

वार्षिक अनुसंधान प्रतिवेदन

ANNUAL RESEARCH REPORT

2020-2021



State Forest Research Institute, Jabalpur (M.P.)

राज्य वन अनुसंधान संस्थान, जबलपुर (म.प्र.)



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With best compliments from :

Director
SFRI, Jabalpur



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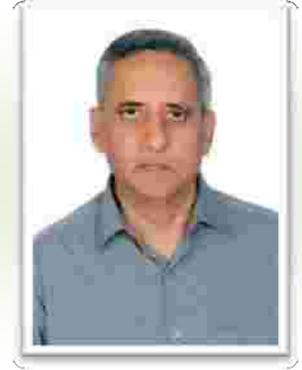
CONTENTS

Production & Guidance Amitabh Agnihotri, IFS	From the Director's Desk	
	1. The Institute	01
	2. Research Activities	08
	2.1 Biodiversity & Wildlife Division	09
	2.1.1 Biodiversity & Medicinal Plants	09
	2.1.2 Wildlife	14
	2.2 Forest Botany & Ecology Division	34
	2.2.1 Forest Botany	34
	2.2.2 Forest Ecology and Environment	35
	2.3 Genetics, Tree Improvement & Biotechnology Division	39
	2.3.1 Genetics and Biotechnology	39
	2.3.2 Tree Improvement	41
	2.4 Seed, Silviculture & Agro-Forestry Division	44
	2.4.1 Seed Technology	44
	2.4.2 Silviculture	51
	2.4.3 Agro Forestry	59
	2.5. Social Economics, Marketing & Forest Mensuration Division	67
	2.5.1 Social Economics & Marketing	67
	2.5.2 Forest Mensuration	74
	3. Extension, Training & Consultancy	77
	4. Documentation Centre	91
	5. Library & Information Centre	98
	6. Computer and Information Technology	99
	7. Published & Presented Research Papers	100
	8. Budget/Finance	105
	9. Establishment	110
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Cover photo Front cover: Marking of sample plots of the institute (Photo courtesy: Richa Seth) Production of quality planting stock of RET species in the institute (Photo courtesy: Dr. Archana Sharma)		
Back cover Medicinal plant gene bank of the institute Glimpses of various training and extension activities at SFRI (Photo courtesy: Anirudhwa Sarkar)		

This report contains semi-processed data which will be form the basis of scientific publications in future. Therefore, the data here-in may not be used without the permission of Director, SFRI, Jabalpur.

FROM THE DIRECTOR'S DESK

The forest resources and biodiversity are being adversely affected due to competing uses of land for agriculture, forestry, urbanisation and industrialization exerting unprecedented pressure on the available land resources of the state as well as the nation. In order to deal effectively with these challenges the forestry sector needs to use innovation and modern technologies in managing natural resources.



State Forest Research Institute has revised its research focus to see how climate resilient practices can be adopted in governance and managing emerging challenges in forestry sector. This year also the institute continued to provide scientific support for decision making on matters related to ecology, biodiversity, wildlife conservation and contemporary issues of forest management.

The research activities of SFRI in the year 2020-2021 were people oriented in the pursuit of establishing sustainably managed forests and meeting requirements of fuel, fodder timber and other products.

The year was particularly eventful and challenging with meager budgetary provisions as well as human resources. The Annual Action Plan was successfully executed with initiation of 06 new project funded by M.P. Forest Department, MPMFP Federation, State Bamboo Mission, and Regional cum Facilitation Centre, (NMPB). This year 03 research projects were completed and project reports of 14 project were submitted to the respective funding agencies. 23 ongoing projects continue as per the envisaged activities of the Annual Action Plan. The recommendations and suggestion of the completed projects will be useful to the professional field foresters and for the forest dependent communities as well.

During this year 19 research papers were published in national, international journals and 14 papers in SFRI publications and 05 papers were published/presented in seminars/ symposiums/ workshops/webinar etc. 32 brochures, handouts, pamphlets were brought out on research findings of various projects by the institute.

The institute also published the Annual Research Report 2019-2020, quarterly Vaniki Sandesh and Journal of Tropical Forestry and Van-Dhan.

The institute also excelled in its outreach activities through trainings and workshops. The training programs were beneficial in skill up gradation and inculcating scientific temperament to the field foresters, graduate and post graduate students from various universities.

I take this opportunity to express my gratitude to the President, Vice-President and members of Board of Governors (BOG) and Research Advisory Committee (RAC) for their constant support and guidance. We are grateful to all the funding agencies for budgetary support.

I am sure that this Annual Research Report will provide a meaningful overview of the diverse forestry research activities of the institute during the year 2020-21 which will be helpful to the Forest Department in the implementation of its various programs.

Comments, views and suggestions are welcome to improve our research activities and other allied services enabling us to serve better.

(Amitabh Agnihotri)
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. Development, implementation of sustainable harvesting technologies and determination of sustainable harvesting limits of commercially important NTFPs in tribal dominated tropical forests.
16. Impact assessment of agro-forestry technologies on natural resource management and livelihoods.
17. Screening and management of diseases of some important forestry species and medicinal & aromatic plants.
18. Scientific management interventions in wildlife habitat improvement.

19. 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. 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.
3. Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected areas/ Territorial divisions of Madhya Pradesh.
4. Monitoring of re-introduced tigers (*Panthera tigris L.*) in Nauradehi Wildlife Sanctuary.
5. 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).
6. Study on tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhyan Range.
7. Preparation of detailed project report of wildlife habitat improvement in the adjoining area of Sardar Sarovar Project, Madhya Pradesh.
8. Phytosociological study of river bank flora from Amarkantak to Mandla with special reference to impact on water quality in river Narmada.
9. 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.
10. Identification of potential pockets and selection of candidate plus trees of Bija and standardization of its clonal propagation technique.
11. Maintenance and enrichment of SFRI Bamboosetum.
12. Dissemination of knowledge through training programme for sustainable management and quality fruit collection of Chironji to Stakeholders.
13. Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important species viz. *Anogeissus latifolia* & *Commiphora wightii*.
14. 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.
15. Conservation of lac insects genetic resources.
16. 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*).
17. Preparation of volume and yield tables of several species.
18. Studies on photosynthetic efficiency, biomass production and carbon sequestration of bamboo in plantation forests.
19. Production of quality planting stock of important RET and wild medicinal tree species through application of advanced technology.
20. Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh.
21. मध्यप्रदेश में प्रमुख गोंदों के संग्रहण के ऑकड़ों का संकलन एवं प्राथमिक संग्राहकों पर सामाजिक आर्थिक प्रभाव।
22. 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।
23. मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन एवं संग्रहण मात्रा का ऑकलन।

