	24-27th December, 2021	Nagpur (MS)

Participation in the Inauguration of Ayush Van Establishment at Amarkantak on 09 Oct 2021

4.2.4 Prakriti - Nil

1. FRC-SD Chhindwara conducted awareness training programme "Avoid the Use of Single Use-plastic" under Azadi ka Amrut Mahotsav by the centre to the Students on 8/10/2021 at Navodhya in Singori village, Chhindwara district Madhya Pradesh.
2. An awareness programme conducted on 07 .02.2022 in Navodaya Vidyalaya, Singodi. 40 students of 10th Standard participated in the event. During the period field visit was conducted for identification, uses and botanical names of various medicinal/aromatic/shrub/tree species. Information was delivered to the students and feedback was obtained.

4.3 Technologies transferred- *A brief write up with suitable photographs on Efforts made on extension /commercialization of the following:*

4.3.1. Clones/Varieties released (species wise):

Plants of both varieties of *Rauvolfia serpentina* were prepared and sold to Chhattisgarh Medicinal Plant Board

4.3.2. Packages of practices developed (species wise)

4.3.3. Products developed

Under the ongoing research project ID No.281/TFRI/2021-22/FRCSD-2/ICFRE/24) funded by ICFRE, Dehradun

Herbal Mosquito repellent Agarbatti sticks were developed. More than 90% repellency was observed in 10 different samples. Further work on testing of standard parameters is under progress.

4.3.3. QPM produced and supplied to stakeholders (species wise) –

QPM of different species of Bamboos viz. *Bambusa nutans*, *B. tulda*, *B. vulgaris* var. green, *B. vulgaris* var. yellow

4.3.5. Patented technologies

4.3.5. License/Material Transfer Agreement signed- .

Please provide details in the given format as annexure -11 (MTA details)

4.4 Intellectual Property - Patents Granted/Applied (during the year), any other information regarding IP

4.4.1 Patents granted/ applied for : nil

4.4.2 Others

4.5 Research Publications: Please provide information in the table given below (Numbers only):

Books	Booklets/ Brochure/ Bulletins/ Phamphlets	Article in Seminars/ Conferences/ Workshops etc.		Popular Article	Research Papers in Journals		Chapters in Books/ Proceeding s
		Articles	Abstracts		Foreign	Indian	
1	5	-	28	21	16	37	3

Note – List of books along with photograph of cover page are to be submitted separately.

★Please provide a list (with subheads as in 4.5 above) of all the publications (in the manner of enlisting references as followed in the Indian Forester) including impact factor (in case of research papers only) as annexure -10 (publications)

4.5 Seminars/Symposia/Workshops Organized

No. of Seminars/Symposia/ Workshops/ meetings organized	No. of days	No. of participants
11	10	581

★ **Please provide details in the given format as annexure -8 (seminars etc. organized)**

4.6.1 Awareness /Demonstration programmes organized

No. of Awareness/ Demonstration programmes organized	No. of days	No. of participants
25	27	1159

★ **Please provide details in the given format as annexure -9 (seminars etc. organized)**

4.6 Consultancies -

S.No	Consultancy	User agency
1.	Development of SOP for developing Quality Planting Material (QPM) of forestry species in Odisha,	Odisha SFD
2.	Monitoring of NTPC Ltd. Accelerated afforestation programme of plantation of 10 million trees – In seven states (M.P. and Maharashtra)	NTPC
3.	Implementable forestry research for ash utilization promotion and development of research park at APML, Gondia	Adani Power Maharashtra Limited, Maharashtra
4.	Pilot study on Raising short rotation forestry crops for intermittent periods at Dubna-Sakradhi Iron and manganese ore mines in Keonjhar district of Odisha”.	Odisha Mining Corporation Limited, Odisha
5.	Study of flora and fauna and preparation of Wildlife Conservation Plan including endangered species if any and comprehensive study of the impact of mining on the wildlife for Rajendra UG and Damini mine, SECL Sohagpur Area (Madhya Pradesh)	SECL
6.	Preparation of Wildlife Conservation Plan for Endangered Species found in and around Dhehwadih UG, Bagdeva UG and Singhali UG mines of DSB Sub Area, SECL Korba Area (Chhattisgarh)	SECL

4.7 Technical Services

4.7.1 Identification and testing services

4.7.2 Advisories given to SFDs and other stakeholders –

1. Suitable recommendations suggested for white grub infestation in teak nursery at kanchangaon range, M.P. on 18.8.2021.
2. Suitable recommendations suggested to manage sal heartwood borer outbreak in sal forest at Kondagaon range, C.G. on 21.12.2021.
3. An advisory (16-11-21) was issued for effective control measures for drying of teak seedlings and infestation of teak skeletonizer, termite attack in plantation at Durgapur, Bargi and Saliwada, Jabalpur.

4.7.3 Other technical services not covered elsewhere in the report

4.8 Activities of Rajbhasha –

1. Scheduled activities like review and quarterly meetings were organized
2. Various competitive programmes were organized during Hindi Pakhwara in September 2021.
3. TFRI received award from TOLIC, Jabalpur for commendable work of Hindi implementation in this institute etc during 2021-22





Fig. 48. Rajbhasha activities were conducted at the TFRI, Jabalpur during year 2021-22

4.9 Awards and Honours –

Awards:

1. Dr. Naseer Mohammad, Scientist-D received “ICFRE Young Professional Award 2020” for outstanding contribution.
2. Shri Kaushal Tripathi, Scientist-B received Prof. S.N. Chaturvedi medal for best research paper presentation during Conference of Indian Botanical Society from 18-20 Oct. 2021 held at Jai Narayan Vyas University, Jodhpur.
3. Shri Kaushal Tripathi, Scientist-B received Young Scientist Award 2021 by the Society of Biological Sciences and Rural Development on the occasion of International conference on Emerging sustainability trends in Agriculture, Rural and environmental development, 19-20 Dec. 2021.

	<p>4. TFRI received Awarded for Hindi Rajbhasha Award on 23rd December, 2021.</p> <p>5. Dr. Mohan C, Scientist-B, received Scientists of the year award 2021 on the occasion of International Conference on emerging sustainability trends in “Agricultural, Rural and Environmental development” (19-20th Dec, 2021) organized by Society of Biological Sciences and Rural Development, Allahabad. U.P.</p> <p>4.10 Special Activities (Such as Van Mahotsava, Forestry Day and Other occasions)-</p> <ol style="list-style-type: none"> 1 Celebrated International day of biodiversity on 22-05-2021 2 Celebrated World Environment Day, 2021 on 05-06-2021 3 Plantation was carried out in TFRI, Jabalpur on celebration of Van Mahotsav on 06/07/2021. 4 TFRI, Jabalpur and FRC-SD, Chhindwara celebrated Independence Day, 2021. 5 FE&CC division Organized “2nd week of Bharat Ka Amrut Mahotsav” with the theme “Biodiversity and Climate Change” from 2-08-2021 to 8-08-2021 6 TFRI observed Parthenium Week from 16th to 22nd August, 2021. 7 TFRI observed World Bamboo Day on 18th September, 2021. 8 An awareness programme "Avoid the Use of Single Use-plastic" under Azadi ka Amrut Mahotsav by the centre to the Students on 8/10/2021 at Navodhya in Singori village, Chhindwara district Madhya Pradesh 9 Swachhata Abhiyan observed at TFRI on 13th October, 2021. 10 TFRI observed Vigilance Awareness on 28th October, 2021. 11 Tropical Forest Research Institute, Jabalpur celebrated the Birth Anniversary of Birsa Munda on 17.11.2021 at Rani Durgawati Samadhi Sthal, Gram Barha, Jabalpur, Madhya Pradesh. 12 Forest Research Centre for Skill Development, Chhindwara celebrated the Birth Anniversary of Birsa Munda on 18.11.2021 at Thanakhede village, Chhindwara, Madhya Pradesh. 13 Celebrated Rivers of India” under Azadi ka Amrit Mahotsav on 29th December, 2021. 14 TFRI, Jabalpur and FRC-SD, Chhindwara celebrated Republic Day, 2022. 15 TFRI celebrated Woman’s Day on 8th March, 2022. 16 Science quiz programme and Rangoli competition organized during the celebration of International Day of Forests on 21 March 2022 	
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4.11 Extension Activities performed under CAMPA Extension (this information is different from the information provided in the Chapter as above)																	
5.	Administration and Information Technology																
Introduction 1.1 Information Technology <ul style="list-style-type: none"> All the virtual meetings have been organized through VC end point, Webex, googlemmeet, Zoom, Microsoft Teams for trainings, workshops, seminar, Inhouse meetings and meetings with headquarter and other organizations throughout the year. The web pages of institute's website (http://tfri.icfre.org) and social media accounts of institute's satellite centre have been updated with latest information on regular basis throughout the year. The social media accounts like YouTube, Facebook, Twitter, Instagram, Koo have been created and integrated with website for ease of access. The online open access e-magazine 'Van Sangyan' (ISSN 2395 - 468X), and journal "Indian Journal of Tropical Biodiversity" published by the institute is linked with institute's web site. Reports have been generated for all the activities undertaken at the institutes level - conferences/seminars/workshops/trainings/visits of dignitaries/visits etc. are uploaded on institute's web site and also sent to the headquarter for uploading over ICFRE website. Various networking facilities extended within the institute. All the circulars, notifications, office orders, proceedings of monthly seminars and other documents have been regularly uploaded over the Online Office Records (Order /MoM / Agenda etc.) System for wider circulation. 1.2 Administration: A brief note on general administration activities along with information on the following: <p><u>Recruitment and promotions etc. during the year: 2021-22</u></p> <table> <tr> <td colspan="2">(A) New appointment during 2021-22:-</td></tr> <tr> <td>(ii) Scientist</td><td>- 01(Shri Manish Kumar Vijay appointed as Sci-B)</td></tr> <tr> <td>(iii) Technical services</td><td>- Nil</td></tr> <tr> <td>(iv) Ministerial staff</td><td>- Nil</td></tr> <tr> <td colspan="2">(B) Promotion during 2021-22:-</td></tr> <tr> <td>(i) Scientist</td><td>- 06</td></tr> <tr> <td>(ii) Technical services</td><td>- 02</td></tr> <tr> <td>(iii) Ministerial staff</td><td>- Nil</td></tr> </table>		(A) New appointment during 2021-22:-		(ii) Scientist	- 01(Shri Manish Kumar Vijay appointed as Sci-B)	(iii) Technical services	- Nil	(iv) Ministerial staff	- Nil	(B) Promotion during 2021-22:-		(i) Scientist	- 06	(ii) Technical services	- 02	(iii) Ministerial staff	- Nil
(A) New appointment during 2021-22:-																	
(ii) Scientist	- 01(Shri Manish Kumar Vijay appointed as Sci-B)																
(iii) Technical services	- Nil																
(iv) Ministerial staff	- Nil																
(B) Promotion during 2021-22:-																	
(i) Scientist	- 06																
(ii) Technical services	- 02																
(iii) Ministerial staff	- Nil																

Sl . No.	Name of Scientist/Technical staff/min. staff	Present post	Promoted post
<i>Scientists</i>			
1	Dr. Fatima Shirin	Scientist-F	Scientist-G
2	Dr. Nanita Berry	Scientist-E	Scientist-F
3	Dr. Rajkumar M.	Scientist-C	Scientist-D
4	Shri Dheeraj Kumar	Scientist-C	Scientist-D
5	Dr. Pramod Kumar	Scientist-C	Scientist-D
6	Smt. Mamta Meshram	Scientist-B	Scientist-C
<i>Technical</i>			
1	Shri I.T.K. Dilraj	STO	ACTO
2	Shri Satish Sahu	TO	STO
<i>Ministerial</i>			
	Nil		

(C) Transferred during 2021-22 :-

- | | | | |
|-------|--------------------|---|-----|
| (i) | Scientist | - | 02 |
| (ii) | Technical services | - | Nil |
| (iii) | Ministerial staff | - | 01 |

Sl . No.	Name of Scientist/Technical staff/min. staff	From (Place)	To (Place)
<i>Scientist</i>			
1	Smt Neelu Singh, Scientist-G	FRI, Dehradun	TFRI
2	Dr. S. Saravanan, Scientist-F	TFRI	IFGTB, Coimbatore
<i>Technical</i>			
	Nil		
<i>Ministerial</i>			
1	Shri N.K. Gupta	TFRI	IFP, Ranchi

(D) Retired during 2021-22 :-

- | | | | |
|-------|--------------------|---|-----|
| (i) | Scientist | - | 01 |
| (ii) | Technical services | - | 02 |
| (iii) | Ministerial staff | - | Nil |

Sl . No.	Name of Scientist/Technical staff/min. staff	Post	
<i>Scientists</i>			
1	Smt. Shalani Bhowate	Scientist-C	V.R.S.
<i>Technical</i>			
1	Shri L.R. Murhekar	STO	
2	Shri A.K. Thakur	TO	
<i>Ministerial</i>			
	Nil		

5.2.1 Sevottam: Activities relating to the Citizens/Clients Charter as detailed below has to be included in the Annual Report.

5.2.1.1 Action taken to formulate the Charter for the Department and its subordinate formation;**(In case the Charter is yet to formulate)**

5.2.1.2 Action taken to implement the Charter;

5.2.1.3 Details of Training Programmes, Workshops, etc. held for proper implementation of Charter;**(this is not the same as provided in chapter no. 4.3 and 4.4. Trainings organized for implementation of charter only is to be given)**

5.2.1.4 Details of publicity efforts made and awareness campaigns organized on Charter for the Citizen/Clients;(**awareness campaigns organized for charter only**)

NIL

5.2.1.5 Details of **internal and external evaluation of implementation of Charter** in the Organization and assessment of the level of satisfaction among Citizen/Clients.

Evaluation of implementation of charter is to be initiated.

5.3Welfare measures for the SC / ST/ backward / minority communities

- Trainings were conducted in tribal areas for awareness about medicinal plants and their uses.
- The interest of the above section are being safeguarded and as per the guidelines of Government of India a Liaison Officer is in position who monitors the promotion / recruitment as per the roster.

5.4 Welfare measures for women

5.4. HR News

2. Annexure

1. RTI : In TFRI, Jabalpur 44 cases with regard to RTI were received during the year 2021-2022 and 41 cases were disposed within stipulated time period.

