वार्षिक अनुसंधान प्रतिवेदन

ANNUAL RESEARCH REPORT

2019-2020

State Forest Research Institute,
Jabalpur
राज्य वन अनुसंधान संस्थान, जबलपुर

वार्षिक अनुसंधान प्रतिवेदन

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With best compliments from :

PCCF & Director
SFRI, Jabalpur

State Forest Research Institute, Jabalpur
राज्य वन अनुसंधान संस्थान, जबलपुर

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Production & Guidance
Giridhara Rao, IFS

Compilation & Editing
Anirudhwa Sarkar
Rakesh Jain
K.L. Verma

Cover Design
Anirudhwa Sarkar
Rakesh Jain

Word Processing
Rakesh Jain
Pradhyumna Soni

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Cover photo

Front cover: Yellow Semal (*Bombax ceiba*) a rare variant prepared and planted in medicinal plant gene bank of SFRI
(Photo courtesy: Dr. Uday Homkar)

Re-introduced tiger and tigress with their first cubs born in Nauradehi Wildlife Sanctuary (M.P.)
(Photo courtesy: Shri Avinash Yadav)

Back cover: Conservation of rare, endangered and threatened medicinal plant in the gene-bank of SFRI

Glimpses of various training and extension activities at SFRI
(Photo courtesy: Anirudhwa Sarkar)

FROM THE DIRECTOR'S DESK

Forests and bio-resources along with traditional knowledge are of vital importance for maintaining ecological equilibrium and sustained development. Harnessing bio-resources in a scientific and sustained manner will help to improve all life forms on this planet. Forests and stable ecosystem, use and management of forests and water, minimizing human – wildlife conflicts, enhancing forest productivity, forest fire impact, agro-forestry and monitoring and evaluation of forest development activities with a focus on using climatic resilient practices are the major areas of the institutes research activities. State Forest Research Institute (SFRI) Jabalpur is committed to provide scientific support on matter related to ecology, seed technology, biodiversity conservation and sustainable livelihoods to the concerned stakeholders and MP Forest Department.

The institute continued to coordinate with various Research and Extension Circles of MP Forest Department to provide technical guidance in nursery practices. This year forest department assigned the task of evaluating and grading of all the nurseries of the Research and Extension Forest circles to the institute.

It gives me great pleasure to publish this Annual Research Report with a hope that it will provide enough information and insight about the forestry research activities of the institute of the past year.

The Annual Action Plan 2019-2020 of the institute was successfully carried out with initiation of 08 new research projects, execution of on-going 27 research projects, completion of 31 research projects and continuation of 09 regular activities. 31 project reports were submitted to the respective funding agencies. 15 research papers were published in various national, international journals and newsletters of SFRI. 08 research papers were published in books, souvenirs, symposiums and newsletters. 22 technical bulletins and brochures were published during the year by the scientific personnel of the institute.

The institute published the Annual Research Report 2018-2019, Quarterly journals, Vaniki Sandesh, "Journal of Tropical Forestry" and marketing information, newsletter, "Vandhan", technical bulletins to disseminate the outcome of research projects. Keeping with its objectives, skill upgradation, expertise, technical knowhow, awareness, trainings for in-service field foresters, newly recruited forest rangers, forest guards, students and staff from other associated organizations are as and when required.

The continued support and guidance provided by the honorable members of the Board of Governors (BOG) and Research Advisory Committee (RAC) of the institute is greatly appreciated. We are highly indebted to the Madhya Pradesh Forest Department, NMPB, EPCO and other esteemed funding organizations in reposing faith in us and for budgetary provisions. Our achievements are mostly attributed to the coordination and support received from our stakeholders. I am also very happy with dedicated administrative and scientific personnel of the institute for displaying team spirit and efforts in accomplishing the tasks and achieving the targets assigned to them.

SFRI appreciates comments and suggestions to improve our services thereby enabling us to improvise ourselves and to provide better services to the stakeholders. As an environmentally responsible forest research institute your queries and suggestions will be appreciated.

(Giridhara Rao)
PCCF & Director

1. THE INSTITUTE

1.1 INTRODUCTION

State Forest Research Institute, Jabalpur (SFRI) came into existence on 27th June, 1963 for the scientific development of forestry sector in the state of Madhya Pradesh following the recommendations of tenth Silvicultural Conference held at Dehradun in 1961. It was granted autonomy on 29th October, 1994 and was registered on 2nd August, 1995 as a society under M.P. Societies Registration Act 1973. Over the years the institute has developed as an educational, training, research and consultancy organization at the state and national level and is carrying out adaptive and applied research programmes. The research programmes are focused on tropical forestry, environment, wildlife, agro forestry, biotechnology and biodiversity conservation. The vision of SFRI is to function as nodal centre of research in forestry and to provide scientific support to the state and its people on matters related to forestry, wildlife and climate change with particular emphasis on conservation, sustainable utilization and scientific management of natural resources. The institute conducts multidisciplinary forestry research and provides technical advice to the practical problems that are encountered by the field foresters. It also disseminates research findings through training, education, seminars, workshops, participation in public fairs and consultancy services. Technical bulletins, series of pamphlets, brochures and two journals namely 'Vaniki Sandesh' and 'Van-Dhan Vyapar' are published quarterly. 'Vaniki Sandesh' contains papers and articles of practical importance and also on research findings of the projects of the institute which can be applied and adopted in the field. The Journal of Tropical Forestry is also published from the institute campus by the Society for Tropical Forestry Scientists comprising of senior forest officers and scientists from the state and all over the country. The journal carries technical research papers, articles and research recommendations of forestry projects undertaken by various organizations.

The institute is located at Jabalpur in a lush green campus spread over a sprawling area of about 102 ha. The region of Jabalpur has close proximity to two major forest types, namely; sal and teak forests of Madhya Pradesh and four protected areas (PA's) namely; Kanha, Bandhavgarh, Pench and Satpuda. This unique location rendered it suitable for the setting this institute here. It houses a rich infrastructure of various research and experimental plots, research nursery, ornamental nursery, clonal nursery, medicinal and aromatic plants nursery, rose garden, seasonal garden, gene-bank, glass-house, mist-chambers, shade-net houses, poly houses, botanical garden, bambusetum, tissue culture, fully renovated state of art EIA, soil and seed testing laboratories along with administrative block, conference halls, lecture room, museum, herbarium, auditorium, library and documentation centre, guest house, officers' rest house, etc. The institute is now equipped with a mobile soil testing laboratory. The institute also provides residential accommodation to its employees inside the campus.

1.2 MISSION AND GOALS

Mission

The institute's mission is to focus its efforts on adaptive and applied research programmes for the conservation and development of forests and forestry sector in the state of Madhya Pradesh.

It endeavours to focus its activities as per the requirement of the forest development community and is engaged in need based research. The institute tries to acquire knowledge about sectoral problems in forest management and means to overcome them and disseminate the same simultaneously to the stakeholders.

Goals

Ongoing research aims at :

1. Conservation of forests and forest resources - soil, water and floral and faunal diversity.
2. Enhancement of productivity of natural forests and plantations.
3. Efficient and sustainable utilization of forest resources and forest products – timber and NTFPs and expansion of tree cover.
4. Sustainable management of forests involving forest dependent communities and people's participation
5. Mass production of high fruit yielding forest tree species through biotechnological approaches.
6. Preparation of inventory and biodiversity assessment in Madhya Pradesh.
7. Monitoring and evaluation of wildlife and their habitats.
8. Documentation of existing agro-forestry systems for different agro-climatic conditions.
9. Climate change and its impact on livelihood rural communities.

1.3 THRUST AREAS

1. Collection of quality seeds, its certification and disposal.
2. Production of quality planting material using biotechnological tools.
3. Development of micro and macro-propagation techniques.
4. Vegetational surveys to assess bio-diversity status and to identify rare and threatened species.
5. Germplasm collection, evaluation and conservation.
6. Cultivation, sustainable harvesting, processing, storage, certification and market information service for medicinal plants.
7. Collection of growth data and preparation of volume and yield tables.
8. Ecological studies and environmental impact assessment and preparation of environmental management plans.
9. Strengthening of *ex-situ* gene bank of medicinal and aromatic plants.
10. Development of botanical garden for conservation of rare, endangered, threatened and endemic plants of MP for mass multiplication.
11. Vegetation and edaphic studies in different preservation plots, established in various forest types of MP.
12. Conservation of rare, endangered and threatened (RET) species in natural condition.
13. Study on ecology & conservation of wildlife including herbivores, carnivores & avifauna of the state.
14. Protection, maintenance and successional study in terms of growth, biomass and carbon sequestration in preservation plots laid in different forest types of Madhya Pradesh.
15. Modernization and digitalization of existing forest herbarium of State Forest Research Institute, Jabalpur (M.P.).
16. Development, implementation of sustainable harvesting technologies and determination of sustainable harvesting limits of commercially important NTFPs in tribal dominated tropical forests.
17. Impact assessment of agro-forestry technologies on natural resource management and livelihoods.
18. Sustainable harvesting and primary processing of gums and gum oleo resin.

19. Screening and management of diseases of some selected important medicinal & aromatic plants.
20. Scientific management interventions in wildlife habitat improvement.
21. Preparation of form factor table for important miscellaneous timber species of M.P.
22. Soil analysis of various forest plantation and providing mobile soil testing services.
23. Training on techniques of protection of sal forests affected by sal borer attack.
24. Knowledge upgradation and skill development of field foresters and forest dependent communities through training and extension.

1.4 MAJOR RESEARCH CONTRIBUTIONS

The institute undertakes need-based forestry research programmes of the state and plays a dynamic role to address various forestry management problems. Some of the important research contributions during the year are enumerated below:

1. Survey, population density and quantitative assessment of medicinal plants for the sustainable development of livelihood generation in Jabalpur Forest Circle (M.P.).
2. Biodiversity assessment of encroachment removed area of Madan Mahal Hills of Jabalpur and it's surrounding forest area for ecological restoration through plantation and conservation of cleaned area.
3. Development of high-tech nursery and preparation of quality planting material of RET species for their restoration in natural forest and rural/urban areas through plantations.
4. Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected areas/ Territorial divisions of Madhya Pradesh.
5. Monitoring of re-introduced tigers (*Panthera tigris L*.) in Nauradehi Wildlife Sanctuary.
6. Study of the impact of proposed Morena Water supply sub project under MPUDP on Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial wildlife Sanctuary, Morena (MP).
7. Study on tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhyan Range.
8. Preparation of detailed project report of wildlife habitat improvement in the adjoining area of Sardar Sarovar Project, Madhya Pradesh.
9. Role of Management Interventions in Wildlife Habitat Improvement on abandoned sites of Satpura Tiger Reserve, Madhya Pradesh
10. Sustainable livelihood based management plan for Kuno-Palpur Wildlife Sanctuary of Madhya Pradesh
11. Phytosociological study of river bank flora from Amarkantak to Mandla with special reference to impact on water quality in river Narmada.
12. Phenological studies and determination of sustainable harvesting limits of some important wild medicinal plants and NTFPs with active participation of users forest dependent communities in Satna Forest Division of Madhya Pradesh.
13. Identification of potential pockets and selection of candidate plus trees of Bija and standardization of its clonal propagation technique.
14. Quantitative determination of bio-active compounds of highly threat medicinal plant species (*Butea superba, Corallocarpus epigeous Alectra chitrakutensis*) through chemoprofiling and standardization of propagation techniques using biotechnological interventions for their conservation.
15. Maintenance and enrichment of SFRI Bamboosetum.
16. Dissemination of knowledge through training programme for sustainable management and quality fruit collection of Chironji to Stakeholders.
17. Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important species viz. *Anogeissus latifolia & Commiphora wightii*.
18. Selection of suitable species on the basis of growth performance of established plantation and development of nursery techniques to increase green cover under Green India Mission (GIM) in western Madhya Pradesh.
19. Conservation of lac insects genetic resources.
20. Estimation of wood demand and supply in Madhya Pradesh

21. The scheduled tribes and other traditional forest dwellers (Recognition of Forest Right Act, 2006) Implementation and its impact in Madhya Pradesh.
22. Sequestered carbon in roadside plantation: an assessment of potential contribution in climate mitigation in Jabalpur Smart City.
23. Standardization of seed and nursery techniques for production of quality planting stock of important indigenous species (*Terminalia chebula, Terminalia bellirica, Adina cordifolia, Sapindus trifoliatus & Adunsonia digitata)*.
24. Study of comparison of soil cultural practices in existing bamboo (*D. strictus)* plantation.
25. Preparation of volume and yield tables of several species.
26. Assessment of sal regeneration in borer affected sal forests of Madhya Pradesh.
27. Studies on photosynthetic efficiency, biomass production and carbon sequestration of bamboo in plantation forests.
28. Forensic DNA profiling and timber tracing for origin of wood with special reference to *Tectona grandis* (Teak) and *Pterocarpus marsupium* (Beeja).
29. Production of quality planting stock of important RET and wild medicinal tree species through application of advance technology.
30. मध्यप्रदेश में प्रमुख गोंदों के संग्रहण के ऑकड़ों का संकलन एवं प्राथमिक संग्राहकों पर सामाजिक आर्थिक प्रभाव।
31. मिट्टी के भौतिक एवं रासायनिक गुणों पर जंगल की आग का प्रभाव।
32. पश्चिमी मध्यप्रदेश के मालवा का पठार कृषि–जलवायु प्रक्षेत्र (क्षेत्रीय वन वृत्त, उज्जैन) के अंतर्गत कृषक समृद्धि योजना द्वारा कृषि वानिकी के तहत निजी भूमि के रोपण एवं वर्तमान कृषि वानिकी मॉडल का अध्ययन।
33. मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन एवं संग्रहण मात्रा का ऑकलन।

1.5 ADMINISTRATION

The administration of the State Forest Research Institute Society is governed by a Board of Governors, which is constituted by the following members:

1.	Honorable Minister of Forests, Forest Department, Govt. of M.P., Bhopal	Chairman
2.	PCCF & HoFF, Madhya Pradesh, Bhopal	Vice Chairman
3.	Addl. Chief Secretary / Principal Secretary, Dept. of Forests, Govt. of M.P. , Bhopal	Member
4.	Addl. Chief Secretary / Principal Secretary, Dept. of Finance, Govt. of M.P., Bhopal	Member
5.	PCCF (Wildlife) M.P., Bhopal	Member
6.	Managing Director, M.P. Forest Development Corporation, Bhopal	Member
7.	Managing Director, M.P. Minor Forest Produce Federation (Trade and Development), Bhopal	Member
8.	Director General, Indian Council of Forestry Research & Education, Dehradun	Member
9.	Director, Wildlife Institute of India, Dehradun	Member
10.	PCCF (Working Plan), MP, Bhopal	Member
11.	PCCF/APCCF (Research/Extension & Lok Vaniki) M.P. , Bhopal	Member
12.	Director General, MP Council of Science & Technology, Bhopal	Member
13.	Emeritus Scientist	Member (Nominated by Govt. of MP)
14.	Emeritus Scientist	Member (Nominated by Govt. of MP)
15.	Director, State Forest Research Institute, Jabalpur	Member Secretary & Treasurer

RESEARCH ADVISORY COMMITTEE

The Research Advisory Committee of the institute comprising of eminent forest officers and stakeholders examines and approves the project proposals of the institute, evaluates their progress and results and also monitors the quality of research. The committee comprises of the following members:

1.	Principal Chief Conservator of Forests & HoFF, M.P.	Chairman
2.	PCCF (Wildlife), M.P.	Member
3.	Managing Director, MP MFP Federation, Bhopal	Member
4.	Managing Director, MPRVVN, Bhopal	Member
5.	PCCF (Research and Training), M.P.	Member
6.	PCCF (Production), M.P.	Member
7.	PCCF (Research / Extension and Lokvaniki), M.P.	Member
8.	PCCF (Working Plan), M.P.	Member
9.	APCCF (JFM & FDA), M.P.	Member
10.	APCCF (Research / Extension and Lokvaniki), M.P.	Member
11.	APCCF (Development), M.P.	Member
12.	Director General, MP Council of Science & Technology, Bhopal	Member
13.	Director, TFRI, Jabalpur	Member
14.	Director (Research), Jawahar Lal Nehru Krishi Vishwavidalaya, Jabalpur	Member
15.	CCF (Territorial nominated by PCCF & HoFF), M.P.	Member
16.	Director, Horticulture, Govt.of M.P.	Member
17.	Director, Veterinary and Animal Husbandry, JNKVV, Jabalpur	Member
18.	Farmer's representative	Member
19.	Representative of NGO	Member
20.	Director, SFRI, Jabalpur.	Member Secretary

1.6 ORGANIZATION

S.No	Forestry Professionals	Sanctioned	Working
1	Director (PCCF/APCCF)	1	1
2	Addl. Director (APCCF/CCF)	1	1
3	Deputy Director (CF/Dy.CF)	3	1
4	Assistant Director (ACF)	2	1
5	Forest Ranger	1	1
6	Dy. Ranger	-	-
7	Forester	8	8
8	Forest Guard	10	11
	Total	**26**	**24**
	Scientist		
1	Forest Ecology Scientist	1	0
2	Forest Genetics Specialist (Scientist-E)	1	1
3	Seed Specialist (Scientist-E)	1	1
4	Tree Improvement Specialist	1	0

S.No	Forestry Professionals	Sanctioned	Working
5	Forest Botanist (Scientist-E)	1	1
6	Biodiversity Scientist	1	0
7	Marketing Specialist (Scientist-E)	1	1
8	Wildlife (Scientist - B)	5	0
	Total	**12**	**4**
	Technical		
1	Statistical Assistant (Sr. Research Officer)	1	1
2	Technical Assistant (Social–economics), (Sr. Research Officer)	3	1
	Technical Assistant (Contingency)		2
3	Technical Assistant (Forestry Research), (Sr. Research Officer)	9	7
	Technical Assistant		2
4	Technical Assistant (Consultancy/Extension), (Sr. Research Officer)	1	1
5	Technical Assistant (Library), (Sr. Research Officer)	1	1
6	Technical Assistant (Documention) (Sr. Research Officer)	1	1
7	Technical Assistant (Computer) (Sr.Research Officer)	1	1
8	Lab Technician, (Sr. Research Officer)	7	1
	Lab Technician		1
9	Lab Incharge, (Sr. Research Officer)	3	0
10	Ledger Assistant (Research Officer)	3	1
	Ledger Assistant		1
11	Herbarium Assistant (Contingency)	1	1
12	Lab Assistant	3	1
13	Field Assistant	3	3
	Total	**37**	**26**
	Non-Technical		
1	Head Clerk	1	0
2	Accountant	1	1
2	Assistant Grade – II	1	1
3	Assistant Grade – III	3	3
4	Driver	5	2
5	Daftari	2	0
6	Peon/ Orderly/ Chowkidar/Mali/ Dak Runner	15	2
7	Sweeper	2	0
	Total	**30**	**9**

1.7 WORKING DIVISIONS OF THE INSTITUTE

Forestry research in the institute is categorized in five broad divisions with research branches. They are as follows:

1. **Bio-diversity and Wildlife Division**

   Research Disciplines

   a. Bio-diversity and Medicinal Plants
   b. Wildlife

2. **Forest Botany and Ecology Division**

   Research Disciplines

   a. Forest Botany
   b. Forest Ecology and Environment

3. **Forest Genetics, Tree Improvement and Biotechnology Division**

   Research Disciplines

   a. Forest Genetics and Biotechnology
   b. Tree Improvement

4. **Seed, Silviculture and Agro-forestry Division**

   Research Disciplines

   a. Seed Technology
   b. Silviculture
   c. Agro-forestry

5. **Social Economics and Marketing and Forest Mensuration Division**

   Research Disciplines

   a. Social Economics and Marketing
   b. Forest Mensuration

These divisions are supported by the following three branches :

1. Extension, Training and Consultancy
2. Library and Documentation Centre
3. Computer and Information Technology

1.8 TRANSFER OF TECHNOLOGY

1. Training and demonstration programme on establishment and best management of Seed Production Areas, Seed Technology and Nursery Management for Field Foresters.
2. Dissemination of knowledge through training programme for sustainable management and quality fruit collection of Chironji to stakeholders.
3. Trainings in good collection and cultivation practices.
4. Scientific method of Lac cultivation.
5. Training on establishment, manintainence and periodic measurement of sample plots
6. Orientation programme on wildlife population monitoring tools and technologies
7. Training on biotechnology, plant propagation and tissue culture.
8. Training on sustainable harvesting, processing, grading and storage of gums.
9. Participation in exhibitions and fairs.

2. RESEARCH ACTIVITIES

Abstract of Research Activities

2019-2020

S. N.	Name of the Research Division	No. of completed projects		No. of on-going projects		No. of regular activities
		Internal Projects	External Projects	Internal Projects	External Projects	
1	2	3	4	5	6	7
1	**Bio-diversity and Wildlife Division**					
	Biodiversity and Medicinal Plants	1	4	-	5	1
	Wildlife	-	7	-	4	1
2	**Forest Botany and Ecology Division**					
	Forest Botany	-	1	-	-	1
	Forest Ecology and Environment	-	1	-	2	-
3	**Forest Genetics, Tree Improvement and Biotechnology Division**					
	Forest Genetics and Biotechnology	-	5	-	1	-
	Tree Improvement	1	-	-	1	3
4	**Seed, Silviculture and Agro-forestry Division**					
	Seed Technology	1	2	-	4	1
	Silviculture	-	4	-	2	1
	Agro-Forestry	-	-	-	3	-
5	**Social Economics & Marketing and Forest Mensuration Division**					
	Social Economics and Marketing	-	4	-	3	-
	Forest Mensuration	-	-	1	1	1
	TOTAL	**3**	**28**	**1**	**26**	**9**

Total No. of completed projects (Coln. 3 + 4) - 31
Total No. of on-going projects (Coln. 5 + 6) - 27
Total No. of regular activities (Coln. 7) - 09

2.1.1 BIO-DIVERSITY AND WILDLIFE DIVISION

2.1.2 BIO-DIVERSITY AND MEDICINAL PLANTS

Mandate

1. Biodiversity assessment in forest areas of Madhya Pradesh.
2. Identification of rare and threatened plant species and their *in-situ* and *ex-situ* conservation.
3. Survey of medicinal plants.
4. Mass multiplication and development of agro-techniques of commercially important medicinal plants.

Completed Projects - Five

1. Mass multiplication of Medicinal Plants for the development of Quality Planting Material. (50,000 plants)
2. Production of vegetative propagules and standardization of vegetative propagation protocols of selected medicinal plant species
3. Establishment of medicinal and aromatic plants (MAP) seed production areas at SFRI, Jabalpur.
4. Evaluation of germplasm of Safed Musali (*Chlorophytum* sp.) and Satawar (*Asparagus* sp.) for bio-active compounds.
5. Development of raised mother bed technology and mass multiplication of clonal plants of eucalyptus and some RET species in SFRI, Jabalpur

Summary of achievements / activities & outcome of each project:

1. **Mass multiplication of Medicinal Plants for the development of Quality Planting Material. (50,000 plants)**

Funding agency: RCFC, Central Region, SFRI, Jabalpur

- Preparation of Quality Planting material of 34 selected species was done. More than 50,077 plants of 34 species were prepared. These prepared plants were distributed to farmers and other user groups as per direction given by the Regional Director RCFC, central region.
- Project completed and report submitted.

Preparation of quality planting material

2. **Production of vegetative propagules and standardization of vegetative propagation protocols of selected medicinal plant species**

Funding agency: RCFC, Central Region, SFRI, Jabalpur

- Plantation of 5 selected species was done in SFRI campus.
- Plantation of *Coleus forskohlii* (Pathharchoor) done in 216 sqm area. Total 840 plants planted. Spacing kept between lines and plant to plant is 30 cm x 45 cm.
- Plantation of *Gymnema sylvestre* (Gudmar) plants is done in 1000sqm. area with a spacing of 1.5 m x 1m.
- Plantation of *Premna integrifolia Linn* (Agnimantha) done in 400 sqm area. Total 250 plants planted. Spacing kept between plant to plant and row to row is 1.5 m x 1m.
- Plantation of 302 *Commiphora wightii* (Guggal) plants done in 736 sqm. area with a spacing of 1.5 m x 2m.
- Plantation of *Berberis asiatica DC. (*Daruhaldi) is done in 168 sqm area. Total 150 plants are planted. Spacing kept between plant to plant and row to row is 1.5 m x1m.
- Project work completed and report submitted.

Plantation of Coleus and Daru Haldi

3. Establishment of Medicinal and aromatic plants (MAP) seed production areas at SFRI, Jabalpur.

Funding agency: RCFC, Central Region, SFRI, Jabalpur

- Plantation of 6 species selected for seed production under this project is completed.
- Plantation of *Asparagus racemosus* (Satawari) done in two areas viz. 1512 sqm and 529 sqm area. Total 592 Satawar plants are planted.
- Plantation of 500 *Dioscorea hispida* Linn. (Baichandi) tubers done in 2000 sqm. area.
- Plantation of *Mucuna pruria* Linn *(*Safed kewach) done by direct seed sowing under the old trees.
- Plantation of 136 *Oroxylum indicum* Vent. (Sheonak) plants done in 5000 sqm. area.
- Plantation of 10000 plants of *Rauwolfia serpentina* Benth. Ex Kurz *(*Sarpgandha) done in 1ha. area.
- 607 plants of *Plumbago zeylanica* Linn. (Chitrak) planted in 312 sqm area.
- Project work completed and report submitted.

Plants of *Plumbago zeylanica* Linn and *Mucuna pruria* Linn

4. Evaluation of germplasm of Safed Musali (*Chlorophytum* sp.) and Satawar (*Asparagus* sp.) for bio-active compounds.

Funding agency: RCFC, Central Region, SFRI, Jabalpur

- Samples of Safed Musali (*Chlorophytum* sp.) and Satawar (*Asparagus* sp.) were collected from two agro-climatic zones of M.P. i.e; Bundelkhand zone and Gird zone and SFRI, Jabalpur. Project was stopped in between.
- Project report of the work done prepared and submitted.

Production of Tubers of Satawari and Safed Musali

5. Development of raised mother bed technology and mass multiplication of clonal plants of eucalyptus and some RET species in SFRI, Jabalpur

Funding agency: SFRI, Jabalpur

- Infrastructure of for mother beds has been developed. Plants of different clones and hybrid species have been procured from known source and mother plant area have been developed. 50,000plants were prepared and sold / distributed to farmers for plantation.. As per declaration of Govt. of Madhya Pradesh Eucalyptus plantation was restricted in Narmada catchment areas of M.P. Hence multiplication process was stopped. Some RET species like *Plumbago rosea* (Red Chitrak), *Entida scandence* (Dev Singhadi) and *Berbaris aristrata* (Daru Haldi).
- Project work completed and report is submitted.

Multiplication of Eucalyptus through clonal

Ongoing Projects: Five

1. Survey, population density and quantitative assessment of medicinal plants for the sustainable development of livelihood generation in Jabalpur Forest Circle (M.P.)
2. Regional-cum-Facilitation Centre, Central Region, Jabalpur, State Forest Research Institute Jabalpur (M.P.)
3. Biodiversity assessment of encroachment removed area of Madan Mahal Hills of Jabalpur and its surrounding forest area for ecological restoration through plantation and conservation of cleaned area.
4. Extension of developed nursery techniques of some NTFPs and medicinal plants species through Research and extension centers of M.P.
5. Development of high-tech nursery and preparation of quality planting material of RET species for their restoration in natural forest and rural/urban areas through plantations.

Regular activity: One

1 औषधीय पौधैं के जीन बैंक एवं रोपणी का प्रवंधन एवं विकास

Summary of achievements / activities & outcome of each project:

1- Survey, population density and quantitative assessment of medicinal plants for the sustainable development of livelihood generation in Jabalpur Forest Circle (M.P.)

Funding agency: National Medicinal Plants Board, New Delhi

Interim Finding/Activities

- The area of this project is Jabalpur Forest Circle which contains 05 Forest divisions namely Katni, Jabalpur, West Mandla, Dindori & East Mandla.
- During the second year, pilot survey work has been carried out in 16 ranges of 02 Forest divisions namely East Mandla and Dindori.
- Basic information of above ranges such as compartment number, beat number and JFMCs etc. were collected.
- 16 training programmes organised in above mentioned 02 Forest divisions.
- More than 500 beneficiaries have been trained through lectures and field demonstration methods.
- During the second year 2018-19 field survey and laying of sample plot and data collection work have been done in 2 forest divisions (East Mandla and Dindori) of Jabalpur Forest Circle.
- During the field survey, 312 sample plots were laid.
- Information regarding existing trees, shrubs and herbs were collected in prescribed field data sheets.
- The field data sheets were collected from each ranges.

- These collected data sheets were computerized.
- Data compilation and analysis work is under progress.
- More than 35000 data of trees, shrubs & herbs has been computerized from the primary field data sheets obtained from 16 ranges of 2 forest divisions.

Training cum field demonstrations for quantitative assessment of medicinal plants

2- Regional-cum-Facilitation Centre (RCFC), Central Region, Jabalpur, State Forest Research Institute Jabalpur (M.P.)

Funding agency: National Medicinal Plants Board, New Delhi

Interim Findings/Activities

The following activities were carried out by RCFC Central Region, Jabalpur

Organisation of Workshops/Seminars

i. One day Sensitization Workshop on "Voluntary Certification Scheme on Medicinal Plant Produce" sponsored by Quality Council of India at SFRI, Jabalpur on 25th Nov., 2019.

ii. One day state level consultative workshop-cum–stakeholder meet on "Issues confronting medicinal plants sector" at Naya Raipur (Chhattisgarh) organized by RCFC-CR, Jabalpur on 17th December, 2019.

Consultative workshop cum stakeholders meet at Naya Raipur

2. Organisation of Trainings

11 training programmes were organized by RCFC-CR, Jabalpur at various places in Central Region (Madhya Pradesh and Chhattisgarh) for different stakeholders such as cultivators, gatherers, field foresters, traders and manufacturers.

The details of above training programmes are given as follows:-

S.No.	Name of programmes / places	Date	Number of trainees	Training module
1.	Kanti, District Damoh (M.P.)	13.09. 2019	46	1. Introduction of trainees 2. Natural resource depletion due to unsustainable and destructive collections. 3. Good collection practices of locally occurring high demand species of medicinal plants 4. Scope of cultivation of MAP species in the area : site specific selection of species and listing of interested farmers. 5. Discussion about availability of QPM for the selected species 6. Cultivation techniques of the selected species 7. Group cultivation and its advantages. 8. Primary processing of collected /harvested produce. 9. Voluntary certification scheme 10. Marketing of the collected/cultivated produce.
2.	Bhundakona, District Anuppur (M.P.)	16. 10. 2019	42	
3.	Damgarh, District Anuppur (M.P.)	17.10.2019	28	
4.	Dehka, District Seoni (M.P.)	04.11. 2019	72	
5.	Jam, District Seoni (M.P.)	04.11. 2019	30	
6.	Santhal, District Seoni (M.P.)	05.11. 2019	72	
7.	Dudha Pandhurna, District Chhindwara (M.P.)	06..11.2019	34	
8.	Sakarwara, Range Bahoriband, District Katni (M.P.)	19.11.2019	32	
9.	Bargawan, Teh.M arwahi, District Bilaspur (C.G.)	19.12. 2019	39	
10.	Basti Marwahi (C.G.)	16-17.02 2020	192	
11.	Sensitization and training workshop on "voluntary certification Scheme for medicinal plant produce" held at Sehore, Madhya Pradesh	17.12. 2019	91	1. Introduction of trainees 2. Introduction to voluntary certification scheme 3. Site specific selection of species for cultivation 4. Discussion about availability of QPM for the selected species 5. Cultivation techniques of the selected species 6. Marketing of the collected/cultivated produce.
		Total	**678**	

3. Exposure Visits

Two exposure visit programmes were organized by RCFC-CR during the year. The details are given in the table below:-

S.No.	Programmes / places	Dates	Number of trainees	Module
1	Training-cum-Exposure Visit for members of Farmer Producer Company (in collaboration with Synergy Technofin. Pvt. Ltd.) Seoni & Chhindwara at State Forest Research Institute, Jabalpur (M.P.)	17-18 June, 2019	52	1. Introduction of trainees 2. Good collection practices of locally occurring high demand species of medicinal plants 3. Site specific selection of species 4. Discussion about availability of QPM for the selected species 5. Cultivation techniques of the selected species 6. Voluntary certification scheme 7. Marketing of the collected/cultivated produce.