24. 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।
25. 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।
26. देवास जिले में लोकवानिकी प्रबन्ध योजना क्रियान्वयन का अनुश्रवण एवं मूल्यांकन।
27. म.प्र. के समस्त सामाजिक वानिकी वृत्तों के माध्यम से महत्वपूर्ण अकाष्ठीय वन्य प्रजाति तथा औषधीय पौधों के नर्सरी तकनीक का विस्तार।
28. उच्च गुणवत्ता वाले पौध तैयार करने हेतु बीज तथा नर्सरी तकनीकों का मानकीकरण।
29. क्षेत्रीय सह सुविधा केन्द्र, जबलपुर द्वारा मध्यप्रदेश एवं छत्तीसगढ़ में औषधीय पौधों के लिए डेटाबेस प्रबंधन प्रणाली की स्थापना एवं औषधीय पौधों की खेती का प्रचार-प्रसार।
30. विभिन्न वानिकी प्रजातियों के उत्तम गुणवत्ता वाले बीजों का एकत्रीकरण, प्रसंस्करण, परीक्षण तथा प्रमाणीकरण एवं वितरण।
31. गृह औषधीय वाटिका स्थापना हेतु आवश्यक तकनीकी सलाह व मार्गदर्शन एवं निःशुल्क औषधीय पौधों का वितरण।
32. संस्थान के बैम्बूसिडम में (बांस का पौधशाला) देश के विभिन्न क्षेत्रों से विभिन्न प्रजातियों के बांस का रोपण तथा उनका रखरखाव।

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	0
3	Deputy Director (CF/Dy.CF)	2	1
4	Assistant Director (ACF)	2	1
5	Forest Ranger	3	1
6	Dy. Ranger	1	0
7	Forester	1	7
8	Forest Guard	15	11
	Total	26	22
	Scientist		
1	Forest Ecologist	1	0
2	Forest Geneticist (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	0
6	Biodiversity Scientist	1	0
7	Marketing Specialist (Scientist-E)	1	1
8	Wildlife (Scientist - B)	5	1
	Total	12	4
	Technical		
1	Statistical Assistant (Sr. Research Officer)	1	1
2	Technical Assistant (Social–economics), (Sr. Research Officer)	3	0
	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 (Documentation) (Sr. Research Officer)	1	1
7	Technical Assistant (Computer) (Sr. Research Officer)	1	1
8	Lab Technician, (Sr. Research Officer)	6	1
	Lab Technician		2
9	Lab Incharge, (Sr. Research Officer)	3	1
10	Ledger Assistant (Research Officer)	3	1
	Ledger Assistant		0
11	Herbarium Assistant (Contingency)	1	1
12	Lab Assistant	3	1
13	Field Assistant	3	1
	Total	36	24
	Non-Technical		
1	Head Clerk	1	0
2	Accountant	2	1
3	Steno – II	2	0
4	Steno - III	2	0
5	Assistant Grade – II	2	1
6	Assistant Grade – III	4	3
7	Driver	6	2
8	Daftari	1	0
9	Peon/ Orderly	10	0
10	Khalashi	1	0
11	Chowkidar	4	0
12	Mali	4	0
13	Dak Runner	3	0
14	Sweeper	2	0
	Total	44	7

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, maintenance 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 cum demonstration of cultivation techniques, processing and marketing of medicinal and aromatic plants.
9. रोपणी में रूट ट्रेनर में पौध तैयारी, पौधों में होने वाली बीमारियों का निदान एवं रोपणी प्रबंधन पर प्रशिक्षण एवं प्रदर्शन।
10. Training cum awareness and orientation programmes regarding forestry research for the newly recruited trainee forest rangers and forest guards and students from universities.
11. Participation in exhibitions and fairs.

2. RESEARCH ACTIVITIES

Abstract of Research Activities

2020-2021

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	-	-	-	4	1
	Wildlife	-	-	-	4	1
2	Forest Botany and Ecology Division					
	Forest Botany	-	-	-	-	1
	Forest Ecology and Environment	-	-	-	2	-
3	Forest Genetics, Tree Improvement and Biotechnology Division					
	Forest Genetics and Biotechnology	-	-	-	1	-
	Tree Improvement	-	1	-	-	3
4	Seed, Silviculture and Agro-forestry Division					
	Seed Technology	-	-	-	5	1
	Silviculture	-	1	-	1	1
	Agro-Forestry	-	-	-	3	-
5	Social Economics & Marketing and Forest Mensuration Division					
	Social Economics and Marketing	-	1	-	1	-
	Forest Mensuration	-	-	1	1	1
	TOTAL	-	3	1	22	9

Total No. of completed projects (Coln. 3 + 4) - **03**

Total No. of on-going projects (Coln. 5 + 6) - **23**

Total No. of regular activities (Coln. 7) - **09**

2.1.1 NAME OF THE DIVISION :- BIO-DIVERSITY AND WILDLIFE DIVISION

2.1.2 NAME OF THE BRANCH :- 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.

On-going Projects :- Four

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 Plant Board, New Delhi

2. 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, Jabalpur

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

Funding Agency : APCCF, Research Extension & Lokvaniki, M.P., Bhopal

4. Regional-cum-Facilitation Centre, Central Region, Jabalpur

Funding Agency : National Medicinal Plant Board, New Delhi

Regular Activities :- One

1. औषधीय पौधों के जीन बैंक एवं रोपणी का प्रबंधन एवं विकास।

Project Summary:-

On-going Projects

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

Why this Project :-

This project was funded by NMPB, New Delhi to estimate to population density, production potential and capable MAPs for livelihood generation in 5 Forest divisions namely Jabalpur, Katni, West Mandla, East Mandla and Dindori forest division of Jabalpur Forest Circle.

Research Methodology :-

The research methodology for this project has been followed as prescribed in training manual prepared and published during the training program by Verma, Dharmendra & S.K. Masih, 2017; Rai, C.P., R.K. Pandey & S.K. Masih, 2011.

Study Design :-

To complete the objectives of the project the following design has been adopted:-

- Preparation and publication of survey manual to disseminate survey methodology to front line forest field staff (Beat Guard)
- Training to front line forest field staff (Beat Guard)
- Resource Survey in identified potential area/ medicinal plant rich area.
- Focused group discussion program (FGDPs) in identified JFMCs
- Data collection, computation
- Drafting of project report and submission

Objectives of Research:-

Estimation of population density, production potential and livelihood generation capabilities of medicinal plants.

Activities Undertaken:-

Data Computation, Data Analysis, Drafting of project report, finalization of project report, submission of project report

Cost of the Project :- Rs. 15.47 lakhs

Expected Outcome of Research :-

Outcome of the analysis will be utilized in drafting and finalizing of the project report which will be utilized by the Forest Managers for sustainable development of their forest areas as well as livelihood generation of Forest Dependent Communities (FDC).

2. Title of the Project:- Biodiversity assessment of encroachment removed area of Madan Mahal Hills of Jabalpur and its surrounding forest areas for ecological restoration through plantation and conservation of cleaned areas.**Why this Project: -**

This project is funded by Smart city, Municipal Corporation Jabalpur (M.P.) to provide technical expertise to ensure that indigenous species of tree, shrubs and herbs that are to be planted in future, for ecological restoration in encroachment removed areas of Madan Mahal Hills of Jabalpur. Therefore phyto-sociological studies were important in the forest areas adjoining to encroachment removed areas of Madan Mahal Hills of Jabalpur.