2.

Names and Addresses of Public Information Officers and Appellate Authorities under the Right to Information Act 2005 in the Institute

Headquarter / Institute	Appellate Authority	Public Information Officer	Subject matter(s) allocated
Tropical Forest Research Institute, Jabalpur	Director, TFRI, Jabalpur	Shri AJK Asaiya, Scientist-C, TFRI, Jabalpur	As per provision and guidelines provided under RTI Act, 2005.
Centre for Forestry Research & Human Resource Development, Chhindwara	In-charge Scientist, CFRHRD, Chhindwara	In-charge Scientist, CFRHRD, Chhindwara	As per provision and guidelines provided under RTI Act, 2005

3. Information on vigilance cases – NIL

4. Information on audit objections – NIL

5. Email and Postal addresses :

Director

TROPICAL FOREST RESEARCH INSTITUTE

(Indian Council of Forestry Research & Education)

P.O. – R.F.R.C, Mandla Road, Jabalpur – 482021 (M.P), India

Phones: 0761 – 4044002, 2840483(O) , Fax: 0761 – 4044002, 2840484

E-mail – dir_tfri@icfre.org

Scientist In-charge,

Centre for Forestry Research & Human Resource Development

(Indian Council of Forestry Research & Education)

Poama, P.O- Kundalikala, Parasia Road, CHHINDWARA - 480 001 (M.P)

Phones: 07162 – 292061 (O)

e-mail: head_cfrhrd@icfre.org/dir_cfrhrd@rediffmail.com

6. LIST OF ABBREVIATIONS

AICRP – All India Coordinated Research Project

AM – Arbuscular Mycorrhiza

APML – Adani Power Maharashtra Limited

ARS – Agriculture Research Services

BA – Benzyl Adenine

BIS – Bureau of Indian Standards

CAMPA – Compensatory Afforestation Fund Management and Planning Authority

CCF – Chief Conservator of Forests

CEO- Chief Executive Officer

CG – Chhattisgarh

CGM- Chief General Manager

CPT- Candidate Plus Tree

CRIDA – Central Research Institute for Dry Land Agriculture

CSO – Clonal Seed Orchard

DDM – Deputy Development Manager

DFO – Divisional Forest Officer

DNA – Deoxyribonucleic acid

DPR – Detailed project report

EAP- Externally Aided Project

ESIP – Earth Science Information Partners

ESIP – Ecosystem services improvement project

FGP – Final Germination Percentage

FRCSD – Forest Research Centre for Skill Development

FRI – Forest Research Institute

<p>FSI – Forest Survey of India</p> <p>GBH – Girth at Breast Height</p> <p>GIS – Geographical Information System</p> <p>GPS – Global Positioning System</p> <p>GRI – Germination Rate Index</p> <p>GSDP – Green Skill Development Programme</p> <p>HoFF – Head of Forest Force</p> <p>HPLC – High Performance Liquid Chrometography</p> <p>HPTLC – High Performance Thin Layer Chrometography</p> <p>HRM – Heat Ratio Method</p> <p>IAA – Indole Acetic Acid</p> <p>IBA – Indole Butyric Acid</p> <p>ICAR – Indian Council of Agricultural Research</p> <p>ICFRE – Indian Council of Forestry Research and Education</p> <p>IFRIS – Integrated Forest Resource Information System</p> <p>IFS – Indian Forest Service</p> <p>IPM – Integrated Pest Management</p> <p>JNKVV – Jawaharlal Nehru Krishi Vishwavidyalaya</p> <p>JNV – Jawahar Navodaya Vidyalaya</p> <p>KVK – Krishi Vigyan Kendra</p> <p>MoEF&CC – Ministry of Environment, Forests and Climate Change</p> <p>MoU – Memorandum of Understanding</p> <p>MP – Madhya Pradesh</p> <p>MPCA – Medicinal Plant Conservation Area</p> <p>MPCST – Madhya Pradesh Council of Science and Technology</p> <p>MPFDC – Madhya Pradesh Forest Development Corporation</p> <p>MPSFD – Madhya Pradesh Forest Department</p> <p>MS – Murashige and Skoog</p> <p>MS – Maharashtra</p> <p>NAA – Napthyl Acetic Acid</p> <p>NABARD – National Bank for Agriculture and Rural Development</p> <p>NGO – Non Government Organisation</p> <p>NPC- National Project Coordinator</p> <p>NTFP – Non-Timber Forest Produce</p> <p>NTFPs – Non Timber Forest Products</p> <p>NTPC – National Thermal Power Corporation</p> <p>NWFP – Non Wood Forest Produce</p> <p>PCCF – Principal Chief Conservator of Forests</p> <p>PIMC – Project Implementation and Monitoring Committee</p> <p>PIO- Public Information Officer</p>	
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PMS – Payroll Management system PSB – Phosphate Solubilizing Bacteria PSP – Permanent Preservation Plots QPM – Quality Planting Material RAG – Research Advisory Group RFRC – Regional Forest Research Centre RIMS – Research Information System RSP – Rourkela Steel Plant RTI – Right to Information SC – Schedule Caste SECL – South Eastern Coalfields Limited SHGs – Self Help Groups SPA – Seed Production Area SSO – Seedling Seed Orchard ST – Schedule Tribe TFRI – Tropical Forest Research Institute TSG – Time Spread of Germination TSO – Teak Seed Orchards UNDP-GEF – United Nations Development programme –Global environment facility VVK – Van Vigyan Kendra	
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Trainings organized						
SN	Topic	Duration and period		Participants		Overall feedback of Participants
		Days	Date	Category	Numbers	
a. Trainings under VVK						
1.			Nil			
b. Trainings under DV						
1.			Nil			
c. Trainings under GSDP						
1.			Nil			
d. Other Trainings (43 Trainings, 74 days and 1696 participants)(except HRD trainings)						
SN	Topic	Days	Date	Category	Numbers	Overall feedback of Participants
(1)	Seed technology developed by ICFRE' for the forest officials of Madhya Pradesh and Chhattisgarh States	1 day	25/06/2021	SFDs, MP & CG	25	
(2)	Nine one day training programme on “Biological control of Teak defoliator and skeletonizer through TFRI-Trichocard”	9 days	Korba (01/07/21) Kawardha (02/07/21) Kawardha (03/07/21) Kawardha (12/07/21) Gariyaband (14/07/21) East Bhanupratappur (15/07/21) Bastar (16/07/21) Datewada and (17/07/21) Kondagaon divisions (19/07/21)	for the front line staff in eight different Forest Divisions of Chhattisgarh Forest Department	30 (Each training)	Satisfactory
(3)	Six one day training programme on “Management of Sal borer (<i>Hoplocerambyx spinicornis</i>) in	6 days	Korba (01/07/21) Kawardha	for the front line staff of different Forest Divisions of Chhattisgarh State	30 (Each training)	

	Sal (<i>Shorea robusta</i>)”		(02/07/21) Kawardha (03/07/21) East Bhanuprata ppur (15/07/21) Bastarand (16/07/21) Kondagaon divisions (19/07/21)	Forest Department		
(4)	three trainings “Management of Sal heartWood borer (<i>Hoplocerambyx spinicornis</i>) in sal (<i>Shorea robusta</i>)” at Keshkal Forest Division, Chhattisgarh, Kanker Forest Division, Chhattisgarh, and Bhanupratappur Forest Division, Chhattisgarh.	03 day	05/08/2021 to 07/08/2021	Front line staff of Chhatti State Forest Department	(Each training) 25	
(5)	“Introduction to Basic Forestry” for stakeholders other than State Forest Department.	02 days	16/08/21 to 17/08/2021	Students ,Social activists, SFDs, M.P., and frontline Staff	141	
(6)	Introduction to Basic Forestry for other stakeholders-Through virtual modes	2 days	16-17 September, 2021	Students, researchers, NGOs etc.	87	Highly satisfactory
(7)	“Biological control of Teak defoliator and skeletonizer through TFRI-Trichocard” at Korba, Chhattisgarh.	01 day	23/09/2021	Korba, frontline StaffChhattisgarh Forest Department	25	
(8)	“Biological control of Teak defoliator and skeletonizer through TFRI-Trichocard” at Katghora, Chhattisgarh.	01 day	24/09/2021	Katghora, frontline StaffChhattisgarh Forest Department	25	
(9)	"Training programme on capacity building of Madhya Pradesh and Maharashtra Forest Department for developing State REDD+ action Plans.	2 Days	26/09/2021 to 27/09/2021	Forest officers, Scientists and scholars.	30	
(10)	'Gmelina with Betel vine based agroforestry system in Madhya Pradesh'	01 day	27/09/2021	Farmers	20	
(11)	"Avoid the Use of Single Use-plastic"	01 day	05/10/2021	Youth People	25	
(12)	"Avoid the Use of Single Use-plastic" In two session.	01 day	08/10/2021	School Students	80 & 56	
(13)	Workshop for Capacity Building of State Forest Departments for Developing State REDD+ Action Plans	2 days	26-27 October, 2021	State Forest Officials from State of M.P. and Maharashtra	30	Highly satisfactory

(14)	"Training on Instrumentation"(Online)	3 days	27/10/2021 to 29/10/2021	Researchers', Students	18	
(15)	"Cultivation, Processing techniques and Management of Non-wood Forest Products including Medicinal Plants	05 days	22/11/2021 to 26/11/2021	Technical Staff of ICFRE	30	
(16)	"Climate Change Carbon Sequestration Increasing Green Cover and Utilization of Fly Ash"	02 days	15/12/2021 to 16/12/2021	officers of Adani power Maharashtra ltd	35	
(17)	Online training program on "Propagation of Forestry species"	5 hours	21/12/2021	State Forest department, Scientists and technical officers	88	
(18)	Six one day training programme on "Management of Sal Heart Wood Borer <i>Hoplocerambyx spinicornis</i> "	06 day	21/12/2021 (Kondagoan , Amabeda, and Bhanuprata ppur) 23/12/2021 (Mainpur) 25/12/2021 (Navagarh) 26/12/2021 (Gariyaband)	front line staff Chhattisgarh Forest Department.	(i)27 (ii)15 (iii)11 (iv)10 (v)15 (vi)10	
(19)	On line Training Program on "Plant Biotechnology"	2 days	05/01/2022 to 06/01/2022	Scientists, Foresters, Academicians and Students	132	
(20)	online training programme on "Biodiversity Conservation"	01 day	13/01/2022	B.Sc and M.Sc Students of Danielson College, Chhindwara	45	
(21)	"Nursery development and vegetative propagation"	05 days	17/01/2022-21/01/2022	ICFRE Technical Staff.	36	Excellent
(22)	online training programme on "Biodiversity Conservation"	01 day	31/01/2022	B.Sc and M.Sc Students of ATASH College of Management & Technology, Pandhurna District-Chhindwara	38	
(23)	Outreach training on "Avoid Use of Single Plastic & Medicinal plants" Use for Govt. Higher, Nonia Karbal, Chhindwara (MP)	1 day	15/02/2022	Students of Std.8 th & 9 th class of Govt. Higher Secondary School ,Nonia Karbal, Chhindwara	51	
(24)	online refresher training program on Agroforestry and opportunities in value addition for established agri-prenuers under AC & ABC MANAGE , Jabalpur	2 days	17/02/2022 & 18/02/2022	Agri-preneure And farmers	100	
(25)	One week training programme on Biotechnology for Students of Govt. Science College, Jabalpur.	5 days	21/02/22 to 25/02/22	Students	16	

(26)	Plant Biotechnology	5 days	8-12 March 2022	Students	12	Useful exposure To labo techniques
(27)	"Advance Training in Molecular Biology Techniques and Its Application"	05 Days	21/03/2022 to 25/03/2022	Scientists ICFRE	21	Excellent
(28)	"Bamboo: processing & management"	02 days	24/03/2022 & 25/03/2022	Members of Foundation of MSME Cluster, New Delhi and Maharashtra	25	
Total		74			1696	

5. Format for details of trainings organized - annexure-6 (HRD Trainings)

Trainings organized							
SN	Topic	Duration and period		Participants		Overall feedback of Participants	
		Days	Date	Category	Numbers		
1.	"Nursery development and vegetative propagation"	05 days	17/01/2022 to 21/01/2022	ICFRE Technical Staff.	36	Excellent	
2.	on "Advance Training in Molecular Biology Techniques and Its Application"	05 Days	21/03/2022 to 25/03/2022	Scientists ICFRE	21	Excellent	
	Total	10 days			57		