S.No.	Programmes / places	Dates	Number of trainees	Module
				8. Exposure visit to Shubham Aushadhi Nursery at Kundam
2.	Training-cum-Exposure Visit of members of Farmer Producer Company in collaboration with Synergy Technofin. Pvt. Ltd. Seoni & Chhindwara and other cultivators from different parts of the state of M.P. to Neemuch (M.P.)	27-29 Feb 2020	47	1. Introduction of trainees 2. Site specific selection of species for cultivation 3. Discussion about availability of QPM for the selected species 4. Cultivation techniques of the selected species 5. Voluntary certification scheme 6. Marketing of the collected/cultivated produce. 7. Exposure visit to Ashwagandha and Isabgol cultivation sites in village Umaheda, Isabgol processing unit and Krishi Upaj Mandi, Neemuch.
Total			**99**	

4. Meetings organized by RCFC Central Region

Following meetings were organized by RCFC Central Region:

- Coordination Committee of Regional-cum-Facilitation Centre (RCFC), Central Region, Jabalpur was held on 29th of May 2019, in the conference room of State Forest Research Institute, Jabalpur.
- Meeting with state level officials of MP Horticulture Department at Director Horticulture, Vindhychal Bhawan, Bhopal (M.P) on 04th of September 2019 .
- State level Consultative-cum-Review meeting with officials of MP Forest Department & SMPB at MP-MFP Federation Bhopal on 04th of September 2019 .

Meeting of co-ordination committee of RCFC Central Region at SFRI, Jabalpur

5. Meetings/programmes attended by RCFC officials

The officials of RCFC Central Region attended the following 09 meetings, as shown in table given below:-

S.No.	Meeting	Venue	Date
1.	The Regional Director and Dy. Director participated in the review meeting of RCFCs	NMPB New Delhi	10th June, 2019
2.	The Regional Director and RCFC team members participated in the review meeting of the RCFC, chaired by Hon'ble Forest Minister, M.P.	SFRI, Jabalpur	24th June, 2019
3.	The Regional Director attended the National Level Training Programme on "Forestry Sector in Disaster Risk Reduction & Climate Resilience" as resource person	TFRI, Jabalpur.	05-09 August 2019
4.	The Regional Director and Dy. Director attended the meeting with state level officials of MP Horticulture Department to discuss about the collaboration between the RCFC and state horticulture department for promotion of cultivation of medicinal plants in the state.	Office of Director Horticulture Vindhychal Bhawan, Bhopal (M.P)	04th September 2019
5.	The Regional Director and Dy. Director attended the Regional Consultative Workshop on Strengthening of Medicinal Plants Sector	KFRI Peechi	3rd October, 2019
6.	The Regional Director delivered lecture as guest speaker on "Conservation, resource augmentation and sustainable harvesting of medicinal plants from natural forests through micro-planning and implementation by user communities" in the training of IFS officers organized by MP-MFP Federation.	IIFM Bhopal	04th November, 2019
7.	The Regional Director attended the Research Advisory Group meeting of TFRI, Jabalpur as Member.	TFRI, Jabalpur	05th November, 2019
8.	The Regional Director attended the workshop for finalization of DPR for rejuvenation of river Naramada through forestry interventions as special invitee and resource person.	TFRI, Jabalpur	12th February 2020
9.	The Regional Director and Dy. Director participated in the review meeting of RCFCs and SMPBs organized by NMPB	NMPB New Delhi	18th & 19th February, 2020

6. Participation in fairs/exhibitions

RCFC-CR erected stalls on behalf of NMPB and participated in a number of fairs & exhibitions organized at different places. The details are given below in following table:

S. No.	Programmes	Venue	Date	Number of Visitors
1	World Ayush Expo 2019 & Arogya Fair organized by Dr. G.D. Pol Foundation	CIDCO Exhibition Centre, Vashi, Navi Mumbai.	22nd -25th August 2019	43
2	"Bhopal Vigyan Mela" organized by Council of Scientific and Industrial Research (CSIR)-Advanced Material and Processes Research Institute (AMPRI)	BHEL Dussehra Ground, Bhopal	13th -16th September, 2019	125
3	Exhibition and Scientist-Farmers Interface – National Krishi Uday-2019 organized by JNKVV, Jabalpur.	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	14th – 16th Oct, 2019	78
4	Arogya Fair organized by Directorate of Ayurveda, Rajasthan	Fatehe High School Ground, Udaipur, Rajasthan	19th to 22nd Oct. 2019	265
5	14th edition of Krishithon-International Agriculture Trade Fair & Conference organized by Media Exhibitors Pvt. Ltd.	Nashik, Maharashtra.	21st to 25th November, 2019	517

6	Agrovision Workshop; National Expo and Conference on Agriculture organized by Agrovision foundation.	Reshambagh Ground, Nagpur	22nd - 25th November, 2019	154
7	Chutka Scientific Literacy cum Health and Wellness Festival organized by Centre for Studies of Popular Science (A Research unit of S &T Education Forum), New Delhi	Mandla (M.P.)	05th to 07th December, 2019	189
8	7th International Herbal Fair organized by Madhya Pradesh State Minor Forest Produce Federation.	Lal Parade Ground, Jahangirabad, Bhopal	18th to 22nd December, 2019	193
9	Global Agriculture Festival – 2020, organized by Shree Swami Samarth Krushi Vikash Sanshodhan Charitable Trust	Dongre Vasti Gruh Ground, Nashik, Maharashtra	23rd -27th January 2020	278
10	Panacea 2020 – 9th Natural Products Expo India organized by Seishido Communications.	World Trade Centre Mumbai, Maharashtra	05th -07th March 2020	120
			Total	**1962**

8. Development of Quality Planting Material

- RCFC Central Region prepared 1,02,379 plants of 29 species. These QPM were distributed among stakeholders during to the planting season.

- Some of the species were procured from CIMAP Lucknow and DMPAR Anand. It was sown in RCFC nursery for production of QPM and also to develop as future seed stands.

9. Collection of data of market rates of medicinal plant products

Under this activity, 05 important national markets viz. Neemuch, Shivpuri, Dhamtari, Jaipur and Mumbai were identified by NMPB for the market rate survey to be carried out by RCFC-CR.

Market rates of commercially important medicinal plant products are being regularly collected from following states, scrutinized, finalized and sent to NMPB for incorporation into e-CHARAK portal.

Mandi	State	Month of data collection	Number of Medicinal herbs
Neemuch	Madhya Pradesh	January 2019	29
Shivpuri	Madhya Pradesh	January 2019	52
Dhamtari	Chhattisgarh	January 2019	41
Mumbai	Maharashtra	January 2019	81
Jaipur	Rajasthan	May 2019	97

10. Mandis/trade centres proposed for establishment of (eNAM)

NMPB has proposed Neemuch, Jeeran, Katni, Mandsour, Unjha, Gadchiroli, Dhamtari, Jagdalpur, Raipur and Udaipur of Madhya Pradesh, Chhattisgarh, Gujarat, Maharashtra, and Rajasthan states for mandis. In this context, these proposed mandis were visited by RCFC-CR officials to collect the required information.

11. Project evaluation and monitoring

NMPB, New Delhi has assigned RCFC-CR to evaluate and monitor 05 projects funded by them to various organizations of Jabalpur, Bhopal, New Delhi and Gujarat. The current status of monitoring and evaluation of this project is mentioned below:

S.No.	Project title	Project No.	Organization	Status
1	Survey, population density and quantitative assessment of medicinal plants for the sustainable development of livelihood generation in Jabalpur Forest Circle (M.P.).	Sur&Invt./ MP-01/2017	State Forest Research Institute, Jabalpur	Project on-going. M&E Report submitted on 06-09-2019
2	*In-situ & Ex-situ* conservation of medicinal plants in the forests of Madhya Pradesh	CONS/MP-01/2016	MP State MFP-Federation Bhopal	Field inspection in 09 out of 16 forest divisions completed
3	Establishment of primary processing unit for medicnal & aromatic plants	F.No. A-11019/34/Mkt./2018-NMPB-VII	Synergy Technofin Pvt. Ltd. New Delhi	Field inspection in Dist. Chhindwara & Seoni done
4	Allocation of nursery for promotion of two farmer producer companies (FPCGs) for medicinal and aromatic plants in Chhindwara & Seoni districts of Madhya Pradesh and to facilitate institutional marketing linkages with Vindhya Herbals for supply of MAP produces from FPCs.	F.No. A-11019/08/Mkt./2018-NMPB-VII	Synergy Technofin Pvt. Ltd. New Delhi	Two nursery sites in Janamkhari Village of Seoni district and Sankh Village of Chhindwara district were found suitable for the establishment of nurseries
5	Development of training module, facilitation guide and agriculture practices for medicinal plants	Z.18017/187/CSS/IEC/ GUJ-02/2016-17-NMPB	DMAPR Gujarat	The P.I. has been requested vide this office letter no. RCFC/SFRI/Moni. & Eva./365 dated 01-02-2020 to make available copies of the project and latest progress report. Response is awaited.

12. Publications

- RCFC-CR has published 02 introductory brochures about the center in Hindi and English.
- 12 species-specific brochures of the following important medicinal species were prepared for free distribution to different stakeholders.

1.	Ashwagandha (*Withania somnifera*)	7.	Chitrak (*Plumbago zeylanica*)
2.	Salai (*Boswellia serrata*)	8.	Baibidang (*Embelia ribes Burm. F.*)
3.	Guggal (*Commiphora wightii*)	9.	Chanahur (*Marsdenia tenacissima*)
4.	Bhilwa (*Semecarpus anacardium*)	10.	Giloy (*Tinospora cordifolia*)
5.	Kalihari (*Gloriosa uperb*)	11.	Shankhpushpi (*Evolvulus alsinoides*)
6.	Chirayta (*Swertia chirata*)	12.	Kuchla (*Strychnos nux-vomica*)

- 18 posters were also prepared for dispay in fairs, exhibitions and training programs.

  The titles of posters are mentioned below:-

- Establishment, jurisdiction and important function of RCFC
- Multipronged strategy for development of medicinal plant sector
- Cultivation of medicinal and aromatic plants in central region
- *In-situ* conservation of endangered medicinal and aromatic plants in central region
- ISM industries and traders in central region
- Four success stories of progressive farmers.

- 12 species-specific posters were also prepared on species such as Ashwagandha (*Withania somnifera*), Salai (*Boswellia serrata*), Guggal (*Commiphora wightii*), Bhilwa (*Semecarpus anacardium*), Kalihari (*Gloriosa uperb*), Chirayta (*Swertia chirata*), Chitrak (*Plumbago zeylanica*), Baibidang (*Embelia ribes Burm. F.*), Chanahur (Marsdenia tenacissima), Giloy (*Tinospora cordifolia*), Shankhpushpi (*Evolvulus alsinoides*) and Kuchla (*Strychnos nux-vomica*)

13. Settlement of pending utilization certificates of projects sanctioned by NMPB

- National Medicinal Plants Board has sanctioned a number of projects to SMPBs/State Forest Departments and other agencies and released the sanctioned amounts to them.
- Many of these projects have been completed. However, utilization certificates in a number of cases had been pending for a long time.
- In order to sort out this matter, RCFR-CR wrote D.O. letters for the settlement of Utilization Certificates.
- A total of 25 Utilization certificates were settled and resolved by RCFC-CR.
- An abstract of the present status of UCs is given in table below:-

S.No.	State	Number of UCs	Settled	Resolved
1	Madhya Pradesh	11	-	11
2	Chhattisgarh	14	4	10
Total		**25**	**4**	**21**

14. Success Stories

Two success stories written by RCFC-CR were:-

- Cultivation of Ashwagandha in Umaheda Village of Neemuch District
- Maa Danteshwari Herbal Group, Kondagaon, Bastar (Chhattisgarh)

3. Extension of developed nursery techniques of some NTFPs and medicinal plants species through Research and extension centre of M.P.

Funding agency: PCCF (R/E & Lok Vaniki), M.P. Bhopal

Interim Findings/Activities

- One day training programme on nursery techniques of some RET, NTFPs and medicinal plants species was organized at two Research and extension circles of M.P. viz. Betul and Seoni Research and extension centre.
- Training was attended mainly by the forest staff who is engaged in production of panting material work in nurseries and plantation in forest areas.
- Total 196 beneficiaries trained through lecture and field demonstration method.
- Technical bulletin containing nursery techniques prepared and published. 196 copies were distributed during the training programme.

4. Biodiversity Assessment of Encroachment removed area of Madan Mahal Hills of Jabalpur and its surrounding forest area for ecological restoration through plantation and conservation of cleaned area.

Funding agency: Municipal Corporation (Smart City) Jabalpur

Interim Findings/Activities

- Survey of flora and fauna in the encroachment removed areas of Madan Mahal Hills completed.
- Survey of flora and fauna in the surrounding forest area for ecological restoration done.
- Total 50 tree species, 57 Shrub and climber species and 121 Herb species recorded from Madan Mahal Hills of Jabalpur.
- Plantation in the encroachment removed areas of Madan Mahal Hills completed.
- Checklist of fauna is in progress.
- Data analysis and report writing is in progress.

5. Development of high-tech nursery and preparation of quality planting material of RET species for their restoration in natural forest and rural/urban areas through plantations.

Funding agency: PCCF (R/E and Lok Vaniki) MP, Bhopal

Interim Findings/Activities

Plants of 58 RET species were prepared in large number and made available for different agencies for plantations. Plants were provided to different Research and Extension nurseries for increasing diversity in their nursery and to field staff of territorial department for departmental plantations. Available infrastructure were maintained under the project. Low cost nursery technique of Salai (*Boswellia serrata*), Kullu (*Sterculia urens*), Pilu (*Salvidora s*p.), Nirmaly (*Strychnops potatorum*) are also developed for mass multiplication. Field oriented nursery technique provided to forest field staff who visited to nursery.

- As per instructions of 44th RAC meeting the project is terminated.

Regular activity: One

1. औषधीय पौधैं के जीन बैंक एवं रोपणी का प्रवंधन एवं विकास

Summary of achievements:

- जीन बैंक में संरक्षित औषधीय पौधों की प्रजातियॉ : 429
- औषधीय प्रजातियों का संरक्षण एवं जीन बैंक क्षेत्र का सुदृढ़ीकरण एवं विस्तार किया गया।
- मसाला वाटिका, नक्षत्र वाटिका, नवग्रह वाटिका, सर्पगंधा, काली हल्दी, तीखुर एवं केवकंद का मातृ पौध क्षेत्र तैयार किये गये औषधीय प्रजातियों का संरक्षण एवं जीन बैंक क्षेत्र सुदृढीकरण एवं विस्तार किया गया।
- नक्षत्र वाटिका, नवग्रह वाटिका, सर्पगंधा, काली हल्दी, तीखुर, लगभग 20 प्रजातियों के मातृ पौंध क्षेत्र का रखरखाव किया गया ।

2.1.2 WILDLIFE

Mandate

1. Monitoring and evaluation of wildlife and their habitats
2. Study on ecology and conservation of wildlife including herbivores, carnivores and avifauna of this state
3. Impact of wildlife on human habitation and vice versa
4. To prepare the wildlife management plan
5. Serve as nodal agency to compliment management authorities for scientific inputs
6. To develop wildlife forensic laboratory
7. Documentation and dissemination of information on wildlife conservation

Completed Projects : Seven

1. Preparation of Detailed Project Report for wildlife habitat improvement in the adjoining area of Sardar Sarovar Project, Madhya Pradesh. (Revised DPR)
2. Impact of tourism on ecological, economical and social dynamics in and around the Tiger Reserves of Madhya Pradesh
3. Study on agricultural crop damage by wild animals and its management in Hoshangabad Circle of Madhya Pradesh
4. Role of management interventions in wildlife habitat improvement on abondened sites of Satpuda Tiger Reserve, M.P.
5. Capacity building of forest staff of Madhya Pradesh on wildlife population monitoring techniques
6. Collection of baseline data and impact of airport activities on proposed tiger safari at Dumna Nature Park.
7. Standardization of the population estimation techniques of blue bull (*Boselaphus tragocamelus*) using Pellet Group Count Method in Van Vihar National Park, Bhopal.

Summary of achievements/ activities & outcome of each project:

1. Preparation of Detailed Project Report for wildlife habitat improvement in the adjoining area of Sardar Sarovar Project, Madhya Pradesh. (Revised DPR)

Funding Agency: Narmada Valley Development Authority, Bhopal (M.P.)

Final report of this project has been submitted and presented before the report reviewing committee on 28.02.2019. Received recommendations by report reviewing committee in the month of April 2019. As a follow up action, revised field survey was made and revised DPR was submitted after incorporating the suggestions of reviewing committee. Revised DPR has been presented on 20/08/2019 before the committee at Bhopal which was approved by the committee.

Habitat improvement for wildlife have been proposed in the project area of 6344.22 ha with budgetary provision of 19.75 crores with following activities –

S.No.	Activities	Estimated cost in Rs. (lakh)
1	Protection activities and maintenance	68.81
2	Plantation and maintenance	1074.68
3	Seed sowing and maintenance	63.54
4	Grassland development	210.70
5	Gabion structure	15.88
6	Loose boulder structure	9.67
7	Stop dam/Anicut construction	88.38
8	Pond construction	8.35
9	Eco-tourism activities	249.68
10	Extension activities	135.00
11	Monitoring & Evaluation	50.00
	Total	**1975.00**

2. Impact of tourism on ecological, economical and social dynamics in and around the Tiger Reserves of Madhya Pradesh.

Funding Agency: PCCF (Research/Extension & Lok Vaniki) M.P. Bhopal

Tourism is one of the rapidly growing sectors and is widely recognized as an important sector that significantly contributes to the development of national economy. Present study was focused on tourism impacts on environmental and ecological aspects.

Status of tourists and management staff in Tiger Reserves - In all tiger reserves (Bandhavgarh, Kanha, Panna, Pench & Satpura) gradual increase in number of domestic tourists were observed. It represents a vital opportunity to educate and mobilize public support for conservation of wildlife and nature, when compared with other tiger reserves it was found that Bandhavgarh tiger reserve had more foreign tourists than other tiger reserves which indicates Bandhavgarh is a tourist's destination not only for India but for other countries too. The maximum number of domestic and foreign tourist's were observed in Kanha Tiger Reserve. Sizeable number of tourists in Bandhavgarh and Kanha Tiger Reserves represents widespread publicity and keen interest of tourists to the Tiger Reserves.

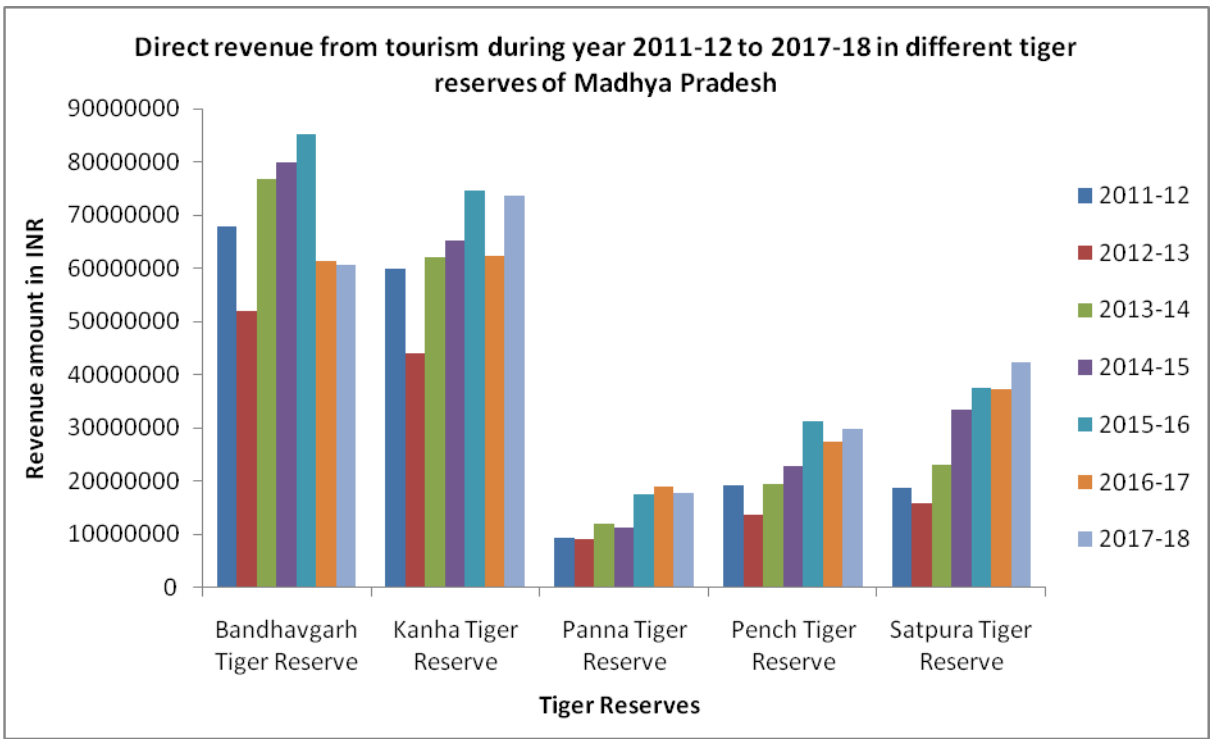
Impact of tourism on noise and air pollution due to vehicular movement - The sound pollution is under control as, the sound level recorded was within the acceptable limit. All the park authorities are maintaining the entire environment regulations including vehicle speed for environment safety. Only petrol vehicles are allowed for safari.

In all the studied tiger reserves the overall averages of particulate matters were within the acceptable limits. Only during the peak hours, the concentration of particulate matter increases with the movement of vehicles. High value of particulate matter was observed in high impact zones in Kanha Tiger Reserve and in Bandhavgarh Tiger Reserve. So, on the safer side some mitigation like spraying of water on roads may be practiced, especially during the peak seasons to avoid any health problems both for human and animals and their impact on water bodies of that area.

Impact of mushrooming of resorts on wildlife corridor - Most of the resorts in Bandhavgarh, Kanha and Pench are located in one or two clusters. Due to creation of such infrastructure clustering, impact on wildlife corridor has been observed. In the present study impact on tiger corridor has been observed mainly in Bandhavgarh and Kanha Tiger Reserve. This may be due to the higher number of tourists visiting the area, resulting in the day by day increase in numbers of resort construction hindering the wildlife corridor function.

Wildlife tourism and its economic growth - Year-wise analysis of tourist's numbers of five tiger reserves revealed gradual increase in tourist's number indicating the tourism growth rate. Of course, some fluctuation was observed which may be due to increasing people's interest in nature tourism and worldwide widespread publicity of tiger reserve. Maximum numbers of tourists were recorded in Kanha Tiger Reserve followed by Bandhavgarh Tiger reserve. Proper connectivity to the destination is also the one of the major deciding factor for the increase in numbers.

Rate of tourism growth may also be estimated through amount of revenue received. Maximum revenue during 2011-12 to 2017-18 was recorded from Bandhavgarh Tiger Reserve i.e. Rs. 48.37 crores, followed by Kanha Tiger Reserve (i.e. Rs. 44.17 crores), where as the number of tourist were higher in Kanha Tiger Reserve but the percentage of foreign tourists was higher in Bandhavgarh Tiger Reserve. Tiger is the main attraction for foreign tourists for better tiger sighting in Bandhavgarh Tiger Reserve. Total revenue from all the five tiger reserve during 2011-12 was Rs. 17.52 crore which attained a high of Rs. 22.41 during 2017-18. If we will look at the total figure of the seven years for revenue generated from the five tiger reserves, it amounts to Rs.139.43 crore. Direct revenue from tourism supports the conservation and management of the tiger reserves.



Beneficiaries of Wildlife Tourism- There are a wide range of beneficiaries from wildlife tourism. Local communities are one of the biggest beneficiaries (direct employment, salaried and non - salaried work such as guides, safari vehicle owner, small businesses etc.). In Madhya Pradesh, tiger reserves are sharing the financial benefits of ecotourism with local people of that area as per the prevailing rules and regulations.

Conservation Planning and Awareness Campaign - Enhancement of tourism activities in the study sites requires for appropriate improvement in conservation planning and in protection strategies. Nature education is essential for nature based tourism.

Grading of Resorts - Eco-rating to the lodges and resorts has been provided through the Eco-rating System criterions developed by MPEDB. The Eco-rating for ecotourism is first in the world of its kind. It will provide assurance to guest as well as lodges and resorts operators that lodging facilities and activities are meeting best eco friendly practices and providing quality guest service with minimum detrimental impact on environment and better support to the local community.

Eco - Rating of Resorts of Panna Tiger Reserve

S.No.	Name of Resorts	Final Score	Eco - rating of Resorts
1	Tuli Tiger Corridor	14.15	★★★★
2	Jungle Hut	6.41	★★
3	We Village	15.64	★★★★★
4	Mrignayani	13.46	★★★★
5	River Wood Resort	7.71	★★★

S.No.	Name of Resorts	Final Score	Eco - rating of Resorts
6	Baghvan	24.51	★★★★★
7	Tiger Cubs Land	5.86	★★
8	Mahua Van	16.11	★★★★★
9	Vilean Wildlife Resort	5.89	★★
10	Pench Jungle Camp	19.68	★★★★★

Similar rating has been done for resorts of all the tiger reserves of Madhya Pradesh

Interaction of villagers

Interaction with tourist guides

3. Study on Agricultural Crop Damage by Wild Animals and its Management in Hoshangabad Circle of Madhya Pradesh.

Funding Agency: PCCF (Research/Extension & Lok Vaniki) M.P. Bhopal

Study was conducted in Hoshangabad Forest Circle of Madhya Pradesh. Observation on situational analysis of existing status of crop depredation in the area was done through collection of secondary information and questionnaire survey. Experimental plots were laid-out in different six clusters with three replicates in each clusters. Observations were made during all the crop seasons. Crop damage by wild animals and crop compensation are the main problems being faced by the farmers of the area.

- As per questionnaire survey on average 45.76 % crop damage has been recorded ranging from 20 to 92.50 % and as per the observation recorded through field experiments on an average 31.85 % (ganging from 26.43 to 38.66%) crop damage were recorded within 0 – 2 km impact zone and 18.51 % (Ranging from 11.25 to 22.50 %) in 2 – 5 impact zone.
- Major species recorded for crop raiding were Wild pig, Blackbuck, Chital, Sambar and Neelgai.
- Maximum crop damage was recorded by Wild pig i.e. 64.13% followed by Blackbuck 21.74%.
- During winter season, the peak hours of maximum crop raiding was observed between 8:00 PM to 4:00 AM and during summer season maximum activity of crop raiding was observed between 10:00 PM to 6:00 AM.
- The positive effect of animal repellent may also support as short term solution for prevention of crop damage problems.

Estimation of economic loss in Kharif, Rabi and Summer - The compensation for crop damage is being paid by Government of Madhya Pradesh as per rules and the actual economic loss of crop damages borne by the farmers are influenced by current market rate or minimum support price as described below in the table.

S.No.	Name of Crop	Crop damage/ha as observed during study (%)	Compensation as prescribed by Govt. of MP based on % of crop damage (Rs. per ha)	Actual loss as per MSP Rs./ha (Reference table No. 14,15,16,17)	Difference in Rs.
In case, landholding status is 0-2 hectare					
Impact zone 0-2 km	Paddy	26.43%	9000	13200	4200
	Wheat (Irrigated)	32.06%	9000	17350	8350
	Bengal Gram	38.66%	9000	41800	32800

S.No.	Name of Crop	Crop damage/ha as observed during study (%)	Compensation as prescribed by Govt. of MP based on % of crop damage (Rs. per ha)	Actual loss as per MSP Rs./ha (Reference table No. 14,15,16,17)	Difference in Rs.
	(Irrigated)				
	Moong (Irrigated)	30.25%	9000	15675	6675
Impact zone 2-5 km	Paddy	18.04%	0	10290	10290
	Wheat (Irrigated)	22.5%	0	12145	12145
	Bengal Gram (Irrigated)	11.25%	0	8800	8800
	Moong (Irrigated)	22.25%	0	10450	10450
In case, landholding status is more than 2 hectare					
Impact zone 0-2 km	Paddy	26.43%	6500	13200	6700
	Wheat (Irrigated)	32.06%	6500	17350	10850
	Bengal Gram (Irrigated)	38.66%	6500	41800	35300
	Moong (Irrigated)	30.25%	6500	15675	9175
Impact zone 2-5 km	Paddy	18.04%	0	10290	10290
	Wheat (Irrigated)	22.5%	0	12375	12375
	Bengal Gram (Irrigated)	11.25%	0	8800	8800
	Moong (Irrigated)	22.25%	0	10450	10450

It is suggested that there is need to revise the revenue criteria of crop damage compensation regarding crop damage percentage, issues and minimum support price of the particular year for particular crop should also be considered.

- Habitat improvement and water resource development in forest buffer areas may reduce the cases of crop raiding
- Use of animal repellent may play important role to reduce the crop damage percentage as immediate temporary solution.
- Chain link fencing, solar fencing, bio fencing, game-proof wall, guarding through pet dogs etc. may be the better solution for preventing the agricultural fields form crop raiding.
- Strengthening of prevailing system for crop damage compensation.

Crop raiding by Blackbuck

4. Role of management interventions in wildlife habitat improvement on evacuated sites of Satpuda Tiger Reserve of Madhya Pradesh.

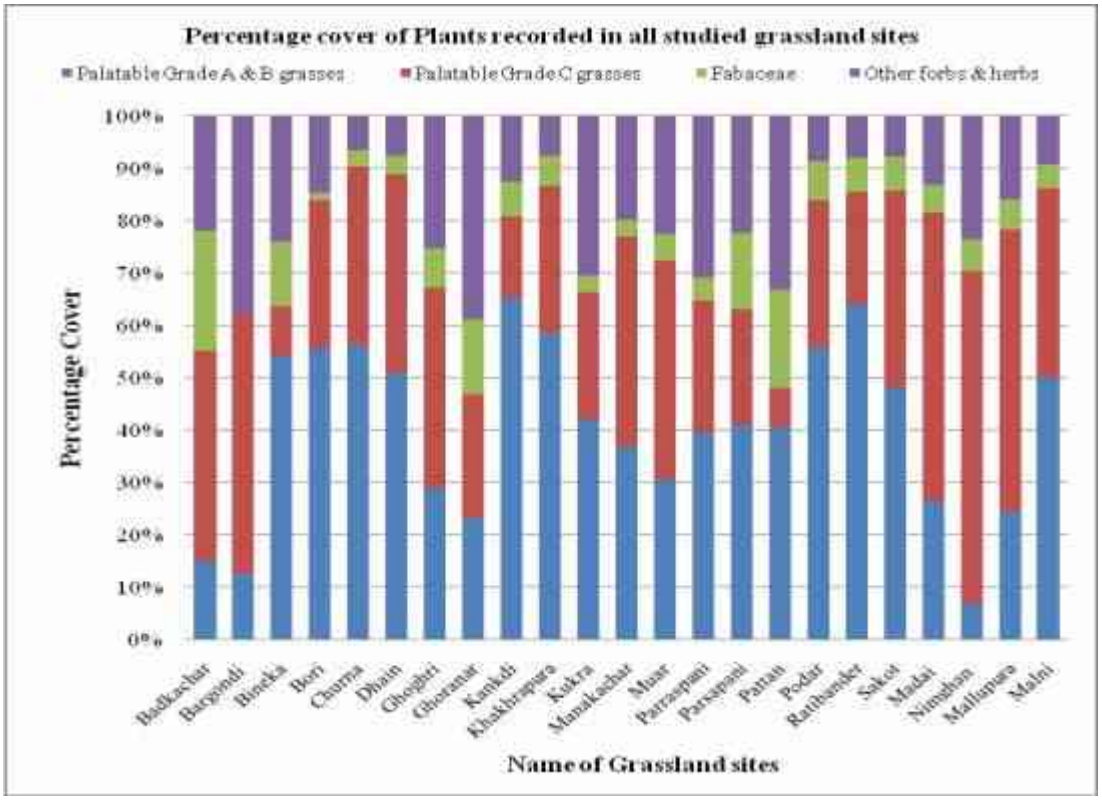
Funding Agency: PCCF (CAMPA), M.P. Bhopal

Study was focused on finding out the role of management interventions in grassland development and to find out the species specific habitat suitability. Besides other information gathered during the study were food choice of chital through fecal animal sampling method, animal abundance in the area through pellet count and camera trap method, grassland productivity and carrying capacity of the each grassland as chital unit/ha/year.