Research Methodology:-

The research methodology followed by the methods adopted for biodiversity survey viz. 0.1 ha quadrat for trees, 10X10m quadrat for established regeneration, shrub 1X1m quadrat for grasses, herbs and new regeneration. A check list of birds, butterflies etc. are also prepared.

Study Design:-

To evaluate the vegetational composition of the area and fulfill the objectives of the project following design has been adopted:-

- Phyto-sociological study in three seasons i.e. summer, monsoon, and winter season.
- Laying Quadrates up to 0.05 km to 1.0 km distance inside the forest area from the boundary of the end line of encroachment area.
- Quadrates of 0.1 hectare area were laid for assessment of tree.
- Inside this quadrates three quadrates of 10 x 10 m size laid for shrub
- Inside each 10x10 m size quadrat five 1 x 1m size quadrat laid for herbs, grasses and new generation.
- Along with vegetation survey list of fauna were also prepared.
- On the basis of survey, preparation of list of indigenous plant species for plantation work.
- Herbarium of 332 tree, shrub and herb sp. collected from the project area prepared.
- Data collection, Data analysis, Drafting of project report and submission

Objectives of Research :-

- To assess the floral combination of forest area of Madan mahal Hills.
- To prepare a checklist of the faunal diversity of the area.
- To suggest the appropriate plantation technique to Smart city, Jabalpur for plantation in encroachment cleaned areas.

Activities Undertaken:-

Survey, data collection, Data Computation, Data Analysis, preparation of list of plants for plantation work, Preparation of Herbarium of 332 tree, shrub and herb sp. collected from the project area, Drafting of project report, finalization of project report, submission of project report

Cost of the Project :- Rs.14.04 lakhs

Expected Outcome of Research:-

Preparation and publication of field guide and herbarium. Biodiversity assessment survey of adjoining area of the encroachment removed area helped to understand the floral composition of that area. On the basis of that selection of plant species for plantation work and technical knowledge of selection of suitable species will be provided to the funding agency for the plantation work. The plants which were planted by the Smart city, Municipal Corporation Jabalpur are well established. In the next few years the encroachment removed area will be full of greenery and it is hoped that ecological restoration will be attained similar to the adjoining area. It will also help in the development of this area as eco-tourism spot of Jabalpur city.



Views of Madan Mahal Study Site

3. Title of the Project:- Extension of developed nursery techniques of some NTFPs and medicinal plants species through Research and extension centre of M.P.

Why this Project:-

Nursery techniques of various RET species developed by this branch will be helpful to the field staff of Social Forestry for preparation of RET plantlets in their nurseries. As discussed with Addl. PCCF, Research, Extension and Lok Vaniki Bhopal this project was redesigned and resubmitted and was sanctioned by the funding agency accordingly.

Research Methodology: - Following action were taken to fulfil the objectives of the project.

1. **Selection of User group:** Training was provided to the field staff of research and extension nurseries. About 100 trainees were trained from each Research and Extension circles, identified by concerned Research and Extension circles.
2. **Preparation of literature:** Literature of nursery techniques of 17 species was prepared.
3. **Training schedule:** One day training was organized in each site for dissemination of the nursery techniques. Each trainee was provided a Kit having Pen, Writing book and Literature (manual) on nursery technique.

Study Design:-

To fulfill the objectives of the project following activities were undertaken has been adopted:-

- Compilation and publication of nursery techniques of selected species.
- Organized 11 training programs, one each in all the Social forestry circles of Research, Extension and Lok Vaniki , Madhya Pradesh.
- Distribution of Training material along with the manual to each participants
- Collected information related to training through feedback form.
- Providing post training support to nursery field staff physically and virtually.
- Compilation of feedback of the trainees.
- Drafting of project report and submission of final report.

Objectives of Research:-

- Providing training to nursery staff of Research and Extension nurseries of Madhya Pradesh regarding nursery techniques of selected species. (One training programme in each R&E circle.)

- Providing post training support to nursery field staff for helping them in plant preparation in their nursery.

Activities Undertaken:-

Literature preparation and publication, organizing trainings and preparation of final report.

Cost of the Project: - Rs.14.77 Lakhs

Expected Outcome of Research:-

Knowledge upgradation of field staff of Social forestry regarding RET plants preparation. This work will facilitate them in preparation of RET species in nurseries of social forestry and help them to resolve their problems.

Earlier field staff of Social forestry was lacking knowledge of RET plants preparation. This work helps them in preparation of RET species in nurseries of social forestry and help them to resolve their problems in RET plants preparation.



Views of different trainings on nursery techniques of RET species.

4. Title of the Project:- Regional-cum-Facilitation Centre, Central Region, Jabalpur.

Why this Project:-

This project was taken up to avail the opportunity of establishment of Regional –Cum-Facilitation Centre for the central region under the Central Sector Scheme on Conservation, Development and Sustainable management of Medicinal Plants of National Medicinal Plants Board, New Delhi.

Objectives of Research:-

- Establishment of linkage among various stakeholders of medicinal plants sector in the central region.
- Conservation and sustainable management of wild medicinal plants resources
- Improvement in the quality of medicinal plant produce collected from the wild sources and enhancement of income of gatherers
- Promotion of cultivation of high demand medicinal plants
- Development of Quality Planting Material
- Awareness generation and dissemination of information about medicinal plants
- Facilitation in marketing of medicinal plant produce
- Providing support to National Medicinal Plants Board

Activities Undertaken:-

- Data collection of cultivators, traders and manufacturers.
- Training programmes for farmers on good cultivation and post harvesting techniques.
- Collection of germplasm of selected medicinal plant species from various forest types/agro-ecological regions and its evaluation for active ingredients
- Standardization of region-specific nursery techniques.
- Maintenance of old planting material in RCFC nursery
- Renewal and maintenance of RCFC website (Annual maintenance)
- Publication of monthly e-news letter (मध्य क्षेत्र औषधि पादप संदेश)
- Publications
- Fortnightly collection of market rates data from identified mandis/trade Centres in M.P. & C.G.

- Maintenance of RCFC WhatsApp/Telegram groups

Cost of the Project:- Rs.: 84.21 lakhs

Expected Outcome of Research:

- List of 350 Cultivators has been prepared.
 - Total 4 Training programmes organized for farmers on good cultivation and post harvesting techniques, total 341 trainees participated. Organized buyer-seller meet and farmers meet.
 - 23 samples of medicinal plants were collected for phyto-chemical analysis.
 - Nursery techniques of Giloy and Agnimantha was developed.
 - 34042 medicinal plants were maintained and disposed as per the demand.
 - Web site renewed
 - Published e-news letter.
 - Published brochures on medicinal plants.
 - Fortnightly market rates collected and published in e-charak.
 - RCFC Central region, NMPB- 158 members
- Enhancement of the area under medicinal plant cultivation in M.P. and C.G., encouragement of new farmers for cultivation of medicinal plants and improvement in the quality of the medicinal plants produce.