1. Format for details of participation in workshops etc. Annexure-7

Workshops/seminars/symposia/meetings etc. participated in					
SN	Topic	Duration and period		Participants from the institute	
		Days	Date	Category	Numbers
1.	Dr. Nanita Berry, Scientist E & Head participated in meeting with NPC of Seed Ball technology under chairmanship of ADG(RP) on 5 th April, 2021	1	5/04/2021	ICFRE scientists and SFDs	12
2.	International Symposium Global symposium on soil Biodiversity FAO, United Nations.	4	19/04/2021 to 22/04/2021	Scientists Researchers, Students across the Globe & farmers	700
3.	RathodDigvijaysinhUmedsinh, Scientist – B, Participated in Tree mortality webinar series: "Tree mortality modelling- a tool for ecological inference and challenges for projecting forest dynamics" organized by International Tree Mortality Network an initiative of the IUFRO task force on tree mortality.	1	06/05/2021	Concern Stakeholders.	489
4.	International Webinar soil Biodiversity and the stabilization of carbon in the soil.	1	07/05/2021	Scientists Researchers, Students across the Globe & farmers	650
5.	Dr. Mohan C., Scientist-B Forest Protection Division attended 01 day National webinar on “Prospects & problem of Bee keeping in India” through video conferencing organized by College of Forestry, Ponnampet& UAHS, Shivamoga on 20 th May 2021.	1	20/05/2021	Faculty, Students, Bee keepers	145
6.	Scientist and Technical Officers of TFRI and FRC-SD, Chhindwara attended 01 day National webinar on “Non-destructive harvesting, processing & marketing of NTFPs” through video conferencing organized by Forest Extension Division at TFRI on 21 th May 2021.	1	21/05/2021	Faculty, Students, stakeholders	70
7.	Scientists, Technical Officers and staff of Attended World Environment Day – 2021 organised by ICFRE, Dehradun	1	05/06/2021	Scientist and staff	100
8.	Shri. M. Rajkumar, Scientist-C, delivered a Keynote address during the celebration of World Environment Day on topic ‘Ecosystem Restoration: Unveiling the past, present for a better future’.	1	05/06/2021	Faculty, students and researchers from Kerala Agricultural University.	133
9.	Dr. Avinash Jain, Scientist-F, delivered lecture on “Ecological restoration of	1	05/06/2021	Engineers, Miners, Scientist and	100

	degraded lands: Working with industries.”			Scholars	
10.	Shri AjinShekhar, Scientist – B,waskeynote speaker for Kerala Agricultural University, College of Agriculture, Trivandrum on World Environment Day.	1	05/06/2021	Faculty, students and Researchers	113
11.	Sh. A.J.K. Asaiya, Scientist-C, Forest Protection Division attended one day webinar on “Conserving and restoring ecosystem” through video conferencing hosted by Department of environmental science, University of Kashmir, Srinagar.	1	05/06/2021	Researchers, Faculties, Students	110
12.	Shri RathodDigvijaysinhUmedsinh Scientist – B, Participated in “Food System Resilience through Integrated Natural Resource Management: A Food Systems Summit Independent Dialogue”, organized by FAO.	1	07/06/2021	Multi-level Stakeholders (including governments, academia etc.)	100
13.	Dr. Avinash Jain, Scientist-F, delivered lecture to Forest ranger Trainees of Tamil Nadu Forest Academy, Coimbatore on Topic : An overview of TFRI.	2	09/06/2021	Forest Ranger Trainees	40
14.	Dr. Darshan, K., Scientist- B delivered virtual guest lecture on ‘Multi-omics: Approaches and its applications in Plant Pathology’ at VIT School of Agricultural Innovations and advanced learning (VAIAL), Vellore, Tamil Nadu.	1	09/06/2021	Agricultural students and faculties.	120
15.	Dr.Nanita Berry, Scientist 'E' & Head attended meeting with representatives of Indo-German project on Agroforestry subject.	1	14/06/2021	SFD, SHG and Farmers	5
16.	Dr. Mohan C., Scientist-B delivered special lecture on Recent trends in Forest pest management.	1	14/06/2021	U. G students of TNAU, Coimbatore.	120
17.	Dr. Mohan, C, Scientist-B delivered lecture in webinar on ‘World Day to Combat Desertification and Drought and agro climatological model training organized by All India Agricultural Students Association, Tamil Nadu State Environmental Cell.	1	17/06/2021	Students and Research Scholars	80
18.	Shri RathodDigvijaysinhUmedsinh Scientist – B, delivered lecture (online) on "Integrated Farming System - Agroforestry", invited by the PlanticaInstitute of Agricultural Studies in Dehradun.	1	19/06/2021	U. G Students	48
19.	Sh. A.J.K. Asaiya, Scientist-C, Forest	1	19/06/2021	Researchers,	125

	Protection Division attended one day national webinar on “Biodiversity assessment monitoring and conservation” through video conferencing organized by Dr. B.R.R. Govt. Degree College, Mehboobnagar, Telangana held on 19 th June 2021.			Faculties, Students	
20.	Shri Rathod Digvijaysinh Umedsinh Scientist – B, participated in “National Workshop on Water Budgeting: An Approach for Sustainable Water Resources Management in Rajasthan”, organized by Maharana Pratap University of Agriculture and Technology, Udaipur, (Rajasthan).	1	21/06/2021	Farmers, Research Scholar, Scientists, other stakeholders	130
21.	Dr. Mohan C. Scientist- B Forest Protection Division participated in one day International webinar on “Desert locust <i>Schistocerca gregaria</i> – International scenario and a potential threat to India” organized by NIPHM Hyderabad, Telangana.	01	02/07/2021	Researchers, Faculties, Students	70
22.	Smt. Mamta Meshram, Scientist-B of the FRC-SD attended webinar on "Conservation and Value Addition of Fruits of Forest Origin" organized by Forest Research Centre for Eco-Rehabilitation, Prayagraj.	01	02/07/2021	Researchers, Faculties, Students	25
23.	Dr. Hariom Saxena, Scientist-D, delivered a lecture on “Sustainable management of economically important NTFPs of central India their conservation and sustainable livelihood of dependent communities”	01	07/07/2021	UG Students of Agriculture college, Indore.	100
24.	Shri Rathod Digvijaysinh Umedsinh, Scientist-B, Participated in Drones for restoration monitoring and planning organized by Open Forests and One Tree Planted.	01	08/07/2021	Researches, Scientist, Students and other stockholders	950
25.	Dr. Nanita Berry, Scientist 'E' delivered Guest lecture on ‘Silviculture of important tree species and its plantation’ through virtual mode.	01	12/07/2021	Forest Guards of Balaghat Rangers College, Balaghat (MP)	51
26.	Scientist and Technical Officers of TFRI, Jabalpur and FRC-SD Chhindwara attended one day webinar on “Development of <i>Moringa</i> leaf based product” through video conferencing hosted by FRC- Eco rehabilitation, Prayagraj.	01	16/07/2021	Researchers, Faculties, Students	30
27.	Sh. A.J.K. Asaiya, Scientist-C, Forest	01	16/07/2021	UG students of Dr	77

	Protection Division attended one day International Webinar on “Ecological importance of snake” organized by Association for Biodiversity Conservation & Development.			BRR Govt. Degree college Mehaboob Nagar Telangana	
28.	All Scientist attended online meeting and discussed regarding submission of long term project proposals in Forestry Research supported by NITI AYOOG.	01	20/07/2021	TFRI Scientists	14
29.	Sh. A.J.K. Asaiya, Scientist-C, Forest Protection Division attended one day webinar on “Stories of Mushroom” through video conferencing hosted by Department of Botany, University of Delhi	01	20/07/2021	Researchers, Faculties, Students	55
30.	Dr. Mohan C. Scientist- B Forest Protection Division participated in one day webinar on “Bamboo” through video conferencing organized by Bamboo society of India, Bengaluru.	01	24/07/2021	Researchers, Faculties, Students	60
31.	Sh. A.J.K. Asaiya, Scientist-C, Forest Protection Division attended one day webinar on “Mangrove” through video conferencing hosted by Forest Research Center for Coastal Ecosystem Vishakhapatnam.	01	26/07/2021	Researchers, Faculties, Students	42
32.	Dr. Nanita Berry, Scientist 'E' attended Project Evaluation Committee meeting for the project entitled - Biodiversity of Satpura Agro-climate region with special reference to dependencies of Tribes.	1	5/08/2021	SFDs	5
33.	ShAjinShekhar, Scientist-B participated in International webinar on Restoration Ecology – jointly organized by WCB Research Foundation and, Centre For Nature and Ecosystem Well Being (CNEW) Vadodara, Gujrat.	01	08/08/2021	Researchers, Scientists and Scholars	87
34.	Scientists and Technical Officers of TFRI attended meeting with Dr. T.K. Dhamodharn, Chair of Excellence (Forest products), IWST-ICFRE: (Chair of Excellence –Prioritization of Forest Products Research, Training and HR Need Assessment hosted by IWST, Bengaluru	01	13/08/2021	Researchers, Scientists and Technical Staffs	40
35.	Dr. Fatima Shirin, Scientist 'G' delivered lecture in certificate course on bamboo based entrepreneurship opportunities, challenges and option for agriculture	01	17/08/2021	Agriculture Graduates Name of college/university	60

	graduates: An interaction with industries and role models and administrations. Rajmata Vijayaraje Sindhiya Agriculture University, Gwalior, M.P.				
36.	Dr. Hariom Saxena, Scientist-D delivered invited lecture on “Value addition and processing of bamboo shoots” for students of Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior (M.P. on the occasion of Certificate course on bamboo based entrepreneurship opportunities; challenges and options for agriculture graduates: An interaction with Industrialists and Role Models and administrators.	01	20/08/2021	Agriculture graduates.	25
37.	Scientists of TFRI and FRC-SD Centre attended the meeting under chairmanship of DG, ICFRE for review of Concept Notes submitted to NITI Aayog through Video Conferencing on 23-08-2021	01	23/08/2021	Scientists	20
38.	Sh. N.D. Khobragade, Scientist-D and Smt. Mamta Meshram, Scientist-B from FRC-SD attended webinar on "Genetics, Breeding and Biotechnological Application in Trees of Agroforestry and Short Rotation Forestry" organized by Forest Research Institute, Dehradun.	01	24/08/2021	Researchers, Scientists and Scholars	37
39.	Shri A.J.K. Asaiya, Scientist- C attended 02 days national webinar on “IPR & PATENTING: Road map to make India the next innovation Hub” organized by Adarsh Mahavidyala, Dhamangaon, Amravati University, Maharashtra	02	23/08/2021 & 24/08/2021	Students, Researchers, Faculties	145
40.	TFRI organised a meeting with the Officials of IFFDC, Madhya Pradesh and Scientists of TFRI under the Chairmanship of Dr. G. Rajeshwar Rao, ARS, Director, TFRI, Dr. Nanita Berry, Scientist 'E', Dr. S. Saravanan, Scientist F', Shri Rathod Digvijaysinh Umedsinh, Scientist B and Shri Neeraj Prajapati, Scientist B. The agenda of the meeting was how best to have collaboration between TFRI and IFFDC to improve livelihoods of stakeholders.	01	25/08/2021	TFRI Scientists and IFFDC Officers	10
41.	Dr. Avinash Jain, Scientist-F, Shri A.J.K. Asaiya, Scientist- C, Dr. Darshan K., Scientist- B, Shri Ajin Shekhar, Scientist-B and Shri Nahar Singh Mawai,	01	27/08/2021	Scientists, Technical officers and Research scholars	108

	A.C.T.O. attended one day national webinar on “Creation of Manmade Forest for Environment Protection” organized by IFGTB, Coimbatore (T.N.)				
42.	Director TFRI and Dr. Avinash Jain, Scientist- F and Head of FE&CC Division attended National stakeholders consultation workshop on “Development of roadmap for institutional and policy mainstreaming of sustainable land and ecosystem management (SLEM) in India” held on 27-08-2021	01	27/08/2021	Officers and Scientists	70
43.	Mr. Digvijay S. Thakur participated in webinar on “Increase in Forest Productivity through Tree Improvement”, Organized by: TFRI Jabalpur	1	Sept. 2021		25
44.	Shri A.J.K. Asaiya, Scientist- C attended national webinar on “Jaivik/VedikKheti” organized by The Eco-Factory Foundation Pune.	01	04/09/2021	Students, Researchers, Faculties	225
45.	Shri A.J.K. Asaiya, Scientist- C attended national webinar on “Catch The Rain” organized by Government Degree College, Koratla& Government Degree College (W), Jagtial, Hyderabad.	01	04/09/2021	Researchers, Students, Faculties	148
46.	Shri A.J.K. Asaiya, Scientist- C attended national webinar on “Recent trends in plant Bio-technology” organised by Department of Biotechnology Pingle Govt. College For Women, Warangal, Telangana.	01	08/09/2021	Students, Researchers, Faculties	135
47.	Mr. Digvijay S. Thakur, Mr. Neeraj Prajapati participated in National Webinar on “What to look for: Sustainable Ways to Protect the Forest Health” organized by the Forest Protection Division, Tropical Forest Research Institute [TFRI] JABALPUR, MP.	1	13 sep, 2021	Researchers, Scientists, TOs	250
48.	Mr. M. Rajkumar, Scientist -D attended Webinar on “Ethnobotanical studies and publication in a world of Nagoya protocol and post SARS-COV-2” organized by the Centre for Conservation of Natural Resources (CCNR), The University of Trans-Disciplinary Health Sciences & Technology, Bengaluru.	01	15/09/2021	Students and Researchers	01
49.	Shri Rathod Digvijaysinh Umedsinh, Scientist – B , participated in webinar "Income Enhancement from	01	16/09/2021	Scientist and Officers of TFRI, Research Scholar,	37

	Agroforestry" on 16th September, 2021, Organized by Forest Research Institute Dehradun.			Assistant Professor, Farmers, Industrialist	
50.	Mr. M. Rajkumar, Scientist -D attended Webinar on 'Celebration of World Ozone Day 2021' organized by MOEFCC, New Delhi	01	16/09/2021	Students, Teachers, IFS Officers, and Researchers	01
51.	Shri A.J.K. Asaiya, Scientist- C attended International Virtual Conference on "Advances in information and communication technology" Organized by Dept. of Agricultural Extension, NABS & DSPT PURSE II, Faculty of Agriculture, Annamalai University.	03	20/09/2021 to 22/09/2021	Students, Researchers, Faculties	165
52.	Mr. AjinSekhar, Scientist –B attended webinar organized by IFB Hyderabad on 22.09.2021.	1	22/09/2021	Scientists, Technical officers and project fellows	30
53.	Dr. Avinash Jain, Scientist -F and Head delivered talk on "Management of fly-ash in thermal power plant and its application in forestry sector" in webinar organized by IFB Hyderabad on 22.09.2021.	1	22/09/2021	Scientists, Technical officers and project fellows.	30
54.	Mr. AjinSekhar, Scientist –B attended webinar on "The status of grasslands in India and the complex life of Banni" on 23.09.2021 organized by ICAR- Indian Grassland and Fodder Research Institute, Jhansi (UP) and Range Management Society of India, Jhansi (UP).	1	23/09/2021		150
55.	Dr. VishakhaKumbhare, Scientist Incharge/ Scientist-E of the centre attended Series 13 webinar on "Innovative Technology for Propagation and Cultivation of Bamboo" organized by Bamboo Society of India on 25.09.2021 through online mode.	1	25/09/2021	Students and Researchers	45
56.	Dr. Mohan C., Scientist- B participated in five days online training programme on "Forest certification" through virtual mode organized by Division of Silviculture & Forest Management, FRI, Dehradun held on 27.09.2021 to 01.10.21	05	27/09/2021 to 01/10/2021	Scientists	28
57.	Mr. Digvijay S. Thakur participated in IUFRO World Day: Digital Forest Science Forum 2021 Attending the event "Role of ICFRE in India Forestry" talk delivered by DG ICFRE and other events, dated on 28 & 29 Sept. 2021	2	28.09.2021 to 29.09.2021		35
58.	Mr. Manish K Vijay participated in the	3	29/09/21 to	Scientist across ICAI	500