Evaluation of those grasslands sites were done to assess the role of management intervention practices implemented on grassland sites. Grasslands were stratified into three categories.

- Evacuated sites (sites with management interventions)
- Established sites (sites relocated long back, with management interventions)
- Controlled sites (sites without management interventions)

The most dominant grass species recorded in studied grasslands are *Themeda quadrivalvis, Dichanthium annulatum, Ischaemum indicum, Oplismenus burmanii, Setaria pumilla, Cynodon dactylon, Heteropogon contortus* and *Eragrostis tenella*.



The correlation results between management practices vs grass density disclose that there are significant difference in the composition and grass density as influenced by interventions.

Habitat Suitability - Suitability of developed grasslands was assessed through habitat suitability modelling only for chital and sambar. It is based on the biotic and abiotic life requisite components, existing in the area. Following eight parameters were considered to find out the Habitat Suitability Index i.e. grass density, leguminous plant density, availability of water, elevation, terrain of the grasslands, distance of grassland from human habitation, grassland distance from road, vegetation type around 2 Km buffer of Grassland.

Based on the Habitat Suitability Index value the most suitable sites found for Chital are: Churna, Dhain, Khakhrapura, Kankdi, Parsapani, Malni, Mallupura, Pattan (Highly suitable) Badkachar, Bargondi, Bineka, Bori, Ghoghri, Ghoranar, Kukra, Manakachar, Muar, Parraspani, Podar, Ratibandar, Sakot, Madai, Nimgham (Moderately suitable).

Similarly the suitable sites for Sambar were also assessed. This information would be useful for further grassland management and animal translocation programmes.

Grassland productivity and its carrying capacity: Grassland productivity and carrying capacity of all the studied grasslands were also estimated.

Maximum forage production was recorded for Khakhrapura (12878.13 kg) followed by Bori (12067.23) and Dhain (11861.46) than other evacuated grassland sites. Productivity of established grassland recorded in Madai and Nimghan was 4859.59 kg and 2547.49 kg respectively and controlled grassland sites Mallupura and Malni was 3371.79 kg and 5681.36 kg respectively

The results of the carrying capacity reveals that the maximum capacity in terms of chital unit/ha/year for Khakhrapura (7.41) followed by Bori (6.94), Dhain (6.82) and Sakot (4.59), while in other evacuated grasslands it varies from 1.69 – 3.93 chital unit/ha/year.

The carrying capacity of grasslands depends on the available forage production. The grasslands producing maximum density but less in biomass cannot sustain large population whereas the grasslands with higher biomass production can sustain more number of individuals.

Axis deer in Madai Grassland of Satpura Tiger Reserve

Grasslands developed in Khakhrapura village relocated site at Satpura Tiger Reserve

5. Capacity building of Forest Staff of Madhya Pradesh on Wildlife Population Monitoring Techniques.

Funding Agency: PCCF (Wildlife) & Chief Wildlife Warden, M.P. Bhopal

The objective of this project was to create a cadre of master trainers on advanced wildlife population monitoring techniques who can further transfer their knowledge to ground level.

Forest of Madhya Pradesh harbours diverse wild flora and fauna. The mean tiger population of the state was 300, 257 and 308 for the year 2006, 2010 and 2014 respectively. Despite its rich faunal assemblages, it was observed, the skill to identify various carnivores signs by ground level staff was poor resulting in less estimation of the actual existing population. To get accurate wildlife population estimates, M.P. Forest Department assigned, State Forest Research Institute to procure, advanced population monitoring instruments such as camera traps, compass, GPS & range finders. These instruments have been procured to various Protected Areas and Territorial Forest divisions to augment the domain knowledge of frontline forest staff of this state on advanced population monitoring tools and technologies and more over to collect quality data for AITE-2018.

Based on the long term subject expertise, mentors, resource persons and training team associates has been selected from both forest department and SFRI for conducting both 1st and 2nd Phase of training programme.

Cadre of Master Trainers – Total 544 master trainers have been trained. During the first round training programme in 2017, a cadre of 262 master trainers and in the second round training pogramme in 2018, a cadre of 282 master trainers were trained.

Following training manuals were prepared and distributed to all the master trainers of M.P.

1. **बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण–2019 हेतु मार्गदर्शिका**
2. **कैमरा ट्रैप मार्गदर्शिका**
3. **रेंज फाइंडर एवं जीपीएस संचालन हेतु मार्गदर्शिका**

6. Collection of baseline data and impact of airport activities on proposed tiger safari at Dumna Nature Park.

Funding Agency: Municipal Corporation, Jabalpur (M.P.)

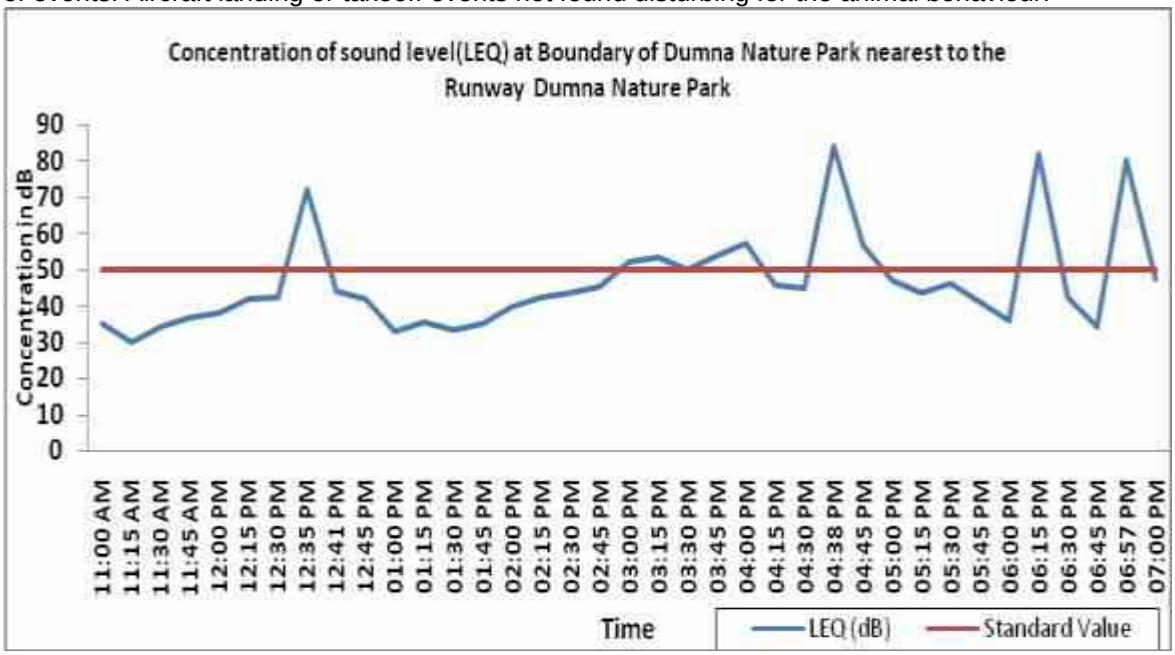
Study was conducted to observe the impact of airport activities on proposed Tiger Safari Project and collection of baseline data of the proposed area.

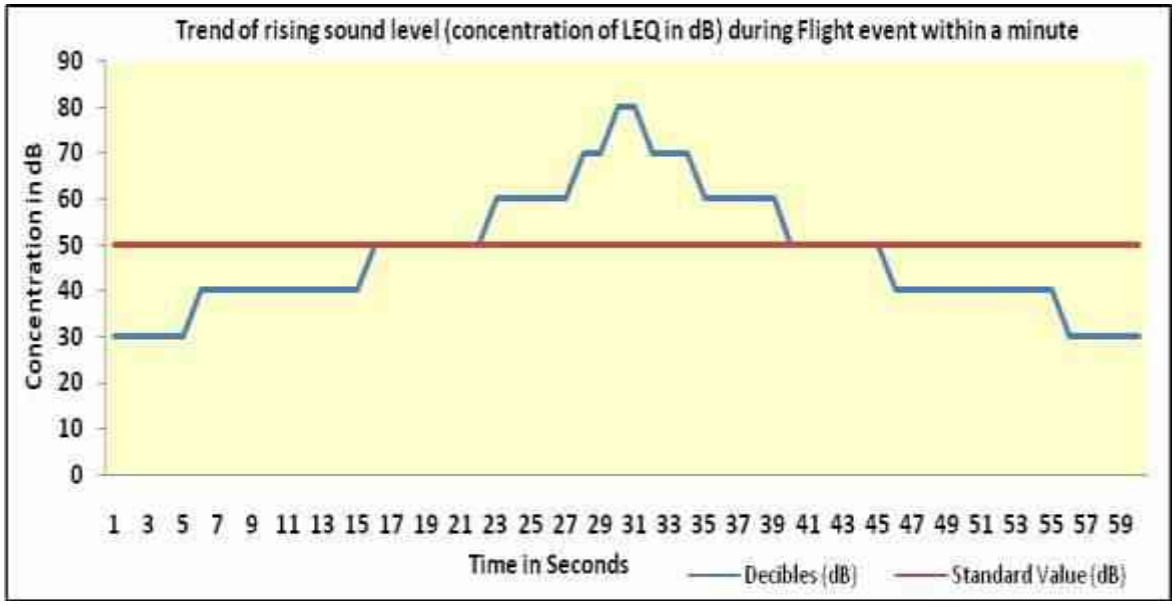
The overall flight frequency at Dumna Airport Jabalpur was 0.25/hour in a day (24 hours) during the study period. In India, amongst all the airports, Indira Gandhi International Airport, New Delhi is the busiest airport, where the flight frequency is 254 per day (24 hrs) with total 508 events, including landing and take-off of aircraft. If we compare flight frequency of Dumna Airport, Jabalpur to Indira Gandhi International Airport, New Delhi it is only 2.36% of that.

Duration and higher sound intensity around Dumna Airport

The sound level rises beyond the acceptable limit of silent zone only for the period of 20 second/event. During a day, animal/person has to bear less than 4 minutes time when sound level is supposed to be beyond the accepted limits as per the CPCB standards for silent zone. It was observed during study that the aircraft take-off events are taking place through runway No 06. Events of aircraft landing are taking place on Runway No. 24.

There are 1440 minutes in a day and an animal/person has to bear loud sound only for 4 minutes. It was observed that other wild animals of Dumna Nature Park are habituated for such kind of events. Aircraft landing or takeoff events not found disturbing for the animal behaviour.





The aircraft engines create noise around 140 dB during takeoff and that is a main source of noise pollution. This Dumna Airport is located 1.57 km. (Arial Distance) from the proposed tiger safari and at the nearest boundary of the study area from runway; one has to face maximum intensity of sound level i.e. 80 dB for few second only. The expecting impact of noise pollution at proposed tiger safari area would be insignificant.

Overall, the sound intensity, its duration and frequency of the present scenario does not possess any risk for the tigers to be introduced in the proposed tiger safari.

Air Quality- Air quality not found affected due to aircraft movement. All the parameters including PM 2.5, PM 10, TSP, O_2, SO_2, CO, CO_2, draught and temperature were recorded under acceptable limits. Even SO_2, CO, CO_2 level found below the detectable limit.

Presence of Wildlife- Eight species of wildlife has been captured in the camera traps. There may be some more species but due to dense growth of ground vegetation in rainy season, small mammals could not be exposed. Camera trapping in summer season is recommended for better detection of wildlife. Thirteen more species were also recorded through direct sighting and indirect evidences.

List of wildlife species captured in camera trap

S.No.	Common Name	Scientific Name	Family
1	Chital	*Axis axis*	Cervidal
2	Indian peafowl	*Pavo cristatus*	Phasianidae
3	Wild dog (Dhole)	*Cuon alpinus*	Canidae
4	Wild pig	*Sus scrofa*	Suidae
5	Jungle cat	*Felis chaus*	Felidae
6	Indian hare	*Lepus nigricollis*	Leporids
7	Cattle	*Bos taurus* & others	Bovidae
8	Red collared dove	*Streptopelia tranquebarica*	Columbidae

Water Resources- Seven water resources are available along with the huge reservoir, which is as per the requisite norms for wildlife. Only their maintenance is needed, especially during peak summer.

Vegetation Status- Number of tree species recorded is 24. Tree density of the study area is recorded as 279.33/ha, which is falling as open forest type. Density of shrubs and established tree regeneration is 77373.33/ha and density of ground flora 1651060/ha including 90 species.

Land cover pattern- Existing study area is falling under 58.36% of Non Forest Area, 13.99% Open Forest Area, 27.40% Moderate Dense Forest Area and 0.24% Water body Area.

7. Standardization of the population estimation techniques of Blue Bull *(Boselaphus tragocamelus)* using Pellet Group Count Method in Van Vihar National Park.

Funding Agency: PCCF & CWLW, MP, Bhopal

- Fecal Standing crop method (FSC PELLET-PGC) was found the best suited Indirect method for Nilgai population estimation as gain Performance Percentile 99.62% specifically for a season and highly sensitive to homogenous distribution of population.
- Distance based line transect method was found the best suited direct method for Nilgai population estimation as gain Performance Percentile 72%.
- Daily defecation rate of male Nilgai was observed 4.33±1.76 at enclosure site of Van Vihar National Park, Bhopal.
- HYPOTHESIS; “BOTH THE SEXES INVOLVED IN REPEATED DEFECATION WITHIN SAME POINT LOCATION CALLED LAVATORY SITE MAKING LARGE DUNG PILE (HEAP)” was rejected due to fact overcome by the result of one month camera trap at the all heap locations of Vanvihar, where 99% defecation trap was only belongs to male Nilgai.
- New method Daily Defecation Rate (DDR) on heaps was developed by SFRI for male Nilgai population estimation where Performance Percentile was 46.5%, If multiplied with scattered factor 2.15 (For Van Vihar Site) than actual number or 100% performance percentile can be obtained.
- Project findings clearly indicate that male Nilgai trap can be possible from heap location for translocation. Monitoring of dung pile for getting Daily Defecation Rates (DDR) in a unit area and its comparison with standard of one male DDR can give estimation of population density of male Nilgai in unit area, but then scattered factor coefficient for natural open site will be required to know actual numbers. High defecation rate at dung piles in unit area can confidently reveal about high density of male Nilgai in unit area. Regular trap from heap site can provide easy and cost effective trap opportunity and make opportunity in subsequent decline the male ratio within Nilgai population in unit forest area, after translocation remaining female population will decline naturally within in one or two generation time.

Heap (dung pile) formation behavior of Male

Scattered type of defecation by female

Ongoing Projects : Four

1. Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected areas/ territorial divisions of Madhya Pradesh.
2. Monitoring Re-introduced tigers (*Panthera tigris* L.) in Nauradehi Wildlife Sanctuary.
3. To study the impact of proposed Morena water supply under sub project MPUDP on the Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial Wildlife Sanctuary, Morena (M.P.).
4. Study on tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhyan range.

Regular Activity ; One

1. Maintenance of monitoring and evaluation facilities and database of predators prey in Madhya Pradesh.

Summary of achievements / activities & outcome of each project:

1. Monitoring and evaluation of Wildlife and their habitats for sustainable management and development in the protected areas/ Territorial divisions of Madhya Pradesh.

Funding Agency: PCCF (Wildlife) & Chief Wildlife Warden, M.P. Bhopal

Interim Finding/Activities

The main aim of this research project is to estimate population of prey and predators of various protected and territorial divisions of this state to develop suitable management intervention. Phase I data of All India Tiger Estimation 2018 project have been received from total 83 Territorial divisions/ Protected Areas/Corporation Divisions. Issues regarding improper data entry in m-Stripe software have been observed and entire Phase I data have been scrutinized by researchers of this project and assistance have been provided to computer operators of various Territorial divisions/ Protected Areas/Corporation Divisions to correct the proper GPS entry in the software. Problem was observed in m-stripe software too, especially during installation of SQL server and it was fixed in consultation with NTCA-WII. The entire voluminous exercise has been completed in four months span. Phase III data have been also received from 25 Territorial divisions/Protected Areas/ Corporation Divisions. Total 5000 GB data of more than 12 lakh wildlife photographs have been scrutinized and segregated by researchers and took three months to complete this segregation exercise of Phase III data. On behalf of Madhya Pradesh Forest Department, all scrutinized and processed data have been submitted to National Tiger Conservation Authority and Wildlife Institute of India. Individual tiger identification processes is completed for all 25 Territorial divisions/ Protected Areas/Corporation Divisions. Based on Phase I data, a brief report on tiger bearing beats have been prepared and submitted to PCCF (Wildlife), M.P.

Range wise and division wise detail interim report is under progress. In addition to this ongoing activity, abundance of herbivore and carnivore population have been estimated and submitted to various territorial divisions of this state to include in their working plans.


Photo captured tiger from Bandhavgarh Tiger Reserve showing left and right flanks

2. Monitoring of Re-introduced tigers (*Panthera tigris* L.) in Nauradehi Wildlife Sanctuary.

Funding Agency: PCCF (Wildlife) & Chief Wildlife Warden M.P. Bhopal

Interim Finding/Activities

With an aim to recover tiger population outside the tiger reserve area of Madhya Pradesh, one female (N1) and one male (N2) tiger have been reintroduced in Nauradehi Wildlife Sanctuary.

During the study period, it was observed that both of these tigers have established their territories inside the Sanctuary area. Estimated annual home range of male tiger was 84.47 sq km and female tiger was 47.74 sq km during the study period. Both of these tiger preferred feral cattle followed by spotted deer as prey and riparian habitat. Female tiger was spotted with three cubs last year which uphold the success of this reintroduction programme.

Tiger and tigress with their cubs at Nauradehi wildlife Sanctuary

3. To study the impact of proposed Morena water supply sub project under MPUDP on the Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial Wildlife Sanctuary, Morena (M.P.).

Funding Agency: MP Urban Development Company Ltd., Dept. of Urban Development & Housing, Govt. of MP, Bhopal

Interim Finding/Activities:

This project of Madhya Pradesh Urban Development Company Limited is supported by the World Bank and Madhya Pradesh Government. The task has been assigned to examine the impact

on ecological values and ecological flow with special reference to critically endangered Dolphin, Gharial and the major aquatic fauna of the Chambal River including Crocodile & and their habitat that may influence, due to constructing and water abstraction by proposed intake well for water supply to Morena district of Madhya Pradesh .

Research team observed various parameters related to the study. Field data, such as river flow depth, river physiochemical analysis, population status of aquatic animals (Muggar, Gharial. Turtle and Smooth coated otter etc.), river birds, anthropogenic activity, etc were collected during June, 2019-June 2020.

Measurement of water flow at National Chambal Sanctuary, Morena

Water analysis at National Chambal Sanctuary, Morena

4. Study on Tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhyan Range.

Funding Agency: PCCF (Wildlife) & Chief Wildlife Warden, M.P. Bhopal

Interim Finding/Activities:

Activities:

- Tiger sign mark survey completed.
- 267 DNA samples from Satpura Tiger Reserve and 04 samples from Kheoni sanctuary of Tigers were collected. DNA analysis is under progress at National Centre for Biological Sciences Bengaluru.
- Tiger distribution map has been developed and Tiger occupancy analysis on PRESENCE 2.12.41 program is in under progress.
- Binomial Multiple Logistic Regression (BMLR) habitat suitability analysis is in under progress.
- Planning to execute Species Distribution Model (SDM) in R-platform for Environment Niche Factor analysis to find out the quantitative value of co-relation and identification of most influence factor of environment regarding the Tiger presence.
- Raster and Vector layers have been prepared of principal variables regarding the Tiger habitat suitability subsequently Species Distribution Modeling has been performed at the platform of MaxEnt.
- Tiger, Leopard, Sloth Bear, Nilgai, Sambar and Chital distribution maps were prepared.

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Interim Findings:

- Tiger presence is supported by cattle presence by anthropogenic means.
- Perennial water source is a prime factor making functional critical tiger habitat.
- Rugged topography of Vindhyan range along with steep slopes is principle geological variable make suitable habitat around the Bhopal city.
- Blue Bull (*Boselaphus tragocamelus*) encounter rate is highest among the ungulate. Sambar encounter rate is lower than Nilgai.
- Tiger, Leopard and Sloth Bear presence is significantly supported by physical attribute viz. slope, ruggedness of terrain.
- Prepared maps of occupancies distribution of the species Tiger, Leopard, Sloth Bear, Nilgai, Sambar, Chital and Wild pig in the study area of Ratapani-Kheoni landscape

- Presence of Tiger reported in 139 beats out of 337 beats of study area during Tiger Sign Mark survey.
- Presence of Leopard reported in 198 beats, Sloth Bear reported in 196 beats, Wild Boar reported in 184 beats, Nilgai reported in 193 beats, Sambar reported in 106 beats, Chital reported in 88 beats out of 337 beats of study area during Tiger Sign Mark survey.
- Water availability reported in 159 beat out of 337 beats of study area during Tiger Sign Mark survey.

Tiger scat collection

Presence of water resources during summers at Singhpur beat of STR

Regular Activity: One

1. Maintenance of monitoring and evaluation facilities and database of predators prey in Madhya Pradesh.

Funding Agency: SFRI and PCCF (Wildlife) & Chief Wildlife Warden, M.P. Bhopal.

Interim Finding/Activities:

Maintenance of Tiger database, herbivore and carnivore database of the year 2016, 2017 and 2018.

- Data for herbivore density and carnivore encounter rate has been analysed and sent to the following offices for inclusion in working plan -
  - South Sagar – 2018
  - Working Plan Office, Shivpuri – 2018
  - Forest Office, Rajgarh – 2018
  - Conservator of Forests, Ujjain
  - Pench Tiger Reserve – 2018
  - Conservator of Forests, Betul
  - Sanjay Tiger Reserve – 2016, 2017, 2018
  - Conservator of Forests, Rewa – 2018
  - Divisional Forests Office, Sheopur – 2018
  - Conservator of Forests, Chhatarpur – 2018
  - Divisional Forests Office, Chhindwara
  - Divisional Forests Office, Sehore – 2014, 2018
  - Divisional Forests Office, South Betul – 2014, 2018
- Radio telemetry equipments i.e. Radio Collar, Multichannel Receiver and Yagi Antenna distributed and demonstrated to the following -
  - Divisional Forests Office, Nauradehi Wildlife Sanctuary, Sagar
  - Field Director, Kanha Tiger Reserve, Mandla
  - Field Director, Satpura Tiger Reserve, Hoshangabad
  - Field Director, Panna Tiger Reserve, Panna
  - Divisional Forests Office, Satna
  - Addl. Principal Chief Conservator of Forests (Wildlife) Chhattisgarh Raipur

2.2 FOREST BOTANY AND ECOLOGY DIVISION

2.2.1. FOREST BOTANY

Mandate

1. Documentation and inventorization of plant diversity in natural forests of Madhya Pradesh.
2. Phenological studies of forest species.
3. Maintenance and development of botanical garden.
4. Maintenance and development of forest herbarium.
5. Studies on carbon sequestration and climate change.

Completed project: One

1. Studies on photosynthetic efficiency, biomass production and carbon sequestration of bamboo in plantation forests

Summary of achievements / activities & outcome:

1. Studies on photosynthetic efficiency, biomass production and carbon sequestration of bamboo in plantation forests

Funding agency : APCCF (R/E & Lok-Vaniki), M.P. Bhopal

- Moisture was recorded between 50.89 to 69.81% (Avg. 58.6) in stem, 31.54 to 51.05% (Avg. 42.4) in leaf, 42.86 to 62.95% (Avg. 54.2) in rhizome and 69.77 to 78.26% (Avg. 72.7) in litter of all the plantations in the studied area.
- Decayed culm was recorded nearly 7% (6.82% to 7.08%) in all the studied plantations.
- Carbon per culm was also evaluated and recorded between 0.02 to 2.96 kg in Chhattisgarh Plain, 0.4 to 3.0 kg in Kymore Plateau & Satpura Hills, 0.09 to 1.49 kg in Satpura Plateau, 0.98 to 3.95 kg in Northern Hills Zone of Chhattisgarh and 0.1 to 2.81 kg in Central Narmada Valley. These values are statistically analysed at 95% precision level through SPSS software and found significant with 2.96 kg (1985) in Chhattisgarh Plain, 3 kg (2011) in Kymore Plateau & Satpura Hills, 1.49 kg (2000) in Satpura Plateau, 3.95 kg (2011) in Northern Hills Zone of Chhattisgarh and 2.81 kg (1989) in Central Narmada Valley over other values recorded for different year in the respective zones.
- Carbon sequestration was evaluated between 0.07 to 27.51 Mg ha^{-1} in Chhattisgarh Plain, 0.79 to 24.08 Mg ha^{-1} in Kymore Plateau & Satpura Hills, 0.15 to 34.17 Mg ha^{-1} in Satpura Plateau, 0.33 to 50.99 Mg ha^{-1} in Northern Hills Zone of Chhattisgarh and 0.10 to 29.06 Mg ha^{-1} in Central Narmada Valley. Average sequestration for all the studied zones ranges 9.6 to 23.4 Mg ha^{-1}.
- Carbon in litter was measured between 11.8 to 361.8 kg ha^{-1} in Chhattisgarh Plain, 82.7 to 610.1 kg ha^{-1} in Kymore Plateau & Satpura Hills, 9.4 to 360.5 kg ha^{-1} in Satpura Plateau, 16.2 to 1076.1 kg ha^{-1} in Northern Hills Zone of Chhattisgarh and 32.9 to 592.3 kg ha^{-1} in Central Narmada Valley. Average carbon in litter for all the studied zones ranges between 146.9 to 309.9 kg ha^{-1}.
- Soil organic carbon (SOC) was evaluated between 20.0 to 28.5 Mg ha^{-1} in Chhattisgarh Plain, 21.6 to 35.7 Mg ha^{-1} in Kymore Plateau & Satpura Hills, 29.3 to 38.5 Mg ha^{-1} in Satpura Plateau, 22.3 to 35.0 Mg ha^{-1} in Northern Hills zone of Chhattisgarh and 42.6 to 168.3 Mg ha^{-1} in Central Narmada Valley. Average soil organic carbon for all the studied zones ranges between 25.5 to 88.3 Mg ha^{-1}.
- Carbon pool was estimated between 20.96 to 56.88 Mg ha^{-1} in Chhattisgarh Plain, 22.74 to 61.36 Mg ha^{-1} in Kymore Plateau & Satpura Hills, 35.7 to 53.01 Mg ha^{-1} in Satpura Plateau, 22.82 to 76.35 Mg ha^{-1} in Northern Hills Zone of Chhattisgarh and 47.71 to 176.11 Mg ha^{-1} in Central Narmada Valley. Average carbon pool for all the studied zones is estimated between 37.4 to 99.6 Mg ha^{-1}.
- Annual carbon sequestration was recorded between 209.3 to 2552.4 kg ha^{-1} yr^{-1} in Chhattisgarh Plain, 170 to 3904 kg ha^{-1} yr^{-1} in Kymore Plateau & Satpura Hills, 67.3 to 1975.2

kg ha^{-1} yr^{-1} in Satpura Plateau, 119.3 to 6538.2 kg ha^{-1} yr^{-1} in Northern Hills Zone of Chhattisgarh and 35.9 to 1606.1 kg ha^{-1} yr^{-1} in Central Narmada Valley. Average annual carbon sequestration for all the studied zones is recorded between 519 to 1827.5 kg ha^{-1} yr^{-1}.

- Carbon potential was also evaluated for all studied agroclimatic zones. Carbon potential is expected between 0.08 to 34.3 Mg ha^{-1} in Chhattisgarh Plain, 1.3 to 46.6 Mg ha^{-1} in Kymore Plateau & Satpura Hills, 0.28 to 44.6 Mg ha^{-1} in Satpura Plateau, 0.60 to 115.9 Mg ha^{-1} in Northern Hills Zone of Chhattisgarh and 0.18 to 92.9 Mg ha^{-1} in Central Narmada Valley.

Regular Activity:

1. Maintenance of herbarium.

Funding Agency: SFRI, Jabalpur

Activities:

- Maintenance of old specimen
- Identification of specimens for students and researchers of various institutions through soft-ware

2.2.2 FOREST ECOLOGY AND ENVIRONMENT

Mandate

- Ecological studies in natural forests of Madhya Pradesh
- Environmental Impact Assessment
- Sustainable Forest Management

Completed Projects - One

1. Study of sal regeneration status in borer affected areas.

Summary of achievements / activities & outcome of each project:

1. Study of sal regeneration status in borer affected areas.

Funding Agency : APCCF (R/E & Lokvaniki) M.P. Bhopal

- Project work carried out in protected Sal Forest Areas - core zone of Kanha Tiger Reserve, Phen Wildlife sanctuary and Satpura Tiger Reserve.
- High species richness, density and abundance were recorded in protected Sal Forest Areas.
- The overall population structure of tree species in the study site reveals that contribution of seedlings to the total population was highest followed by saplings and adult trees.
- It can be concluded that regeneration of tree species in the forest is 'good' which exemplify overall regeneration of tree species is mostly favoured by the prevailing environmental factors and the future communities may be sustained unless there is any major environmental stress or interference exherted by human activities.
- Final report submitted to Funding Agency.



Field survey in Kanha Tiger reserve, Satpura Tiger reserve & Phen Wildlife Sanctuary

On-going Projects: Two

1. Phytosociological study of river bank flora from Amarkantak to Mandla with special reference to impact on water quality in river Narmada

2. Phenological studies and determination of sustainable harvesting limits of some important wild medicinal plants and NTFPs with active participation of users forest dependent communities in Satna Forest Division of Madhya Pradesh.

Summary of achievements / activities & outcome of each project:

1. Phytosociological study of river bank flora from Amarkantak to Mandla with special reference to impact on water quality in river Narmada.

Funding Agency : PCCF (R/E & Lokvaniki), M.P. Bhopal

Interim Findings/Activities:

- Collection of water samples from 79 points from river Narmada in summer & winter season from North Seoni, East & West Mandla, Dindori and Annuppur Forest Divisions and comparison of water quality of winter & summer season data analysis is in progress.
- Phytosociological data collected from 08 ranges of Amarkantak to Dindori and Mandla Forest division data compilation & analysis is in progress.
- Field survey for collection & identification of phytoplankton of Narmada River is in progress.


Phytosociological studies from Amarkantak to Mandla Forest Division

2. Phenological studies and determination of sustainable harvesting limits of some important wild medicinal plants and NTFPs with active participation of users forest dependent communities in Satna Forest Division of Madhya Pradesh.

Funding Agency : PCCF (R/E & Lokvaniki), M.P. Bhopal

Interim Findings/Activities:

- Inventory and status assessment of commercially important wild medicinal plants in Chitrakoot and Maihar range of Satna Forest Division completed.
- Phenological observation of *Vitex nigundu*, *Alectra parasitica* var. *chitrakutensis*, *Aegle marmelos*, *Terminalia bellerica* and *Gymnema sylvestre* are being collected at regular intervals.
- Harvesting of important medicinal part of the plants had been done as per the experimental design.
- Phenological observation of *Aegle marmelos* and *Terminalia bellerica* is in progress and harvesting treatment will be given at the time of maturity periods.
- Analysis of data is in progress.