Activities of RCFC

Regular activity

1. Title of the Project:- औषधीय पौधों के जीन बैंक एवं रोपणी का प्रबंधन एवं विकास।

Why this Project:-

Conservation of Medicinal and aromatic plants.

Research Methodology:-

- Survey, collection and maintenance of medicinal plants:** Survey will be done in natural forest areas and other institutions for identification of new medicinal plants which are not available in the medicinal plant genebank. These medicinal plants will be collected and planted /conserved in the medicinal plant genebank of SFRI.
- Replications:** At present one or two plants are kept in the genebank. But in future 5 to 10 replicates of each species will be conserved.
- Labeling :** Each species will be labeled with their local name, botanical name, useful part and uses. (in both Hindi and English language).
- Maintenance:** The entire nursery will be maintained for educational purpose medicinal plants.

Study Design:- Based on the information of working plans, survey will be conducted in the species rich areas. Population will be observed through quadrat method.

Objectives of Research:-

1. Survey, collection and maintenance of medicinal plants.
2. Conservation of medicinal plants in the genebank.
3. Proper self explanatory display of medicinal plants

Activities Undertaken:-

1. Survey and collection of medicinal plants.
2. Plantation and conservation of collected plants in genebank.

Expected Outcome of Research:-

1. Collection and conservation of medicinal plants.
2. Awareness and identification of medicinal plants with live materials.



Visitors of medicinal plant nursery (forest staff and students)

Other significant achievements

Packages of practices (Pops) of five medicinal and aromatic plants developed for Quality Council of India (QCI), New Delhi.

2.1.2 NAME OF THE BRANCH : 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 Project : One

1. Management & Conservation Plan for Proposed Acharya Shankar International Vedant Sansthan in Godadpura of Punasa Range, Beat Mandhata Near Omkareswar of Khandwa District Madhya Pradesh (As per Government of India, Ministry of Environment, Forest & Climate Change, Specific Condition No. 14 (b):- Wildlife Conservation Plan)
Submitted to : Principal Secretary, Culture Department, Government of Madhya Pradesh, Vallabh Bhavan, Bhopal

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.
Funding Agency: Principal Chief Conservator of Forest (Wildlife) & Chief Wildlife Warden, Bhopal
2. Monitoring Re-introduced tigers (*Panthera tigris L.*) in Nauradehi Wildlife Sanctuary.
Funding Agency: Principal Chief Conservator of Forest (Wildlife) & Chief Wildlife Warden, Bhopal.
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.).
Funding Agency: MP Urban Development Company Ltd., Department of Urban Development & Housing Government of Madhya Pradesh.

4. "Study on tiger presence and their dispersal movements in Ratapani-Kheoni landscape of vindhya range."

Funding Agency : PCCF, Wildlife & CWLW, M.P. Bhopal

Regular Activities : 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

Project Summary:-

Completed Project

1. Title of the Project:- Management & Conservation Plan for Proposed Acharya Shankar International Vedant Sansthan in Godadpura of Punasa Range, Beat Mandhata Near Omkareswar of Khandawa District Madhya Pradesh (As per Government of India, Ministry of Environment, Forest & Climate Change, Specific Condition No. 14 (b):- Wildlife Conservation Plan)

Why this Project:-

To prepare Management & Conservation Plan for Proposed Acharya Shankar International Vedant Sansthan in Godadpura of Punasa Range, Beat Mandhata Near Omkareswar of Khandawa District Madhya Pradesh.

Activities Undertaken:-

This project was jointly undertaken by Ecology Branch and Wildlife Branch. As per the specific condition No. 14 (b) of Government of India, Ministry of Environment, Forest & Climate Change for this project, the Wildlife Conservation Plan was prepared by Wildlife Branch. This conservation plan focused on the following points -

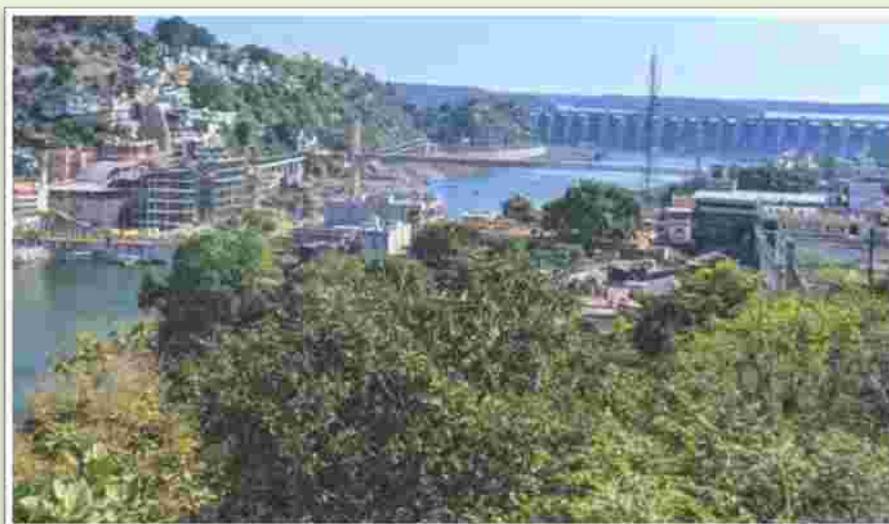
- Present status of faunal species of the area of Mandhata beat of Punasa range in Khandwa Division which included carnivore species, herbivore species, aquatic fauna and avifauna species which were analysed and listed. The animals directly sighted by staff of the forest department were also included in the list of terrestrial fauna and avifauna of the study area.
- During the present survey twelve species of mammals were recorded, including carnivore and herbivore species. All the recorded species were under the least concerned as per IUCN status. No endangered or rare species were recorded from the study area.

Outcome of Research :-

Compartment no. 211 comprises of 10 ha area of (Total area-134.84 ha) of Mandhata beat of Punasa range which is to be diverted for the proposed construction of Acharya Shankar International Vedant Sansthan. The wildlife species are emigrant in nature and as the construction activities begins, they may shift towards adjoining forest area which has the capacity of absorbing the displaced wild animals of the project area. The area comprises (towards west) good habitat, which may be congenial for displaced wild animals of the area. It is expected that the magnitude of the adverse impact will be negligible on emigrant wildlife due to project activities in the area.

- There are human settlements around the adjoining area on all the three sides of the project site. During operational phase noise of machines and vehicles, may cause disturbance to animal species up to a tolerable extent, the wildlife of the area will not be affected as they are habituated to such biotic pressures and activities.
- Open teak forests are there in the project site on the western side, but on the other three sides i.e. North, South and East directions, there are human settlements. Location of Omkareshwar dam is at a distance of 5 kms from the proposed construction site. Location of the river Narmada is hardly 500 meters from the outer boundary of the proposed area. The adjoining forest and water bodies may sustain a good population of bird species. It may also provide good shelter, food and water to the displaced wild life of the area. Any protected area or wildlife corridor is not passing through the project site. Hence, there is no direct threat to terrestrial or to aquatic faunal species of the area. As for avifauna is concerned, surrounding area with good forest cover and huge water body may support nesting and feeding sites for

bird species for survival. The relevant mitigation measures were also suggested for this project.