	International Webinar Conference on “Alternate Cropping Systems for Climate Change and Resource Conservation” from 29th September – 1st October 2021 organized by ICAR-IIFSR		01/10/21	other institutions	
59.	Mr. M. Rajkumar, Scientist – D attended "Launch of MoEFCC's Iconic week of Azadi Ka Amrut Mahotsav and wild life week celebrations" organized by MoEFCC, New Delhi on 2nd October, 2021	01	02/10/2021	Scientists, students and general public	190
60.	All Scientists attended Launch on "Elimination of single use plastics" organized by MoEFCC, New Delhi on 4th October, 2021	01	04/10/2021	Scientists and school students	150
61.	Shri A.J.K. Asaiya, Scientist- C attended a talk on “Awareness programme to avoid single use plastic” organized by T.F.R.I., Jabalpur under MOEFCC Iconic week celebration held on 04th October 2021.	01	04/10/2021	Scientist, Researchers, Students	32
62.	Mr. Manish K Vijay participated in the FRI ICONIC Week Talk-01 on “Policies and Procedure for handling single-use plastics at consumer level”	1	04/10/2021	Scientists of TFRI and other ICFRE institutes	35
63.	Mr. Digvijay S. Thakur attended the meeting with Director , Achanakmar Amarkantak Biosphere Reserved (AABR) under the headship of Director TFRI at TFRI on providing research support and landscape level management plan for conservation of flora and fauna of AABR.	1	4.10.2021		25
64.	Dr. Mohan C., Scientist- B participated in two days National webinar on “Nano size–Big impact : Nano revolution for transforming Agriculture, Food, Nutrition & Health” through virtual mode organized by Rani Lakshmi Bai Central Agri. University, Jhansi & collaboration with IGFRI (ICAR), Jhansi held on 04.10.2021 to 05.10. 2021	02	04/10/2021 to 05/10/2021	Researchers, Faculties, Students	215
65.	Mr. Manish K Vijay participated in the ICAR lecture series #30 on “Future Proofing the Drylands” by Dr. Jacqueline Hughes, DG ICRISAT on	1	05/10/2021	Scientist across ICAR and other institutions	85
66.	Mr. Manish K Vijay participated in the Webinar on “Forest genetic resources and their importance” organized by IFGTB, Coimbatore on	1	06/10/2021	Scientists across ICFRE institutes	40

67.	Shri A.J.K. Asaiya, Scientist- C attended one day webinar on “Biotechnological approaches in forest insect pest and disease management” organised by FRI Deharadun held on 08th October 2021	01	08/10/2021	Students, Researchers, Faculties	48
68.	Dr. Mohan C., Scientist- B attended online training programme in hindi on “Sandal Farming & Management of its Health” organized by IWST, Bengaluru held on 11th October 2021	01	11/10/2021	Scientists	45
69.	Mr. Manish K Vijay participated in the ICAR lecture series #31 on “Science, Technology, and innovation for Transforming Agriculture in India” by Prof. R.B.Singh, Former President NAAS on	1	12/10/2021	Scientist across ICAR and other institutions	156
70.	Dr. Nanita Berry, Scientist - E presented poster (Virtual Mode) in 3rd International Conference Global Initiative in Agriculture, Forestry and Applied Science (Theme - Food security, Environment safety and Sustainable Development (GIAFAS-2021) held at Shri Guere Ram Rai University, Dehradun, Uttarakhand, India	2	17-18/10/2021	Scientist, Researchers and Students	523
71.	Mr. Manish K Vijay participated in the “An Evening with World Food Laureates Discussion on Global Food and Nutrition Security to meet the SDGs during and after Covid 19 Pandemic” (Virtual mode)	1	16/10/2021	Scientist across the world	450
72.	Mr. Manish K Vijay participated in the Seed Science and Technology webinar series, by IOWA State University, the USA addressing current topics in seed science and technology-led by seed industry leaders and educators.	5	25/10/21 to 29/10/21	Researcher and academicians around the world	25
73.	Dr. Jangam Deepika attended webinar on “Salinity and climate smart agriculture: Understand, connect and act now” organised by FAO	01	09/11/2021	Scientist and Research Scholars	500
74.	Dr. Vishakha Kumbhare, Scientist Incharge / Scientist-E, attended ICFRE-IUFRO Workshop on Forest Landscape Restoration (FLR) through on-line mode on 9.11.2021 and 11.11.2021	02	09/11/2021 & 10/11/2021	Scientist and Research Scholars	27
75.	Dr. Pramod Kumar Scientist-C and Shri KaushalTripathi, Scientist-B participated and presented research paper in National conference on Clonal Forestry in Eco—restoration (NCCFER-2021) organised at	02	10/11/2021 & 11/11/2021	Scientist, Academicians, Students	32

	Forest Research Centre for Eco-rehabilitation, Prayagraj (UP)				
76.	Shri Manish Kumar Vijay, Scientist-B attended Webinar on “Urban Forestry” by IFGTB,Coimbatore	01	12/11/2021	Scientist across ICFRE and other institutions	35
77.	Shri AviralAsaiya, Scientist C and Dr. Darshan K, Scientist-B participated one day workshop on FDCM and delivered lecture on Biofertilizers and Organic fertilizers organized by MADHYA PRADESH VAN VIKAS NIGAM, LTD. at Bhopal on 17.11.2021	01	17/11/2021	FDCM	40
78.	Shri Manish Kumar Vijay, Scientist-B attended webinar on “Integration of medicinal and aromatic plants in different cropping system”organized by ICAR-DCR.	01	20/11/2021	Scientist across ICAR and other institutions	205
79.	Mr. M. Rajkumar, Scientist-D, Mr. AjinSekhar and Dr.Jangam Deepika, Scientist-B participated closing ceremony of “Awareness Campaign On Single Use Plastic - 2021” organized by MOEFCC on 20-11-2021.	01	20/11/2021	Scientists, students and general public	159
80.	Shri Rathod Digvijaysinh Umedsinh Scientist – B,participated in 4 th PSRM-2021: National Conference on Advance in Plant Sciences Research, Organized by APSR, Dehradun and SOAAS, H.N.B Garhwal University (A central University), Srinagar, dated on 20-21 November, 2021.	02	20/11/2021 & 21/11/2021	Scientists, Faculties, Professors, Students, Research Scholars and other stockholders	150
81.	Mr. M. Rajkumar participated in webinar “Sensitization cum review workshop on National clean air programme” organised by MoEFCC.	01	23/11/2021	Scientist, Students and general public	04
82.	Shri A.J.K. Asaiya, Sci- C attended one day webinar on "Potential and prospects of value addition in Wild edibles" organised by FRI Dehardun on 26.11.2021.	01	26/11/2021	Scientists, Researchers	65
83.	Shri Manish K. Vijay,Sci.-B attended 8 th edition of <i>Dr. S. Kedharnath Memorial Lecture (KML – 2021)</i> .	01	29/11/2021	Scientists, Researchers	45
84.	Dr.Avinash Jain, Mr. M. Rajkumar and Mr. Dheeraj Gupta participated in MoU meeting between TFRI, Jabalpur and Rajmata Vijayaraje Sindhiya Krishi Vishwa Vidyalaya, Gwalior on 07-12-2021.	01	07/12/2021	Both the signatories' institutes	20
85.	Shri Rathod Digvijaysinh Umedsinh,	01	08/12/2021	Scientists and	50

	Scientist – B, Dr.Jangam Deepika attended Webinar on “Climate Smart Forestry: An Instrument For Mitigating Climate Change” jointly organized by FRI, Dehradun and British deputy high commission, Chandigarh on 8-12-2021.			research scholars	
86.	Dr. Jangam Deepika attended webinar on “Salinity and climate smart agriculture: Understand, connect and act now” organized by FAO	01	09/12/2021	SFDs	500
87.	Dr.Avinash Jain, Mr. M. Rajkumar and Mr. Dheeraj Gupta participated in MoU meeting between TFRI Jabalpur and Rani Lakshmi Bai university, Jhansi on 09-12-2021	01	09/12/2021	Both the signatories' institutes	100
88.	Dr. Avinash Jain, Mr. M. Rajkumar and Mr. Dheeraj Gupta participated in MoU meeting between TFRI Jabalpur and ICAR-CAFRI, Jhansi on 09-12-2021	01	09/12/2021	Both the signatories' institutes	7
89.	Dr.Avinash Jain, Mr. M. Rajkumar and Mr. Dheeraj Gupta participated in MoU meeting between TFRI Jabalpur and ICAR-Indian Grassland and Fodder Research Institute, Jhansi on 09-12-2021	01	09/12/2021	Both the signatories' institutes	6
90.	Dr.Avinash Jain, Mr. M. Rajkumar and Mr. Dheeraj Gupta participated in MoU meeting between TFRI Jabalpur and IISC, Jhansi on 09-12-2021	01	09/12/2021	Both the signatories' institutes	6
91.	Dr.Avinash Jain, Mr. M. Rajkumar and Mr. Dheeraj Gupta participated in MoU meeting between TFRI Jabalpur and Banda University of Agriculture and Technology, Banda on 10-12-2021	01	10/12/2021	Both the signatories' institutes	6
92.	Dr. Jangam Deepika attended Webinar on “Nursery techniques, cultivation and management of sandalwood” Under “Azadika Amrit Mahotsav” on 10-12-2021 organized by Institute of Wood Science And Technology, Bengaluru	1	10/12/2021	Scientists, technical officers and research scholars	60
93.	Dr. Mohan C, Participated webinar on (10 th Dec, 2021) “Nursery techniques, cultivation and management of sandal wood” organized by IWST, Bangalore.	01	10/12/2021	Research scholars, scientists and stake holders.	25
94.	All scientists participated Online Regional Research Conference (RRC) on "Vocal for Local: Sustainable Development of Non-Timber Forest Products for livelihood generation" on 13-14 December, 2021 organized by TFRI, Jabalpur.	2	13/12/2021 to 14/12/2021	Scientists, technical officers and research scholars	120

95.	Dr. M. Kundu, Dr. Nanita Berry, Dr. S. C. Biswas, Dr. Hariom Saxena, Shri Rathod Digvijaysinh Umedsinh, & Sh. Neeraj Prajapati, attended Regional Research Conference (RRC) held from 13 th -14 th Dec., 2021 at TFRI.	2	13/12/2021 & 14/12/2021	Scientists, Forest officials, Technical staff, Research Scholars of ICFRE and other stakeholders	100
96.	Mr. A.J.K Asaiya (Sci -C) delivered a lecture on “Role of Bio-fertilizers in stress sites” through powerpoint presentation on Two days training on “Climate Change Carbon Sequestration Increasing Green Cover and Utilization of Fly Ash” for the officers of Adani power Maharashtra Ltd organised by TFRI on 15-16 December 2021.	02	15/12/2021 & 16/12/2021	Officers of Adani power Maharashtra	35
97.	Dr. Nanita Berry, Scientist ‘E’, Mr. Ajin Sekhar and Dr. Jangam Deepika, Scientist-B attended National Conference on “Value addition and marketing of NTFPs” under “Azadika Amrit Mahotsav”	1	16/12/2021	Scientists, technical officers and research scholars	80
98.	Dr. M. Kundu, Scientist-F, Dr. N. Berry, Scientist-E, Shri Neeraj Prajapati Scientist- B attended the inaugural session of “01 day ‘Workshop on National Conference on Value addition and Marketing of NTFPs’ dated 16 th December, 2021 organised by TFRI Jabalpur	1	16/12/2021	Scientists, Technical staff and Research Scholars of ICFRE	29
99.	Dr. Mohan C (Sci- B) and Mr. A.J.K Asaiya, attended ICFRE organised Training programme on “Forest Policy Laws and Environmental Laws” from 13-17 December 2021.	05	13/12/2021 & 17/12/2021	Scientists, Researchers	28
	Dr. Jangam Deepika, Scientist-B attended Online training program on “Propagation of Forestry species” on 21-12-2021 organized by TFRI, Jabalpur.	01	21/12/2021	State Forest department, Scientists and technical officers	70
100.	Mr. M. Rajkumar participated in webinar – “Sensitization Cum Review Workshop on National Clean Air Programme” organized by MOEFCC	01	23/12/2021	Field functionary	04
101.	Mr. A.J.K Asaiya (Sci -C) delivered introductory lectures on Forest Pathology to visiting students of Manglayatan University on 27 December 2021.	01	27/12/2021	Students/Researchers	90
102.	Mr. M. Rajkumar, Scientist-D, Mr. Ajin Sekhar and Dr. Jangam Deepika, Scientist-B participated in “South Asian Consultation on Post-2020 Global Biodiversity Framework” organized by	.5	06/01/2022 & 07/01/2022	Scientists, students and general public	300

	MOEFCC on 6-7 January, 2022.				
103.	Mr. M. Rajkumar, Scientist-D and Mr. Ajin Sekhar, Scientist-B attended Launch of Indian State of Forest Report 2021 organized by MOEFCC – virtual mode on 13-01-2022.	.5	13/01/2022	Scientists, students and general public	250
104.	Scientists of TFRI attended the meeting on Signing of MoU between TFRI, Jabalpur and MANAGE, Hyderabad	1	16/1/2022	25	25
105.	Dr. Pramod Kumar, Scientist "D", delivered a lecture on "Vegetative propagation of important trees and bamboo and Clonal Seed Orchards." In HRD training module on "Nursery Development and Vegetative propagation"	01	17/01/2022	Scientists, Foresters, Academicians and Students	25
106.	Dr. JangamDeepika, Scientist-B attended Webinar on “Economics of Soil Health: Contributions of Reduced Tillage and Cover Cropping” organized by Soil Science Society of America.	01	18/01/2022	Scientists, and research scholars	50
107.	Mr. AjinSekhar, Scientist-B attended workshop on “Consortium on Industrial Agro-forestry – A value chain approach under ICAR – NAHEP- CAAST project” organized by Punjab State Forest Research Institute, Ludhiana.	01	20/01/2022	Faculty, Students, Industries and researchers	85
108.	Dr. JangamDeepika, Scientist-B attended Webinar on "Role of Cation Exchange in Nutrient Management" jointly organized by American Society of Agronomy and Soil Science Society of America.	01	25/01/2022	Scientists, Scholars and researchers	70
109.	Scientists of FE&CC division participated in online meeting on “Plantation - Audit & sequestration capacity assessment” with Reliance/ Birla Officers on 28-01-2022	01	28/01/2022	Reliance/ Birla Officers	25
110.	Dr. Avinash Jain, Mr. Raj Kumar and Mr. Ajin Sekhar participated in “National Level Dissemination and Demonstration Workshop on SLEM Knowledge Sharing and Reporting System” organized by ICFRE – Centre of Excellence.	01	01/02/2022	Scientists	13
111.	Shri. Aviral Asaiya, Scientist C attended webinar on “IPR: patent and Design Filling” organized by Seth Kesariwalporwal college in collaboration with Rajiv Gandhi National Institute of Intellectual Property Management, Govt. of India Nagpur.	1	01/02/2022	Researcher	25