S. No.	Study sites	Selected Species	Treatment	Replications (size of plot* 10 m X 10 m)
1.	Satna Forest Division Range: Chitrakoot Beat: Nayagaon Comptt. No.: P-3 Samiti : Nayagaon VFCs	*Vitex nigundu* (Nirgundi)	T0 (Control)	04
			T1 (20%)	04
			T2 (40%)	04
			T3 (60%)	04
			T4 (80%)	04
2.	Satna Forest Division Range: Chitrakoot Beat: Nayagaon Comptt. No.: P-3 Samiti : Nayagaon VFCs	*Alectra parasitica* var. *chitrakutensis*	T0 (Control)	04
			T1 (20%)	04
			T2 (40%)	04
			T3 (60%)	04
			T4 (80%)	04
3 .	Satna Forest Division Range: Chitrakoot Beat: Bhatiachua Comptt. No.: P-64 & P-68 Samiti : Bhatiyachua VFCs	*Terminalia bellerica* *(Baheda)	T0 (Control)	04
			T1 (60%)	04
			T2 (70%)	04
			T3 (80%)	04
			T4 (90%)	04
4.	Satna Forest Division Range: Chitrakoot Beat: Surangi Comptt. No.: P-38 Samiti :Surangi VFCs	*Aegle marmelos* (Bel)*	T0 (Control)	04
			T1 (60%)	04
			T2 (70%)	04
			T3 (80%)	04
			T4 (90%)	04
5.	Satna Forest Division Range: Maihar Beat: Udaipur Comptt. No.: P-479 Samiti : Udaipura VFCs	*Gymnema sylvestre (Gudmar*)	T0 (Control)	04
			T1 (20%)	04
			T2 (40%)	04
			T3 (60%)	04
			T4 (80%)	04

* *Plot size varies for Terminalia bellerica and Aegle marmelos is a 25 x 25* ***m.***

Other significant achievements:

1. **अनुसंधान एवं विस्तार वृत्त जबलपुर में संचालित लघु अनुसंधान संचालित परियोजना शीर्षक टॉल ट्री (बड़े पौधों) के वृद्धि में विभिन्न कारकों का अध्ययनः प्रजाति–नीम (स्थल – शहरी रोपणी, जबलपुर)**

   - कार्यो पर तकनीकी मार्गदर्शन हेतु नोडल ऑफिसर के रूप में कार्य किया। परियोजना प्रजाति नीम के लिये प्रस्तावित की गयी तथा विभिन्न क्षेत्रों के बीज से पौधा तैयारी का तुलनात्मक प्रभाव जानने के लिए मालवा, निमाड़, ग्वालियर, महाकौशल (जबलपुर) एवं विन्ध्यक्षेत्र (सतना, रीवा) क्षेत्रों से नीम बीज एकत्रीकरण तथा विभिन्न उपचारों के अनुसार पौधो की वृद्धि सम्बधित आकड़े एकत्रित किये गये।

   - अंतिम परियोजना प्रतिवेदन अपर प्रधान मुख्य वन संरक्षक अनुसंधान विस्तार एवं लोक वानिकी, सतपुड़ा भवन, मध्यप्रदेश, भोपाल (म.प्र.) को प्रेषित किया जा चुका है।

2. ग्रीन इण्डिया मिशन के तहत इकोसिस्टम सर्विसेज इम्प्रूवमेंट प्रोजेक्ट के लिए "Forestry/Ecosystem Service and Knowledge management Specialist" चयन हेतु दिनाक 11/02/2020 को सतपुडा भवन भोपाल में चयन प्रक्रिया में साक्षात्कार समिति सदस्य के रूप में भाग लिया।

3. Collection of baseline data and impact of airport activities on proposed Tiger Safari at Dumna Nature Park. Funding Agency-Municipal Corporation, Jabalpur (M.P.)

   - Worked as PI in the project for monitoring the noise intensity and air quality of the project area.
   - The sound intensity, its duration and frequency in the present scenario is not posing any risk for tigers to be introduced in the proposed Tiger Safari at Dumna Nature Park.
   - Air Quality - Air quality not found affected due to aircraft movement. All the parameters including PM 2.5, PM 10, TSP, O_2, SO_2, CO, CO_2, draught and temperature were recorded under acceptable limits. Even SO_2, CO, CO_2 level found below the detectable limit.
   - Report submitted to Funding Agency.

2.3. GENETICS, TREE IMPROVEMENT AND BIOTECHNOLOGY DIVISION

2.3.1 FOREST GENETICS AND BIOTECHNOLOGY

Mandate

1. Standardization of clonal propagation protocol using biotechnological applications of tree & medicinal plant species.
2. Germplasm evaluation of medicinal plants through chemoprofiling.
3. Cryopreservation of rare, endangered and threatened medicinal plants.
4. Genetic diversity assessment of different species using molecular marker techniques.
5. Species specific identification through molecular marker technique for plant.

Completed Projects - Five

1. Genetic diversity assessment using molecular characterization, chemoprofiling, standardization of micropropagation and cryopreservation protocol of four RET species. (*Berberis aristata, Swertia angustifolia, Embelia tsjeriam-cottam, Saraca asoka).*
2. Quantitative determination of bio-active compounds of highly threatened medicinal plant species (*Butea superba, Corallocarpus epigeous Alectra chitrakutensis*) through chemoprofiling and standardization of propagation techniques using biotechnological interventions for their conservation.
3. Forensic DNA profiling and timber tracing for origin of wood with special reference to *Tectona grandis* (Teak) and *Pterocarpus marsupium* (Beeja).
4. Monitoring and evaluation of tissue culture grown plants of *Dendrocalamus asper* in different forest divisions of Madhya Pradesh.
5. Production of *Dendrocalamus asper* through tissue culture technique.

Summary of achievements/activities & outcome of each projects

Completed Projects

1. **Genetic diversity assessment using molecular characterization, chemoprofiling, standardization of micropropagation and cryopreservation protocol of four RET species. (*Berberis aristata, Swertia angustifolia, Embelia tsjeriam-cottam, Saraca asoka).***
   Funding Agency : National Medicinal Plant Board (NMPB), New Delhi
   1. The germplasm of proposed species were collected from different geographical location of the country.
   2. Genetic diversity assessment was conducted using molecular markers.
   3. The genetically distinct populations were evaluated on the basis of their polymorphism for the identification of elite material.
   4. Chemoprofoling was performed using HPLC for the identification of quality planting material by estimating bioactive ingredients (alkaloids).
   5. Clonal propagation technique was standardized through macro and micropropagation technique.

Rooting responses of stem branch cutting of *Berberis aristata* & *Swertia angustifolia*

2. Quantitative determination of bio-active compounds of highly threatened medicinal plant species (*Butea superba, Corallocarpus epigeous Alectra chitrakutensis*) through chemoprofiling and standardization of propagation techniques using biotechnological interventions for their conservation.

Funding Agency: APCCF (R/E and Lok Vaniki),MP. Bhopal.

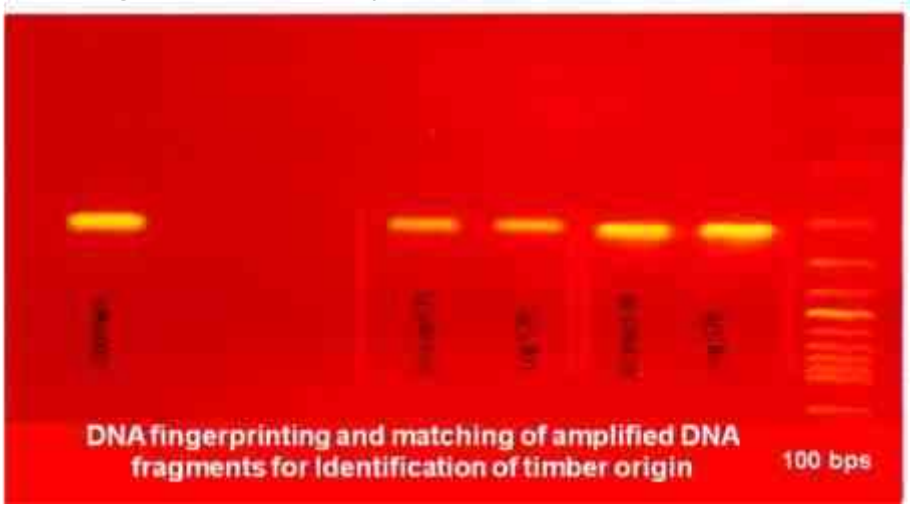
1. The germplasm of proposed species were collected from different forest areas of Madhya Pradesh.
2. The bioactive compound (alkaloid) in *Butea superba* and *Alectra chitrakutensis* were estimated through HPLC.
3. The critically endangered medicinal plant *Alectra chitrakutensis* were multiplied through clonal propagation.
4. Rare medicinal plant *Butea superba* was multiplied through macropropagation.

In vitro grown plants of *Alectra chitrakutensis* with host plants

3. Forensic DNA profiling and timber tracing for origin of wood with special reference to *Tectona grandis* (Teak) and *Pterocarpus marsupium* (Beeja).

Funding Agency: APCCF (R/E and Lok Vaniki),MP. Bhopal.

1. The DNA fingerprinting technique has significant practical applications of molecular markers as a forensic timber identification tools, screening of suspect material and identification of illegally sourced wood.
2. The genetic information which is non-manipulable and authentic provides a trustworthy trait to evaluate any biological material at various levels, and that can be traced by forest department. In addition, the modified protocol also helps to isolate high quality of DNA from wide range of timber wood species (leaf, fresh and dry wood), in short time, cost-effective and suitable for PCR amplification.
3. In this project the stumps and logs (Teak) DNA were isolated successfully and matched through DNA fingerprinting technique for the origin of wood. Hence, this mechanism can be used for identification of origin of wood which helps in wood forensic studies.



Matching of DNA form both the origin (Stump and Log)

4. Monitoring and evaluation of tissue culture grown plants of *Dendrocalamus asper* in different Forest Divisions of Madhya Pradesh.

Funding Agency: Mission Director, M.P. State Bamboo Mission, Bhopal.

Interim Finding/Activities:

The *Dendrocalamus asper* plants were distributed to forest department in 2017 there filed performance were monitored in 2018. It was noticed that the survival percent of *Dendrocalamus asper* were 12.66% in Teekamgarh, 16.88% in Raisen and 0.66% in Alirajpur

The field performance of *Dendrocalamus asper* were not recorded due to unavailability of plants under field conditions in Ujjain, Indore, North Betul and South Seoni.

5. Production of *Dendrocalamus asper* through tissue culture technique.

Funding Agency : Mission Director, M.P. Bamboo Mission, Bhopal.

- Combination of 3.0mg/lt. BAP & IAA 0.1mg/lt., excellent morphogenetic response in terms of shoot induction and shoot multiplication were observed. Other combination and concentration of BAP & IAA showed moderate to poor morphogenetic response. On MS control medium no morphogenetic response were observed.
- *In-vitro* raised shoots were harvested and separated for root induction. Profuse root induction were observed when MS culture medium was supplemented with NAA 3.0mg/lt. and IAA 1.0mg/lt. In this combination NAA helped for induction of roots from shoots while IAA helped for more elongation of healthy shoots. 5000 *In-vitro* regenerated plantlets were shifted in 1:1:1 FYM for acclimatization and hardening.
- 5000 plants were produced and distributed to forest department.

On-going Project: One

1. **Identification of potential pockets and selection of candidate plus trees of Bija and standardization of its clonal propagation technique.**

Summary of achievements / activities & outcome:

1. Identification of potential pockets and selection of candidate plus trees of Bija and standardization of its clonal propagation technique.

Funding Agency: PCCF (R/E & Lok Vaniki), M.P. Bhopal

Interim Finding/Activities:

1. The working plan of different forest division Seoni, Chhindwara, Balaghat were reviewed for the occurrence of Bija.
2. Total 35 Candidate Plus Trees (CPTs) have been identified from Seoni and Balaghat Forest Division.
3. The cuttings were collected from CPTs as well as SFRI campus for standardizing clonal propagation technique.
4. Two types of cuttings vertical and horizontal were tried under mist chamber for rooting of cuttings for standardizing clonal propagation. The cuttings were treated with various concentration of root promoting hormones IBA and NAA from 100 to 1000 ppm concentration.
5. It was observed that It takes 2 to 3 months for horizontal cuttings to sprout but very poor rooting response was observed. Vertical cuttings failed to sprout.
6. Various combination and concentrations were tried in culture media but no morphogenetic response were observed.

Pterocarpus marsupium (Bija)

Other significant achievements:

1. Trainings provided to various stake holders such as Trainee Range Officers, Forest Guards, students etc.
2. Establishment of bamboo rhizome bank of different bamboo species collected from North East States of India.
3. विश्व पर्यावरण दिवस के अवसर पर राज्य वन अनुसंधान संस्थान, जबलपुर द्वारा आयोजित 'वायु प्रदूषण' विशय के अन्तर्गत आयोजित कार्यक्रम दिनांक 05/06/2019 में भाग लिया।
4. ''अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघुशोध कार्यों की अद्यतन स्थिति का आंकलन'' अनुसंधान एवं विस्तार वृत्त खंडवा की निर्माण, नेपानगर एवं बोरगांव रोपणियों का श्रेणीकरण, मान्यता एवं लघु ोध कार्यों की अद्यतन स्थिति का आंकलन का कार्य किया गया।

2.3.2 TREE IMPROVEMENT

Mandate

1. To select, document and maintain the plus trees.
2. To raise seedling and clonal seed orchards.
3. To conduct progeny trials.
4. To raise quality planting stock.
5. To maintain and enrich bamboosetum of SFRI

Completed project - One

1. Evaluation of performance of different plus trees of Teak through progeny trial.

Summary of achievements/activities & outcome:

Completed project

1. Evaluation of performance of different plus trees of Teak through progeny trial.

Funding Agency : SFRI, Jabalpur

1. The progeny trial of teak plantation was established in 1996 in Katni Forest Division.
2. Total 10 clones were tested for their performance of different plus tress of teak through progeny trial.
3. The highest genetic gain is reported from the trees of family Betul Baretha CPT 10 (BBC_{10}) while the minimum is reported from family North Raipur Lavan CPT 17 ($NRLC_{17}$).
4. The family members of Betul Baretha CPT 10 (BBC_{10}) showed maximum genetic gain and it can be used for further genetic improvement programme such as controlled breeding and cloning etc.

On-going Project : One

Summary of achievements/activities & outcome:

1. Maintenance and enrichment of SFRI Bamboosetum.

Funding Agency: Director, M.P. State Bamboo Mission, Bhopal.

Interim Finding/Activities:

- SFRI, Jabalpur established Bamboosetum in an area of 1.0 ha. This bamboosetum consists of 47 species belonging to 12 genera.
- This bamboosetum will facilitate further genetic improvement programme such as their propagation and multiplication by various means. Maintenance of bamboosetum is going on.
- Bamboo rhizomes of different bamboo species were collected from different forest areas of Meghalaya and Nagaland states during April, 2018. The rhizomes of bamboo species have been planted in rhizome bank in the month of August, 2019.

- The maintenance of these plants is in progress. The pit size is 60×60×60 cm and spacing between plant to plant and row to row is 8 meter × 8 meter.


Views of bamboosetum of SFRI, Jabalpur

Regular Activities

1. Provenance trial of Litsea (*Litsea glutinosa*).
2. Maintenance of clonal germplasm of *Madhuca latifolia* (Mahua).
3. Maintenance of Seedling Seed Orchards of *Gmelina arborea.*

1. Provenance trial of Litsea (*Litsea glutinosa*).

Objective : Provenance trial of *Litsea glutinosa* to conserve its germplasm.

- Seedling of eight provenance (places) were planted in 15 replication with spacing of 3m×3m in the year 2011 in 0.25 ha.
- The performance of Patalkot provenances was found to be the best over other tried provenances.

2. Maintenance of clonal germplasm of *Madhuca latifolia* (Mahua).

Objective : To maintain the germplasm bank of Mahua for training and motivation.

- Clonal orchard has been established in SFRI campus in the year 2011 in 0.1 ha. Six Clonal germplasm namely SFRI-1, SFRI-2, SFRI-3, SFRI-4, SFRI-5 and SFRI-6 were conserved in six replication of each (36 in number)
- Weeding, soil working and insecticides treatment works have been done.
- The height and collar girth has been recorded. No flowering and fruiting was recorded during this year.

3. Maintenance of Seedling Seed Orchards of *Gmelina arborea*.

Objective : To get improved planting material.

- Plantation was established in 0.5 ha area in July 2005 at SFRI campus. A total of 480 plants of 30 families were raised. Flowering and fruit setting has been observed in few trees.
- Brush shoot clearance work has been done. Three trees were marked as candidate plus tree from the orchard.

2.4 SEED, SILVICULTURE AND AGRO-FORESTRY DIVISION

2.4.1 SEED TECHNOLOGY

Mandate

1. Collection of quality seeds from identified superior genetic sources.
2. Seed storage.
3. Seed certification.
4. Research on seed biology, pollination biology, physiology and biochemistry.
5. Contribution to the knowledge of seed technology with regards to enhanced germination and longevity of seeds.

Completed Project – Three

1. Standardization of seed and nursery techniques for production of quality planting stock of important indigenous species
2. Production of quality planting stock of important RET and wild medicinal tree species through application of advanced technology
3. Cultivation and production of plants of wild medicinal species.

Summary of achievements / activities & outcome of each project:

1. Standardization of seed and nursery techniques for production of quality planting stock of important indigenous species.

Funding Agency : PCCF (R/E, Lok Vaniki), M.P. Bhopal

Findings

On the basis of above findings, following conclusion were drawn:

- As regards development of seed technology, species wise results was given below:

Species	Best pretreatment	Best storage condition	Best use before
Adina cordifolia	Cold water for 72 hours	Sealed plastic container with Silica gel	6 months
Adansonia digitata	10% H_2SO_4 for 10 minutes	4°C temperature	12 months
Terminalia bellirica	20% H_2SO_4 for 10 minutes	Sealed Plastic container	18 months
Terminalia chebula	40% H_2SO_4 for 10 minutes	Sealed Polythene bags	18 months
Sapindus trifoliatus	GA3 200 ppm for 10 minutes	Sealed Plastic container	18 months

- Pure sand was found as the best sowing medium for maximum germination in *Adina cordifolia,*
- *Adansonia digitata, Terminalia bellirica, Terminalia chebula* and *Sapindus trifoliatus* with respect to nursery techniques.
- Potting media for growth and survival of seedlings with promising results in *Adina cordifolia, Terminalia chebula* and *Sapindus trifoliatus* were mixture of Sand + Soil + Vermicompost in the ratio of 1:1:2 (T9) and in *Terminalia bellirica* the ratio of potting mixture of Soil + Sand + Vermicompost was found to be 1:1:1 (T6).
- In *Adansonia digitata* the best potting media was found to be the mixture of Soil + 40gm PSB (T17).

Experiment of *Adina cordifolia* in biodegradable bags

- ❖ In vegetative propagation the rooting response was found in *Adansonia digitata* with hormonal treatment 250 ppm IBA and 500 ppm IBA and in *Sapindus trifoliatus* with hormonal treatment 500 ppm IBA
- ❖ Species wise brochure prepared and published for extension programme.

2. Production of quality planting stock of important RET and wild medicinal tree species through application of advanced technology (Internal).

Funding Agency : SFRI, Jabalpur

.**Results:**

To achieve these objectives, 35000 quality plants has been produced by using application of advance technology and sold to the department and other interested institutions.


Production and disposal of quality planting stock

3. Cultivation and production of plants of wild medicinal species.

Funding Agency : RCFC, Central Region, Jabalpur

Results:

35000 quality planting stock of 10 targeted wild Medicinal species produced and disposed to interested institutions and department.


Plant Production and disposal of various wild medicinal plants

On-going Projects - Four

1. Dissemination of knowledge through training programme for sustainable management and quality fruit collection of Chironji to stakeholders.
2. Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important species viz. Anogeissus latifolia & Commiphora wightii.

3. Training and demonstration programme on establishment and best management of Seed Production Areas, Seed Technology and Nursery Management for Field Foresters.
4. अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यों की अद्यतन स्थिति का आंकलन।

Regular activity : One

1. Seed Testing and Certification

Summary of achievements / activities & outcome of each project:

1. Dissemination of Knowledge Through Training Programme for Sustainable Management and Quality Fruit Collection of Chironji to Stakeholders.

Funding Agency : PCCF (R/E, Lok Vaniki), M.P. Bhopal

Achievement

- The project started from January 2020 and project staff recruitment work has been completed.
- Training module and course material has been prepared.

2. Germplasm evaluation and Standardization of Propagation technology for Production of Quality Planting Stock of medicinally important species viz. *Anogeissus latifolia & Commiphora wightii*.

Funding Agency : PCCF (R/E, Lok Vaniki), M.P. Bhopal

Achievement

- The project started from January 2020 and project staff recruitment work has been completed.
- Review of literature has been completed.
- Seeds and Vegetative part of guggle has been procured from Morena District under project work.

3. Training and Demonstration Programme on Establishment and Best management of Seed Production Areas, Seed Technology and Nursery Management for Field Foresters.

Funding Agency : PCCF (R/E, Lok Vaniki), M.P. Bhopal

Achievement

- The project started from January 2020 and project staff recruitment work has been completed.
- Training module and course material has been prepared.

4. अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यों की अद्यतन स्थिति का आंकलन।

Funding Agency : PCCF (R/E, Lok Vaniki), M.P. Bhopal

Achievements :

- ग्वालियर अनुसंधान विस्तार केन्द्र की तीन रोपणी भूता बैराज एवं गुना के कार्यों का श्रेणीकरण, मान्यता, मूल्यांकन कार्य के साथ–साथ रोपणी के अमले को प्रशिक्षण।
- सागर अनुसंधान विस्तार एवं लोकवानिकी केन्द्र की 10 रोपणियों : चकरा, सिरोंजा, बहरोल, अंडेला, गंज, पण्डाझिर, देवरा, कुण्डेशर, पिपरोठ, अमरमऊ का सतत् मूल्यांकन, श्रेणीकरण एवं प्रशिक्षण कार्य किया गया।


अनुसंधान विस्तार की रोपणियों का अवलोकन एवं प्रशिक्षण

Regular activities - 1

1. Seed, collection, testing & certification.

Objectives:

1. Seed Collection, testing and certification.
2. To provide quality seeds for future plantation programme of users

Achievements :

- 42 seed samples of teak and other misc. seeds were tested and certified.
- 200 quintals of teak seeds and 132 quintals seeds of various miscellaneous species were collected during the year.
- 200 quintals of teak seeds were treated with scientifically and after treatment 127.5 quintals seeds was obtained which was disposed to MP Forest Department and other state.

2.4.2 SILVICULTURE

Mandate:

1. Contribution to the knowledge of silviculture of forestry species.
2. Development and standardization of nursery and planting techniques of different forestry species.
3. Evaluation of plantations raised by the State Forest Department and Forest Development Corporation.
4. Evaluation of the quality and impact of various development activities of the state forest department.
5. Determination of sustainable harvesting practices of timber and bamboo species.
6. Provision of soil testing services to the State Forest Department, Forest Development Corporation and other stakeholders.

Completed Projects: Four

1. Mobile Soil Testing Van
2. चलित मृदा परीक्षण प्रयोगशाला के माध्यम से म.प्र. के अनुसंधान एवं विस्तार केन्द्रों में मृदा परीक्षण कर मृदा में उपस्थित पोषक तत्वों की जानकारी प्रदान करना।
3. Selection of suitable species on the basis of growth performance of established plantations and development of nursery techniques to increase green cover under Green India Mission (GIM) in western Madhya Pradesh.
4. Study and Comparison of Soil Cultural Practices in existing bamboo(*D. strictus*) plantations

Summary of achèvements/ activities & outcome of each projects:

1. Mobile Soil Testing Van

Funding agency : CAMPA, Bhopal (M.P.)

- Report submitted to funding agency.
- 634 soil samples from Katni, Jabalpur, Raisen, Indore, Mandla, South Seoni, North Seoni, Narsinghpur, Balaghat Forest Divisions & 11 R&E centers collected and analyzed.


On site collection of soil samples and soil testing in mobile van

2. चलित मृदा परीक्षण प्रयोगशाला के माध्यम से म.प्र. के अनुसंधान एवं विस्तार केन्द्रों में मृदा परीक्षण कर मृदा में उपस्थित पोषक तत्वों की जानकारी प्रदान करना।

Funding Agency : APCCF (R/E and Lok Vaniki) M.P. Bhopal

अनुसंधान एवं विस्तार वृत्तों के मृदा नमूनों का चलित मृदा परीक्षण प्रयोग ाला के द्वारा परीक्षण

क्र.	अनुसंधान एवं विस्तार वृत्त का नाम	कुल मृदा नमूने
1.	जबलपुर	24
2.	रीवा	74
3.	ग्वालियर	45
4.	सागर	72
5.	भोपाल	63
6.	रतलाम	40
7.	झाबुआ	83
8.	इंदौर	27
9.	खंडवा	79
10.	बैतूल	45
11.	सिवनी	94
	कुल मृदा नमूने	**646**


Discussion and demonstration of soil testing in mobile soil testing van

3. Selection of suitable species on the basis of growth performance of established plantations and development of nursery techniques to increase green cover under Green India Mission (GIM) in western Madhya Pradesh.

Funding agency : CAMPA, Bhopal (M.P.)

1. Proforma for field survey has been prepared.
2. Field survey of 16 divisions (Mandsour, Neemach, Ratlam, Ujjain, Dewas, Indore, Sajapur, Rajgarh, Dhar, Jhabua, Khandwa, Burhanpur, Khargon, Badwani, Harda and Alirajpur) have been successfully completed and reports regarding above have been submitted as per schedule.
3. A booklet has been prepared regarding (Nursery and plantation techniques for suitable species in western M.P.)

Field survey for selection of suitable species in Western MP

4. Study and comparison of soil cultural practices in existing bamboo *(D. strictus*) plantations

Funding Agency : APCCF (R/E and Lok Vaniki) M.P. Bhopal

- Report submitted to funding agency.
- Protocol of bamboo soil working developed for adoption in the field.


Demonstration of soil working in bamboo plantations

On-going Projects - Two

1. म.प्र. राज्य वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्श 2015–2016 (द्वितीय मूल्यांकन) एवं 2016–17 (प्रथम मूल्यांकन) के वर्शा ऋतु में हुए वृक्षारोपण कार्यों का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पेक्ट असिसमेंट (पी.आई.ए.) के संबंध
2. मिट्टी के भौतिक एवं रासायनिक गुणों पर जंगल की आग का प्रभाव

Regular Activity :

1. Analysis of soil samples

Summary of achievements / activities & outcome of each project:

1. **म.प्र. राज्य वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्ष 2015–2016 (द्वितीय मूल्यांकन) एवं 2016–17 (प्रथम मूल्यांकन) के वर्षा ऋतु में हुए वृक्षारोपण कार्यों का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पेक्ट असिसमेंट (पी.आई.ए.) के संबंध।**

Funding Agency: APCCF (JFM/FDA) MP Bhopal

Activities:

- Selection of project staff.
- Collection of information of plantation from different Forest Divisions.
- Preparation of work plan.

2. **मिट्टी के भौतिक एवं रासायनिक गुणों पर जंगल की आग का प्रभाव**

Funding Agency: APCCF (Protection), MP Bhopal

Activities:

- Selection of project staff.
- Review of literature.

Regular Activity : **One**

1. Analysis of soil samples.

520 soil samples were received from forest department, MPRVVN Ltd., private agencies (NGO's) and various branches of the institute. These were analysed for their physical and chemical properties and nutrients status for various parameters viz. moisture, pH, EC, organic carbon%, organic matter, available nitrogen, phosphorus, potassium, calcium, sodium, water holding capacity, textural class, bulk density, specific gravity, etc. Soil analysis reports were sent to the concerned agencies and various branches of the institute.

Exposure visit of trainee foresters mobile soil testing van of the institute

2.4.3 AGRO-FORESTRY

Mandate

1. Documentation of existing agro-forestry systems of different agro-climatic condition.
2. Impact assessment of agro-forestry technologies on natural resource management and livelihoods.
3. Study of social, anthropological and economic issues of agro-forestry with special reference to tribal and women.
4. Strengthening agro-forestry database development programme and to serve as a repository of information.

On-going projects - Three

1. पश्चिमी मध्यप्रदेश के मालवा का पठार कृषि–जलवायु प्रक्षेत्र (क्षेत्रीय वन वृत्त, उज्जैन) के अंतर्गत कृषक समृद्धि योजना द्वारा कृषि वानिकी के तहत निजी भूमि के रोपण एवं वर्तमान कृषि वानिकी मॉडल का अध्ययन।
2. मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा का आँकलन।
3. देवास जिले में लोकवानिकी प्रबन्ध योजना क्रियान्वयन का अनुश्रवण एवं मूल्यांकन।

Ongoing projects

1. पश्चिमी मध्यप्रदेश के मालवा का पठार कृषि–जलवायु प्रक्षेत्र (क्षेत्रीय वन वृत्त, उज्जैन) के अंतर्गत कृषक समृद्धि योजना द्वारा कृषि वानिकी के तहत निजी भूमि के रोपण एवं वर्तमान कृषि वानिकी मॉडल का अध्ययन।

Funding Agency : PCCF (R/E and Lok Vaniki) M.P. Bhopal

इस परियोजना के अंतर्गत इन्दौर, धार, देवास, रतलाम, मन्दसौर एवं नीमच जिलों में प्रारम्भिक सर्वेक्षण का कार्य पूर्ण कर वनमंडल कार्यालय से आवश्यक जानकारी एकत्र करने का कार्य किया गया। निजी भूमि में प्रायोगिक प्रदर्शन प्लाट स्थापित करने हेतु धार, रतलाम एवं देवास जिले में कृषकों का चयन किया गया। 44 वी. अनुसंधान सलाहकार समिति की बैठक (16 सितम्बर 2019) में निर्देशित किया गया कि तकनीकी कारणों से कृषकों के खेतों में उक्त प्रदर्शन प्लाट स्थापित करने के लिए राशि नही दी जा सकती, कृषकों को केवल पौधे दिए जाएगे। ऐसी परिस्थिति के लिए कृषक तैयार नही थे, इसलिए फंडिंग एजेन्सी के निर्देशानुसार कृषक समृद्धि योजना के अंतर्गत किए गये रोपण एवं स्थापित प्रदर्शन प्लाट का उज्जैन वन वृत्त के अंतर्गत अध्ययन करने के लिए परियोजना प्रस्ताव को संशोधित एवं पुनरीक्षित कर कर अनुमोदन प्राप्त किया। परियोजना का अध्ययन क्षेत्र उज्जैन, मन्दसौर, रतलाम, नीमच, देवास, आगर एवं शाजापुर रहेगा।

2. मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा का आँकलन

Funding Agency : PCCF (R/E and Lok Vaniki) M.P. Bhopal

इस परियोजना के अंतर्गत देवास, इंदौर, धार, भोपाल, सागर, पन्ना, छिंदवाड़ा, सिवनी, बालाघाट जिलों में महुआ फूल एवं अचार गुठली से सम्बंधित प्रारंभिक सर्वेक्षण कार्य के साथ वनमंडलों में जाकर महुआ फूल एवं अचार गुठली के द्वितीयक आँकड़ों के एकत्रीकरण का कार्य किया गया। इसके उपरांत मंडला जिले की (06 तहसीलों), डिण्डोरी (03), सतना (11), कटनी (07), पन्ना (09), शहडोल (06), अनूपपुर (02), टीकमगढ़ (06), निवाड़ी (01), छतरपुर (12), सीधी (07), सिवनी (08) एवं रीवा (03 तहसीलों) में सामाजिक–आर्थिक सर्वेक्षण का कार्य पूर्ण करते हुए प्रत्येक जिले की सभी तहसीलों से 2–2 गॉवों का चयन कर महुआ फूल एवं अचार गुठली संग्रहण करने वाले 5 प्रतिशत कृषकों का साक्षात्कार लेकर संरचित अनुसूची में ऑकड़ा एकत्र करने का कार्य पूर्ण किया जा चुका है।

कटनी जिले में महुआ एवं अचार गुठली के संग्राहक से साक्षात्कार

टीकमगढ़ जिले में महुआ संग्राहकों के साथ समूह चर्चा करते सर्वेक्षण दल के सदस्य

3. **देवास जिले में लोकवानिकी प्रबन्ध योजना क्रियान्वयन का अनुश्रवण एवं मूल्यांकन**

Funding Agency : PCCF (R/E and Lok Vaniki) M.P. Bhopal

इस परियोजना के अंतर्गत देवास जिले में लोक वानिकी प्रबन्ध योजना के कियान्वयन का अनुश्रवण एवं मूल्यांकन कार्य किया जाना है। पयिोजना स्टाफ की नियुक्ति होने के उपरांत कोरोना महामारी के कारण स्थल सर्वेक्षण का कार्य नही हो पाया है। सर्वेक्षण के लिए तहसील, गॉव एवं हितग्राहियों के चयन का कार्य पूर्ण कर लिया गया है।

2.5 SOCIAL ECONOMICS, MARKETING AND MENSURATION DIVISION

Mandate

1. Research on social, economic, marketing and mensurational aspects related to forestry.
2. Measurements of growth for computing volume and finding the development of crop stands, for different species, in different quality classes and in different climatic zones of the state.