Ongoing Projects

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

Why this Project:-

To estimate the population of wild animal species of Madhya Pradesh. The main objective is to find out the population density, the spatial occupancy of different species and to utilize the findings for its management purposes, as the Wildlife-population is not always static and its number increases/decreases at different places at different times, means the number of the same species varies from place to place from year to year.

Research Methodology:-

- Procured the primary data from all 83 units of Madhya Pradesh on Monitoring Tigers, Co-predators, prey and their habitats which is already being generated annually for PAs and at every 4 year interval in the entire state by the staff of MP Forest Department at beat level. The information is collected on prescribed formats following the protocol developed by WII and NTCA in the form of Field guide: "Monitoring Tigers, Co-predators, prey and their habitats" which includes the following points:
 - i. Sampling for Tiger, Leopard and other carnivore sign encounter rate.
 - ii. Sampling for ungulate encounter rates.
 - iii. Sampling of vegetation, human disturbance and ungulate pellets.
 - iv. Camera trapping for tiger identification.
- Double sampling method is used for tiger population estimation. It is based on determining spatial occupancy of tigers throughout the potential tiger forests and sampling such forests using camera traps in a statistical framework (one pair in each 2 sq km grid).
- Checking of the data received in Hard and soft copy.
- Rectification of the data mainly for GPS location errors.
- Analysis for population estimation of Tigers, other carnivore and herbivore species using various software (*Arc GIS, Distance 6.2 software*).
- Tiger identification with the help of capture histories (X matrix) and analysis using the program *Density 7.2*.
- Preparation of various maps in ArcGIS software including habitat mask.
- Preparation of tiger data base with minimum movement area of individual for 2018 and 2019-20
- Data tabulation and report preparation.

Study Design:-

Followed the protocol developed by WII and NTCA in the form of Field guide: "Monitoring Tigers, Co-predators, prey and their habitats-2017

Objectives of Research:-

- To monitor the Tigers, co-predators, prey and their habitats in protected areas and territorial divisions of the state.
- To strengthen/improve the facilities and services for monitoring and data interpretation.
- To create a database based on individual stripe pattern and movement area of tiger which will support monitoring the individual tiger and to deal with wildlife crime.

Activities Undertaken:-

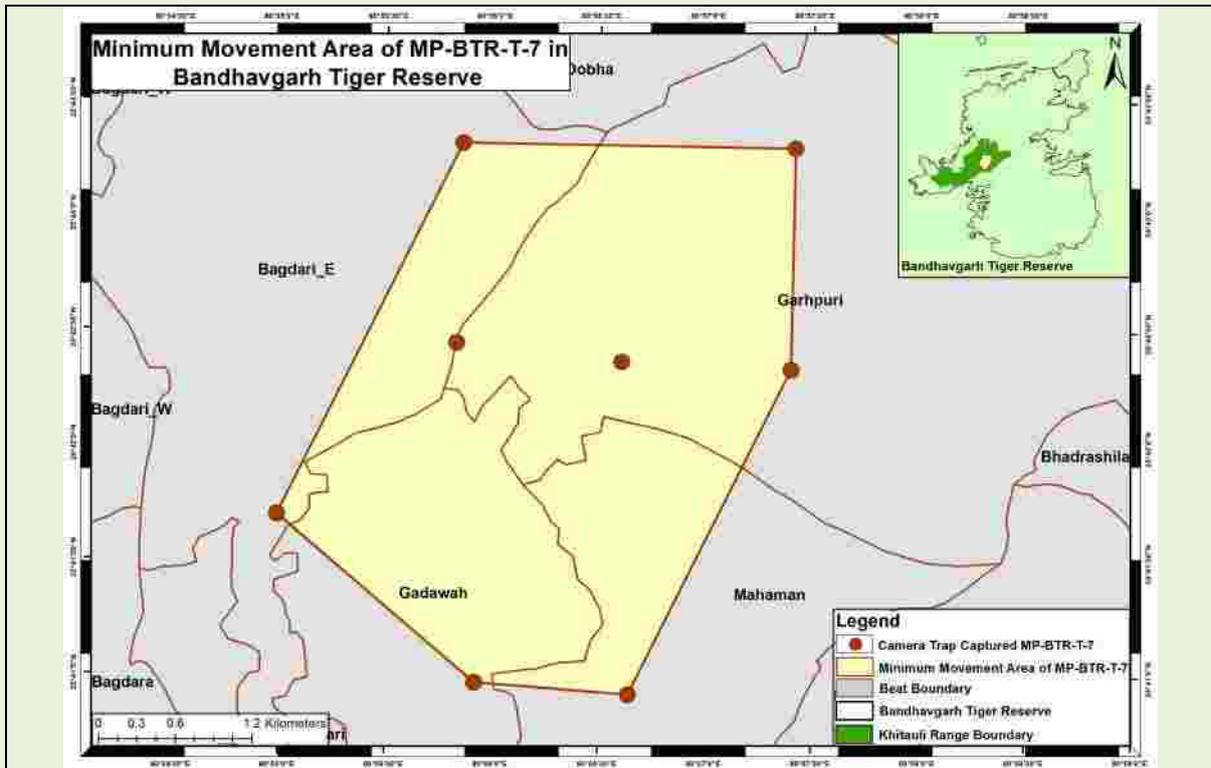
- Procurement of hard and soft copies of wildlife census data from all 83 units of Madhya Pradesh Forests Department.
- Data checking and rectification of huge amount of data for -wrong GPS entries, double entry errors through cleaning tool and manual corrections for wrong entry.
- Segregation of Tiger and Leopard bearing beats and Map preparation in Arc GIS.
- Analysis of encounter rate/km for carnivore species.
- Analysis of herbivore densities/sq km in Distance 6.2 software.
- Segregation of Tiger images.
- Collate each and individual image with other images and with existing old database to find out individual tiger numbers
- Tiger Identification with their IDs
- Preparation of MMA of each individual tiger based on their capture location
- Preparation of camera matrix and trap matrix
- Preparation of MCP for each unit based on camera trap locations
- Preparation of habitat mask for each unit using Arc GIS
- Analysis of camera trap data with capture –recapture matrix for tiger density analysis and, Tiger density analyzed using Density 7.2 software.
- Creation of updated data base of individual tiger with left-right flanks and its minimum movement area.

Cost of the Project:- 154.28 Lakhs

Expected Outcome of Research:-

- Estimation of population of wild animal species including carnivore and herbivore of Madhya Pradesh during 2018 and 2019-20
- The generated database on available ungulates density and spatial distribution of tigers and all co-predators would be useful for park managers during wildlife management programmes.
- Database of individual tigers of Protected Areas/Non protected areas of Madhya Pradesh would be generated up to beat level information which will support to monitor their spatial distribution and movement or dispersal pattern.

Findings will be very useful for park managers while performing various kinds of interventions regarding wildlife management on spatial and temporal basis.