112.	Mr. Raj Kumar, Mr. Ajin Sekhar and Dr. J. Deepika participated in “National Level Celebration of World Wetlands Day” organized by MOEFF&CC.	01	02/02/2022	Scientists, Research Scholars, Students and general public	650
113.	Dr. H. O. Saxena participated in 2nd International Conference on Recent Advances in Biotechnology & Nano-biotechnology (Int-BIONANO-2022) held at Amity University, Gwalior.	01	10/02/22 to 11/02/22	-	50
114.	Mr. Manish K Vijay participated in the Attended national webinar on “Floristic Research in India” organized by BSI (MoEF&CC)	2	13-14 Feb, 2022	Researchers	15
115.	Mr. Manish K Vijay participated in the Attended inaugural session of collaborative refresher training programme on “Agroforestry and Opportunities in Value Addition” on	1	15-17 th feb 2022	Scientist, Technical staff	30
116.	Shri Manish Sharma Scientist- B, Attended inaugural session of collaborative refresher training programme on “Agroforestry and Opportunities in Value Addition”.	3	15/02/2022 to 17/02/2022	Scientist, Technical staff	25
117.	Mr. Raj Kumar, Scientist- D delivered talk on “Biodiversity Conservation Potential of Agroforestry Systems” in online Refresher Training Programme jointly organized by TFRI and MANAGE, Hyderabad.	01	17/02/2022	Farmers, Research Scholars and Agri Entrepreneurs	35
118.	Dr. H. O. Saxena attended International Conference on Sustainability & Environmental Perseverance in the Era of Covid 19” at Amity University, Gwalior.	1	17/02/2022	-	50
119.	Shri Aviral Asaiya, Scientist- C, attended one day webinar on Development in hydrology science: Challenges and Opportunities organised by Forest Research Institute, Dehradun.	1	18/02/2022	Researcher	42
120.	Kundu, M., Saxena HO, Tiwari, S., Kahar, L., Gupta, D.K. and Chouhan, S. K. participated in National Symposium-Cum Workshop on “Biodiversity and Its Utilization and Conservation in Central India” held (In Blended Mode) at GGV, Bilaspur.	2	21/02/2022 to 22/02/2022	Scientists and Research Scholars	100
121.	Mr. Raj Kumar participated in “India-Japan Webinar on Biodiversity Conservation and Sustainable Development” organized by MOEFF&CC.	01	24/02/2022	Scientists, and Research Scholars	30

122.	Manish Kumar Vijay, Scientist – B attended National webinar on “Nurturing the Neem (<i>Azadirachta indica</i>) for Nature and Livelihood Security” organized by Rani Lakshmi Bai Central Agricultural University, Jhansi	2	02/03/2022 to 03/03/2022	Scientist & Scholars	60
123.	All scientists of TFRI participated in the meeting under chairmanship of PCCF,MP, APCCF to discuss new project proposal on submitted to MPSFD.	1	04/03/2022	SFD and Farmers	25
124.	Manish Kumar Vijay, Scientist – B Meeting with PC, KVK Mandla and different managers for preparation of KisanMela.	1	04/03/2022	Scientists	25
125.	Manish Kumar Vijay, Scientist – B attended webinar on “Macropropagation of commercially important Bamboo species” by Bamboo Society of India	1	05/03/2022	Scientist & Scholars	80
126.	Director, all Head of Divisions and Scientist of TFRI attended “Release of DPR of 13 major rivers of India prepared by ICFRE, Dehradun”	1	14/03/2022	State Forest Officers, Scientists and Academicians	120
127.	Dr. Nanita Berry, Scientist ‘F’ participated in the meeting with CEO, SMPB, Chhattisgarh to discuss new project proposal on Agroforestry	1	14/03/2022	SFDs, and farmer	5
128.	Mr. AjinSekhar attended “World Forest Day celebrations” organized by Kerala Forest Research Institute	1	22/03/2022	Scientists, Researchers and Scholars	100
129.	Attended meeting with under the Chairmanship of the Director sir TFRI to discuss different issue related to duties of observers, deputed for Group C & D exam.	1	25/03/2022	Scientists	15
130.	Dr. H. O. Saxena participated in online International conference on “Technology, Innovation and Management for Sustainable Development (TIMS-2022)” held at ITM University Gwalior	2	25-26 th March, 2022	>100	110
131.	Dr. Avinash Jain attended and delivered lecture on “Carbon Sequestration and atmospheric pollution” in National e-conference on “Sustainable Development of Environmental Protection Technology” organized by ISBM university, Gariyabad, (C.G.)	1	28/03/2022	Scientists, Researchers, Professors and Students	50
	Total	167			14378

Category =Scientists,TOs, Forest Officers, etc.

List of Training attended by the official of TFRI :

1	Mr. Manish K Vijay Received a five days training on "Forest Certification" for Scientists of ICFRE w.e.f. at FRI, Dehradun in online mode.	5	27/09/2021 to 01/10/2021	Scientists across ICFRE institutes	1
2	Mr. Manish K Vijay Received a "Training on Instrumentation" by TFRI in Virtual mode	3	27/10/21 to 29/10/2021	Scientists and other interested candidates across ICFRE or other institutes	1
3	Mr. Manish K Vijay participated in the Online training on "Sandalwood cultivation" by IWST, Bengaluru	1	10/12/2021	Open for all interested	1
4	Mr. Manish K Vijay participated in the Online training on "Propagation of Forestry Species" by the Genetics and Tree Improvement Division, TFRI	1	21/12/2021	For SFDs and other stakeholders	1
5	Mr. Manish K Vijay participated in the Attended Induction Training (Phase-II) for the newly recruited scientist of ICFRE	74	13/12/21 to 25/02/2022	Newly recruited scientist of ICFRE.	1
6	Mr. Manish K Vijay Attended two days of online training for scientists and researchers working in the forest and wildlife sector on "Linkage between Field Forest Managers and R&D Personnel" by CASFOS Dehradun, MoEF&CC	2	29th and 30th December 2021	scientists and researchers working in forest and wildlife sector	1
7	Mr. Manish K Vijay Attended training on "Biodiversity assessment, conservation and development" for the Scientists of Indian Council of Forestry Research and Education, Dehradun, India from by WII	5	21st to 25th February 2022	Scientists of ICFRE	1
8	Mr. Manish K Vijay Attended training on "Bioinformatics	5	28th Feb to 04th March	scientist of ICFRE	1

	and computational Biology” for the Scientists of Indian Council of Forestry Research and Education, Dehradun, India by IFGTB, Coimbatore		2022		
9	Mr. Manish K Vijay Attended training on “Advance training on molecular biology techniques” for the Scientists of Indian Council of Forestry Research and Education, Dehradun, India by TFRI, Jabalpur	5	21st to 25th March 2022	scientist of ICFRE	1
10	Mr. Digvijay S. Thakur participated in Virtual Induction Training on Project Management & Research Methodology organized by ICAR-NAARM, Hyderabad	12	03.05.2021 To 14.05.2021		1
11	Mr. Digvijay S. Thakur participated in Refresher training in Statistical methods in forestry research” for Scientist of ICFRE, Dehradun, Organized by Statistical Division, ICFRE Dehradun, Dated on	5	20.9.2021 to 24.9.2021		1
12	Mr. Digvijay S. Thakur participated in Training program on Office correspondence and file management” Organized by ICFRE, dated on	1	22.11.21		1
13	Mr. Digvijay S. Thakur participated in Training on Biodiversity assessment, conservation and development" conducted by WII	5	21.02.2022 to 25.02.2022		1
14	Mr. Digvijay S. Thakur participated in hort course on “Recent Developments in Agroforestry Dimension for Managing Salt Affected Ecologies” dated on 22nd Feb. -3rd March 2022 organized by ICAR-CSSRI Karnal Haryana	10	22.02.2022 To 3.03. 2022		1

	Mr. Digvijay S. Thakur participated in Induction training for Scientist of ICFRE	102	15.03.2021 to 25.06.2021		1
15	Sh. A.J.K. Asaiya attended Trg. on "Identification and Characterization of micro-organism" to be held at Agharkar Research Institute, Pune	5	7-11 March 22		1
16	Mrs. Mamta Meshram, Sci-C attended trg. on "Application of bio-char and nano fertilizer for quality planting stock, organized by CARI, Jhansi.	5	7-11 March 22		1
17	Dr. S N Mishra, Sci-C attended trg. on "Application of bio-char and nano fertilizer for quality planting stock" organized by CARI, Jhansi.	5	7-11 March 22		1
18	Dr. Mohan C, Sci-B, attended Induction training for Newly Recruited Scientists	90	15 th march to 25 th June 2021	Scientists	01
19	Dr. Mohan C, Sci-B, attended Prospects and Problems of Bee keeping in India	01	20 th May 2021	Scientists	01
20	Dr. Darshan K, Sci-B, attended 5-days online training on 'Production Protocol for Entomopathogenic Nematodes' organized by National Institute of Plant Health Management, Hyderabad	5	22 -26 th Feb 2021	Scientists	01
21	Dr. Mohan C, Sci-B, attended International webinar on Desert Locust <i>Scistocera gregaria</i> - International scenario and a potential threat to India	01	2 nd July 2021.	Scientists	01
22	Dr. Mohan C, Sci-B, Participated in five days training program on "Remote sensing	05	August 02-06 , 2021	Scientists	02

	and GIS for ICFRE Scientists”				
23	Dr. Mohan C, Sci-B, participated one-week training program on statistical methods in forestry research for scientists of ICFRE	05	20- 25 th Sep, 2022	Scientists	02
24	Dr. Darshan K, Sci-B, participated in ICAR-Niche Area of Excellence funded virtual training course on “Bioprospecting of Natural Resources for the Production of Biopesticides“ organized during held at Division of Agricultural Chemicals, ICAR-Indian Agricultural Research Institute, New Delhi.	05	March 15-19, 2021	Scientists	01
25	Dr. Mohan C, Sci-B, participated in five days training program on “Forest certification”	05	Sep 27 th to 2 nd Oct , 2021	Scientists	01
26	Dr. Mohan C, Sci-B, participated in National webinar on “Nano size- Big impact: Nano revolution for Transforming agriculture, food nutrition and Health”	02	October 4-5, 2021	Scientists	01
27	Dr. Mohan C, Sci-B, participated in Training program on Forest Policy, Laws and environmental Law	05	13-17 th Dec, 2021	Scientists	01
28	Dr. Mohan C, and Dr. Darshan, Sci-B, participated in Training for the ICFRE Scientists on “Wood Seasoning, Preservation and Composite wood”	05	07 th - 11 th March, 2022	Scientists	02
29	Dr. Mohan C, Sci-B, participated in Training program for Scientists on “Advance	05	21 st - 25 th March, 2022	Scientists	01

	training in molecular biology techniques and its application”				
30	Dr. Mohan C, Sci-B, attended ICAR sponsored 21 days winter school on “Commercial Apiculture for livelihood security of farmer and unemployed rural youth”	21	Feb 10 th to 2 nd March, 2022	Scientists	01
31	Dr. Darshan K, Sci-B, attended Induction training for Newly Recruited Scientists	90	15 th Dec to 25 th Feb 2022	Scientists	01
		148			35

Workshops/seminars/symposia/meetings etc. organized						
SN	Topic	Duration and Period		Participants		Overall feed of Participants
		Days	Date	Category	Numbers	
1	Celebrating 75 th year of Indian Independence, "Bharat KaAmritMahotsava', a webinar on “Non-destructive harvesting, processing and marketing of NTFPs” wasorganized at Tropical Forest Research Institute, Jabalpur (MP)	1 day	21/05/2021	Scientists, Technical Officers and Staff, Research Scholar and Farmers	70	
2	TFRI organized a webinar entitled – “We’re part of solution # for nature’ on the occasion of International Day of Biodiversity, 2021	1.5 hrs.	22/05/2021	Research Scholars, Technical Officers & Scientists	45	

4	Advances in Teak Cultivation: Genetic resources and technologies" Hosted by IFGTB, Coimbatore Co-Hosted by TFRI, Jabalpur.	01 day	16/07/2021	Scientists and Researchers	10	
6	TFRI organised a webinar on "Biodiversity and Ecosystem Restoration" as a part of Bharat KaAmrutMahotsav celebrations 2021.	2 hours	04/08/2021	Scientists and Technical Personnel	256	
7	TFRI organised a meeting with the Officials of IFFDC, Madhya Pradesh and Scientists of TFRI under the Chairmanship of Dr. G. Rajeshwar Rao, ARS, Director, TFRI The agenda of the meeting was how best to have collaboration between TFRI and IFFDC to improve livelihoods of stakeholders.	01 day	25/08/2021	TFRI Scientists and IFFDC Officers	63	
8	TFRI organised a webinar on "Increase in Forest Productivity through Tree Improvement" during the observation of 'Bharat KaAmritMahotsav' under the theme "Increase in Forest Productivity through Tree Improvement" from 6-12 September 2021".	1 day	09/09/2021	Scientists, Students, Technical officers and Research scholars	10	
9	The National Webinar on "What	01 day	13/09/2021	Scientists, Students, Technical officers	35	

	to look for: Sustainable Ways to protect the Forest Health”, organized by Forest Protection Division, Tropical Forest Research Institute, Jabalpur (MP) held on 13th September 2021.			and Research scholars		
10	A Institute level monthly seminar (Webinar) organised on ‘Zero Budget Natural Farming’	1 hour	07/01/2022	Scientist, Technical Officers, Research scholars and JRF	42	
11	FE&CC division organized online meeting on “Plantation - Audit & sequestration capacity assessment” with Reliance/ Birla Officers on 28-01-2022	1 Hour	28/01/2022	Reliance/ Birla Officers	25	
	Total	10			581	