2.5.1 SOCIAL ECONOMICS AND MARKETING

Completed Projects – Four

1. Assessment of demand and supply and value supply chain of three commercially important medicinal species .
2. Database management system for medicinal plants in Madhya Pradesh.
3. Survey of existing primary processing centres, evaluation of their present status and identification of their infrastructure upgradation and training needs.
4. Capacity building of forest staff and rural communities in sustainable harvesting and primary processing of selected medicinal plants.

Summary of achievements / activities & outcome :

Completed Projects - Four

1. Assessment of demand and supply and value supply chain of three commercially important medicinal species.

Funding agency: Regional-Cum-Facilitation Centre, Central Region, Jabalpur

Objectives:

- Estimation of the demand and supply of Baibidang, Malkangni and Vanjeera.
- Documentation of the prevailing collection/harvesting and primary processing techniques used by the rural population.
- Study of value-supply chains of these species.

Outcome:

The assessment of demand and supply of the three medicinal plants showed that the state is surplus in these species and about 80-90% of produce to being supplied to other states and markets. The value of Baibirang is Rs.99.20 lakhs that of Malkangini is Rs.28.40 lakh and Vanjeera it is Rs.195.75 lakhs. These are high value medicinal plants.

Large part of these species are produced in the Mahakaushal region of the state which has a large extent of forest area. However, Baibirang and Malkangni represent rare species and if they are harvested unsustainably and with no efforts for resource argumentation in forests or cultivation in farm lands, these are likely to disappear from more areas.

Table-1: Supply chains of Baibirang, Malkangni & Vanjeera

S.N	Medicinal Plant	Major markets in M.P	Major markets outside state
1.	Baibirang	Chhindwara, Katni, Neemuch, Mandla, Umaria, Neemuch.	Punjab, Delhi, Kerala, Karnataka, Nagpur (M.S.), Raipur (C.G.) Rajnandgaon (C.G.), Kanpur, Lucknow, (U.P.), Odisha, Gujarat, Rajasthan.

S.N	Medicinal Plant	Major markets in M.P	Major markets outside state
2.	Malkangni	Chhindwara, Katni, Neemuch, Mandla, Umaria, Bhopal, Shivpuri, Satna, Panna, Gadasarai, Indore.	Punjab, Delhi, Kerala, Karnataka, Nagpur (M.S), Raipur (C.G.), Rajnandgaon (C.G.), Kanpur (U.P.), Odisha, Gujarat, Rajasthan.
3.	Vanjeera	Bhopal, Indore, Hoshangabad, Mandla, Shahdol, Bhopal, Neemuch, Chhindwara, Alirajpur	Gujarat, Rajasthan, Amritsar, (Punjab), Delhi, Nagpur (M.S.), Rajnandgaon (C.G.), Raipur, Dhamtari (C.G.), Odisha

2. Database management system for medicinal plants in Madhya Pradesh.

Funding agency: Regional-Cum-Facilitation Centre, Central Region, Jabalpur

Objective

- To identify the major pockets of natural occurrence of medicinal plants.
- To identify the major pockets of cultivation and get details of species cultivated by different farmers.
- To document traders and the existing ISM industries, the names/addresses/contact no. of medicinal plant farmers/traders/processors/ISM industries in M.P.
- To disseminate the relevant information in the quarterly newsletter 'Van Dhan Vyapar'

Achievement

- Identification of major pockets of natural occurrence of medicinal plants was done through review of literature of various reports, journals and research papers and through some primary surveys. Areas of natural occurrence of medicinal plants is shown in Table 1.

Table1: Major pockets of natural occurrence of medicinal plants in Madhya Pradesh.

S. No.	Districts	Major Pockets Identified	Medicinal species
1.	Chhindwara	Tamia	Harra, Bahera, Aonla, Achar, Vanjeera, Malkangini, Baibirang, Bhilwa,
		Delakhari	Harra, Bahera, Achar, Aonla, Vanjeera, Malkangini, Baibirang, Apamarg, Arjun bark, Kalihari, Kalmegh, Kali musli, Giloy, Tikhur, Nagarmotha, Nirgundi, Neem, Bechandi, Bael, Marorphali, Bahera.
2.	Mandla	Mawai	Harra, Baibirang, Vanjeera, Buch, Kali Musli, Charota seed, Safed Musli, Dhawai flower, Aonla, Kali musli, Keokand.
		Anjania	Charota seed, Dhawai flower, Baibirang, Aonla, Nagarmotha.
3.	Dindori	Bajag	Aonla,Vanjeera, Malkangini, Baibirang, Dhawai flower, Buch.
4.	Katni	Reethi	Harra, Bahera, Marorphali, Achar, Bael, Bhilwa, Aonla, Baibirang, Nagarmotha, Dhawai flower, Gudmar leaves, Anantmool, Kalmegh.
		Paan umaria	Nagarmotha, Charota, Baibirang, Malkangini, Harra, Bahera.
		Khitauli	Kalmegh, Nagarmotha, Gudmar, Satawar, Kali Musli, Nirmali, Giloy, Bahera, Aonla, Bhilwa.
5.	Umaria	Umaria	Nagarmotha, Harra Bahera, Aonla, Bhilwa Gudmar, Kalmegh, Charota, Dhawai flower, Malkangini.
6.	Satna	Majhgawa	Harra, Bahera, Aonla, Satawar, Nagarmotha, Gudmar leaves.
7.	Panna	Kalda	Aonla, Safed Musli, Bael, Satawar, Nagarmotha, Charota seeds, Kalmegh, Gudmar, Kalihari, Harra, Bahera.
		Pawai	Aonla, Nagarmotha, Charota seeds, Dhawai flower, Bael, safed musli.
8.	Balaghat	Lamta	Bahera, Harra, Baibirang, Malkangini, Safed musli, Satawar, Nagarmotha, Dhawai flower, Aonla, Achar, Bhilwa.

S. No.	Districts	Major Pockets Identified	Medicinal species
		Ukwa	Harra, Bahera, Baibirang, Safed musli.
9.	Shahdol	Ghunghuti	Aonla, Harra, Bahera, Nirmali, Kalmegh, Nagarmotha, Keokand, Buch, Bhui aonla.
10.	Rewa	Dabhora	Gudmar.
11.	Seoni	Barghat	Balapanchang, Charota seed, Aonla, Anantmool, Nagarmotha, Amaltas phalli, Adusa panchang, Bael, Bhilwa, Harra, Bahera Baibirang Kalmegh, Bhilwa.
		Ari	Balapanchang, Charota seed, Anantmool, Nagarmotha Amaltas phalli, Kali musli, Harra, Bahera. Baibirang, Kalmegh, Aonla, Bhilwa.
12.	Shivpuri	Pohri	Satawar, Aonla, Amaltas phalli, Sankhpuspi, Arnimool, Adusa, Arjun bark, Kateri small, Giloy, Gudmar, Nagarmotha, Neem, Balpanchang, Bramhi, Bringraj, Bahera, Bhilwa, salai guggle, Dhaora.
13.	Raisen	Raisen	Charota seed, Aonla, Safed musli, Gudmar leaves, Arjun bark, Neem, Achar.
		Dehgaon	Achar, Charota seed, Neem.
14.	Vidisha	Gyaraspur	Bahera, Giloy, Charota seed, Baibirang.
		Lateri	Bahera, Charota seed, Nagarmotha.
15.	Hoshangabad	Kesla	Kalmegh, Bahera, Achar.
16.	Sheopur	Karhal	Salai guggle, Nagarmotha, Anantmool black, Kateri big, Giloy, Gudmar, Chitrakmool, Patol panchang, Bechandi, Bael, Bharangi bark, Bahera, Aonla, Amaltas phalli.
17.	Betul	Chicholi	Vanjeera, Nagarmotha, Charota seed, Aonla, Harra, Bahera, Bhilwa.
		Bhimpur	Vanjeera, Nagarmotha, Charota seed, Aonla, Harra, Bahera.
18.	Morena	Morena	Guggal, Gudmar, Nagarmotha.
19	Tikamgarh	Baldeogarh	Nagarmotha.
20.	Chhatarpur	Chhatarpur	Nagarmotha, Aonla, Neem, Bael.
21.	Anuppur	Amarkantak	Nagarmotha, Satawar, Kalmegh, Gudmar, Safed musli, Charota seed, Buch, Kalihari, etc, Aonla, Harra, Bahera, Bhilwa, Gul bakauli.
22.	Singrauli	Bargawa	Giloy, Nagarmotha, Harra, Bahera, Anantmool, Buch, Vantulsi.
23.	Burhanpur	Burhanpur	Amaltas phali, Dudhi big, Nagarmotha.
24.	Sehore	Sehore	Amaltas phalli, Kali musli, Kullu gum, Aonla.
25.	Sidhi	Sidhi	Amaltas phalli, Aonla, Arjun bark, Tikhur, Bael, Bhilwa.
26.	Guna	Guna	Adusa, Arjun bark, Kateri small, Giloy, Gudmar, Nagarmotha, Neem, Balpanchang, Bhui aonla, Bringraj, Bahera, Aonla.
27.	Sagar	Sagar	Kalihari, Bael, Aonla, Achar.
28.	Damoh	Damoh	Kullu gum, Aonla, Achar.
29.	Khandwa	Khandwa	Kullu gum, Aonla, Achar.
30.	Narsinghpur	Narsinghpur	Bael, Aonla, Achar.
31.	Shajapur	Shajapur	Aonla.
32.	Alirajpur	Alirajpur	Aonla, Vanjeera, Malkangini.
33.	Jabalpur	Kundam	Bahera, Aonla.

- Survey of 378 cultivators of medicinal plants in Madhya Pradesh has been done to document the details of species cultivated.

Table 2: Major pockets of cultivation

S. No.	Districts	Major pockets identified	Medicinal species identified
1.	Niwari	Prithvipur	Safed musli.
2.	Tikamgarh	Jatara	Safed musli.
3.	Betul	Chichauli	Safed musli.
4.	Balaghat	Lalbarra	Buch, Bramhi.
5.	Vidisha	Haidergarh	Safed musli.
		Diwanganj	Safed musli.
6.	Indore	Rau	Safed musli, Isabgol.
7.	Alirajpur	Sondwa	Safed musli, Vanjeera.
8.	Neemuch	Manasa	Ashwagandha, Kalmegh, Isabgol, Asaliya, Tulsi, Kalonji.
		Jiron	Kalmegh, Isabgol, Asaliya, Kalonji.
9.	Mandsaur	Mandsaur	Ashwagandha, Kalonji, Asaliya, Isabgol, Kalonji, Kalmegh.
10.	Hoshangabad	Hoshangabad	Aloevera, Adusa, Jiwanti, Sarpgandha, Isabgol.
11.	Chhindwara	Delakhari	Vanjeera.
		Tamia	Vanjeera.
12.	Mandla	Mawai	Vanjeera.
13.	Jabalpur	Jabalpur	Stevia, Coleus, Haldi, Satawar.lemon grass.
14.	Narsinghpur	Narsinghpur	Stevia. Aloevera.
15.	Khandwa	Khandwa	Safed musli.
16.	Katni	Bahoriband, Katni	Lemon grass, Tulsi, Aonla

- Directory compiled of medicinal plants and NTFPs traders, cultivators and ISM industries of MP.
- Two issues of quarterly News letters Van Dhan Vyapar were published and disseminated.

Interview with medicinal plant traders in Lamta, district Balaghat

Meeting with Baidnath Ayurvedic Industry Manager in Seoni

3. Survey of existing primary processing centres, evaluation of their present status and identification of their infrastructure upgradation and training needs.

Funding agency: Regional-Cum-Facilitation Centre, Central Region, Jabalpur

Objectives:

To operationalize the established processing centres as profitable units running at optimum, besides ensuring sustained availability of raw material and livelihood to dependent local communities and quality of the processed products.

Outcome:

- Detailed survey was done in 20 processing centres which were established under NMPB scheme in 2014-15.
- Evaluation of current status of all centres and identification of infrastructure gaps in terms of manpower, machinery, raw material and marketing channel was done by undertaking visits to centres and interviewing all stake holders.
- Focussed group discussion and surveys were done to collect information on commercially important medicinal species and other NTFPs, method of processing–cleaning, drying, grading, value addition, household income from collection to the gatherers from the catchment areas.
- Collection of information on capacity building needs of the gatherers in the catchment areas.
- Identification of the equipment for upgradation of infrastructure in each centre.

The report mentions centre wise current status of infrastructure. Demographic profile of the area, medicinal plants occurrence, collection, primary processing and drying methods. Number of households engaged in collection and income from each medicinal plants/NTFPs. Present state of marketing, marketing channel. Selection of medicinal plants and NTFPs for processing centre and potential interventions required.

4. Capacity building of forest staff and rural communities in sustainable harvesting and primary processing of selected medicinal plants.

Funding agency: Regional-Cum-Facilitation Centre, Central Region, Jabalpur

Outcome:

- Identification of capacity building needs was done and preparation of training manual for five selected medicinal species Baibidang (*Embelia ribes*), Malkangni (*Celastrus paniculatus*), Vanjeera (*Centratherum anthelminticum),* Chironji (*Buchanania lanzan*), Aonla (*Phyllanthus emblica*) done.

Ongoing projects : Three

1. Network project on conservation of lac insects genetic resources.
2. Estimation of wood demand and supply in Madhya Pradesh.
3. Sequestered carbon in roadside plantations: an assessment of potential contribution in climate mitigation in Jabalpur Smart City and Katni district.

1. Network project on conservation of lac insects genetic resources.

Funding agency: ICAR Indian Institute of Natural Resins and Gums, Ranchi, Jharkhand

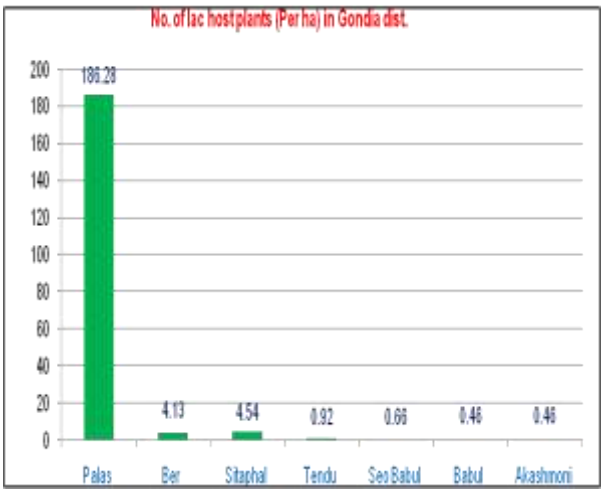
Achievements:

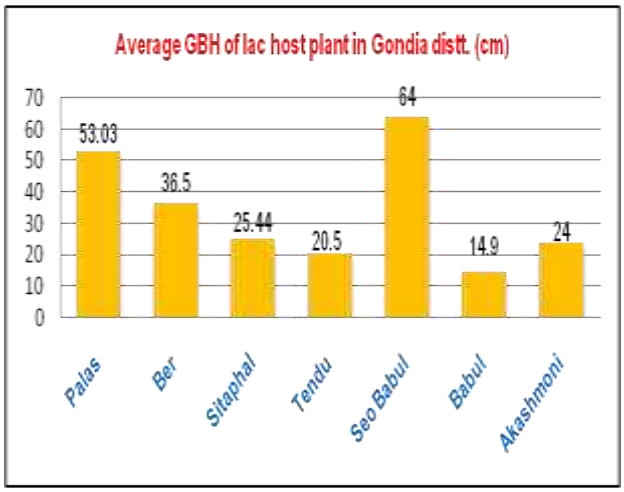
- In Madhya Pradesh survey of 58 blocks of 16 districts was done and natural occurrence of lac reported in 30 blocks of 14 districts.
- In Maharashtra, survey of 18 blocks of 4 districts was done and natural lac occurrence found in 2 blocks of 2 districts.
- 80 samples of lac insect from 40 blocks of 16 districts of Madhya Pradesh were collected and conserved in lac insect gene bank as *ex-situ* conservation.
- 40 samples of lac insect from 17 blocks of 8 districts of Maharashtra were collected and conserved in lac insect field gene bank.

Activities:

- Pruning demonstration of palas and ber were carried out in Chargaon (Kalpi), Sukhri (Mandla), Kohani (Niwas), Bhadari (Mandla), Rehloankala (Seoni) in Madhya Pradesh.
- Brood lac samples inoculation was done in selected training sites like village Rehlonkala, Block Lakhnadon, Seoni, village Kohani, Block Niwas Mandla,village Chargaon, Block Bijadandi, Mandla, village Bhadari, Mandla, Village Sukhri, Block Niwas, Mandla.
- Lac based Integrated cropping model with paddy crop were developed in Seoni and Balaghat district of Madhya Pradesh.
- Four blocks, Waraseoni, Katangi, Lalbarrha, Paraswara of Balaghat and one block of Keolari, Seoni district of Madhya Pradesh was selected in 2019 to develop lac based integrated cropping model with paddy crop.

- 50 kg brood lac was inoculated in selected five sites and total 272.7 kg stick lac produced from katki crop.
- Studies on assessment of lac host plant diversity were carried out in Gondia, Maharashtra. quadrates 10 m X 10 m size was randomly laid out in the field for detailed observation on growth parameters. Total number of 31 such quadrates were laid out in Gondia, Amgaon and Deori blocks of Gondia district in which 15 quadrates were laid out in forest lands, 16 quadrates were in farm lands.
- Among the listed host plant species in Gondia, palash was maximum with 186.28 plants ha^{-1} followed by Sitaphal (4.54 plants ha^{-1}), Ber (4.13 plants ha^{-1}), Tendu (0.92 plants ha^{-1}), Su Babul (0.66 plants ha^{-1}) and minimum number of plant ha^{-1} was found of babul and akashmoni (0.46 plants ha^{-1}).





Outcome:

- 13 trainings on scientific method of lac cultivation were conducted in Madhya Pradesh and Maharashtra in which 497 farmers benefited.
- On-farm trials on lac cultivation technologies were carried out in five different sites of M.P.
- Location specific studies on lac-insect and/or host-plants diversity were done in Gondia districts of Maharashtra.

2. Estimation of wood demand and supply in Madhya Pradesh.

Funding Agency: APCCF (R/E and Lok Vaniki) MP Bhopal

Objective

- To assess demand and supply of wood and to identify the gap in supply and demand of timber and fuel wood.
- To suggest options for management and policy interventions.

Survey of rural & urban household of 10 selected districts

S.No.	Rural & Urban Households		S.No.	Rural & Urban Household	
1.	Chhindwara	400	6.	Satna	386
2.	Damoh	471	7.	Sheopur	220
3.	Ujjain	469	8.	Shivpuri	271
4.	Jabalpur	306	9.	Tikamgarh	414
5.	Indore	462	10.	Hoshangabad	402

- **Survey of wood based industries furniture, & timber traders, plywood and veneers etc. of selected districts**

S.No.	Funiture Unit (FU) & Timber Traders (TT)		S.No.	Funiture Unit (FU) & Timber Traders (TT)	
1.	Anuppur	73	16.	Jhabua	3
2.	Balaghat	55	17.	Dhar	21

S.No.	Funiture Unit (FU) & Timber Traders (TT)		S.No.	Funiture Unit (FU) & Timber Traders (TT)	
3.	Betul	100	18.	Sihore/Budhni	15
4.	Damoh	43	19.	Tikamgarh	-
5.	Chhatarpur	53	20.	Bhopal	53
6.	Gwalior	45	21.	Katni	11
7.	Indore	308	22.	Mandsaur	10
8.	Jabalpur	151	23.	Neemach	16
9.	Rewa	118	24.	Ujjain	49
10.	Satna	48	25.	Harda	27
11.	Seoni	52	26.	Hoshangabad	22
12.	Sidhi	15	27.	Sagar	57
13.	Singrauli	22	28.	Shivpuri	-
14.	Khargone	29	29.	Sheopur	-
15.	Chhindwara	163	30.	Khandwa	51

- Total Households= Rural Households + Urban Household. The survey was done for 3801 households
- Total wood based industries = Registered Units + Unregistered Units (TT+FU). Sample of 1610 were covered.
- The service sectors covered commercial establishments like tea shops, dhabha. Working Plans for socio-economic survey of 38 districts was consulted.

Supply of wood is considered from two main sources viz,

- Forests/Plantations,
- TOFs (Trees Outside Forests), and

Hence, the supply for wood is to be calculated as FD + MPRVVN + TOFs

Where, FD = Forest Department

MPRVVN = Madhya Pradesh Rajya Van Vikas Nigam

While estimating **demand and supply of wood**, cross checks were done through assessment of transactions in timber depots and saw mills, construction industries like paper, pulp and veneer. Survey of Brick kiln, Dhaba/Restaurant, Construction of 4 districts-Ujjain, Indore, Jabalpur, Tikamgarh. Survey data compilation of Timber traders, merchants and furniture units and other wood based industries from the selected districts ongoing. Data analysis of Timber traders, merchants and furniture units and other wood based industries from the selected districts, survey of carpenters to ascertain supply of wood from TOFs, data analysis is in progress.

3. Sequestered carbon in roadside plantations: an assessment of potential contribution in climate mitigation in Jabalpur Smart City and Katni district.

Funding Agency: Environmental & Pollution Control Organization (EPCO), Bhopal, MP

Objectives

- To estimate carbon sequestration in roadside plantations and parks and gardens of in Jabalpur and Katni districts.
- To study variations in rates of carbon sequestration with species and age.
- To identify suitable tree species for roadside plantations and parks and gardens.
- To assess the potential contribution of roadside plantations in climate change mitigation.

Achievement of the project:

Roadside Plantations in Jabalpur and Katni:

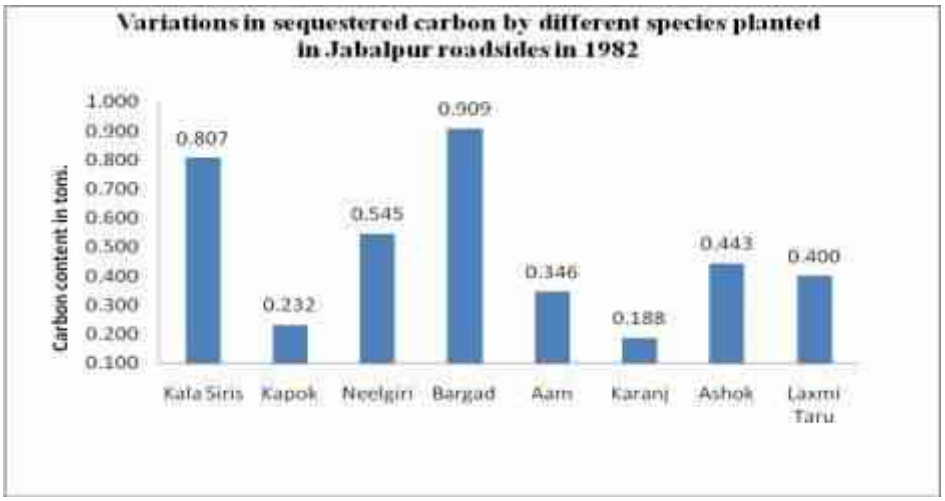
- Roadside plantations in Jabalpur and Katni was stratified various road types, such as National highway, State highway, district roads and colony roads of Jabalpur and Katni city.

- Survey and measurement of trees on these roadside plantations were stratified on basis of types of plantations like plantations on both sides of the road, one side of the road or median plantations.
- Table 1 gives progress of survey work of roadside plantations and estimation of carbon for both districts:-

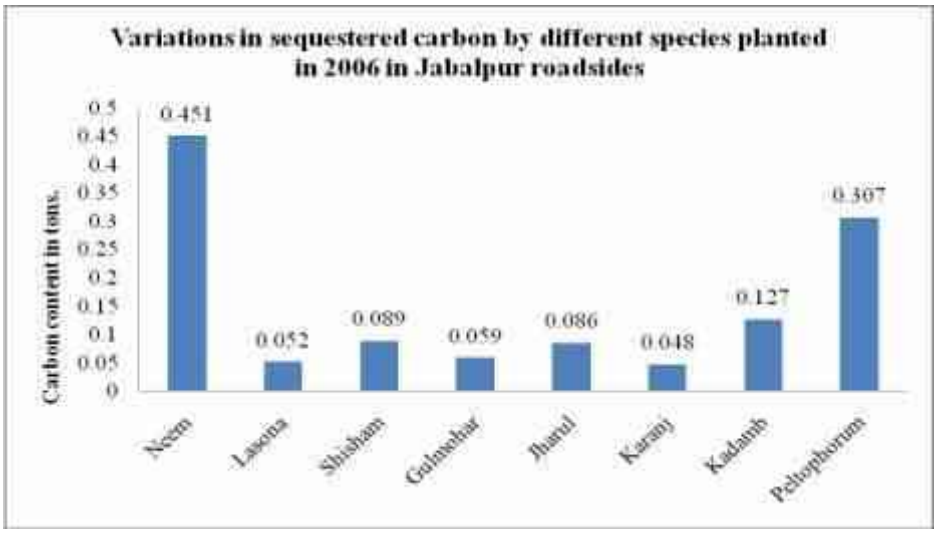
Table 1: Details of survey work of roadside plantations in Jabalpur and Katni.

S.N.	District	Road types	No. of roads	Sample	Completed	Total carbon (in tones)
1	Jabalpur	NH	02	02	02	Data analysis ongoing
		SH	02	02	02	
		District	NA	100%	100%	
		Colony	NA	50%	30%	
2.	Katni	NH	02	02	02	Data analysis ongoing
		SH	03	03	03	
		District	NA	100%	100%	
		Colony	NA	50%	30%	

- Most common tree species on basis of number of occurrences found on the roadsides are Gulmohar (*Delonix regia),* Peltaforum (*Peltaforum pterocarpum),* Kassod *(Cassisa siamea),* Karanj *(Millettia pinnata),* Ashok *(Polyalthia longifolia),* Amaltas *(Cassia fistula),* Nandi Flame *(Spathodea campanulata),* Neem *(Azadirachta indica)* and Nilgiri (*Eucalyptus territocornis).*
- Study of variations in rates of carbon sequestration with respect to species and age are shown in the following graphs the rates of variations of carbon sequestration by different species of same age:



Variations in sequestered carbon by different species planted in 1982 on roadsides (38 years of age)



Variations in sequestered carbon by different species planted in 2006 (14 years of age)

Parks and Garden in Jabalpur and Katni were also taken for estimation of sequestered carbon.

There are 200 parks and gardens ranging between 01 hectare to 05 hectare in Jabalpur. There are 62 parks and gardens of size between 01 hectare to 07 hectare size in Katni.

Selection of parks and gardens were made on the basis of size viz large parks (5-9 ha size) 100%, sampling, medium parks (2-4 ha size) 100% sampling and small parks (less than 1 ha size) 25% sampling. Selection of trees for measurements in these parks and gardens was 100% in small parks while quadrate method were applied in large park.

- Most common species in parks and gardens on basis of number of maximum occurrences in Jabalpur and Katni were recorded as Ashok (*Polyalthia longifolia),* Bottle Palm *(Hyophorbe laginicaulis),* Fish-tail Palm (*Caryota urens*), Saptparni *(Alstonia scholaris),*Kaner (*Cascabela thevetia*), Gulmohar *(Delonix regia)* and Peltaforum (*Peltaphorum pterocarpum)*.
- Among 43 parks and gardens surveyed in Jabalpur, Tagore Garden sequestered highest amount of carbon (87.6 tons); sampled trees in the gardens were 123.
- Among 22 parks and gardens surveyed in Katni Gandhi Udyan has sequestered highest amount of carbon (11.5 tons) total tree in the gardens were 56.