Left-Right Flank and Minimum Movement Area of MP-BTR-T-7 of Bandhavgarh Tiger Reserve

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

Why this Project:-

The tiger (*Panthera tigris*) is the top-order predator in the Indian subcontinent, with high flagship and conservation value. The latest tiger census conducted in India during the year 2014 shows that it harbours 57% of the global tiger population in 7% of their historic global range. Given that the tiger populations have undergone drastic declines and the recovery efforts including reintroduction are being promoted across the range countries. Nevertheless, such recovery efforts are limited by inadequate understanding of the behaviour of reintroduced animals. Translocation, reintroduction, restocking and rehabilitation are recognized as the central challenges for conservationist to re-establish wild population. Subsequently, the characteristics of home range, movement patterns and inter-specific interaction of released animals are indicative of the post-release response of each animal and the overall success of the release efforts.

Research Methodology:-

- Studying ranging pattern of reintroduced tigers-** As per IUCN guidelines, all founder population has been radio-collared before hard release. All the collared animals need to be monitored intensively on 24×7 basis. Data has been analysed using Arc GIS 10.3.1. Minimum Convex Polygon (MCP) method and Kernal method were used to study the ranging pattern of reintroduced tigers.

- **Food habits and prey choice study-** Food habits and prey choice of reintroduced tigers have been studied from scat and kill data.
- **Studying prey availability for reintroduced tigers-** Line transects have been laid in the overall MCP areas of tigers to assess available prey base for re-introduced tigers. Distance software used for data analysis.
- **Recruitment pattern and population dynamics study** - Reproductive success is a key to the survival of a species, and understanding the reproductive parameters of free ranging large carnivores is crucial for assessing the reproductive output. Continuous monitoring of first litter (three cubs) of reintroduced tigress N1 was done.
- **Collection of vegetation data** - Study on vegetation composition, forest density and cover in each grid of the area has been carried out as per the working plan norms of Madhya Pradesh.
- Survey of habitat components including waterholes, unique habitats, special habitats, sensitive sites etc done at the time of field survey.
- Human disturbances indices like Number of tree cutting, no of human/livestock trail, people seen, livestock seen, grass/bamboo cutting has been recorded in each 10m x10m plot.
- Topography of the area and forest types have been recorded
- **Habitat selection of reintroduced tigers** - Based on the habitat characteristic of the area and movement pattern of reintroduce tigers, season-wise tiger locations have been analysed and plotted on the classified Landsat ETM+ imagery of Nauradehi Wildlife Sanctuary.

Study Design:-

- NTCA guidelines and SOP has been followed for taking observations of reintroduced tigers.

Objectives of Research :-

- To study ranging & movement pattern of re- introduce tiger in Nauradehi Wildlife Division.
- To study food habit and prey choice of re-introduced tiger.
- To study habitat selection by re-introduced tigers.
- To develop suitable management strategies on long term sustenance and growth of tiger in Nauradehi and its adjoining forest patches.

Activities Undertaken:-

- Radio collaring of male and female tigers.
- Continuous monitoring through Satellite and VHF radio collar tracking.
- Monitoring of tiger through camera trap installation, based on direct and indirect evidences.
- Preparation of profile of tigers and their individual identification through stripe patterns.
- Pugmark monitoring by regular PIP checking
- Monthly and seasonal analysis of tiger movement area based on tiger location points in a certain duration.
- Observation of animal behavior through direct sighting using vehicle and elephant back, based on fecal sampling method of individual tigers
- Recording of kill data through approachable vehicle and elephant back.
- Collection of scat sample for microscopic analysis of hairs of prey species.
- Vegetation analysis of the area which is used by tigers in different seasons.

Cost of the Project : 69.58 Lakhs

Expected Outcome of Research:-

Findings will be very useful for tiger population revival in the area and will support park managers for proper monitoring and protection of the introduced tiger and their recruits.



Male Tiger – N2 collaring at Nauradehi Wildlife Sanctuary



Scat sample collection from field



Female Cub N111 killing the bull near Purana Anicut, Kushiyari beat on 23.01.2021



Tigress with their cubs

3. Title of the Project:- 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.).

Why this Project:-

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 of ecological flow on critically endangered species and their habitat which may be influenced due to construction of proposed intake well on Chambal Gharial Wildlife Sanctuary for water supply to Morena district.

Research Methodology:-

The study was performed by adopting nationally and internationally accepted scientific methods, in rainy, winter and summer seasons, round the year as under:-

Selection of reference sites - Reference sites selected in upstream with zero value of hydrological stress.

Selection of observation sites – 30 observation sites were selected for following observations –

- Observation on population distribution, movement pattern, habitat, nesting and breeding sites of crocodile (Mugger) Ganges river dolphin and Gharial in upstream and downstream during all three seasons.
- Observation on various hydrological parameters i.e. rate of discharge, water velocity, river depth from reference site and sampling site of 30 Km river stretch.
- Observation on physico-chemical properties of water (pH, DO, EC, COD, BOD, Temperature, salinity, Nitrate, phosphate, Magnesium, chloride etc) from reference site as well as from 30 sampling sites.
- Sampling of macro-invertebrates done from 30 sites in all the three seasons.
- Working on methods of Maximum Allowable Environmental Difference (MAED) for similarity measure related to reference site.
- Other abiotic attributes of the study area i.e. landuse-landcover, catchment area, drainage etc. analysed in ArcGIS software as influencing variables.

Study Design:-

- The study area covers 30 km stretch of the Chambal River 15 km either sides from the proposed intake well along the side of National Highway (Old NH-3- Agra-Mumbai road) including reference site to compare the hydrological and ecological data from the project site.
- The study area of 30 km is divided into 30 segments at the interval of 1 km to observe hydrological, ecological and population data of Gharial, Dolphin and Mugger, details as given in the methodology.

Objectives of Research:-

- Study the population distribution, movement pattern, nesting and breeding sites of Gharial (*Gavalia gangeticus*), Ganges Rivers Dolphin (*Platanista gangetica*) and Crocodile (Mugger) affected by the proposed project of Chambal River.
- Asses the Ecological flow including ambient water flow, water discharge, Physico-chemical properties and water requirements in reference to Gharial, Dolphin and Crocodile.
- Predict and identify the impact of proposed project on the river ecology, existing flora and fauna and their habitat at the stage of operation, execution and maintenance phases.
- Recommend the mitigation measure and monitoring plan, based on finding of the study.

Activities Undertaken:-

- A reconnaissance survey of the proposed project site where intake well is to be constructed on Chambal River and 15 km upstream and 15 km downstream was done and collected relevant secondary data.
- Work permission from PCCF Wildlife to work in National Chambal Gharial Sanctuary, Morena.
- Prescribed proforma with details of the individual team member sent to Chief Wildlife Warden Madhya Pradesh Bhopal to grant work permission.
- Collection of primary data on – population, movement and behavior pattern, location of breeding & nesting sites of Crocodile, Gharial and Dolphin in different months (including lean season, pre and post monsoon).
- Observed the population of animal, through boat survey using binocular and camera.
- Movement and behavior pattern through fecal sampling method and recording of the physical conditions of that area.
- Recording of breeding and nesting sites and their locations recorded through GPS.