1. Format for detailsof Awareness/ Demonstration programmes organized- Annexure -9

Awareness/ Demonstration programmesorganized						
SN	Topic	Duration and period		Participants		Overall feedback of Participants
		Days	Date	Category	Numbers	
1.	Dr. S. N. Mishra, Scientist 'C' virtually demonstrated the research activities, laboratories and infrastructure.	01	01/07/2021	Forest Guards of Van Vidhyalaya, Shivpuri (MP)	35	
2.	Dr. Nanita Berry, Scientist 'E' delivered lecture on ‘Plantation	01	22/07/2021	Forest Guards of Van Vidhyalaya, Betul (MP)	55	

	techniques and Agroforestry models developed by 'TFRI' through virtual mode.					
3.	Sh. A.J.K. Asaiya, Scientist-C, Forest Protection Division delivered lecture on laboratories and infrastructure, TFRI, Jabalpur	01	22/07/2021	Forest Guards of Van Vidhyalaya, Betul (MP)	55	
4.	World Bamboo day	01	17.09.21	Scientists, Technical staff and Research scholars	46	A timely and relevant celebration
5.	Demonstrated <i>Gmelina</i> with betel vine based agroforestry system to IFFDC group of Chhattarpur, Sagar and Tikamgarh district of M.P.	2	27/09/2021 to 28/09/2021	IFFDC Group (M.P.)	20	
6.	"Avoid the Use of Plastic" under Azadi Ka Amrut Mahotsav was organized by the center Mordongri village, Chhindwara district Madhya Pradesh	01	5/10/2021	Youth	24	
7.	"Avoid the Use of Plastic" under Azadi Ka Amrut Mahotsav was organized by the center on at Navodaya Vidhyapeeth Chhindwara (M.P.)	01	8/10/2021	Students of 8 th class Navodaya Vidhyapeeth, Chhindwara (M.P.)	80	
8.	"Avoid the Use of Plastic" under Azadi Ka Amrut Mahotsav was organized by the center on 8/10/2021 at Navodaya Vidhyapeeth Chhindwara (M.P.)	01	8/10/2021	Students of 9 th class Navodaya Vidhyapeeth, Singori Village Chhindwara (M.P.)	56	

9.	Demonstration programme organised for B.Sc (Forestry) students FCRI, Hyderabad	1	1/11/2021	B.Sc (Forestry) students FCRI, Hyderabad	45	
10.	Demonstration and hands on training selection and cultivation of host trees for implementing LAC cultivation	1	16/11/2021	Three societies of IFFDC, Sagar, MP.	50	Excellent
11.	An awareness programme under Azadi ka amrit mahotsav 2021 on the occasion of Birsa Munda Jayanti at Rani Durgavatisamdhi place .	1	17/11/2021	Villagers of Narai Village, Jabalpur (MP)	50	Excellent
12.	Demonstration programme organised for ACF trainees of Central Academy of State Forest Service, Coimbatore.	01	24/11/2021	ACF trainees	64	
13.	"Environmental Awareness and Biodiversity Conservation training programme" under Ka Amrut Mahotsav"	01	9.12.2021	students of ATASH College Management Technology, Pandhurna Chhindwara District (M.P.)	53	
14.	Dr. Nidhi Mehta, ACTO demonstrated botanical garden to students from JawaharNavodaya Vidhyalaya, Bargi Nagar and KV, TFRI on 5 January, 2022.	0.5	05/01/2022	Students	86	
15.	Demonstrations of agroforestry systems, bamboo	1	6/01/2022	A group of 86 Higher Secondary	86	Prakriti Programme

	plantations			students of Navodaya and DPS School of Bargi on 6 th January, 2022.		
16.	Demonstrations of agroforestry systems and Bamboo plantations. A group of Range Officers of Kundalpur Forest Ranger College, Maharashtra on 7 th January, 2022	01	07/1/2022	Trainees Range Officer	45	
17.	"Biodiversity Conservation" training programme" under Ka Amrut Mahotsav	01	13/01/2022	B.Sc and M.Sc Students of Danielson College, Chhindwara	45	
18.	Biodiversity Conservation" under Azadi Ka Mahotsav	01	31/1/2022	B.Sc and M.Sc Students of ATASH College Management Technology	38	
19.	Identification uses botanical names of various medicinal/aromatic/sterile species	01	07.02.2022	Jawahar Navodaya Vidyalaya, Chhindwara students (10 th std)	40	04
20.	Avoid Use of Plastic & Medicinal plants Use,	01	15.02.2021	Students of Std. 8 th & 9 th class of Govt. Higher Secondary School, Nonia Karbal, Chhindwara	20	
21.	Diversity of Medicinal Plants and Tree Diversity of Chhindwara	1	16.02.2022	College of Forestry, Punjabrao Deshmukh Vishwa Vidyalaya Akola (MS)	51	
22.	Exposure visit of	01	17.02.22	Entrepreneurs	24	Excellent

	Bamboo Entrepreneurs sponsored by Foundation for MSME Clusters, New Delhi					exposure of bamboo propagation, nursery, plantations and management
23.	Dr. Nanita Berry, Scientist 'F', demonstrated sandalwood based agroforestry system and research activities of TFRI to the group of FRO, 2021-22 batch of State Forest Service, Coimbatore (Tamil Nadu)	01	21/03/2022	Ranger Trainees, 2021-22 batch Coimbatore.	36	
24.	Demonstration of Bamboo Slicer and Bamboo plantation to the members of Foundation of MSME Cluster, New Delhi and Maharashtra	02	24/03/2022 to 25/03/2022	members of Foundation of MSME Cluster, New Delhi and Maharashtra	25	
25.	Demonstration of research activities of TFRI to the Trainees Rangers from Haldwani	01	29/03/2022	Ranger Trainees of Coimbatore.	30	
	Total	27			1159	

Category = Students, farmers, ladies, officers from SFDs, Members of JFMCs etc.

Format for details on License/ Material Transfer agreements annexure -10

<u>Sl. No.</u>	<u>Name of Technology/ package of practices</u>	<u>Name of species</u>	<u>Name of the party</u>	<u>Revenue details including revenue generated and mode of payment, if any</u>
-	-	-	-	-

11. List of publications - Annexure -11 (publications) - Please prepare the list in the following order:

- Books

Dr. Darshan K, Scientist-B has published a text book entitled “Phyto Pathological Techniques Basic to Advances (1st ed.)” by Darshan K., Amrutha Lakshmi M., M. Gurivi Reddy. (2021). Self publication, Mysore. ISBN 978-93-5473-629-2

- Booklets/Brochures/Bulletins/ Pamphlets etc.

Chapters in Books/ Proceedings	<ol style="list-style-type: none"> 1. Mr. Manish K Vijay published a chapter on “Nursery Input Management: Present and Future Perspectives” in the book released during HRD training module on ‘Nursery development and vegetative propagation on 17th -21st Jan. 2022 for ICFRE Technical Staff. 2. Dr. Darshan K., Scientist- B submitted a Book Chapter: Ganoderma: Biodiversity, Ecological Significances, and its management for Springer's book Fungal diversity, Ecology and Control Management, Vol-I 3. Rathod Digvijaysinh Umedsinh (2022). A book chapter published on “Nursery Input Management: Present and Future Perspectives” in the book released during HRD training module on ‘Nursery development and vegetative propagation’ on 17th -21st Jan. 2022 for ICFRE Technical Staff.
Booklets/ Brochure/ Bulletins/ Phamphlets	<ul style="list-style-type: none"> • Rathod Digvijaysinh (2022) Miyawaki Plantation: New Technique for Afforestation, Technical Manual, TFRI • Kundu, M., Schmidt, L. (Editor), 2021. <i>Bridelia retusa</i> (L.) A. Juss. Seed Leaflet, No. 175, p-1-2. Forest & Landscape, University of Copenhagen, Denmark Kundu, M., Schmidt, L. (Editor), 2021. <i>Buchanania cochinchinensis</i> (Lour.) M.R. Almeida. Seed Leaflet, No. 176, p-1-2. Forest & Landscape, University of Copenhagen, Denmark. • Kundu, M., Schmidt, L. (Editor), 2021. <i>Butea monosperma</i> (Lam.) Taub. Seed Leaflet, No. 174, p-1-2. Forest & Landscape, University of Copenhagen, Denmark.