Table 2: List of 43 parks and gardens of Jabalpur with total trees and carbon content

S.N.	Name of Parks	Area	Total No. of trees	Total carbon
1.	Bhavartal Garden, Near old Bus stand, Jabalpur	4.000	168	34.28
2.	Shail Parn Udyan, Garha, Jabalpur	5.000	121	9.650
3.	Tagore garden, Sadar, Jabalpur	3.000	131	87.821
4.	Civic centre Park, Civic Centre, Jabalpur	1.000	83	14.209
5.	Nehru Garden, Opp. Nagar Nigam, Jabalpur	0.670	136	6.894
6.	Rail sourabh colony garden, Bajrang nagar, Jabalpur	5.000	173	17.285
7.	Children's Parks, Cantt. Sadar, Jabalpur	1.000	132	56.771
8.	Suramya garden, Cantt. Sadar, Jabalpur	1.250	86	27.673
9.	Bajnamath Park, Near medical college, Jabalpur	0.315	56	8.503
10.	Modi colony park, Tagore Nagar, Polipather, Jabalpur	0.518	94	13.848
11.	Naya gaon garden, Rampur, Jabalpur	1.210	41	0.807
12.	Lalit Garden, High court road, Jabalpur	0.070	24	0.447
13.	Laxmi Parisar Garden, Katanga, Jabalpur	0.260	44	2.790
14.	Mansarovar Colony Garden, Adhartal, Jabalpur	0.660	22	0.262
15.	MCI Colony Garden, Katanga, Jabalpur	0.125	17	0.773
16.	Panchmatha Mandir Garden, Adhartal, Jabalpur	0.302	55	5.588
17.	Pink city colony Garden, Bilhari, Jabalpur	0.200	30	3.811
18.	Rajul city Garden-1, Bilhari, Jabalpur	0.158	11	1.21
19.	Rajul city Garden-2, Bilhari, Jabalpur	0.135	22	1.877
20.	Swami Vivekanand Park, Vijay nagar, Jabalpur	0.322	48	0.933
21.	Rani Durgawati garden, Sneh Nagar, Jabalpur	0.223	43	2.173
22.	Saraswati garden, Vijay nagar, Jabalpur	0.057	28	2.422
23.	Sakar hills view Park-02, Sainik society, Jabalpur	0.055	26	1.188
24.	Vasundhara colony Park, Vijay Nagar, Jabalpur	0.126	11	0.867
25.	Sainik Society main Garden (Large), Badanpur, Jabalpur	0.070	13	5.974
26.	Sainik Society main Garden (Small), Badanpur, Jabalpur	0.060	14	1.410
27.	Gajanand Society Park, Yadav colony, Jabalpur	0.090	33	3.352
28.	Indira Park, Sneh nagar, Jabalpur	0.370	34	2.045
29.	Ideal hills Garden-1, Polipather, Jabalpur	0.518	30	4.615
30.	Ideal hills Garden-2, Polipather, Jabalpur	0.203	29	3.528
31.	Rameshwar colony Park, Vijay Nagar, Jabalpur	0.135	17	1.168
32.	Ekta Park, Vijay Nagar, Jabalpur	0.225	13	1.265
33.	Nikhil Bangdeo samiti garden, Near railway ground, Jabalpur	0.200	44	6.077
34.	New Ram nagar garden, Rampur, Jabapur	0.032	19	0.504
35.	Shivarth colony Park-1, Jasuja city Garha, Jabalpur	0.081	66	6.481
36.	Shivarth colony Park-2, Jasuja city Garha, Jabalpur	0.300	45	0.585
37.	Indrapuri garden, Polipather, Jabalpur	0.338	30	8.976
38.	Awadhpuri garden, Gwarighat, Jabalpur	0.209	15	7.012

S.N.	Name of Parks	Area	Total No. of trees	Total carbon
39.	Hathital Colony Park, Gorakhpur, Jabalpur	0.150	15	4.927
40.	Sanjeevani Nagar Garden, Garha, Jabalpur	0.201	23	1.602
41.	Green park, Adarsh Nagar, Jabalpur	0.337	40	7.097
42.	Vivekanand Park, Ranjhi, Jabalpur	0.322	36	8.248
43.	Sai Mandir Garden, Adhartal, Jabalpur	0.125	27	0.932
		Total	2145	377.88

Table 3: List of 22 parks and gardens of Katni with total trees and carbon content

S.N.	Name of Parks	Area	Total No. of trees	Total carbon
1.	Jaguriti Park, Bargawan, Katni	3.000	101	6.514
2.	Filter Park, Community Park-1, Kateyeghat, Katni	2.830	60	4.501
3.	Sant Nirankari Garden, Madhavnagar, Katni	0.805	65	10.370
4.	Baba Narayan Shah colony Garden, Jhinjhari, Katni	0.309	74	9.864
5.	Nagar Nigam office Garden, Katni	0.05	22	5.416
6.	Bal Vihar Udyan, NKJ, Katni	0.105	17	0.641
7.	Caldryz Club Garden, OFK, Katni	0.300	48	8.559
8.	Dadda Dham colony Park, Jhinjhari, Katni	0.167	44	2.415
9.	Dwarka city colony Park-1, Madhavnagar, Katni	0.125	30	3.652
10.	Dwarka city colony Park-2, Madhavnagar, Katni	0.126	22	3.624
11.	Dwarka city colony Park-3, Madhavnagar, Katni	0.129	16	0.543
12.	Everest industry, Kymore, Katni	0.500	83	9.013
13.	Gandhi Udyan, Opp. South Katni Railway station, Katni	0.350	56	11.550
14.	Krishna colony Park-1, Katayeghat, Katni	0.120	28	6.001
15.	Krishna colony Park -2, Katayeghat, Katni	0.130	17	3.020
16.	Mansarovar colony Park, MPHS, Katni	0.130	18	2.789
17.	Mittal Enclave colony Garden-1, Nai Basti, Katni	0.120	9	0.098
18.	Mittal Enclave colony Garden-2, Nai Basti, Katni	0.129	12	0.696
19.	Mittal Enclave colony Garden-3, Nai Basti, Katni	0.130	10	0.204
20.	Mittal Enclave colony Garden-4, Jhinjhari, Katni	0.225	13	0.494
21.	Mittal Enclave colony Garden-5, Jhinjhari, Katni	0.070	15	2.513
22.	Mittal Enclave colony Garden-6, Jhinjhari, Katni	0.333	17	0.060
		Total	**834**	**92.53**

Verification of field data by Principal Investigator of the project, in Katni and Jabalpur

2.5.2 FOREST MENSURATION

Ongoing Projects - Two

1. Economic analysis of the Rainfed teak plantations raised by MPRVVN under different models of planting for determination of optimum age of final felling to get the most profitable returns on the costs incurred in raising and maintaining them.
2. Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh..

Summary of achievements / activities & outcome of each projects:

Ongoing Projects

1. **Economic analysis of the Rainfed teak plantations raised by MPRVVN under different models of planting for determination of optimum age of final felling to get the most profitable returns on the costs incurred in raising and maintaining them.**

   Funding Agency - MPRVVN, Bhopal

Summary: The management plans of different project divisions of MPRVVN have been making omnibus prescriptions regarding ages of thinning and final felling for all the rainfed teak plantations. The plantations are thinned during 11th, 12st, 31st and 46th years of planting and final felling has been prescribed to be done at the age of 60 years. However, in several other countries, the age of final harvesting of teak plantations is kept much lower.

In view of this, the M.D. MPRVVN has desired that SFRI, Jabalpur should take up an economic study to determine the optimum ages of thinning and final harvesting in the rainfed teak plantations raised by MPRVVN at sites with different site qualities and under different methods of planting to fulfill the following objectives:-

- To study the growth pattern in selected rainfed teak plantations of MPRVVN in different age classes raised at sites with different site qualities and under different models of planting.
- To calculate the average costs incurred and economic benefits accrued during different years of planting discounted to the present value at the prevalent rate of bank interest.
- To conduct economic analysis of these plantations by calculating B:C ratio and I.R.R.
- To determine the optimum ages and intensities of intermediate thinning on the basis of growth rates and congestion status and also of the final harvest for different site qualities and methods of planting using the above data.

Interim Findings:

- It was found that age vs estimated B:C ratio Curve is showing increasing trend. At this stage, the crop should be retained for maximum financial benefit until estimated B:C ratio starts decreasing and cost of maintaining the plantations overcomes the net benefit gained by felling them.
- MD, MPRVVN suggested to mix the Seoni Working plan data to analyze it for older age.

Measurement in Barghat Project Division

2. **Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh.**

   Funding Agency: SFRI, Jabalpur

Summary : To study the yield for individual group for different site qualities wise, forest type wise and species and to create an initial database for guidance, reference and comparison, work is being carried out in the following phases :

- Collection of data such as Age of the crop , Site quality and Crop parameters such as number of trees /ha, basal area/ha, crop diameter, top diameter, crop height, top height, age,

MAI, CAI and volume measurement of felled trees in case of full measurement. From plots files for different species.

- Grouping of data into different site qualities, forest types and species wise.
- Entering the data in computer.
- Yield study for each group for different site qualities, forest types and species wise. Plotting of MAI and CAI curves for each group.
- Estimation of future productivity.
- Final compilation and publication of report.

Interim Findings:

- Data entry of 33 sample plots (Diameter over bark, Diameter under bark, site quality, length of stem, length of branch, volume of timber portion, volume of branch) has been completed.
- Data entry of crop parameters of all the plots has been completed.

Regular Activity:

1. **Measurement of sample plots due for measurement in the year 2019-20.**

Funding Agency - SFRI, Jabalpur

Summary: At present, there are 59 permanent sample plots in Madhya Pradesh. Out of these, 41 are sample plots of Pure Stands, 17 are Tree increment plots (TIP) and one is Linear Tree Increment plot (LTIP) of miscellaneous species. These plots are measured periodically to determine the development of even aged crops and comparison of growth in different localities.

Progress: 15 sample plots were measured in different localities and data was compiled.

Sample Plot no. 8 of Supkhar

Diameter Measurement using Caliper

Cleaning of trees for numbering

Other significant achievements

1. Statistical support to various projects of the institute
2. Selection of suitable species on the basis of growth performance of established plantations and development of nursery techniques to increase green cover under Green India Mission (GIM) in western Madhya Pradesh.
3. Study and comparison of soil cultural practices in existing bamboo (*Dendrocalamus strictus*) plantations in Kalpi, Mandla Forest Division.

3. EXTENSION, TRAINING AND CONSULTANCY

Mandate

1. Dissemination of forestry research technologies evolved by the institute.
2. To act as a nodal agency for co-ordination of extension activities.

Activities

- Publication of Annual Research Report, Annual Action Plan of the institute and training modules.
- Organization of trainings, workshops, meetings, seminars and conferences and preparation of proceedings.
- Participation in ‘Kissan Mela’, 'Herbal Fairs' and public events.
- Providing logistic support of xeroxing audio visual equipments, public address system, binding of research documents and co-ordination with different branches to research projects.
- Providing desired information to the users through correspondence.
- Preparation of information related to Madhya Pradesh Vananchal Sandesh, Annual Administrative Report, Annual Statistical Report and informations pertaining to extension of activities of the institute for the M.P. Forest Department.
- Providing I.D. nos. to all research projects, compilation of information of research projects of the institute for periodical monitoring of their progress.
- Co-P.I. in the Network project on "Conservation of Lac insect genetic resources of IINRG, Ranchi."

Dissemination of information through publications

a. Annual Action Plan

The Annual Action Plan of the institute for the year 2019-20 was compiled and prepared on quarterly basis from April 2019 to March 2020 and progress of the works were monitored and evaluated by conducting review meetings of each branch periodically.

b. Annual Research Report

The Annual Research Report for 2018-19 was prepared, published, and disseminated to all the stakeholders.

c. Dissemination of research technologies and strengthening of extension linkages

Exposure visit of trainee forest rangers, forest guards and front line staff

Trainee Forest Range Officers posted in various forest divisions of M.P., trainee Forest Range Officers from Uttar Pradesh, Forest Training Academy Haldwani, Kundal Academy of Development Administration and Management (Forest), Dhumal, Maharashtra, Central Academy of Forest Education, Kurseong, Darjeeling, Trainee ACF's from Central Academy of State Forest Service, Coimbatore, Probationary Assistant Directors Agriculture from JNKVV, Jabalpur, BAMS students from Government Autonomous Ayurvedic Mahavidyalaya and Hospital, Jabalpur, Under

Graduate Students from Govt. Science College, Chhapara, Seoni, Trainee Forest Guards from Shivpuri, Amarkantak and Lakhnadon visited the institute during the year as a part of their course curriculum. They were acquainted with the research activities of the institute by class room lectures and visit to various laboratories, wildlife, mist chambers, shade net houses, gene bank, botanical garden, nurseries, museum and herbarium, located in the campus.


Exposure visit to soil lab and polyhouse of the institute

1. Organization of sensitization workshop on Voluntary Certification Scheme for Medicinal Plant Produce.

A one day workshop on voluntary certification scheme for medicinal plant produce was organized on 25th Nov. 2019 in the institute. The workshop was sponsored by Quality Council of India (QCI), New Delhi. Various participants like progressive farmers, dealers of medicinal plants products, forest officers, scientists and researchers participated in the event. Experts from QCI, New Delhi, discussed good agriculture practices, good field collection practices, primary processing, value addition and marketing of medicinal plants.


Sensitization workshop and visit to gene bank of medicinal plant by officials from QCI, New Delhi and participitans

2. Organization of training programmes by Regional Cum Facilitation Center – Central Region SFRI, Jabalpur for farmers from Seoni and Chhindwara MP.

Two training cum exposure visit was organized by Regional Cum Facilitation Center – Central Region SFRI, Jabalpur for 99 farmers of Farmer Producer Company in collaboration with Synergy Technofin Pvt. Ltd. on 17th and 18th June, 2019 and 27th and 29th Feb. 2020. Trainees were made aware about the good collection practices, quality planting material, cultivation techniques, voluntary certification of medicinal plants and exposure visits to farms and processing units.


Training on good agriculturual practices of medicinal plants cum exposure visit organized by RCFC-CR, SFRI

3. Organization of meeting cum workshop on tapping of Salai Gum.

A meeting cum workshop was organized to formulate training and demonstration programme project of tapping of Salai Gum in various Forest Division of Madhya Pradesh with Prof. Moni Thomas, JNKVV Jabalpur on 24.10.2019 and Dr. Rupa Khanolkar, Prof. IIT, Mumbai regarding designing of equipment for tapping of Salai Gum on 25.02.2020.


Field work & workshop on Salai Gum tapping technology with faculty from IIT Mumbai at SFRI

4. Lecture on Biotechnological Interventions.

A lecture on "Application of Biotechnological interventions for the benefit of the society with special reference to forestry crops was organized in the institute on 07.08.2019. The speaker on this occasion was Emeritus Professor Dr. S.P. Gautam from Rani Durgawati Vishwavidyalaya, Jabalpur. The lecture was followed by plantation of different exotic species of bamboos collected from North Eastern states of India to establish a bamboo rhizome bank, in SFRI.


Lecture session on biotechnological intervention & plantation of bamboos in rhizome bank at SFRI

5. Visit of Hon'ble Forest Minister, Govt. of MP to SFRI, Jabalpur.

Shri Umang Singhar, Hon'ble Forest Minister, Govt. of MP visited the institute on 24.06.2019. On this occasion a plantation programme was organized in the medicinal plant gene bank in the institute. A visit to mobile soil van and museum of the institute was also made by dignitary. Thereafter a review meeting was conducted regarding the research activities of the institute and forest management activities of Central Circle, Jabalpur. Technical bulletins prepared by the institute was also released on this occasion.

Glimpses of visit of Honorable Forest Minister Govt. of MP in SFRI

6. Training and sensitization programmes regarding forestry research activities of SFRI, Jabalpur.

Various sensitization programmes regarding forestry research activities being conducted by the institute was organized during exposure visit of probationary and trainee ACF's, forest rangers, forest guards from various forest training academies of the country as well as forest training schools of Madhya Pradesh.

Training and sensitization programmes on lac cultivation and seed technology at SFRI

7. Organization of World Environment Day by SFRI, Jabalpur

The institute organized World Environment Day on 5th June, 2019 based on the theme "Air Pollution". A plantation programme was organized in the premises of the institute which was participated by the Commissioner Jabalpur, Chief Executive Officer, Jila Panchayat, CCF & DFO Jabalpur Forest Circle along with the officers and staff of the institute and Forest Department. This was followed by discussion on Global Warming and its mitigation measures. Scientists and Senior Research Officers of the institute also conducted a drive on measuring level of Air Pollution in Jabalpur City in the vicinity of the institute. An awareness campaign for "Save the Tiger" was also organized by the Forest Department along with a drawing competition for the children on environmental pollution.

Drawing competition for children and measurement of air pollution level on World Environment Day at SFRI

Organization of Meetings

S. N.	Meeting	Organised by	Place	Date of organization	Participants
1.	Organization of 33rd, 34th and 35th meeting of the Board of Governors of the Institute.	Extenstion and Training Branch, SFRI, Jabalpur	Bhopal	08th July 2019 27th July 2019 27th Sept. 2019	Chairman and Members of the BOG
2.	Organization of 44th Research Advisory Committee meeting of the institute.		Bhopal	16th Sept. 2019	Chairman and Members of the RAC & Forest Officers, Scientists and SRO's of the Institute
3.	4th Review Meeting of Climate Change Cell	Climate change cell, SFRI, Jabalpur	SFRI, Jabalpur	16th May 2019	Director, Forest Officers, Scientists and SRO's of the Institute
4.	Coordination Committee of Regional-cum-Facilitation Centre (RCFC), Central Region	RCFC	SFRI, Jabalpur	29th May 2019	Regional Director, Dy. Director, RCFC,
5.	Meeting with state level officials of MP Horticulture Department		Vindhyachal Bhawan, Bhopal (M.P)	04 September 2019	Regional Director, Dy. Director, RCFC
6.	State level Consultative-cum-Review meeting with officials of MP Forest Department & SMPB		MP-MFP Federation Bhopal	04 September 2019	Regional Director, Dy. Director, RCFC
7.	One day lecture on “Application of	Genetics, Tree	SFRI, Jabalpur.	07/08/2019	1. SFRI Officers,

S. N.	Meeting	Organised by	Place	Date of organization	Participants
	biotechnological interventions for the benefit of society with special reference to forestry crops by Emeritus Professor Dr. S.P. Gautam, RDVV University, Jabalpur	Improvement & Biotechnology Division			Scientist, SROs, RO, SRA, RA & other staff of SFRI, Jabalpur 2. Faculty and students of Department of Forestry, JNKVV, Jabalpur
8.	One day meeting on formulation of project on training and demonstration programme of tapping of Salai Gum in various divisions of MP	Seed, Silviculture & Agroforestry Division	SFRI, Jabalpur	24.10.2019	Director, Forest Officers, Scientists and SROs
9.	One day meeting on formulation of project for collection processing and value addition of 50 MFP species	Biodiversity & Wild Life Division	SFRI, Jabalpur	18.7.2019	
10.	One day technical meeting on monitoring and contribution of forests to GDP	Extension and Training Branch, SFRI, Jabalpur	SFRI, Jabalpur	25.5.2019	
11.	One day technical and scientific meeting attended on Carbon sequestration and climate change	Climate change cell, SFRI, Jabalpur	SFRI, Jabalpur	16.5.2019	
12	One day meeting with IIT Professor Dr. Roopa Khanolkar on designing the equipment of salai gum tapping.	Seed, Silviculture & Agroforestry Division	SFRI Jabalpur	25.02.2020	
13.	One day workshop on sustainable harvesting and conservation of *Commiphora wghtii.*		Morena (MP)	28.2.20	Dr. Archana Sharma and Dr. G.S. Mishra

Organization of Seminars/Symposiums/Workshops

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	One day Sensitization Workshop on "Voluntary Certification Scheme on Medicinal Plant Produce" sponsored by Quality Council of India	SFRI & RCFC (CR) Jabalpur	SFRI, Jabalpur	25th Nov., 2019	Farmers, gatherers, Researchers	48
2.		QCI, New Delhi and SFRI, Jabalpur	Sehore, M.P.	17th Dec., 2019	Farmers, gatherers, Researchers,	78

Organization of trainings

S.N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	Trainings in good collection and cultivation practices	RCFC (CR), SFRI, Jabalpur	Kanti, District Damoh (M.P.)	13th Sept. 2019	Farmers	46
2.			Bhundakona, District Anuppur(M.P.)	16th Oct. 2019	Farmers	42
3.			Damgarh, District Anuppur(M.P.)	17th Oct. 2019	Farmers	28
4.			Dehka, District Seoni (M.P.)	04th Nov. 2019	Farmers	72
5.			Jam, District Seoni (M.P.)	04th Nov. 2019	Farmers	30
6.			Santhal, District Seoni (M.P.)	05th Nov. 2019	Farmers	72
7.			Dudha Pandhurna, District Chhindwara (M.P.)	06th Nov. 2019	Farmers	34
8.			Sakarwara, Range Bahoriband, District Katni (M.P.)	19th Nov. 2019	Farmers	32
9.			Bargawan, Teh.Marwahi, District Bilaspur(C.G.)	19th Dec. 2019.	Farmers	39
10.			Basti Marwahi (C.G.)	16-17 Feb 2020	Farmers & gatherers	192
11.	Sensitization and training workshop on "Voluntary Certification Scheme for Medicinal Plant Produce"	RCFC (CR), SFRI, Jabalpur	Sehore, (Madhya Pradesh)	17th Dec. 2019	Farmers & gatherers	91
12.	Training-cum-Exposure Visit of members of Farmer Producer Company (in collaboration with Synergy Technofin. Pvt. Ltd.) Seoni & Chhindwara	RCFC (CR), SFRI, Jabalpur	Shubham Ayushadhi, Kundam & SFRI, Jabalpur (M.P.)	17th -18th June, 2019	Farmers	52
13.	Training-cum-Exposure Visit of members of Farmer Producer	RCFC (CR), SFRI, Jabalpur	Neemuch Mandi & Umaheda Neemuch (M.P.)	27th -29th Feb 2020	Farmers	47

S.N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
	Company in collaboration with Synergy Technofin. Pvt. Ltd. Seoni & Chhindwara and other cultivators from different parts of the state of M.P.					
14.	Orientation programme on Wildlife population monitoring tools and technologies	Wildlife Branch	SFRI-Jabalpur	26-6-2019	Trainee Forest guards of Lakhnadon Training School, Seoni	38
15.				3-7-2019	Trainee Forest guards of GovindgarhTraining School, Rewa	27
16.				5-7-2019	Trainee Forest rangers of Telangana State Forest Academy, Hyderabad	26
17.				12-8-2019	Trainee Forest RFOs of CASFOS, Coimbatore	40
18.				2-9-2019	Trainee Forest RFOs of KSFA, Dharwad	45
19.				13-12-2019	Trainee Forest RFOs of KSFA, Dharwad	47
20.				21-1-2020	Trainee Forest RFOs of Central Academy of Forest Education, Kurseong	50
21.				4-3-2020	Trainee Forest RFOs of Kundal Forest Academy, Sangli	42
22.				4-3-2020	Trainee Forest Guards of Forestry Training School, Shivpuri	16

S.N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
23.	Biotechnology and plant tissue culture	Genetics, Tree Improve-ment & Biotechno-logy Division	SFRI	24/06/2019 to 06/07/2019	M.Sc. (Bio tech student)	01
24.	Training and demonstration programme for field foresters on production of quality planting stocks (under grading and recognition) / evaluation of existing nurseries.	SFRI, Jabalpur	Bhuta Bairaj and Guna nursery (R&E) Gwalior Chakra, Sironja, Andela, Amarmau Pandajhir, Devra, Ganj, Piproth, Kundeshwar nursery (R&E) Sagar	29.02.2020 to 02.03.2020 17.03.2020 to 21.03.2020	Field foresters	25 60
25.	Training and demonstration on seed technology seed quality, testing processing and certification.	Seed Technology, Silvi Culture and Agroforestry Division	SFRI, Jabalpur	(04.06.201914.06.2019, 26.06.2019, 03.07.2019, 04.07.2019, 05.07.2019, 16.07.2019, 18.07.2019, 13.08.2019, 14.08.2019, 20.08.2019, 07.09.2019, 15.11.2019, 13.12.2019, 24.12.2019, 21.01.2020, 17.02.2020, 04.03.2020) (**21** training programes)	**280** field foresters from Seoni, Amarkantak, Lakhnadon, Govindgarh, Betul, South and North Panna, Sehore, Hoshangabad, Balaghat, Shivpuri, Khandwa, Harda, Karnataka, Maharashtra, Telangana and Darjeeling trainees. **131** students of Seoni, Jabalpur and Jhansi Colleges.	411
26.	Training on scientific method of Lac cultivation on Kusum	Social Economic, Marketing and Mensuration Division	Kekra, Block Chichli, Narsinghpur (M.P)	05/09/2019	Van samiti members and villagers	32
27.			Dangarhai, Block Bankhedi, Hoshangabad (M.P.)	07/09/2019		39
28.			Jhhotkhurd, Block Jumnaradeo, Chhindwara (M.P.)	07/09/2019		32
29.			Bandha, Block	28/09/2019		31

S.N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
			Rethi, Katni (M.P.)			
30.			Bodli, Block Nowrojabad, Umaria (M.P.)	29/09/2019		53
31.			Chhirpani, Block Shahpura, Dindori (M.P.)	30/09/2019		30
32.	Trainings on scientific method of Lac cultivation on Palash	Social Economic, Marketing and Mensuration Division	Mediyaras, Block Jaithari, Anuppur (M.P.)	15/10/2019	Van samiti members and villagers	30
33.			Tirora, Gondia (M.H.)	29/12/2019		60
34.			Gadegaon, Bhandara (M.H.)	28/12/2019		47
35.			Selotpar, Block Tirrora, Bhandara (M.H.)	30/12/2019		55
36.			Dobh, Block Keolari, Seoni (M.P.)	01/08/2019		35
37.			Sherpar, Block Paraswara, Balaghat (M.P.)	02/08/2019		26
38.			Rehlonkala, Block Lakhnadon, Seoni (M.P.)	03/08/2019		27
39.	Training on "Establishment, Maintenance and periodic measurement of sample plots."		State Forest Research Institute, Jabalpur	June 2019-Feb.2020	Range officers from Hoshangabad, South Seoni, West Mandla, South Betul, South Panna, Burhanpur Forest Division	10
40.				Sept.2019	Range Officers from Dharwad Forest Academy and Telangana State Forest Academy	45

Participation in fairs

S.No.	Event	Date	Place
1.	World Ayush Expo 2019 & Arogya Fair organized by Dr. G.D. Pol Foundation	22nd -25th August 2019	CIDCO Exhibition Centre, Vashi, Navi Mumbai.
2.	“Bhopal Vigyan Mela” organized by Council of Scientific and Industrial Research (CSIR)-Advanced Material and Processes Research Institute (AMPRI)	13th -16th September, 2019	BHEL Dussehra Ground, Bhopal
3.	Exhibition and Scientist-Farmers Interface – National Krishi Uday-2019 organized by JNKVV, Jabalpur.	14th – 16th Oct, 2019	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur

4.	Arogya Fair organized by Directorate of Ayurveda, Rajasthan	19th to 22nd Oct. 2019	Fatehe High School Ground, Udaipur, Rajasthan
5.	14th edition of Krishithon-International Agriculture Trade Fair & Conference organized by Media Exhibitors Pvt. Ltd.	21st to 25th November, 2019	Nashik, Maharashtra.
6.	Agrovision Workshop: National Expo and Conference on Agriculture organized by Agrovision foundation.	22nd - 25th November, 2019	Reshambagh Ground, Nagpur
7.	Chutka Scientific Literacy cum Health and Wellness Festival organized by Centre for Studies of Popular Science (A Research unit of S &T Education Forum), New Delhi	05th to 07th December, 2019	Mandla (M.P.)
8.	7th International Herbal Fair organized by Madhya Pradesh State Minor Forest Produce Federation.	18th to 22nd December, 2019	Lal Parade Ground, Jahangirabad, Bhopal
9.	Global Agriculture Festival – 2020, organized by Shree Swami Samarth Krushi Vikash Sanshodhan Charitable Trust	23rd -27th January 2020	Dongre Vasti Gruh Ground, Nashik, Maharashtra
10.	Panacea 2020 – 9th Natural Products Expo India organized by Seishido Communications.	05th -07th March 2020	World Trade Centre Mumbai, Maharashtra

Trainings/Workshops/Meetings attended by officers/scientists and Research Staff of the Institute.

S.N.	Name of the programme	Organized by	Venue	Date	Participants
1.	Review meeting of RCFCs	NMPB New Delhi	NMPB New Delhi	10th June, 2019	Dr.P.K. Shukla, Regional Director and Shri Alok Sharma, Dy. Director RCFC, SFRI
2.	Review meeting of the RCFC, chaired by Hon'ble Forest Minister, M,P.	SFRI, Jabalpur	SFRI, Jabalpur	24th June, 2019	Dr.P.K. Shukla, Regional Director and RCFC team members
3.	National Level Training Programme on "Forestry Sector in Disaster Risk Reduction & Climate Resilience"	TFRI, Jabalpur	TFRI, Jabalpur.	05-09 August 2019	Dr.P.K. Shukla, Regional Director RCFC, Jabalpur
4.	Meeting with state level officials of MP Horticulture Department to discuss about the collaboration between the RCFC and State Horticulture Department for promotion of cultivation of medicinal plants in the state.	RCFC (CR), SFRI, Jabalpur	Office of Director Horticulture Vindhyachal Bhawan, Bhopal (M.P)	04th September 2019	Dr.P.K. Shukla, Regional Director and Shri Alok Sharma, Dy. Director RCFC, SFRI
5.	Regional Consultative Workshop on Strengthening of Medicinal Plants Sector	KFRI, Peechi	KFRI Peechi	3rd October, 2019	Dr.P.K. Shukla, Regional Director and Shri Alok Sharma, Dy. Director RCFC, SFRI
6.	Training of IFS officers organized by MP-MFP Federation.	MP-MFP Federation, Bhopal	IIFM Bhopal	04th November, 2019	Dr.P.K. Shukla, Regional Director, RCFC, SFRI, delivered lecture as guest speaker on "Conservation, resource augmentation and sustainable harvesting

S.N.	Name of the programme	Organized by	Venue	Date	Participants
					of medicinal plants from natural forests through micro-planning and implementation by user communities"
7.	Research Advisory Group meeting of TFRI, Jabalpur	TFRI, Jabalpur	TFRI, Jabalpur	05th November, 2019	Dr.P.K. Shukla, Regional Director RCFC, Jabalpur
8.	Workshop for finalization of DPR for rejuvenation of river Narmada through forestry interventions	TFRI, Jabalpur	TFRI, Jabalpur	12th February 2020	Dr.P.K. Shukla, Regional Director RCFC, Jabalpur as special invitee and resource person.
9.	Review meeting of RCFCs and SMPBs organized by NMPB	NMPB New Delhi	NMPB New Delhi	18th & 19th February, 2020	Dr.P.K. Shukla, Regional Director and Shri Alok Sharma, Dy. Director RCFC, SFRI
10.	Meeting with PCCF (Wildlife) on final project report submission on "Phase-IV: Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected areas of Madhya Pradesh".	PCCF (Wildlife)	Bhopal	4-6-2019	Shri Giridhara Rao Shri O.P. Tiwari Dr Anjana Rajput Dr Aniruddha Majumder
11.	International Day of Tiger programme organised by Madhya Pradesh Forest Department	Madhya Pradesh Forest Department	Minto Hall, Bhopal	29-7-2019	Dr Anjana Rajput Dr Aniruddha Majumder
12.	Application of Biotechnological interventions for the benefit of society with special reference to forestry crops	State Forest Research Institute Jabalpur	Sageriya Hall, SFRI	7-8-2019	Forest Officers, Scientist, SROs, Technical Staff of SFRI and faculty and student of forestry from JNKVV
13.	Final Report presentation meeting with Narmada Valley Development Authority (NVDA) and PCCF (Wildlife) on "Preparation of Detailed Project Report for wildlife habitat improvement in the adjoining area of Sardar Sarovar Project, Madhya Pradesh"	NVDA & SFRI-Jabalpur	Van Vihar National Park, Bhopal	20-8-2019	Shri Giridhara Rao Dr P K Shukla Dr Anjana Rajput Shri Shailendra Yadav Ms Rishika Thakur Shri Prashant Kori
14.	Meeting with Rajabhoj Airport Authority, Bhopal to discuss on feasibility study on wildlife presence in this airport premises	Rajabhoj Airport Authority, Bhopal	Rajabhoj Airport, Bhopal	27-11-2019	Dr Anjana Rajput Shri Shailendra Singh Yadav
15.	Landscape-level Stake-holders/Professionals	Wildlife Institute of India and	Madla, Panna Tiger	18-1-2020 to 19-1-2020	Dr Anjana Rajput Dr Aniruddha

S.N.	Name of the programme	Organized by	Venue	Date	Participants
	Consultation Workshop	Panna Tiger Reserve	Reserve		Majumder
16.	Negotiation meeting for project "Assessment of Wildlife around the Raja Bhoj Airport, Bhopal, Madhya Pradesh"	Raja Bhoj Airport, Bhopal, Madhya Pradesh	Raja Bhoj Airport, Bhopal, Madhya Pradesh	13.02.2020 to 14.02.2020	Dr. Anjana Rajput
17.	वन एवं वन्यप्राणी संरक्षण संबंधी कार्यशाला	Madhav National Park & Kuno-Palpur National Park	Shivpuri & Sessaipura	24-2-2020 26-2-2020	Dr Aniruddha Majumder Ms Rishika Thakur Shri Prashant Kori
18.	Meeting of members of the committee for guidelines for notification of critical wildlife habitat of Nauradehi Wildlife Sanctuary.	Nauradehi Wildlife Sanctuary	Mohli, Forest Rest House, Nauradehi	17th May, 2019	Anirudhwa Sarkar Dr. Anjana Rajput
19.	One day Sentisization workshop on " Voluntary certification for meditional plant produce"	State Forest Research Institute, Jabalpur (M.P.)	State Forest Research Institute, Jabalpur (M.P.)	25/11/2019	Forest Officers, Scientist, SROs, Technical Staff of SFRI and faculty and student of forestry from JNKVV
20.	Meeting regarding "Value addition of NTFPs and medicinal plants"	State Forest Research Institute, Jabalpur (M.P.)	Jabalpur	25/02/2020	Dr. Sachin Dixit, Amit Pandey Dr. S.K. Tiwari Dr. A.K. Sharma Dr. Archna Sharma
21.	Honorable Forest Minister's, Govt. of MP review meeting in SFRI	State Forest Research Institute, Jabalpur (M.P.)	State Forest Research Institute, Jabalpur (M.P.)	24/06/2019	Forest Officers, Scientist, SROs, Technical Staff of SFRI and faculty and student of forestry from JNKVV
22.	World Environmental Day 05 June 2019 theme "Air Pollution" – वायु प्रदूषण विषय के अंर्तगत वायु प्रदूषण मापन यंत्र द्वारा प्रदूषण स्तर का आमजन के समक्ष प्रर्दशन किया गया	State Forest Research Institute, Jabalpur (M.P.)	SFRI Jabalpur	05.June 2020	Forest Officers, Scientist, SROs, Technical Staff of SFR
23.	अकाष्ठीय लघुवनोपज एवं औषधीय पौधों के विनाश विहीन विदोहन, संग्रहण एवं उपचारण विषय पर मण्डला वनमण्डल में प्रबंध संचालक कार्यालय में आयोजित कार्यशाला	MP MFP Federation, Bhopal	East Mandla Forest Division Sheopur-kala	22-23 Oct.2019 10-12-2019 ls 14-12-2019	Dr. Jyoti Singh Shri Vijay Kumar Haldkar& Shri Shailendra Nema
24.	Meeting on Eco System Services Evaluation and Accounting Project	Green India Mission, Bhopal, M.P.	IIFM Bhopal	16.02.2020	Dr. Jyoti Singh
25.	Forestry sector in Disaster Risk Reduction and Climate Resilience	TFRI, Jabalpur	TFRI, Jabalpur	05 to 09 August, 2019	Dr. S.K. Tiwari & Dr. A.K. Sharma