- Assessment of water velocity, river depth, width in 30 km stretch in each segment of 1 km interval including reference site in different months (including lean season, pre and post monsoon)..
- Workout the way points of each segment for observation with the help of Arc GIS on study area map.
- Observation recorded on water velocity (Water flow Probe), river depth (Depth finder), width (Range finder and Rope) in each 30 segment of 30 km stretch including reference site.
- Assessment of Physico-chemical characteristics of water.
- Observations were taken with the help of portable instruments – DO meter and multi parameter.
- Collected river water sample for laboratory analysis from 30 sampling sites and reference site.
- Macro-invertebrates sampling for bio monitoring of river health.
- Collection of samples with dip-net from river, from rock substratum and from shallow river bank. Identified and documentation by photographs.

Cost of the Project : 76.12 lakhs

Expected Outcome of Research:-

- Effect of Water extraction of Chambal River on population of Crocodile, Gharial and Dolphin.
- Population estimation of Gharial, Mugger and Dolphin in the stretch of 30 km length of study area.
- Animal behaviour, their habitat details in the stretch of 30 km length of study area.
- Assessment of river cross- section and status of water discharge at each segments of 30 km stretch to fulfill the basic requirement of living for Crocodile, Gharial and Dolphin.
- Estimation of water quality of Chambal River in relation to habitat suitability of Crocodile, Gharial and Dolphin.
- Status of Macro-invertebrates at different sampling sites in 30 km stretch and reference sites for preparing good river health.
- Prepare site-specific water quality guidelines following the CPCB protocols.

Findings of the study will assess the positive / negative impact of water abstraction from Chambal River on major aquatic animals i.e. Gharial, Mugger and Dolphin. Water supply to Morena district will depend on the fulfillment of minimum requirement of ecological flow for aquatic endangered species after the water abstraction from Chambal river based on hydrological data of last 10 years.



Macro-invertebrates and macro-phytes sampling near Rajghat at National Chambal Sanctuary, Morena



Measurement of water velocity across the river width at every 10 m distance marked by red ribbon on synthetic rope



Observation of animal assemblage during basking at small island in National Chambal Sanctuary, Morena

4. Title of the Project:- “Study on tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhyan range.”

Why this Project:-

The need for the project was originated by roaming of dispersal tigers near the Bhopal city, the capital of Madhya Pradesh. Scientific investigation to find out root cause reasons for the presence of tigers in the proximity of capital jurisdiction was essential to make a strategic plan for sustainable wildlife management. This study finding will be helpful in decision supporting system (DSS) for demarcation of critical tiger habitat based on prevailing functional attributes and GIS mapping of pinch point barriers by calculation of geospatial resistance for tiger movements at connecting linkages. The landscape-level functionality assessment through genetic relatedness and gene flow between the adjoining source populations of landscape to find out the principal reasons, regarding the presence of tigers within the urban matrix was critical to managing the human/animal interaction in the present coexistence scenario. Study findings will be helpful in support to the strategic green development of Bhopal capital in the upcoming future with special reference to tiger conservation in the Ratapani-Kheoni landscape.

The study demonstrates the feasibility of using non-invasive genetics as one of the methods for monitoring land occupancy. The opportunistic camera trap method of last five years data' to identify the land use pattern of dispersal tigers was used in the study area. We contend that population studies of cryptic species like tigers should be carried out using more than one method, here the genetic component and opportunistic camera trap played a predominant role in monitoring and estimation of tiger population for conservation planning and management. This combination of techniques is cost-effective and appropriate for long decadal monitoring. The present knowledge of tiger presence outside protected areas is inadequate and there is a need to address this issue to enable better management of the potential alternative tiger habitat in Madhya Pradesh. This project

aims at addressing this issue by providing reliable information through monitoring of tigers in the Ratapani-Kheoni landscape.

Research Methodology:-

- **For Occupancy analysis:** The present study was initiated with the goal of occupancy modeling and long-term conservation of tigers in the landscape. Here we analyzed the single-species, single-season model Using program PRESENCE 2.13.6 (Hines, 2006), which will be shown the tiger occupancy & framework of a tiger in the landscape. The total study area was around 4620.84 sq. km.
- **For MaxEnt analysis:** The survey was conducted over 234 out of 337 beats in the study area of the Ratapani-Kheoni landscape. In the figure, the track line is representing the trails over the beat surveyed according to the carnivores species Tiger, leopard, sloth bear, jackal, etc. the number of the track is 234 along with the same number of the beat which is surveyed. Then execute the analysis of these presence data. The survey sample data with coordinates and information is overlaid to a similar unit of grid areas. The grid length and width are 3.14 X 3.14 km and a total of 10 km² of area grid. The analysis requires independent environment variable layers. The steps required to modify environmental layers in ArcMap. All spatial data (i.e. independent or predictor variables) have the same extent (same geographic bounds and cell size). MaxEnt requires all the environmental layers to be in raster format in the projection system (e.g., geographic or UTM) to execute a model. We use the same pixel size for all layers as the elevation raster layer (pixel size: 0.0026). MaxEnt analyses are run by using only the present location of the species under species distribution modeling (SDM). We create a Bias layer background of the present location of the tiger in the same. This layer should be the same cell size, extend, and projected as all environmental layers. The MaxEnt (Javascript) software except for all environment raster layers in ASCII format and species locations data in CSV data format has only contained species name and X-Y coordinate. Next to run the MaxEnt jar file software, put the species CSV data, All environment layers into an ASCII file, and integrated the Bias file for background analysis around the present location. Afterward, finally, the output path for the result was given. Software needs to be set before running some settings in the environment. Random test percentage was kept at 25, replicates were fixed 15, replicate run type was "subsample" and Maximum iteration was kept 5000 all these manual standards were kept before the run software. The process end of analysis was to generate the result in the output file path
- **For BMLR analysis:** Field survey data was collected in the predesigned survey form and functionality survey forms.
- **Data collection:** Functionality survey for tigers was done in the Ratapani-Kheoni landscape to determine tiger presence and their habitat-related variables from Dec 2018 to June 2019. We initially superimpose 3.17 X 3.17 km² grids on the geo-referenced land-cover map of the landscape. The overlay grids were 720 falling in the study area, out of 720 grids survey was conducted in 541 grids due to logistic reasons as shown in Fig. below where 357 presence points' locations were recorded from the Tiger sign mark survey carried out in 2018 and 2019.