	<ul style="list-style-type: none"> • Kundu, M., Schmidt, L. (Editor), 2021. <i>Saraca asoca</i> (ROXB.) Willd. Seed Leaflet, No. 172, p-1-2. Forest & Landscape, University of Copenhagen, Denmark. • Kundu, M., Schmidt, L. (Editor), 2021. <i>Semecarpus anacardium</i> L.f.. Seed Leaflet, No. 173, p-1-2. Forest & Landscape, University of Copenhagen, Denmark.
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Article in Seminars/ Conferences/ Workshops etc. <u>Abstracts</u>	<ol style="list-style-type: none"> 1. Dr. Nanita Berry and G.Rajeshwar Rao (2022) : Two Training manuals on HRD training for ICFRE technical staff on 'Nursery technique and plantation management' and MANAGE training for Agri-entrepreneurs on 'Agroforestry and opportunities in Value addition' prepared and published by TFRI. 2. Dr. Nanita Berry, G, Rajeshwar Rao & Ekta Barkade (2021). Extraction of Piper oil from <i>Piper betle</i> grown under <i>Gmelina arborea</i> based agroforestry system besides its value addition. In proceedings in National Conference on 'Value addition and Marketing of NTFPs' held on 16th December, 2021 at Tropical Forest Research Institute, Jabalpur (Madhya Pradesh): 125pp 3. Dr. Nanita Berry (2021). Conservation of commercially important medicinal herbs through agroforestry for health and wealth of tribal community. In Proceedings of International Conference on Minor Forest Produce for Health Securities from 24-25 December, 2021, Bhopal (MP) : 10pp. 4. Berry, Nanita; Dilraj, ITK, Dubey, Saurabh and Nikita Rai. (2021). Agroforestry system adopted by farmers of Hoshangabad (Madhya Pradesh) (Virtual Mode) in 3rd International Conference Global Initiative in Agriculture, Forestry and Applied Science (Theme - Food security, Environment safety and Sustainable Development (GIAFAS-2021) held at Shri Guere Ram Rai University, Dehradun, Uttarakhand, India: 5. Shukla Akash and Berry Nanita (2021). "Giloy or Amrita: Boon to Mankind" Abstracts published in Proceedings of National Conference on 'Value Addition and Marketing of NTFPs' pp 125 6. Sharga, Parul and Berry, Nanita (2021). Clonal Eucalyptus for Environmental Resilience and Climate Change mitigation. In Proceedings of National
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	<p>Conference on ‘Clonal Forestry in eco-restoration’ held from 10-11 November, 2021 at Forest Research Centre, Prayagraj: 91pp.</p> <p>7. Berry, N., Dilraj, I.T.K., Dubey, S. and Rai, N. (2021). Agroforestry system adopted by farmers in Hoshangabad district of Madhya Pradesh in Souvenir Cum Abstract Book (ISBN NO. -978-93-5419-016-2), pp-318.</p> <p>8. Hari Om Saxena*, Samiksha Parihar and Ganesh Pawar (2021). Simultaneous densitometric quantification of betulinic acid, β-sitosterol and lupeol in fruits, leaves, root and stem bark of <i>Dilleniapentagyna</i> Roxb. through a validated HPTLC method. Published in souvenir of 2nd International Conference on Recent Advances in Biotechnology and Nanobiotechnology (Int-BIONANO-2022) held at AMITY University Gwalior on 10-11th Feb., 2022 [OP-30, page no. 35-36].</p> <p>9. Hari Om Saxena (2022). Chemical and morphological variations in <i>Stereospermum suaveolens</i> (Roxb.) DC. – a RET species and its ex-situ conservation” in online National conference on “Biodiversity and its Utilization and Conservation in Central India” held at GGV Central University, Bilaspur on 21 - 22nd Feb., 2022 at page no. 05.</p> <p>10. Kundu, M., Tiwari, S., Kahar, L., Gupta, D.K. and Chouhan, S. K. (2022). Germination of <i>Careya arborea</i> Roxb. Seeds with respect to their maturation, desiccation sensitivity and storage response. Published in National Symposium-Cum Workshop on “Biodiversity and Its Utilization and Conservation in Central India” held (In Blended Mode) at GGV, Bilaspur from 21-22 February 2022.</p> <p>11. Aman Kumar A., Prajapati N.(2021). POTENTIAL DISTRIBUTION RANGE AND CONSERVATION STRATEGIES FOR THE ENDANGERED SPECIES <i>TAXUS BACCATA</i> IN HIMACHAL PRADESH, page no.32 in National Conference on "Value Addition and Marketing of NTFPs" 16th December, 2021, Tropical Forest Research Institute, Jabalpur (M.P.))</p> <p>12. Mr. Manish K Vijay published an abstract on "CONSERVATION AND SEED QUALITY ENHANCEMENT OF BUCHANANIA LANZAN SPRING: AN ENDANGERED NWFP SPECIES OF MADHYA PRADESH" in the compendium of National Conference on "Value Addition and Marketing of NTFPs" 16th December 2021, Tropical Forest</p>
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	<p>Research Institute, Jabalpur (M.P.)</p> <p>13. Rathod Digvijaysinh (2022) Concept of Miyawaki Plantation to Mitigate Climate Change, Proceedings on 4th Plant Science Research Meet (PSRM 2021) “National Conference on Advance in Plant Science Research, organized by: Plantica – Association of plant science research, Dehradun; School of life Sciences, Uttaranchal University, Dehradun; HNB Garhwal University (A central University) Srinagar, Uttarakhand on 20-21 November 2021</p> <p>14. Pramod Kumar, Pawan Kumar Patel and Vimal Pandro (2021) Quality plants of <i>Dalbergia latifolia</i> (Roxb.) through user friendly propagation and field planting for Ecological sustenance. In Abstract Book of National Conference on Clonal Forestry in Eco- Restoration (NCCFER-2021), Page 29.</p> <p>15. Kaushal Tripathi, Ravishankar, Satya Prakash, Mukesh Kumar Sonkar and Fatima Shirin (2021) Macropropagation through root cuttings in <i>Dalbergia latifolia</i> (Roxb.), an important vulnerable tree species. In Abstract Book of National Conference on Clonal Forestry in Eco- Restoration (NCCFER-2021), Page 38.</p> <p>16. Kaushal Tripathi, Ravishanker, Satya Prakash Tantuwary, Mukesh Kumar Sonkar and Fatima Shirin (2021) Macropropagation through root cuttings in <i>Dalbergia latifolia</i>, an important vulnerable tree species, In Abstract Book of National conference on clonal forestry in eco-restoration, Prayagraj, Page 38.</p> <p>17. Irshad Ali Saudagar, Vineet Mehra, Trilok Gupta, Nikhil Verma and Fatima Shirin (2021) Macropropagation of <i>Dendrocalamus strictus</i> (Roxb.) Nees through culm cavity method, In Abstract Book of National conference on clonal forestry in eco-restoration, Prayagraj, Page 39.</p> <p>18. Surendra Singh Ghoshi, Irshad Ali Saudagar, Shruti Thakre, P K Rana, Trilok Gupta and Fatima Shirin (2021) Selection of CPTs of <i>Madhuca longifolia</i> from different agroclimatic zones of Madhya Pradesh for assemblage and conservation, In Abstract Book of National conference on Value addition and marketing of NTFPs, Jabalpur, 16th December, 2021, Page 25.</p> <p>19. Upasana Namdev, Irshad Ali Saudagar, Sharmishtha Gangopadhyay,</p>
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	<p>Sushma Maravi, Mukesh Kumar Sonkar and Fatima Shirin (2021) Vegetative propagation of <i>Plumbago zeylanica</i> useful RET medicinal plant for conservation, In Abstract Book of National conference on Value addition and marketing of NTFPs, Jabalpur, 16th December, 2021, Page 30.</p> <p>20. Kaushal Tripathi and G Kumar (2021) Mutagenic impact of EMS inciting morphological and cytological influence in Berseem (<i>Trifolium alexandrinum</i>), In Abstract Book of XLIV All India Botanical Conference of the Indian Botanical Society. Page 99.</p> <p>21. Irshad Ali Saudagar and Fatima Shirin (2022) Characterization and evolution of conservation practices on phytochemicals in different seasons of <i>Kaempferia parviflora</i>, In Abstract Book of Advances in smart agriculture and biodiversity conservation for sustainable development, Jaipur, March 04 - 06, 2022, Page 235.</p> <p>22. Naseer Mohammad, Ankur Dahayat, Yogesh Pardhi, Fatima Shirin and Yogeshwar Mishra (2021) Clonal fidelity testing of <i>Eucalyptus</i> clonal stock using ISSR markers. In Abstract Book of National Conference on Clonal forestry in Eco-Restoration, Prayagraj, 10-11 November, 2021.</p> <p>23. Naseer Mohammad, Rahul Rathore, HO Saxena and M Rajkumar (2021) Assessment of variability and natural regeneration of an endangered Bijasal (<i>Pterocarpus marsupium</i> Roxb.) in Madhya Pradesh. In Abstract Book of National Conference on Value addition and marketing of NTFPs, Jabalpur, 15 December, 2021.</p> <p>24. Naseer Mohammad, Yogesh Pardhi, Bilal Miskini and M Rajkumar (2021) Field observations of the endangered Gum Karaya (<i>Sterculia urens</i> Roxb.) populations in Madhya Pradesh, India. In Abstract Book of National Conference on Value addition and marketing of NTFPs, Jabalpur, 15 December, 2021.</p> <p>25. Naseer Mohammad, Ankur Dahayat, Yogesh Pardhi, Fatima Shirin and Yogeshwar Mishra (2021) Clonal fidelity testing of <i>Eucalyptus</i> clonal stock using ISSR markers. In Abstract Book of National Conference on Clonal forestry in Eco-Restoration, Prayagraj, 10-11 November, 2021.</p> <p>26. Berry Nanita, Barkade, Ekta and Rao G. Rajeshwar (2021). Extraction of Piper oil from <i>Piper betel</i> growth under <i>Gmelina arborea</i> based agroforestry system besides its value addition'. Abstracts published in proceedings of</p>
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	<p>National Conference 'Value Addition and Marketing of NTFPs' Page No. 55.</p> <p>27. Shukla Akash and Berry Nanita (2021). "Giloy or Amrita: Boon to Mankind" Abstracts published in Proceedings of National Conference on 'Value Addition and Marketing of NTFPs' pp 125</p> <p>28. Dr.Darshan K. Submitted and published abstracts on topic “Mushrooms as Non-Timber Forest Products: Improving Tribal’s Health and Promoting Quality Life” under the theme III - Resources Assessment and Augmentation of NTFPs at NATIONAL CONFERENCE VALUE ADDITION AND MARKETING OF NTFPs organized by TFRI, Jabalpur.</p>
<u>Popular article</u>	<ol style="list-style-type: none"> 1. प्रमोद कुमार, पवन कुमार पटेल, मुकेश कुमार सोनकर, (2021) काला शीशम (डलबर्जिया लैटिफोलियाद्ध के उच्च गुणवत्ता युक्त पौधे तैयार करने की कायिक प्रजनन विधि, वन अनुसंधान ई पत्रिका, जनवरी जून 2021. 2. प्रमोद कुमार, पवन कुमार पटेल , विमल पैन्द्रो, प्रेम कुमार राना एवं मनोज कुमार पूसाम (2021) सागौन के बीज फलोधानों के उचित वैज्ञानिक प्रबंधन द्वारा अधिक बीज उत्पादन. वन अनुसंधान ई पत्रिका अंक 06 जुलाई दिसंबर 2021. 3. कौशल त्रिपाठी, दिग्विजय सिंह, नीरज प्रजापति, ननिता बेरी (2021) बांध क्षेत्र: स्वदेशी मधुमक्खियों के संरक्षण और समृद्धि में सहायक. तरुचिंतन 49-51 4. डॉ फातिमा शिरीन एवं श्री इरशाद अली सौदागर (2021) जुगनू : विलुप्त चमक और उसका संरक्षण . तरुचिंतन 83-84 5. Article on “वनउद्यानिकी कृषि पद्धति में अमरुद का सतत उत्पादन”.<i>Taruchintan</i>, a ICFRE publication by Berry, Nanita, Dubey, Sourabh; and Nikita Rai, (2020). 6. Yogesh Pardhi, ACTO, Minskshi Pardhi, Subhi Mishra, Fatima Shirin and Naseer Mohammad. Popular article: "Critical endangered species <i>Bacopamonerii</i>: Micropropagation technique for large scale production" in <i>VAN SANGYAN</i>, Vol.-8, No.2, Issue 2021. 7. Mamta Meshram scientist-B of the centre, published article on "Growth and yield performance of aonla varieties in Chhindwara district, Madhya Pradesh" <i>Van Sangyan</i> (ISSN2395-468X), Vol.8, No.3, Issue: March 2021. 8. Banerjee Saikat and Jain A. (2021). Air Pollution and Possible Remediation. <i>Van Sangyan</i>, 8 (2), 13-22, 2021 9. Singh R. and Jain A. (2021). Water Pollution-Its Control. <i>Van Sangyan</i>, 8 (2), 28-35, 2021