S.N.	Name of the programme	Organized by	Venue	Date	Participants
26.	Meeting of Executive Committee of Society of Tropical Forestry Scientists, SFRI, Jabalpur	JTF Executive Commettee	SFRI, Jabalpur	01-06-2019	Executive Commettee and Life members of JTF Society
27.	Meeting of Regional Cum Facilitation Center,	RCFC, Jabalpur	SFRI, Jabalpur	29.05.2019	Dr. Archana Sharma
28.	One day technical cum research meeting on formulation of project for collection, processing and value addition of 50 MFPs Species.	SFRI, Jabalpur	SFRI, Jabalpur	-	
29.	Training cum workshop on conservation of *commiphora weightii*	Sujagriti Sanstha	Morena	28.02.2020	
30.	Meeting cum workshop on seed and plant quality act	R&E Circle Jabalpur	R&E Circle Jabalpur	02.12.2020	
31.	One day training cum workshop on application of bio fertilizers and nursery management	R&E Circle Jabalpur	R&E Circle Jabalpur	-	
32.	मालवा क्षेत्र में कृषि वानिकी के अंतर्गत वृक्षारोपण की रणनीति	क्षेत्रीय वन वृत्त कार्यालय इन्दौर एवं अनुसंधान विस्तार एवं लोक वानिकी, भोपाल	क्षेत्रीय वन वृत्त का सभागार इन्दौर	02–02–2020 से 04–02–2020	वन विभाग के क्षेत्रीय अधिकारी, कृषक, आरा मिल मालिक
33.	गोंद नीति के लिए गठित समिति की बैठक	अनुसंधान विस्तार एवं लोक वानिकी, भोपाल	अहमदपुर रोपणी, भोपाल	15–09–2019 एवं 16–09–2019	सेवानिवृत्त एवं वर्तमान प्रधान मुख्य वन संरक्षक एवं वन वल प्रमुख, अपर प्रधान मुख्य वन संरक्षक, अनु. वि. लोक वानिकी, भोपाल, मुख्य वन संरक्षक आदि
34.	सलई वृक्षों में वैज्ञानिक विधि से टैपिंग का सैद्धान्तिक एवं व्यावहारिक प्रशिक्षण कार्यशाला	वनमंडलाधिकारी, सा. वनमंडल, दमोह	संग्रामपुर विश्रामगृह	18–12–2019	वन विभाग के अधिकारी, कर्मचारी एवं आदिवासी लघु वनोपज संग्राहक
35.	7th Lac Coordination Committee Meeting on Conservation of lac insect genetic resources	ICAR-Indian Institute of Natural Resin and Gum	Central Agricultural University, Imphal	3th -4th February 2020	Dr. Pratibha Bhatnagar, Dr. Sunil Prajapati & Balram Lodhi
36.	Meeting for Climate Change Cell projects	Coordinator Climate Change Cell	State Forest Research Institute, Jabalpur	16 May 2019.	Director, Addl Director, Forest Officers, SROs & Technical Staff of the Institute.
37.	Meeting on Carbon sequestration project.			20 May 2019	
38.	Meeting for reviewing the project progress headed by PCCF and HoFF in SFRI, Jabalpur	Extension & Training Branch, State Forest Research	State Forest Research Institute, Jabalpur	29 May 2019	

S.N.	Name of the programme	Organized by	Venue	Date	Participants
39.	Meeting on ' Ecosystem services project	Institute, Jabalpur		15 July 2019	
40.	Meeting on reviewing Annual action plan and Annual research report of SFRI, Jabalpur			09 April 2019.	
41.	Review meeting for project progress			26 April 2019.	
42.	Review meeting for new project proposals			13 May 2019.	
43.	Review meeting for new project proposals			14 May 2019.	
44.	Meeting for project presentation in RAC 2019			13 August 2019	
45.	Meeting on Preparation of budget of the projects			20 Sept. 2019	
46.	Review meeting for project progress			24 Oct. 2019	

4. DOCUMENTATION CENTRE

Mandate

1. Documentation of research information/results.
2. Documentation of technical literature on forestry research activities of the Institute.
3. Maintenance of ledger files.
4. Providing research information to the users.
5. Publication of Vaniki Sandesh.

Activities

1. Maintenance of general and specific ledger files. At present, 250 general and 173 specific ledger files are being maintained. The research findings published in various journals/bulletins and reports, etc. were photocopied and added regularly in the respective ledger files.
2. Documentation of technical literature on forestry research.
3. Documentation of research articles published in different Journals, Magazines, Newsletters, Bulletins, Vaniki Sandesh, Annual Research Report and Extension series.
4. Documentation of final reports of the projects financed by external agencies.
5. Publication of quarterly journal "Vaniki Sandesh", technical bulletins and extension series.
6. Sale of SFRI publications.

A quarterly journal "Vaniki Sandesh" covering articles on forestry research in the institute and elsewhere is published by the institute. Vaniki Sandesh is circulated to officers of the state forest department, research institutes, universities and individuals. The annual subscription is fixed at Rs.150/- for individuals and Rs. 300/- for institutions.

Sale of Publications

The institute has published 05 technical bulletins and 17 brochures.

Journal Section

The branch is well furnished with a reading room. During the year 16 journals were received

Achievements during the year

1. Three issues of Vaniki Sandesh Vol. 9 No. 1, 2018 and Vol.10 No.1-3, 2019 were published.
2. 23 project reports were documented.

3. A sum of Rs. 3430/- was received from the sale of bulletins, extension series, and other publications
4. 16 periodicals were received and displayed.
5. 112 articles were selected, photocopied, classified and filed into ledger files.
6. 165 damaged pages of ledger files were replaced by xerox copies.

Periodicals subscribed / complimentary

Sl. No.	*Name of the Journal*
1.	Indian Forester
2.	Journal of Non Timber Forest Product
3.	Indian Journal of Forestry
4.	Journal of Soil and Water Conservation
5.	Environmental Justice
6.	My Forest
7.	Me & My Earth
8.	Dream 2047
9.	FRIM in FOCUS
10.	Bulletin of Arunachal Forest Research
11.	Journal of Tropical Forestry
12.	Jawahar Vistar Darpan (Hindi)
13.	Scientific News Letter
14.	मध्यप्रदेश वनांचल संदेश
15.	नीति मार्ग
16.	छत्तीसगढ़ राज्य जलवायु परिवर्तन केन्द्र

S.No. 1 to 5 subscribed and S.No.6 to 16 received on complimentrary basis

SFRI PUBLICATIONS

1. Technical bulletins

S N.	Bulletin No.	Title	Year
1	2	Volume Table of Terminalia tomentosa for M.P.	1963
2	4	Yield Table of Sal for M.P.	1966
3	5	Seed Directory vol. I	1967
4	9	Standard Volume Table of Teak for S.Chhindwara in M.P.	1971
5	10	Family Ranunculaceae to Polygonaceae in M.P. (Monograph of 13 family)	1971
6	11	Teak growth tables of different ecological forest types in M.P.	1971
7	12	Standard volume tables of *Boswellia serrata* for Nimar tract in M.P.	1971
8	15	Bark Table for *Boswellia serrata*	1971
9	16	Family Linanceae to Berseraceae	1974
10	18	Species for plantation in M.P. (Reprint)	1977
11		मध्यप्रदेश में वृक्षारोपण के लिये उपयुक्त प्रजातियां	1977
12	22	Bamboo Plantation	1986
13	23	Fuel wood removal by headloads-A case study of Jabalpur	1987
14	24	Eucalyptus cultivation in M.P. – JTF	1987
15	26	Socio-economic Potential of Minor Forest Produce in M.P.	1991

S N.	Bulletin No.	Title	Year
16	28	Material for forest flora of Madhya Pradesh	1996
17	29	Tissue culture protocols for Teak, Neem & Khamer	1997
18	30	Growth statistics of forest plantations	1997
19	31	Medicinal plant of M.P. distribution, cultivation & trade	1998
20	32	Local Volume Table for Teak, Sal and other species	1997
21	33	Price Trends of some medicinal plants	1998
22	34	Biological Diversity of SFRI premises	1998
23	35	Seed production in Teak Seed Orchards in M.P.	1998
24	36	Seed certification protocol of forest tree species	1998
25	37	Tissue culture protocols for important medicinal plants of M.P.	1998
26	38	Macro-propagation protocol of some tree and medicinal plants species.	1998
27	39	Yield and stand tables of teak in Madhya Pradesh	1998
28	40	An Annotated Bibliography of Bamboo	1999
29	41	Status survey of Non Timber Forest Produce in primary Tribal Markets: A case study in Amarkantak Plateau.	1999
30	42	Application of laboratory seed testing results in nursery practices.	2000
31	43	म0प्र0 में भिलवा का सामाजिक आर्थिक विश्लेषणात्मक अध्ययन।	2000
32	44	Silviculture research in M.P.	2000
33	45	Handbook of Bamboos with particular reference to M.P.	2002
34	46	औषधीय पौधों की खेती की प्रचार प्रसार पत्रिका।	2003
35	47	Medicinal herbs in trade: a study of safed musli (chlorophytum species) in Madhya Pradesh	2003
36	48	Collection, processing and marketing of *Buchanania lanzan* in Madhya Pradesh	2005
37	49	मध्यप्रदेश के महत्वपूर्ण आयुर्वेदिक पादप	2005
38	50	आंवला वृक्षारोपण एवं आर्थिक महत्व	2008
39	51	उच्च गुणवत्ता के बीज एकत्रीकरण, भण्डारण, उपचारण, प्रमाणीकरण तथा बीजोत्पादन क्षेत्रों के चयन एवं प्रबंधन पर दिग्दर्शिका।	2008
40	52	Floral Diversity of Kanha Tiger Reserve	2009
41	53	Nursery and Planting technique of Tree Species	2010
42	54	Forest Glossary for All (English – Hindi)	2010
43	55	वृक्षारोपण मार्गदर्शिका	2011
44	56	संग्रहित लाख में समय के साथ वनोपजों में होने वाली कमी का अध्ययन।	2014
45	57	Status of natural gum and gum oleo-resin of M.P.	2014
46	58	बीज प्रक्षेत्र का चयन, बीज उत्पादन क्षेत्र की स्थापना, प्रबंधन, बीज संग्रहण, भण्डारण, उपचारण, परीक्षण एवं रोपणी प्रबंधन	2014
47	59	वानिकी में मेक्रोक्लोनल प्रोपेगेशन तकनीक द्वारा वृक्ष एवं औषधीय प्रजातियों के क्लोनल पौधे तैयार करने की विधियॉ।	2014
48	60	सामुदायिक भागीदारी द्वारा अकाष्ठीय वनोपजों के मानचित्रण एवं आंकलन विधि मार्गदर्शिका।	2015
49	61	अकाष्ठीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2015
50	62	कैमरा ट्रैप मार्गदर्शिका	2016
51	63	अकाष्ठीय वनोपज प्रजातियों का अंतःस्थलीय, बाह्य स्थलीय संरक्षण, नवप्रवर्तन – वनवर्धन एवं विकास।	2016
52	64	अकाष्ठीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2016

S N.	Bulletin No.	Title	Year
53	65	Volume table of Teak for various divisions of Madhya Pradesh	2016
54	66	Volume table *of Shorea robusta* (Sal) for various forest divisions of Madhya Pradesh	2016
55	67	रोपणी मार्गदर्शिका	2016
56	68	Growth table of important coppices origin species for Madhya Pradesh	2016
57	69	वन एवं औषधीय प्रजातियों की रोपणी एवं रोपण तकनीक मार्गदर्शिका	2016
58	70	कट रूट स्टाक विधि : लेन्टाना उन्मूलन की नई तकनीक	2017
59	71	बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण हेतु मार्गदर्शिका	2017
60	72	प्रशिक्षण मार्गदर्शिका – आधुनिक जीपीएस, रेंज फाईडर एवं कम्पास हेतु	2017
61	73	Primary Processing and Drying Techniques of NTFPs	2017
62	74	Directory of Medicinal Plants Traders and ISM Industries in Madhya Pradesh	2017
63	75	Selection of superior races of Khamer (*Gmelina arborea*) through clonal propagation	2017
64		क्लोनल प्रोपेगेशन द्वारा खमेर (*मेलाईना आरबोरिया*) की श्रेष्ठ नस्लो (रेसेस) का चयन	2017
65	76	Quantitative estimation of bioactive compounds through Chemo-fingerprinting (HPLC) for the identification of quality germplasm - *Andrographis paniculata, Bacopa monnieri and Swertia angustifolia*	2017
66	77	औषधीय पौध प्रजातियों की जबलपुर वन वृत्त के वनक्षेत्रों में वर्तमान स्थिति, संख्यात्मक घनत्व एवं उपलब्ध मात्रा का आंकलन ''सर्वेक्षण एवं आंकलन मार्गदर्शिका''	2017
67	78	बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण- 2018 हेतु मार्गदर्शिका	2018
68	79	Volume table of miscellaneous species for various divisions of Madhya Pradesh.	2018
69	80	हमारी कंद संपदा : मध्यप्रदेश में पायी जाने वाली कंद प्रजातियों की पहचान एवं विवरण	2018
70	81	Propagation techniques of economically important endangered and rare species (salai, shisham, achar, maida lakdi and bija) of Madhya Pradesh	2018
71	82	पलाश के वृक्षो में लाख की कृषि प्रक्रिया	2018
72	83	बांधवगढ़ टाईगर रिजर्व के घास मैदानों का पारिस्थितिकीय अध्ययन : वन्य प्राणी प्रबंधन के संदर्भ में	2018
73	84	कुसुम के वृक्षो में लाख की कृषि प्रक्रिया	2019
74	85	Climate Change and Role of Communities in Adaptation and Mitigation	2019
75	86	मध्यप्रदेश की प्रमुख गोंदों के उत्पादन एवं संग्रहण क्षेत्र	2019
76	87	कार्बन का महत्व, पर्यावरणीय घटनाओं से इसका संबंध एवं वनों में कार्बन संचयन का आंकलन ।	2019
77	88	Quantitative estimation of bioactive compounds of 5 commercially important medicinal plants through chemo-fingerprinting (HPLC) for the identification of quality planting material.	2019
78	89	दुर्लभ एवं संकटग्रस्त प्रजातियों की रोपणी तकनीक का प्रचार प्रसार	2019
79	90	वनों एवं वन रोपणियों में लगने वाली कीट व्याधियों एवं उनके निदान पर किये गये कार्यो का सरल भाषा में संकलन : मध्यप्रदेश के संदर्भ मे	2019

S.No.75 to 79 published during the year.

2. Extension Series

Ext. Series	Title	Year
1.	Teak Seed collection and uses	1981
2.	वृक्षारोपण में बीजों का महत्व	1981
3.	म.प्र. में साल रोपण की तकनीक	1991
4.	पड़त भूमि विकास हेतु उपयुक्त प्रजाति लेडिंया	1991
5.	ईसबगोल	1994
6.	सर्पगन्धा	1994
7.	रोसा घास	1995
8.	A mechanical device for pre sowing treatment of teak seeds	1995
9.	वृक्षारोपण कैसे करें	1996
10.	S.F.R.I Publications	1999
11.	माइकोराइजा (वैम)	1999
12.	राजजोबियम	1999
13.	एजेटोबेक्टर	2000
14.	पी.एस.बी. (फास्फोरस विलायक)	2000
15.	आँवला : वनो से किसानों तक	2000
16.	बाँस : वनो से किसानों तक	2000
17.	सागौन : वनो से किसानों तक	2000
18.	खमेर : वनो से किसानों तक	2000
19.	यूकेलिप्टस : वनो से किसानों तक	2000
20.	बच (एकोरस केलेमस)	2001
21.	सतावर (एस्पेरेगस रेसीमोसस)	2001
22.	सफेद मूसली (क्लोरोफाइटम बोरिविलियानम)	2001
23.	कलिहारी (ग्लोरिओसा सुपरबा)	2001
24.	सनाय (केसिया आगस्टफोलिया)	2001
25.	सर्पगंधा (रावोल्फिया सर्पेन्टिना)	2001
26.	अश्वगंधा (विद्यानिया सोमनीफेरा)	2001
27.	मुश्कदाना (एबलेमासकस मास्केटस)	2001
28.	लेमनग्रास (सिंबोपोगन फ्लेक्सिपोसस)	2001
29.	मेन्था या पोदीना (मेन्था आर्वेसिस)	2001
30.	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 1)	2003
31	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 2)	2007
32	Directory of Medicinal Plants Trades and ISM Industries of Central India	2009
33	Monograph on *Alectra chitrakutensis*	2011
34	Monograph on *Ceropegia bulbosa and Ceropegia macrantha*	2011
35	Monograph on *Crateva magna* and *ficus cupulata*	2011
36	Monograph on *Dioscorea tomentosa, D. wallichia* and *d. alata*	2011
37	Monograph on *Flemingia stricta* and *F. paniculata*	2011
38	Monograph on *Guggal (Commiphora wightii)*	2011
39	Monograph on Maida tree (*Litsea glutinosa)*	2011
40	Monograph on Padri tree (*Radermachera xylocarpa)*	2011
41	Monograph on Shyonaka (*Oroxylum indicum)*	2011
42	Some ethnic plants in cure of various human diseases	2011
43	कमरकस (पलाश) गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं भण्डारण तकनीकों का प्रदर्शन	2012
44	साल बोरर से साल वनो की सुरक्षा	2014
45	Education material on Conservation , multiplication and utilization of rare,	2014

Ext. Series	Title	Year
	endemic Angiosperms and Pteridophytes in Forest Botanic Garden of State Forest Research Institute, Jabalpur (M.P.)	
46	Education material on Herbarium preparation and its management	2015
47	मध्यप्रदेश के वनों में पायी जाने वाली महत्वपूर्ण दुर्लभ प्रजातियों की उपयुक्त रोपणी तकनीकी का विकास।	2015
48	खमेर शीर्ष सूखन रोग एवं प्रबंधन तकनीकी मार्गदर्शिका	2015
49	खनन क्षेत्रों में वनीकरण एवं पारिस्थितिकीय पुर्नस्थापना हेतु तकनीकी मार्गदर्शिका	2015
50	**नर्मदा तट पर वृक्षारोपण हेतु उपयुक्त प्रजातियाँ एवं रोपण विधियाँ**	2017
51	मार्गदर्शिका–साल वृक्षों की मृत्युदर को प्रभावित करने वाले कारकों का अध्ययन एवं उनके रोकथाम के उपाय	2017
52	मार्गदर्शिका–आर्थिक महत्व की प्रजातियों बीजा, धावड़ा एवं अचार मे होने वाले रोगों का समेकित प्रबधंन एवं तकनीक	2017
53	महुआ प्रशिक्षण एवं प्रदर्शन मार्गदर्शिका	2018
54	सलई वृक्ष में वैज्ञानिक विधि से टैपिंग तकनीक, सतत् विनाश विहीन विदोहन, प्राथमिक प्रसंस्करण एवं भंडारण विधि – मार्गदर्शिका	2018
55	पौधों की विक्रय दरें ।	2018
56	मध्यप्रदेश में पाई जाने वाली प्रमुख गोंदों की विदोहन एवं विदोहनोत्तर तकनीक	2018

Brouchers

S.N.	Title	Year
1	अचार (बुकनेनिया लेन्जन)	2007
2	महुआ (मधुका लेटीफोलिया)	2007
3	बहेड़ा (टरमिनेलिया बेलेरिका)	2007
4	बांस (डेन्ड्रोकेलेमस स्ट्रिक्टस)	2007
5	बीजा (टेरोकार्पस मारसूपियम)	2007
6	सागौन (टेक्टोना ग्रेंडिस)	2007
7	बबूल (अकेशिया निलोटिका)	2007
8	खैर (अकेशिया कटेचू)	2007
9	खमैर (मेलाइना आरबोरिया)	2007
10	ऑवला पौधों का विनाश विहीन विदोहन एवं संरक्षण मार्गदर्शिका	2007
11	महुआ रासायनिक उर्वरको के प्रयोग से महुआ फूल एवं फल की उत्पादकता में वृद्धि	2011
12	जन भागीदारी द्वारा अकाष्ठीय वनोपजों का प्राकृतिक वन क्षेत्रों में सतत् विदोहन एवं प्रबन्धन तकनीकी का विकास	2012
13	कूल्लू गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
14	धावड़ा गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
15	सलई गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
16	पलाश गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
17	वनौषधि विपणन सूचना विश्लेषण केन्द्र	2014
18	बॉस–बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबनधन	2015
19	खमेंर –बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबनधन	2015
20	कुल्लू–बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबनधन	2015
21	भिलवा – बीज एवं रोपणी तकनीक	2017

S.N.	Title	Year
22	माहुल – बीज एवं रोपणी तकनीकक	2017
23	मुण्डी – बीज एवं रोपणी तकनीक	2017
24	कुम्भी – बीज एवं रोपणी तकनीक	2017
25	मृदा नमूना एकत्रीकरण विधि	2017
26	अश्वगंधा – बीज एवं रोपणी तकनीक	2017
27	कालमेघ – बीज एवं रोपणी तकनीक	2017
28	सर्पगंधा – बीज एवं रोपणी तकनीक	2017
29	जैविक खाद एवं नीम खली वानिकी प्रजातियों के पौधों की वृद्धि में लाभदायक	2017
30	कृषि वानिकी पद्धति के अंतर्गत गेहूँ के साथ क्लोनल यूकेलिप्टस रोपण : लागत एवं आय	2017
31	SFRI ENGLISH BROCHURE (About Institute)	2017
32	SFRI HINDI BROCHURE (About Institute)	2017
33	REGIONAL-CUM-FACILITATION CENTRE, CENTRAL REGION, JABALPUR (RCFC)	2017
34	क्षेत्रीय–सह–सुविधा केन्द्र मध्य क्षेत्र, जबलपुर (आर.सी.एफ.सी.)	2018
35	वृहत् स्तर पर पौधा रोपण कैसे करें	2018
36	कलिहारी *(Gloriosa superb)*	2019
37	गुग्गल *(Commiphora wightii)*	2019
38	अश्वगंधा *(Withania somnifera)*	2019
39	भिलवा *(Semecarpus anacardium)*	2019
40	चिरायता *(Swertia chirata)*	2019
41	सलई *(Boswellia serrata)*	2019
42	चित्रक *(Plumbago zeylanica)*	2019
43	चनाहुर *(Marsdenia tenacissima)*	2019
44	सफेद मुसली *(Chlorophytum borivilianum)*	2019
45	कुचला *(Strychnos nux-vomica)*	2019
46	बायविडंग *(Embelia ribes)*	2019
47	गिलोय *(Tinospora cordifolia)*	2019
48	हर्रा – बीज एवं रोपणी तकनीक	2020
49	बहेड़ा – बीज एवं रोपणी तकनीक	2020
50	रीठा – बीज एवं रोपणी तकनीक	2020
51	हल्दू – बीज एवं रोपणी तकनीक	2020
52	खुरासानी इमली – बीज एवं रोपणी तकनीक	2020

S.No. 36 to 52 published during the year.

TM - Training Material

Note: Payment for the above bulletins and extension series may be made by Demand Draft in favour of the Director, State Forest Research Institute, Jabalpur.

5. LIBRARY AND INFORMATION CENTRE

Mandate

SFRI library and information center is a prominent library of the state of Madhya Pradesh in the field of forestry. It houses books, reports, Indian Forest Records, Working Plans, Working Schemes, Forest resource surveys and Sanctuary Plans. Apart from the research staff of the Institute, forest officers, scientists and technical staff make use of the library facilities. Students, research scholars from various institutes and universities also visit the library regularly.

The library and information centre maintains literature on forestry and allied subjects. It has books on environment, silviculture, forest protection, mensuration, management, marketing, utilization, social forestry, biodiversity, ecology, botany, tissue culture, tree improvement, law, medicinal plants, wildlife, seed science and computer science, etc.

Activities

During the year 2019-2020, 29 working plans were received with the total as under:

1.	Books (including 2659 gratis books)	7588
2.	Reports (Govt. and NGO's)	396
3.	IndianForest Records	641
4.	Working Plans	1482
5.	Sanctuary Plans	24
6.	Working Schemes	85
7.	Forest Resource Surveys	27
	Total	**10243**

Following activities were undertaken during the year.

S. No.	Works	Status
1.	Circulation of books, working plans, reports and other reading materials	Routine work
2.	Correspondence with users for return of books	Routine work
3.	Provide CAS to users	Routine work
4.	Classification of books and arrangement of classified books	Routine work
5.	Preparation of book card slips and pasting of book pockets on books	Routine work
6.	Accession of Working plans	As received during the period

6. COMPUTER AND INFORMATION TECHNOLOGY

Mandate

1. Application of computers in forestry.
2. Design, development and implementation of computer based information system.

Objectives

1. To design and develop the website of the institute.
2. To provide logistics and maintainance of all the computers of the institute.
3. To provide Internet Facilities in the Institute without interruption at a high speed.
4. To maintain CCTV Cameras in the Institute and Main Gate for security purpose.
5. Maintenance of EPABX facilities in the Institute.
6. Maintain Biometrics for attendance of all employees of the Institute.

Information Technology Centre

Information Technology centre has a number of computer systems (Desktop – 64, Laptop – 12) connected to each other via local area network (LAN) and with Domain server. The computer system is shared by a router to access World Wide Web information and Wi-Fi, which is also connected by local area network.

Activities carried out during the year

1. Presentation of Powerpoint for BOG, RAC, workshops, meetings, seminars and trainings, etc. has been done successfully.
2. Website of the institute has been upgraded.
3. Providing internet surfing and e-mail facilities to users through LAN.
4. Maintenance of computer equipments viz., computer systems, printers, scanners, LAN, UPS etc.
5. Research work data in a domain server are stored during the year.

7. PUBLICATIONS AND PRESENTATION OF RESEARCH PAPERS/ ARTICLES BY SCIENTISTS / RESEARCH PERSONNEL'S OF THE INSTITUTE

(April 2019 to March 2020)

Papers published in Journals (National and International)

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.
1.	International Journal of Life Sciences Research	Physical and Chemical Properties of Soil: Indicator of Forest Health and Ecosystem of Mathwad range	Anjana Rajput, S.S. Yadav, and Prashant Kori	July - Sept. 2019 Vol. 7, No.3, Pg. 93-99
2.	Journal of Non Timber Forest Produces	Socio economic status of lac growers Balaghat and Seoni districts of Madhya Pradesh	Pratibha Bhatnagar, Balram Lodhi, Ramdeen Bhalavi & Sunil Prajapati	Sept.2019 Vol.26, No.3 Pg. 151-156
3.	Journal of Tropical Forestry by Society of Tropical Forestry Scientists, Jabalpur	Volume tables of *Shorea robusta* (Sal) for South Shahdol forest Division	Richa Seth	Jan.- March 2019, Vol.35 (1) Pg. 43-49
4.	Climate Change and Environmental Sustainability	Analysis of Temporal Changes in Rainfall Pattern: A Case Study of Damoh District in Madhya Pradesh	P. K. Shukla Jay Prakash George Pratibha Bhatnagar	Vol.8(1):67-77
Papers published from SFRI				
1.	वानिकी संदेश	Volume tables of Miscellaneous Species for Harda Division	Richa Seth	July – Sept. 2019 Vol.10, No.3 Pg. 18-24
2.		औषधीय महत्व की प्रजातियाँ एवं उनका दैनिक जीवन में औषधीय महत्व	विजय कुमार हल्कदार, ज्योति सिंह एव ंके.एल. वर्मा	April – Sept. 2019 Vol.10, No.3 Pg. 5-17
3.		गरारी (कारा) की बीज संग्रहण, भण्डारण, उपचारण, रोपणी एवं रोपण तकनीक	अर्चना शर्मा	April – Sept. 2019 Vol.10, No.3 Pg. 46-48
4.		हल्दू की बीज संग्रहण, उपचारण, भण्डारण एवं रोपणी तकनीक	अर्चना शर्मा	April – Sept. 2019 Vol.10, No.3 Pg. 49-50
5.		बहुउपयोगी लघुवनोपज हर्रा का क्षेत्रीय जन समुदाय द्वारा सतत विदोहन सीमा का निर्धारण	शैलेन्द्र नेमा एवं ज्योति सिंह	March, 2020 Vol.11, No.1 Pg. 42-48
6.		समुदायिक भागीदारी द्वारा अचार प्रजाति का अन्तः स्थलीय वन क्षेत्रों में विनाश विहीन सतत विदोहन	ज्योति सिंह एवं शैलेन्द्र नेमा	March, 2020 Vol.11, No.1 Pg. 35-41
7.		Volume tables of Miscellaneous Species for Raisen Division	Richa Seth	March, 2020 Vol.11, No.1 Pg. 16-21

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.
8.		महत्वपूर्ण औषधीय एवं लघुवनोपज प्रजातियों की अनुमानित उत्पादक क्षमता का आंकलन।	एस. के. मसीह, एकता डेहरिया एवं राखी शर्मा	मार्च 2020 Vol.11, No.1 Pg. 22-34
9.		मालकांगनी (ज्योतिष्मती) उपयोगी औषधीय पादप	Vijay Kumar Haldkar, S.S. Raghuvanshi and R.K. Jain	March, 2020 Vol.11, No.1 Pg. 49-51
10.		मध्यप्रदेश के छिन्दवाड़ा जिले में गोंदों के संग्रहण मात्रा का ऑकलन एवं संग्राहकों की आय में योगदान का ऑकलन	जी. एस. मिश्रा एवं सुनील कुमार पयासी	March, 2020 Vol.11, No.1 Pg. 1-15
11.	Van Dhan Vyapar	Value Chain analysis of Nagarmotha (*Cyperus scariosus*) in Tikamagarh and Umaria district	Pratibha Bhatnagar & Rajesh Barman	Vol.2, April-June 2019