	<ol style="list-style-type: none"> 10. Payal Basu (2021). Effect of pruning on wildlife and micro-organisms. <i>Van Sangyan</i>, 8 (2), 17-23, 2021 11. Choubey SK, Saxena HO and Pawar G (2021). किवांच (<i>Mucunapruriens</i>): फली का संग्रहण, प्रसंस्करण एवं उपयोग. <i>Van Sangyan</i>, 8(2): 7 – 12. 12. Choubey SK, Saxena HO and Pawar G (2021). चारकोल, प्रसंस्करण एवं लघु ग्रह उद्योग, <i>Van Sangyan</i>, 8(3): 27 – 29. 13. Nidhi Mehta and Jain A. (2021). Role of nutrient cycling in forest ecosystems. <i>Van Sangyan</i> 8 (1), 24-29, 2021. 14. Pradeep Kori and M. Rajkumar (2021). मध्यप्रदेश में वन वर्धन पद्धति के कार्य अभ्यास <i>E-magazine - Van Sangyan</i> 8(2): 36-41, 2021. 15. Saikat Banerjee, Sengar K.S. and Jain A. (2021). Acid Rain- A Global Environmental Issue. <i>Van Sangyan, TFRI</i>, 8(4), 21-31, 2021. 16. Saikat Banerjee, Sengar K.S. and Jain A. (2021). Global warming its causes and remediation. <i>Van Sangyan, TFRI</i>, 8 (8) : 5-8. 17. Saikat Banerjee, Sengar K.S. and Jain A. (2021). Deforestation and Forest Degradation – Causes, Effects and Sustainable Solution. <i>Van Sangyan, TFRI</i>, 8(5) : 01-15. 18. Saikat Banerjee, Sengar K.S. and Jain A. (2021). Environment, its component and issues. <i>Van Sangyan, TFRI</i>, 8(6) : 22-35. 19. Saikat Banerjee, Jain A. and Shukla P.K. (2021). Soil and Water Conservation on the Growth of Planted Species in Skeletal Soil – Some Case Studies (2021). <i>Van Sangyan, TFRI</i>, 8(7) : 13-20. 20. Saikat Banerjee and S.K. Banerjee Vegetation Succession in Mine Spoils <i>Vaniki Sandesh, Vol-12 (1,2), 20-27, January-June 2021</i> 21. S.K. Banerjee and Saikat Banerjee Healthy Soil, A Living Ecosystem <i>Vaniki Sandesh, Vol-12 (1,2), 04-13, January-June 2021</i>
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Research papers (please include impact factor against each paper) Published in Indian Journals	<ol style="list-style-type: none"> 1. A.J.K. Asaiya, Divyansh Raj and Chokhelal (2021) published a research paper on "Antibacterial effect of <i>Ponganiapinnata</i> leaf extract against some Human pathogenic bacteria" in <i>Journal of Plant Pathology & Microbiology</i> Vol 12 Iss 7 No 565. 2. Avinash Jain, Nidhi Mehta, M. Rajkumar, Sanjay Singh, Sanjay Komra and G. Rajeshwar Rao Ecorestoration of Tiger Reserves of Central India and its impact on Vegetation Diversity and Community Composition. <i>Indian Forester</i> 148(3):285-295. 2022 (NAAS)5.10 3. Banerjee S.K., Banerjee S. and Shukla P.K. (2021). Sustainable forestry with special reference to the management of non-timber forest products for livelihood security of forest dependents communities in tropical region. <i>Journal of Tropical Forestry</i>, 37 (III), 01-17, 2021 (July-Sept.) 4. Banerjee S.K., Banerjee S., Sahoo T.K. and Shukla P.K. (2021). Changes in Soil Characteristics and Carbon Sequestration
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	<p>Potential Consequent Upon Differences In Forest Cover In a Plantation Area of Kalimpong Division, West Bengal. <i>Journal of Tropical Forestry</i>, 36 (IV): 55-63, 2021.</p> <p>5. Banerjee S.K., Jain A, Banerjee S and Shukla P.K. (2021). Land and Soil Pollution, its causes, effects and possible solution. <i>Journal of Tropical Forestry</i>, 37 (I-II): 39-53, 2021.</p> <p>6. Berry, N., Shukla, A, Dubey, S., Rai, N. and Kumar, P. (2021). Corelation analysis of Yield with Yield Attributing Characters and Soil Properties of <i>Cajanas cajan</i> (Arhar) in Silvi-horti-Agri System. <i>Indian Journal of Agriculture research</i>. (5.13 NAAS rating)</p> <p>7. Berry, N., Shukla, A. and Barkade, E. (2021). Pr- sowing treatments of seeds and impact on germination of <i>Gmelina arborea</i> Roxb. <i>The Pharma Innovation Journal</i>, 10(10):239-243.(5.15 NAAS rating)</p> <p>8. Berry, Nanita; Sharga Parul; Dilraj, ITK; Dubey, Sourabh; JJ Satapathy. (2021). Bio control of <i>Trialeurodes vaporariorum</i> of <i>Piper betle</i> under <i>Gmelina arborea</i> based agroforestry system in Madhya Pradesh. <i>Journal of Entomology and Zoology Studies</i>, Vol. 9, Issue 2 : 439-443</p> <p>9. Brojo Gopal Ghosh, Sanjay Garai, SK Rahaman M, Khatun M, Mohammad N, Mishra Y., Ranjan A and Tiwari S. (2021): Assessing potential habitat distribution range of the endangered tree species <i>Pterocarpus marsupium</i> Roxb. Under the climate change scenario in India. <i>Tree Forest and People</i>.</p> <p>10. Deepti Bhadrawale, Fatima Shirin, Kavita Patel, Shalu Panika, Priyanka Hardaha, Trilok Gupta, Naseer Mohammad and G. Rajeshwar Rao (2021) Effect of different plant growth regulators and additives on <i>in vitro</i> culture establishment of <i>Pseudoxystenantha stocksii</i>. 29 (1): 32-39. <i>Journal: Indian Journal of Tropical Biodiversity</i> Date: March, 2022 NAAS rating: 4.02 (2020)</p> <p>11. Dheeraj K. Gupta, Nitesh Patidar, Mukunda Dev Behera, Sudhindra Nath Panda, V. M. Chowdary. (2021). Estimating Evapotranspiration in Relation to Land-Use Change Using Satellite Remote Sensing. <i>Geospatial Technologies for Land and Water Resources Management</i>. Pp 185-206. 2021.</p> <p>12. Dr. Hari Om Saxena Scientist ‘D’ Parihar S. and Pawar G. (2022). “Simultaneous determination of betulinic acid, B-sitosterol and Lupol in fruit, leaves, root and stem bark of <i>Dillenia pentagyna</i> Roxb. by a validated high-performance thin layer Chromatography method”. <i>JPC-Journal of Chromatography.-Modern TLC</i>. O:1,12</p> <p>13. Dr. Nanita Berry & Indu Meravi (2021). Performance of <i>Asparagus racemosus</i> and saponin content under <i>Gmelina</i> based agroforestry system. <i>Indian Journal of Tropical Biodiversity</i>: 28 (1&2) 89-92. (4.1 NAAS rating)</p> <p>14. Fatima Shirin, Deepti Bhadrawale, Irshad Ali Saudagar, PK Rana, Naseer Mohammad and G. Rajeshwar Rao. (2020) Influence of</p>
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	<p>localities and tree girth classes on morphological and biochemical parameters of fruits and seeds of <i>Madhuca longifolia</i>. 28 (1&2): 31-40 Journal: Indian Journal of Tropical Biodiversity Date: January, 2022 NAAS rating: 4.02 (2020)</p> <p>15. Fatima Shirin, Irshad Ali Saudagar, Vineet Mehra, Sushma Maravi, Mukesh Kumar Sonkar, Pramod Kumar and G. Rajeshwar Rao (2021) Influence of genotypes on adventitious rhizogenesis through macropagation in <i>Bambusa vulgaris</i> and <i>Bambusa nutans</i>. 29 (1): 47-53. Journal: Indian Journal of Tropical Biodiversity Date: March, 2022 NAAS rating: 4.02 (2020)</p> <p>16. Ghosh BG, Garai S, Rahaman SKM, Khatun M, Naseer Mohammad, et al. (2021) Assessing potential habitat distribution range of the endangered tree species <i>Pterocarpus marsupium</i> Roxb. Under the climate change scenario in India. 6, 100124. https://doi.org/10.1016/j.tfp.2021.100124 Journal: Trees, Forests and People (Elsevier) Date: December, 2021 CiteScore: 0.2 (2020)</p> <p>17. Jain A., Gupta D., Banerjee S., Naik R. Performance of Tree Species on Waterlogged Sites of Canal Command Area: A Case Study Of Bargi Dam, Jabalpur (Madhya Pradesh). <i>Current world Environment</i>. 2021. 16(3). 5.37 (NAAS)</p> <p>18. Kaushal Tripathi, Giriraj Kumar, Moni Mishra, Fatima Shirin and Nikhil Verma (2020) Cyto-phenological study of natural population of <i>Butea monosperma</i> (Lam.) Taubert (Palas) in the campus of Tropical Forest Research Institute, Jabalpur, MP. 28 (1&2): 57-64. Journal: Indian Journal of Tropical Biodiversity Date: January, 2022 NAAS rating: 4.02 (2020)</p> <p>19. Mohammad, N., Rajkumar, M., Singh, K., Nain, N. P. S., Singh, S., Rao, G. R. R., Prakasham, U.(2021). Spacing, pit size and irrigation influence early growth performances of forest tree species. <i>Journal of Tropical Forest Science</i> 33(1): 69-76, 2021</p> <p>20. Mohammd N, Saxena HO, Yadav RS and Pawar G (2021). Assessment of Variation for Pterostilbene in Heartwood of <i>Pterocarpus marsupium</i> Roxb., a Vulnerable Medicinal Tree from Central India. <i>Indian Journal of Ecology</i> (2021) 48(6): 1736-1739.</p> <p>21. Mohan and S. Sowmyapriya (2022). Study on invitropathogenicity of various semi synthetic media on pathogenicity of <i>Metarizium anisopliae</i> against <i>Spodoptera litura</i>. <i>Indian Journal of Tropical Biodiversity</i> 28(162):94-96.</p> <p>22. Mohan B, Saxena HO and Kakkar A (2020). Gas chromatography-mass spectrometry (GC-MS) analysis of ethanolic and aqua-ethanolic extracts of <i>Uraria picta</i> Desv. Leaves. <i>Indian Journal of Tropical Biodiversity</i>, 28 (1&2): 97-104.</p> <p>23. Naseer Mohammad, Dahayat A, Pardhi Y (2021) Effect of Growing Media on Seed Germination attributes in <i>Sterculia urens</i> Roxb. - An Endangered Gum Yielding Tree of Tropical Forest. 147(7): 621-626. https://doi.org/10.36808/if/2021/v147i7/153636 Journal: The Indian Forester Date: July, 2021 NAAS rating: 5.10 (2022)</p> <p>24. Naseer Mohammad, Rajkumar M, Rahul Rathore, et al 2022. Factors</p>
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	<p>limiting regeneration of a Near Threatened deciduous tree <i>Pterocarpus marsupium</i> Roxb. in Central India. <i>ActaEcologicaSinica</i></p> <p>25. Naseer Mohammad, Rathore R, Mishra Y and Miskini B (2021) Report on the Flowering and Fruiting in five-year-old Germplasm bank of <i>Litsea glutinosa</i> (Lour.) C.B. Robinson. 147 (4): 410-412. https://doi.org/10.36808/if/2021/v147i4/155267 Journal: The Indian Forester Date: April, 2021 NAAS rating: 5.10 (2022)</p> <p>26. Naseer Mohammad, Saxena HO, Yadav RS, Pawar G (2021) Assessment of Variation for Pterostilbene in Heartwood of <i>Pterocarpus marsupium</i> Roxb., a vulnerable medicinal tree from Central India. 48(6): 1736-1739 https://doi.org/10.1016/j.indcrop.2018.10.047 Journal: Indian Journal of Ecology Date: December, 2021 NAAS rating: 5.79(2022)</p> <p>27. Pramod Kumar, Fatima Shirin and G. Rajeshwar Rao (2021) Enhancement of productivity of bamboo plantations through the selection of superior clumps and management interventions. 29 (1): 66-71. Journal: Indian Journal of Tropical Biodiversity Date: March, 2022 NAAS rating: 4.02 (2020)</p> <p>28. Pramod Kumar, Mishra J.P., Sonker M.K., Mishra Y. and Fatima Shrin (2021): Relationship of season and cutting's diameter with rooting ability of Culm-Branch cuttings in <i>Bambusa tulda</i> and <i>Bambusa nutans</i>. Journal of Plant Growth Regulation.</p> <p>29. Raj Singh Yadav, Ankur Dahayat, Naseer Mohammad, Jay Prakash Mishra, Fatima Shirin and G. Rajeshwar Rao (2020) Assessment of genetic diversity and relationship among different bamboo species revealed by molecular markers. 28 (1&2): 41-48. Journal: Indian Journal of Tropical Biodiversity Date: January, 2022 NAAS rating: 4.02 (2020)</p> <p>30. Rao, G.R., Reddy, P.S. and Rajkumar, M (2021). Quantification of greenhouse gas emissions from managed biofuel plantations in a semi-arid landscape of Southern India. <i>Tropical Ecology</i>,</p> <p>31. S.K. Banerjee, Avinash Jain, Saikat Banerjee and P.K. Shukla Land and Soil Pollution, its causes, effects and possible solution <i>Journal of Tropical Forestry</i>, 37 (I-II): 39-53, Jan-June, 2021</p> <p>32. S.K. Banerjee, Avinash Jain, M. Rajkumar and Saikat Banerjee 2022. Carbon sequestration potential in the soils under <i>Tectonia Grandis</i> of Bori Wildlife Sanctuary under Pachmarhi Biosphere Reserve in Madhya Pradesh. <i>My Forest</i>. 58 (1): 17-26.</p> <p>33. Saikat Banerjee, M. Rajkumar and S.K. Banerjee (2022). "Healthy Soil- A Living Ecosystem for Agricultural and Environmental sustainability". Indian Journal of Tropical Biodiversity. 28(1&2):1-11.</p> <p>34. Saxena HO, Parihar S and Kakkar A(2020). Identification of phytoconstituents in ethanolic and aqua-ethanolic extracts of <i>Solanum indicum</i> L. through GC-MS. <i>Indian Journal of Tropical Biodiversity</i>, 28 (1&2): 49-56.</p> <p>35. Saxena HO, Parihar S, Naseer Mohammad, Pawar G (2021) Variation for caffeic acid and phenolic content in different plant parts of <i>Solanum xanthocarpum</i> Schrad. and Wendl. – a commercially important dashmool species. 7:53. https://doi.org/10.1186/s40816-021-00286-0 Journal: Clinical Phytoscience (Springer) Date: June, 2021 Impact</p>
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	<p>Factor (Thomson Reuters): Not evaluated.</p> <p>36. Saxena HO, Parihar S, Pawar G, Rao GR, Sahu VR and Dhar P (2021). Comparative analysis of phenolic content in <i>Solanum indicum</i> L. harvested from different locations of Madhya Pradesh state of India. <i>Environment Conservation Journal</i>. 22(3): 415-21.</p> <p>37. Shirin F, Saudagar IA, Gupta T, Bhadrawale D, Naseer Mohammad et al. (2021) Comparison of Adventitious Rooting potential of culm cuttings in <i>Bambusa wamin</i>, <i>Bambusa vulgaris</i> var. <i>striata</i> and <i>Bambusa vulgaris</i> var. <i>green</i>. 147(4): 421-425. https://doi.org/10.36808/if/2021/v147i4/156879 Journal: The Indian Forester Date: April, 2021 NAAS rating: 5.10 (2022)</p>
Published in foreign Journals	<ol style="list-style-type: none"> 1. Darshan K. "Transcriptome Reprogramming of Tomato Orchestrate the Hormone Signaling Network of Systemic Resistance Induced by <i>Chaetomium globosum</i>". <i>Frontiers in Plant Science</i>. IV-12: 1-17, 2021 2. Fatima Shirin, Jay Prakash Mishra, Deepti Bhadrawale, Irshad Ali Saudagar, Trilok Gupta and Nanita Berry (2021). <u>Seasonal and hormonal variation during adventitious rhizogenesis in five commercially important bamboo species for production of quality planting material</u>. https://doi.org/10.1080/13416979.2021.1935548 Journal: Journal of Forest Research(Taylor & Francis) Date: 6 June, 2021 Impact Factor (Thomson Reuters): 1.29 NAAS rating: 7.27(2022) 3. Girjesh Kumar, Kaushal Tripathi, Moni Mishra (2021). Cytological impact and seed germination responses of salts (NaNO₃ and KNO₃) stress on Barseem (<i>Trifolium alexandrinum</i> L.) in International Journal of Botany Studies. Vol.6, issue 6, 2021, Page No. 1024-1028 4. Mohan and Nanita Berry (2021). Insect pest of Bamboo and their management. <i>Biotica Research Today</i> : 3 (10) : 874-877. 5. Mohan and Sowmyapriya (2021). Insect pests of <i>Jatropha curcas</i> and their management. <i>Biotica Research Today</i> 3(11): 1055-1058. 6. Mohan C, G Rajeshwar Rao and RK Malviya (2022). Monitoring of sal heartwood borer <i>Hoplocerambyx spinicornis</i> (Newman) infestation in Chhatisgarh. <i>The Pharma Innovation Journal</i> 2022; SP-11 (2):438-442. 7. Mohan C (2021) Ecological engineering as an emerging technology for the management of insect pests. <i>Biotica Research Today</i> 3(2): 1127-1128. 8. Naseer Mohammad, Ankur Dahayat, Yogesh Pardhi, Muthu Rajkumar, Shamim Akhtar Ansar and Fatima Shirin.(2022) Inferring genetic diversity and population structure of India's National Teak (<i>Tectona grandis</i> L.f.), 69:1695–1705. https://doi.org/10.1007/s10722-021-01335-w Journal: Genetic Resources and Crop Evolution(Springer) Date: January, 2022 Impact Factor (Thomson Reuters): 1.524 NAAS rating: 7.52 (2022) 9. Naseer Mohammad, Ankur Dahayat and Yogesh Pardhi. "Effect of Growing Media on Seed Germination attributes in <i>Sterculia aures Roxb.</i>- An Endangered Gum Yielding Tree of Tropical Forest". <i>Indian Forester</i>:147(7): 621-626, 2021 10. Naseer Mohammad, Dahayat A, Pardhi Y and Rajkumar M (2022) Morpho-molecular diversity assessment of Indian kino (<i>Pterocarpus marsupium</i> Roxb.). 29, 100373. https://doi.org/10.1016/j.jarmap.2022.

	<p><u>100373</u> Journal: Journal of Applied Research on Medicinal and Aromatic Plants (Elsevier) Date: May, 2022 Impact Factor (Thomson Reuters): 3.400 NAAS rating 9.40</p> <ol style="list-style-type: none"> 11. Naseer Mohammad, Muthu Rajkumar, Rahul Rathore, Fatima Shirin, G Rajeshwar Rao (2022). Factors limiting regeneration of a Near Threatened deciduous tree <i>Pterocarpus marsupium</i> Roxb. in Central India. https://doi.org/10.1016/j.chnaes.2022.03.003 Journal: Acta Ecologica Sinica (Elsevier) Date: March, 2022 CiteScore: 1.4 (2020) 12. Pramod Kumar, J.P. Mishra, M.K. Sonkar, Y.Mishra and Fatima Shirin (2021), Relationship of Season and Cuttings' Diameter with Rooting Ability of Culm-Branch Cuttings in <i>Bambusa tulda</i> and <i>Bambusa nutans</i>. http://doi.org/10.1007/s00344-0021-10461-9 Journal: Journal of Plant Growth Regulation. Date: 2 August, 2021 Impact Factor (Thomson Reuters) 4.169 NAAS rating 10.17 13. Saxena HO, Parihar S and Pawar G (2021). Simultaneous determination of betulinic acid, β-sitosterol and lupeol in fruits, leaves, root and stem bark of <i>Dillenia pentagyna</i> Roxb. by a validated high-performance thin-layer chromatography method. JPC–Journal of Planar Chromatography–Modern TLC. 34(6): 531-42. 14. Saxena HO, Parihar S, Mohammad N and Pawar G (2021). Variation for caffeic acid and phenolic content in different plant parts of <i>Solanum xanthocarpum</i> Schrad. and Wendl.–a commercially important dashmool species. <i>Clinical Phytoscience</i>. 7(1): 1-8. 15. Saxena HO, Parihar S, Pawar G and Rao GR (2022). Simultaneous densitometric determination of β-sitosterol and lupeol through validated HPTLC method in different plant parts of <i>Urariapicta</i> (Jacq.) Desv. ex DC. – A dashmool species. <i>Acta Chromatographica</i>. 16. Shirin Fatima, Ali, Irshad, & Berry, N. (2021) Seasonal and hormonal variation during adventitious rhizogenesis in five commercially important bamboo species for production of quality planting material. <i>Journal of Forest Research</i> https://doi.org/10.1080/13416979.2021.1935548
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Phyto Pathological Techniques

BASICS TO ADVANCES



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