Paper published in Books / Souvenirs / Newsletters

S. N.	Name of the books/ souvenirs/Newsletters	Title of the paper/Article	Author(s)	Month/ Page No.
1.	Madhya Pradesh Vananchal Sandesh, Bhopal, M.P.	सागौन (Teak) टेक्टोना ग्रेन्डीस (*Tectona grandis*) पर लगने वाले प्रमुख कीट एवं उनके नियंत्रण की जानकारी।	उदय होमकर	Apr-June, 2019. Pg. 21-26.
2.		आवंले पर लगने वाले प्रमुख कीट एवं उनकी रोकथाम।	उदय होमकर	Jan.–March, 2019. Pg. 30-31.
3.		रोपित वन क्षेत्रों में बांसों की प्रकाश संश्लेषण क्षमता, जैवीय भार उत्पादकता एवं कार्बन संचयन का अध्ययन	सचिन दीक्षित	Oct.-Dec., 2019. Pg. 45-46
4.	लघु वनोपज संदेश – स्मारिका (अन्तर्राष्ट्रीय वन मेला) 18–22 दिसम्बर 2019, भोपाल	अकाष्ठीय लघुवनोपज : अचार का प्राकृतिक वन क्षेत्रों में क्षेत्रीय जनसमुदाय की भागीदारी द्वारा सतत् विदोहन सीमा का निर्धारण	ज्योति सिंह, शैलेन्द्र नेमा	18-22 Dec., 2019. Pg. 41-45.
5.		अकाष्ठीय लघुवनोपजः हर्रा का क्षेत्रीय जन समुदाय की भागीदारी द्वारा सतत् विदोहन सीमा का निर्धारण–एक अवसर एवं चुनौती	ज्योति सिंह, शैलेन्द्र नेमा	18-22 Dec., 2019. Pg. 46-50
6.		दारूहल्दी (*Berberis aristata*) की रोपणी तकनीक	उदय होमकर	18-22 Dec., 2019. Pg. 61-63
7.		औषधीय महत्व की प्रजातियाँ एवं उनका दैनिक जीवन में औषधीय महत्व	विजय कुमार हल्दकार	18-22 Dec., 2019. Pg. 81-88
8.		Supply and value chains of medicinal plants	P.K. Shukla, Pratibha Bhatnagar	18-22 Dec., 2019. Pg. 11-14

Publication of technical bulletins / brochures

S. No.	Name of technical bulletins/brochures	Authors	Bulletin/ brochure No.
1.	कलिहारी *(Gloriosa superb)*	Brochures published by RCFC, Central Region, SFRI, Jabalpur	36
2.	गुग्गल *(Commiphora wightii)*		37
3.	अश्वगंधा *(Withania somnifera)*		38
4.	भिलवा *(Semecarpus anacardium)*		39
5.	चिरायता *(Swertia chirata)*		40
6.	सलई *(Boswellia serrata)*		41
7.	चित्रक *(Plumbago zeylanica)*		42
8.	मुरवा		43
9.	मुसली		44
10.	कुचला		45
11.	बायविडंग		46
12.	गिलोय		47
13.	हर्रा	डॉ. अर्चना शर्मा	48
14.	बहेड़ा		49
15.	रीठा		50
16.	हल्दू		51
17.	खुरासानी इमली		52
18.	मध्यप्रदेश की प्रमुख गोंदों के उत्पादन एवं संग्रहण क्षेत्र	डॉ. जी.एस. मिश्रा	86
19.	कार्बन का महत्व, पर्यावरणीय घटनाओं से इसका संबध एवं वनों में कार्बन संचयन का आंकलन।	गिरिधर राव, सचिन दीक्षित, अवधेश शर्मा एवं अमित पांडे	87
20.	Quantitative Estimation of Bioactive Compounds of 5 commercially important medicinal plants through Chemofingerprinting (HPLC) for the identification of quality planting material.	S.K. Tiwari, Giridhara Rao, O.P. Tiwari, Avdesh Sharma, Sachin Dixit, M.P. Goswami & Pankaj Saini	88
21	दुर्लभ एवं संकटाग्रस्त प्रजातियों की रोपणी तकनीक का प्रचार–प्रसार	Uday Homkar, Madhuri Shrivastava,	89
22	वनों एवं वन रोपणीयों में लगने वाली कीट व्याधियॉ एवं उनके निदान पर किये गये कार्यो का सरल भाषा में संकलन : मध्य प्रदेश के संदर्भ में।	Uday Homkar	90
23	Species specific cage designs to rescue & transport the wildlife & Nest boxes for birds [Soft Copy]	Giridhara Rao, Mundrika Singh Anjana Rajput & Aniruddha Majumder	91
24	पश्चिमी मध्यप्रदेश में रोपण हेतु उपयुक्त प्रजातियों की रोपणी एवं रोपण तकनीक	डॉ. प्रतीक्षा चतुर्वेदी	Project Bulletin

8. BUDGET / FINANCE

Funding Sources

1 Grant-in-aid under non-plan budget of the Govt. of Madhya Pradesh, Forest Department

2 Project based external funding from govt./semi govt./non- govt. organizations and private donors.

3 Special assistance received from miscellaneous funding agencies.

4 Revenue from various sources of the institute.

Financial support and expenditure 2019-20

Budget head	Opening balance (Rs.in lakhs)	Budget received during the year (Rs. in lakhs)
10-2406 Non-Plan (Grant-in-aid)	0.00	53104490.00
Deposit Works (Sponsored projects)	65451006.00	38628308.00
CAMPA (Sponsored projects) MP Bhopal	0.00	1901800.00
Total Rs.	**65451006.00**	**93634598.00**

Details of sponsored projects

Various projects have been funded by govt./semi. Govt./non. and private agencies from time to time. Such on- going and completed projects during the year 2019-20 are given below:

S. No.	Project Name & I.D.No.	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Expenditure (1.4.19 to 31.3.20) Rs.
On-Going Projects						
1	देवास जिले में लोक वानिकी प्रबंध योजना कियान्वन का अनुश्रवण एवं मूल्यांकन'। **AF/P/E/19-20/07**	APCCF R/E & LV M.P Bhopal	0	0	0	0
2	मध्यप्रदेश में महुआ फूल एंव अचार गुठली के उतपादन एवं संग्रहण मात्रा का आंकलन एवं उनकी वंशागत विविधता की पहचान करना। **AF/P/E/18-19/22**	APCCF R/E & LV M.P Bhopal	3392000	580000	3972000	1765462
3	पश्चिमी मध्य प्रदेश के मालवा का पठार कृषि जलवायु प्रक्षेत्र (Agro-Climatic Zone) के लिये उपयुक्त कृषि वानिकी पद्धतियों (Agro forestry Models) का विकास एवं उनका कृषकों की निजी भूमियों पर प्रदर्शन **AF/P/E/18-19/17**	APCCF R/E & LV M.P Bhopal	1115000	580000	1695000	356271
4	Extension of developed nursery techniques of some important NTFPs and medicinal plant species through Research and Extension centres of Madhya Pradesh. **BD/P/E/18-19/16**	APCCF R/E & LV M.P Bhopal	1216401	235000	1451401	441295
5	Survey, population density and quantitative assessment of medicinal plants of the sustainable development of livelihood generation in Jabalpur Forest Circle M.P. **BD/P/E/17-18/04**	(National Medicinal Plants Board) New Delhi	696448	0	696448	752530

6	Establishment of "Regional - Cum- Facililtation Center (RCFC) for Central Region at SFRI. **BD/P/E/17-18/11**	(National Medicinal Plants Board) New Delhi	6421541	7020459	13442000	7063717
7	Biodversity assessment of encroachment removed area of Madan Mahal Hills of Jabalpur and it's surrounding forest area for ecological restoration through plantation and conservation of cleaned area. **BD/P/E/19-20/01**	Nagar Nigam Jabalpur (M.P.) (Smart City)	0	702000	702000	762859
8	Phytosociological study of river bank flora from Amarkantak to Mandla with special reference to impact on water quality in river Narmada. **ECO/P/E/18-19/19**	APCCF R/E & LV M.P Bhopal	1217932	0	1217932	1232675
9	Phenological studies and determination of sustainbale harvesting limits of some important wild medicinal plants and other NTFPs with active participation of user forest dependent communities in Satna Forest Division of Madhya Pradesh **ECO/P/E/18-19/23**	APCCF R/E & LV M.P Bhopal	1044000	944000	1988000	349870
10	Forensic DNA profiling and timber tracing for origin of wood with special reference to *Tectona grandis* (Teak) & *Pterocarpus marsupium* (Bija**)** **GEN/P/E/17-18/16**	APCCF R/E & LV M.P Bhopal	3419450	0	3419450	1147471
11	Identification of potential pockets and selection of candidate plus trees of Achar, Beeja, Tinsa, Haldu, Dhaman and Shisham and standardization of their clonal propagation technique. **GEN/P/E/18-19/24**	APCCF R/E & LV M.P Bhopal	1073429	799000	1872429	568739
12	Economic analysis of the rainfed teak plantations raised by MPRVVN under different models of planting for determination of optimum age of final felling to get the most profitable returns on the costs incurred in raising and maintaining them. **MEN/P/E/17-18/13**	Madhya Pradesh Rajy Van Vikash Nigam (FDC)	-2172	2312	140	0
13	Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh **MEN/P/I/17-18/01**	SFRI Jabalpur	144331	0	144331	0
14	Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important tree species viz. *Anogeissus latifolia & Commiphora wightii*. **SD/P/E/19-20/04**	APCCF R/E & LV M.P Bhopal	0	434500	434500	48880

15	Dissemination of knowledge through training programme for sustainable management and quality fruit collection of Chironji to Stakeholders. **SD/P/E/19-20/05**	APCCF R/E & LV M.P Bhopal	0	350000	350000	16380
16	Training and demonstration programme on establishment and best management of seed production areas, seed technology and nursery management for field foresters. **SD/P/E/19-20/06**	APCCF R/E & LV M.P Bhopal	0	386000	386000	16380
17	चलित मृदा परीक्षण प्रयोगशाला के माध्यम से म.प्र. के अनुसंधान एवं विस्तार केन्दों में मृदा परीक्षण कर मृदा में उपस्थित पोषक तत्वों की जानकारी प्रदान करना। **SIL/P/E/18-19/18**	APCCF R/E & LV M.P Bhopal	3695000	0	3695000	1953354
18	म.प्र. वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्ष 2015–16 (द्वितीय मूल्यांकन) एंव 2016–17 (प्रथम मूल्यांकन) के वर्षों ऋतु में हुए वृक्षारोपण कार्यो का अनुश्रवण मूल्योंकन एवं प्रोजेक्ट इम्पेक्ट असिसमेंट। **SIL/P/E/20-21/01**	APCCF JFM/FDA M.P. Bhopal	0	1851300	1851300	0
19	Network project on conservation of Lac insect genetic resource **SEM/P/E/14-15-05**	IINRG Ranchi (ICAR)	605838	1500000	2105838	1645625
20	Sequestered carbon in roadside plantation: an assessment of potential contribution in climate mitigation in Jabalpur Smart City **SEM/P/E/18-19/06**	Enviromental Planning & Coordination Organisation (EPCO), M.P.	653283	400000	1053283	988396
21	Tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vhindhyan range. **WL/P/E/17-18/09**	PCCF, Wildlife, M.P, Bhopal	-113053	1787000	1673947	1139532
22	Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected areas/non-protected areas of Madhya Pradesh. **WL/P/E/17-18/17**	PCCF, Wildlife, M.P, Bhopal	2876444	5718000	8594444	2756330
23	Maintenance of monitoring and evaluation facilities and data base of predators prey in Madhya Pradesh" **WL/RA/32**	PCCF, Wildlife, M.P, Bhopal & SFRI	8159114	6315807	14474921	7654257
24	Monitoring of re- introduced tigers *(Panthera tigris)* In Nauradehi Wildlife Sanctuary" **WL/P/E/18-19/01**	PCCF, Wildlife, M.P, Bhopal	2329607	2481100	4810707	1949018
25	To study the impact of proposed Morena water supply sub-project under MPUDP (funded by the World Bank) on the Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial Wildlife Sanctuary, Morena (M.P.) **WL/P/E/18-19/20**	MP Urban Development Company Limited, Bhopal	910102	1451475	2361577	2423257

26	Collection of baseline data and impact of airport activities on proposed Tiger Safari at Dumna Nature Park. **WL/P/E/19-20/03**	Nagar Nigam Jabalpur (M.P.)	0	177000	177000	3805
	Total Rs.		38854695	33714953	72569648	35036103
Completed Projects						
1	महुआ फूल एवं सलइ गोंद संबंधी प्रशिक्षण के संबंध में **SD/AF/P/E/17-18/15 - (B)**	MP MFP Federation, Bhopal	14222	0	14222	9662
2	*Ex-situ* conservation of medicinally important wild life tuberous/rhizomatic plant and studies on their phenology and growth performance. **BD/P/E/13-14/05**	APCCF R/E & LV M.P Bhopal	429071	0	429071	37760
3	वनों एवं वन रोपणियों में लगने वाले कीट व्याधियों एवं उनके निवास पर किए गए कार्यो का सरल भाषा में संकलन म.प्र. के संदर्भ में। **BD/P/E/16-17/06**	APCCF R/E & LV M.P Bhopal	428884	0	428884	80304
4	Development of high-tech nursery and preparation of quality planting material of RET species for their restoration in natural forest and rural/urban areas through plantations,. **BD/P/E/16-17/19**	APCCF R/E & LV M.P Bhopal	3092959	0	3092959	711046
5	Development of raised mother bed technology and mass multiplication of clonal plants of eucalyptus in SFRI, Jabalpur **BD/P/I/16-17/03**	SFRI Jabalpuur (INTERNAL) PROJECT	601602	20000	621602	0
6	Sustainable livelihood based management plan for Kuno-palpur wildlife Sanctuary. of M.P**. BOT/P/E/13-14-15**	APCCF R/E & LV M.P Bhopal	1054573	0	1054573	39903
7	Studies on photosynthetic efficiency, biomass production and carbon sequestration of bamboo in plantation forests **BOT/P/E/14-15/07**	APCCF R/E & LV M.P Bhopal	1442330	0	1442330	483232
8	Protection maintenance and growth study of dominant tree species for estimation of biomass and carbon sequestration in preservation plots laid in different forest types of M.P.**BOT/P/E/11-12/07**	APCCF (CAMPA) Bhopal	62960	4445	67405	0
9	Development of technology for conservation and sustainable management of wild medicinal plants and NTFPs through community participation in Shahdol Forest Circle of (M.P.) **ECO/P/E/14-15/01**	APCCF R/E & LV M.P Bhopal	0	0	0	0
10	"Study of Sal regeneration status in borer affected areas" **ECO/P/E/17-18/07**	APCCF R/E & LV M.P Bhopal	364940	0	364940	113306
11	Ecological studies on Grasslands of Bandhavgarh Tiger Reserve with special reference to wildlife management.**ECO/P/E/12-13/24**	PCCF, Wildlife, M.P, Bhopal	2310324		2310324	37260

12	म.प्र. खनिज संसाधन विभाग द्वारा विभिन्न जिलों में रेत खनन क्लस्टर्स के अंतर्गत प्रस्तावित रेत खदानों का पर्यावरणीय मूल्यांकन एवं पर्यावरणीय प्रभाव प्रबंधन। **ECO/P/E/15-16/09**	MP State Mining Corporation Limited. Bhopal	1326068	24754	1350822	0
13	"National Seminar on Climate change and Roles & responsibilities of Communities for Adaptaion Mitigation" **ECO/P/E/17-18/05**	MP Clean Development Mechanism Agency, EPCO, Bhopal	16028	0	16028	0
14	"Maintenance and analysis of indoor and outdoor samples in environmental Impact Assessment (EIA) Laboratory," **ECO/RA/31**	SFRI Jabalpur	298273	0	298273	5544
15	अनुसंधान एवं विस्तार वृत्तों के माध्यम से संचालित लघु अनुसंधान कार्यो का अनुश्रवण एवं मूल्यांकन। **EXT/P/E/17-18/14**	APCCF R/E & LV M.P Bhopal	223312	1950	225262	0
16	Development of integrated biotechnological package by genetic diversity assessment using molecular characterization, chemoprofiling and standardization of micro-propagation and cryopreservation protocol of four RET species. **GEN/P/E/14-15/02**	National Medicinal Plants Board (NMPB) New Delhi	225263		225263	225263
17	Quantitative determination of bioactive compounds of highly threatened medicinal plant species through chemoprofiling and standardization of propagation techniques using biotechnological interventions for their conservation. **GEN/P/E/15-16/03**	APCCF R/E & LV M.P Bhopal	64890	11472	76362	0
18	Monitoring and evaluation of tissue culture grown plants of *Dendrocalamus asper* in different forest divisions of Madhya Pradesh. **GEN/P/E/17-18/18**	Director, M.P. State Bamboo Mission Bhopal	96125	327	96452	0
19	बांस की दो प्रजातियों डेन्ड्रोकेलेमस एसपर (संख्या 4000) एवं बेम्बूसा बल्कुआ (संख्या 1000) के 5000 पौधे तैयार करना **GEN/P/I/17-18/19**	SFRI Jabalpur	319760	0	319760	0
20	रोपणी मार्गदर्शिका का प्रकाशन **MEN/P/E/12-13/25**	APCCF R/E & LV M.P Bhopal	57754	0	57754	0
21	Standardization of seed and nursery techniques for production of quality planting stock of important indigeneous species. **SD/P/E/15-16/02**	APCCF R/E & LV M.P Bhopal	738385	0	738385	309686
22	महुआ फूल एवं सलइ गोंद संबंधी प्रशिक्षण **SD/AF/P/E/17-18/15 - (A)**	MP MFP Federation, Bhopal	258772	0	258772	0

23	Production of quality planting stock of important RET and wild medicinal tree species through application of advanced technology. **SD/P/I/17-18/06**	SFRI Jabalpur	975644	0	975644	193262
24	Study & comparison of soil cultural practices in existing bamboo (plantations) **SIL/P/E/16-17/04**	APCCF R/E & LV M.P Bhopal	580206	0	580206	5857
25	म.प्र. वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्ष 2013–14,2014–15 एंव 2015–16 के वर्षों ऋतु में हुए वृक्षारोपण कार्यो का अनुश्रवण मूल्योंकन **। SIL/P/E/16-17/18**	APCCF JFM/FDA M.P. Bhopal	294237	20349	314586	0
26	The scheduled tribes and other traditional forest dwellers (Recognition of forest Rights Act), 2006 implementation and its impact in Madhya Pradesh **SEM/P/E/15-16/11**	APCCF R/E & LV M.P Bhopal	285869	0	285869	7786
27	Climate change and its impact on forest and livelihood of people in Damoh District **SEM/P/E/16-17/07**	APCCF R/E & LV M.P Bhopal	291522	1274	292796	0
28	Estimation of wood demand and supply in Madhya Pradesh **SEM/P/E/16-17/10**	APCCF R/E & LV M.P Bhopal	311765	0	311765	68830
29	Marketing Information Service for NTFPs In Central India **- SEM/P/E/18-19/02**	SFRI Jabalpur	14686	346	15032	0
30	Maintenance and enrichment of SFRI Bamboosetum **TI/P/E/17-18/12**	Director, M.P. State Bamboo Mission Bhopal	154985	0	154985	91054
31	"Evaluation of performance of different plus trees of teak through progeny trial" **TI/P/I/17-18/03**	SFRI Jabalpur	115452	0	115452	25431
32	Preparation of detailed project report for wildlife habitat improvement in the adjoining area of Sardar Sarovar project (M.P.) **WL/P/E/16-17/08**	Narmada Valley Development Authority	845524	0	845524	198506
33	Evaluation of impact of rehabilitation of Pardhi children in Panna district of Madhya Pradesh with reference to the wildlife conservation **WL/P/E/15-16/04**	APCCF R/E & LV M.P Bhopal	0	0	0	-80677
34	Study on agricultural crop damage by wild animals and its management in Hoshangabad Forest Circle of Madhya Pradesh **WL/P/E/15-16/12**	APCCF R/E & LV M.P Bhopal	339317	16765	356082	0
35	Impact of tourism on environmental, ecological, and socio-economic dynamics, in and around the Tiger Reserves of Madhya Pradesh **WL/P/E/15-16/13**	APCCF R/E & LV M.P Bhopal	622746	0	622746	10198
36	Monitoring and evaluation of wildlife and their habitat for sustainable management and development in the protected areas of Madhya Pradesh **WL/P/E/15-16/01**	PCCF, Wildlife, M.P, Bhopal	0	0	0	0

37	Capacity building of forest staff of Madhya Pradesh on wildlife population monitoring techniques **WL/P/E/17-18/02**	PCCF, Wildlife, M.P, Bhopal	1556938	0	1556938	792409
38	Standardization of the population estimation techniques of *blue bull* (*Boselaphus tragocamelus*) **WL/P/E/17-18/10**	PCCF, Wildlife, M.P, Bhopal	25560	0	25560	16555
	Total Rs.		19840946	101682	19942628	3382177
	Gross Total (On Going+ Closed)		58695641	33816635	92512276	38418280
39	Interest Under Bank		612167	783575	1395742	371581
40	Misce. Project - 3987		6143198	1099093	7242291	897167
41	Institutional Charges		0	2929005	2929005	0
	Gross Total		65451006	38628308	104079314	39687028

CAMPA sponsored projects, M.P. Bhopal

S. No.	Project Name & I.D.No.	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Expenditure (1.4.18 to 31.3.19) (Rs.)
1	Collection, processing, testing, certification and supply of quality seed of various forestry species **SD/P/E/16-17/14**	CAMPA MP Bhopal	0	0	0	0
2	Up-gradation of laboratory under EIA/EMP cell for water, air and noise pollution analysis in environmental impact assessment projects.**ECO/P/E/16-17/13**	CAMPA MP Bhopal	0	0	0	0
3	Mobile soil testing van **SIL/P/E/16-17/15**	CAMPA MP Bhopal	0	0	0	0
4	Selection of suitable species on the basis of growth performance of established plantations and development of nursery techniques to increase green cover under Green India Mission (GIM) in western Madhya Pradesh. **SIL/P/E/16-17/20**	CAMPA MP Bhopal	0	650300	650300	650300
5	Demarcation (Protection), maintenance and record keeping of sample plots of Madhya Pradesh. **MEN/P/E/17-18/08**	CAMPA MP Bhopal	0	850800	850800	850800
6	Role of management interventions in wildlife habitat improvement on abandoned sites of Satpura Tiger Reserve, Madhya Pradesh. **WL/P/E/16-17/16**	CAMPA MP Bhopal	0	389700	389700	389700
7	Knowledge upgradation and skill development of field foresters, forest dependent communities and resource persons through lab to land training modules. **EXT/P/E/16-17/17**	CAMPA MP Bhopal	0	0	0	0
	Total (A)		**0**	**1890800**	**1890800**	**1890800**

8	Protection, maintenance and successional study in terms of growth, biomass and carbon sequestration in preservation plots laid in different forest types of Madhya Pradesh **- BOT/P/E/11-12/07**	CAMPA MP Bhopal	0	11000	11000	11000
9	Production of *Dendrocalamus asper* plants 5000 No. **GEN/P/E/18-19/01**	M.P. Bamboo Mission throgh CAMPA MP Bhopal	0	0	0	0
	Total (B)		**0**	**11000**	**11000**	**11000**
	Gross Total (A+B)		**0**	**1901800**	**1901800**	**1901800**

INCOME (Revolving Funds for the year 2019-2020)

S.No.	HEAD	Income (In Lakh)
1	Gate Entry Fee	692032.00
2	Guest House Charges	124405.00
3	House Rent & Water Charges	1167095.00
4	Misc Receipts	535353.00
5	Plant Supply	1141505.00
6	Seed Supply	2964871.00
7	Sale of tender Form	15050.00
8	Training Fee	3000.00
9	Institutional Charge	425400.00
10	Rent From Allahabad Bank	7000.00
	Interest Received :-	
11	Interest on FDR	5534836.00
	Grand Total	**12610547.00**

EXPENDITURE (Revolving Funds) for the year 2019-2020)

S.No.	HEAD	Expenditure (In lakh)
1	Daily Wages	1410450.00
2	Repair & Maintenance	1649444.72
3	Travelling Expenditure	549347.00
4	Advertisement Expenditure	13648.00
5	Bank Charges	573.00
6	Consultancy Charges	0.00
7	Electricity Expenditure	353008.00
8	Misc. Expenses	26394.00
9	Nursery Expenses	46463.50
10	Office Expenses	417744.00
11	POL Expenses	19225.00
12	Seminar & Meeting Expenses	306621.00
13	Stationary Expenditure	220936.00
14	Uniform Expenditure.	205200.00
15	Vehicle Maintenance	19838.00
16	Website Design Maintenance	130000.00
17	Audit and Legal Fee	127418.00

18	Internet Charges	142725.00
19	Seed Collection and Testing	11942417.00
20	Nursery Seed Collection	467262.00
21	Depriciation	2191506.00
	Gross Total	**20240220.22**

Income (Reserve Funds) for the year 2019-20		
	Details	**Income**
1	POL Recovery	10250.00
2	Sale of Books and Magazines	3372.00
3	Miscellaneous	210087.00
4	Institutional Charges	425400.00
5	Tender Form Fee	67780.00
6	Interest on FDR	266185.00
7	Saving Interest	101535.00
	Total Rs.	**1084609.00**

Expenditure (Reserve Fund) for the year 2019-20		
1	Repair & Maintenance	128813.00
2	Bank Charges	53.00
3	Miscellaneous	350.00
	Total Rs.	**129216.00**

Details of Accounts Financial Status as on 31st March, 2020				
S.No.	**Details**	**Cash in Bank**	**F.D.R.**	**Total**
1	Revolving Fund	3829233.00	30600000.00	**34429233.00**
2	Grant-In-aid	8304762.00	0.00	**8304762.00**
3	Deposit Work (Project Funds)	21092286.00	43300000.00	**64392286.00**
4	Reserve funds	2822278.00	46499000.00	**49321278.00**
	Total Rs.	**36048559.00**	**120399000.00**	**156447559.00**

9. ESTABLISHMENT

Postings, Transfers, and Retirement (2019-2020)

Postings :

S.No.	Name	Designation	Date of Joining
1.	Kamal Singh Masram	Dy. Director	20-02-2020

Transfers :

S.No.	Name	Designation	Date of Relieving
1.	B.P. Bathma	ACF	06-11-2019

Retirement :

S.No.	Name	Designation	Date of Retirement
1.	Panna Lal Gond	Driver	31-03-2020
2.	Ramcharit Kahar	Dakruner	28.02.2020

Death :

S.No.	Name	Designation	Date of Retirement
1.	Bhagvandas Yadav	Forester	July 2019

Temporary project staff engaged during the year (March 2019 to March 2020)

S. No	Name	Designation	Project under which appointed	Period	
				From	To
1.	Dr. P.K.Shukla	Regional Director	Regional-Cum-Facilitation Centre (RCFC) Central Region, SFRI, Jabalpur MP.	March 2019	Feb.2020
2.	Alok Sharma	Dy.Director		March 2019	Feb.2020
3.	A.K. Hajari	Consultant (T.O)		March 2019	Feb.2020
4.	Akshya Jain	Consultant (I.T)		March 2019	Feb.2020
5.	Manishpuri Goswami	Consultant (T.O)		March 2019	Feb.2020
6.	Jitendra Singh	DEO		March 2019	Feb.2020
7.	Snehlata Mishra	DEO		March 2019	Feb.2020
8.	Shailendra Nema	DEO		March 2019	Feb.2020
9.	Rajesh Barman	Field Asstt.	Survey of existing primary processing centres, evaluation of their present status, identification of Infrastructure upgradation and training needs	March 2019	Feb.2020
10.	Balram Lodhi	SRF	Network project on conservation of lac insect genetic resources	Jan 2019	March 2020
11.	Bharat Singh Aarmo	Field Asstt.		Jan 2019	March 2020
12.	Dr. Sunil Prajapati	SRF		Jan 2019	March 2020
13.	Jayprakash George	SRF	Sequestered carbon in roadside plantation, an assessment of potentinal contribution in climate mitigation in Jabalpur Smart City.	March 2019	Feb.2020
14.	Akash Shukla	Field Asst.		July-2018	July-2020
15.	Anju Kathel	JRF	Standardization of seed and nursery techniques for	-	June 2019

S. No	Name	Designation	Project under which appointed	Period	
				From	To
16.	Ramkumar Kahar	Field Assistant	Production of quality planting stock of Important Indigenous Species	Nov. 2018	June-2019
17.	Ashish Kumar Patel	Computer Operator		May 2018	June 2019
18.	Dr. Anirudha Mazumdar	RA	Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected areas of MP	Jan. 2019	Dec.-2019
19.	Mohd. Ashad Hussain	Field Astt.		Jan. 2019	Dec.-2019
20.	Rishika Thakur	RA		Aug. 2018	July 2019
21.	Prashant Kori	Field Asstt.		Aug. 2018	July 2019
22.	Pratap Rao Vagh	Computer Operator		Jan- 2019	Dec.2019
23.	Shyamsundar Bhairam,	Project Asstt.		Aug. 2018	July 2019
24.	Deeksha Tamrakar	SRF	Identification of potential pockets and selection of candidate plus trees of bija and standardization of it's propagation technique.	March 2019	Feb.2020
25.	Imrat Sen	Project Asstt.	Studies on photosynthetic efficiency biomass production and carbon sequestration of bamboo in plantation forests	May 2017	Dec. 2019
26.	Ankush Ashok Saddhe	RA-1	Forensic DNA profiling and timber tracing for origin of good with special reference to *T.Grandis & Pterocarpus marsupium*.	March 2019	Feb.2020
27.	Shruti Thakre	Field Asstt.		April 2018	May 2019
28.	P.S. Bhandari	Field Asstt.	Monitoring of re-introduced tigers in Nauradehi Wildlife Sanctuary	March 2019	July 2020
29.	Richa Pandey	JRF		Aug. 2018	July 2019
30.	Avinash Yadav	JRF		March 2020	Feb.2021
31.	Neha Prajapati	Project Asst.	Production of quality planting stock of important RET and wild medicinal tree species through application of advance technology.	March 2019	Aug. 2019
32.	Ajay Kumar Bijewar	JRF	पश्चिमी म.प्र.के मालवा का पठार कृषि–जलवायु प्रक्षेत्र के लिए उपयुक्त कृषि–वानिकी पद्धतियों का विकास एवं उनका कृषकों की निजी भूमियों पर प्रदर्शन।	March 2019	Feb.2020
33.	Pankaj Saini	Project Asst.	Extension of developed nursery techniques of some important NTFPs and medicinal plant species through research and extension.	Jan. 2019	Dec.2019
34.	Dilshad Masih	Project Asst.	Phytosociological study of river bank flora from Amarkantak to Mandla with special reference to impact on water quality in river Narmada.	Jan.2019	Jan.2021
35.	Ramdeen Bhalavi	SRF		Jan.2019	Nov.2020
36.	Shubham Jain	Computer Operator		Feb.2019	Dec.2020
37.	Avdhesh Kumar Singh	Project Asst.	Study on Tiger presence and their dispersal movement in Ratapani-Kheoni.	April 2017	Dec.2019
38.	Shimpi Chourasia	Field Asstt.		Oct.2019	Aug.2020
39.	Ashish Pathak	Project Asst.		Jan.2018	Dec.2019

S. No	Name	Designation	Project under which appointed	Period	
				From	To
40.	Nikita Gupta	Project Asst.		Aug.2019	Aug.2020
41.	Mradul Kumar	Field Asst.-2		oct.2019	Aug.2020
42.	Shailendra Yadev	RA	To study the impact of proposed Morena Water supply sub project under MPUDP on Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial wildlife Sanctuary, Morena (MP)	Feb.2019	July 2020
43.	Dharmendra Baghele	Project Asst.	चलित मृदा परीक्षण प्रयोगशाला के माध्यम से म.प्र. के अनुसंधान एवं विस्तार केन्द्रों में मृदा परीक्षण कर मृदा में उपस्थित पोषक तत्वों की जानकारी प्रदान करना।	Oct.2018	March 2020

Interaction with trainee FROs with Director, SFRI

Visit of trainee FROs to the Soil Science Lab of SFRI

Visit of trainee FROs to the Wildlife Wing of SFRI

Visit of trainee FROs to the Bamboosetum of SFRI

Visit of pharmacy students to medicinal plant gene-bank of SFRI

Participation in International Herbal Fair at Bhopal

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State Forest Research Institute

(An Autonomus Institute of Department of Forests, Government of Madhya Pradesh)
Narmada Road, Polipathar, Jabalpur 482008 (M.P.)
Phone : 0761-2665540, 2666529, Fax : 0761-2661304
E-mail : mpsfri@mp.gov.in, mpsfri@gmail.com, website: www.mpsfri.org