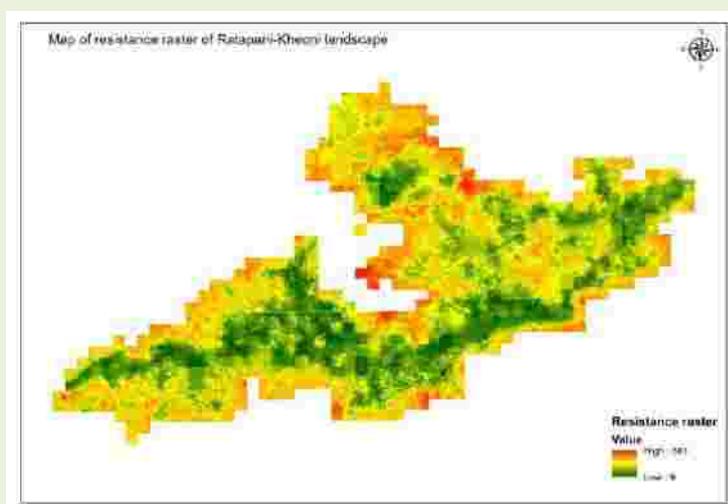
Presence Data: Tiger's sign marks were recorded as encounter rate during the field survey. The location of the tiger signs was recorded in GPS and the details were filled in the predesigned format.

- **Multi-collinearity test:** A method to detect any multi-collinearity is with checking of VIF (Variance Inflation Factor) and tolerance values in the regression model (Pratisto, 2010). Feasibility test of logistic regression model: Hosmer-Lemeshow test was used to test the model feasibility (Hosmer & Lemeshow, 2000). In this research, the feasibility of the developed logistic regression model can be seen from the impairment of -2 log-likelihood as well as the Hosmer-Lemeshow test generated from data analysis using SPSSm16. The model is feasible if the significance of impairment of -2 log-likelihood less than 0.05.
- **Binomial Multiple Logistic Regression analysis:** BMLR is a form of regression where the dependent variable is dichotomous (binomial) and multiple independent variables are continuous or categorical or both. It measures the relationship between a categorical dependent variable and continuous independent variables by converting the dependent variable to probability scores. Probabilities describing possible outcomes of a single trial are modeled as a function of the

explanatory (predictor) variables using a function (Equation 1): where P is the probability of the dependent variable, B (b0, b1,...bk) are the coefficients of independent variable X (x1, x2,... xk).

$$P = \frac{\exp(\sum Bx)}{1 + \exp(\sum Bx)}$$

- Data preparation for model:** Extrapolation of the model was conducted within all areas of Ratapani-Kheoni Landscape to give the picture about parts of the landscape that suits for tiger habitat. The process of extrapolation was done by entering the equation of the formed logistic regression model through a raster calculator in ArcGIS 10.1. The percent of the size of the area was predicted for each classification (least suitable, suitable, most suitable, moderate, and Non-suitable). Then after running the tool, we get generated report of this analysis in another window. In the report, need to the table of Beta coefficient value of Variables in the equation. The beta coefficient table is important to generate the habitat map. Completing the part of the analysis in BMLR. Now comes to the ArcGIS 10.1 in the ArcGIS we use a raster calculator to using the equation HSI (P) =, to generate a Habitat suitability map. We used this B coefficient value in the Habitat suitability index Formula.
- For corridor designing in ArcGIS 10.3.1 by using Linkage mapper tools:**
Preparation of resistance raster to linkage mapper: The using of Gnarly landscape utility tools to generate the cumulative raster on the value of resistance of feature on the ground. Defining the value of resistance to every features to every individual layer. Make an Excel spreadsheet resistance with defining the no. of classes class description and one most important factor is Resistance value on the basis of the negative impact of feature in respect of suitable focal patches.
- For corridor designing in ArcGIS 10.3.1 by using Linkage mapper tools:**
Preparation of resistance raster to linkage mapper: The using of Gnarly landscape utility tools to generate the cumulative raster on the value of resistance of feature on the ground. Defining the value of resistance to every features to every individual layers. Make an Excel spreadsheet resistance with defining the no. of classes class description and one most important factor is Resistance value on the based on negative impact of feature in respect of suitable focal patches.
- Resistance habitat calculator:** The Resistance and Habitat Calculator tool will create a resistance map using the values in column F of the Excel spreadsheet. Resistance values can be calculated as the maximum or the sum across all input layers. We used maximum resistances across all input layers for landscape integrity analyses for the focal species. If the sum is used, then we recommend setting minimum resistances (resistance for ideal conditions for each layer) in the excel sheet to zero, and running the tool with the “Add one to resistance raster” box checked. All input rasters should be stored in a single file geodatabase.



- **Linkage Mapper tool:** We are using Linkage mapper GIS tools to support regional wildlife habitat connectivity analysis. It consists of several Python scripts, packaged as an ArcGIS 10.1 toolbox, that automate the mapping of wildlife habitat corridors.

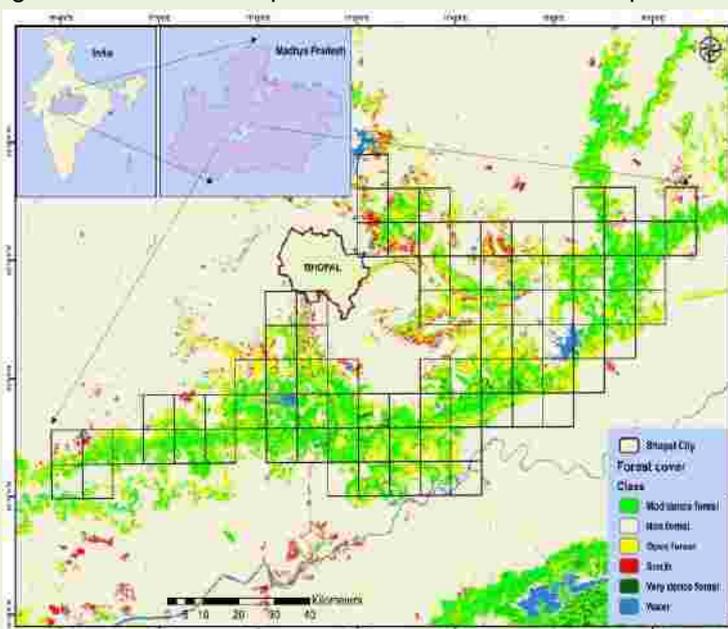
- **Population genetics through DNA analysis:**

Sampling: Samples were collected between December 2017 to June 2019 in the Ratapani-Kheoni landscape and Satpura Tiger Reserve in central India. We have collected 359 scat samples from the Ratapani-Kheoni landscape and 267 scat samples from Satpura Tiger Reserve locations, which were presumed to be from tigers (*Panthera tigris tigris*). This collection of scat aimed to determine the number of tigers sampled in the forest, their relative genetic diversity, and whether there is a population genetic structure among these forest fragments across the central India landscape by comparing with other sampled locations including Kanha and Bandhavgarh tiger reserves. The DNA analysis for population genetics was performed in Uma Ramakrishnan (Associate Professor) Lab. NCBS, Bengaluru in the following steps:

- Sample processing
- DNA extraction
- Species identification
- Genotyping using mPCR
- Individual identification
- Population genetic analysis

Study Design:- The tiger sign mark survey was conducted for tigers in the Ratapani-Kheoni landscape to determine the tiger-bearing area in the landscape from December 2018 to April 2019.

Sampling unit large geographic grid cells at a scale appropriate to the study organism, depending on the biology of the species. For the sake of example, the tiger in south-western India, the cell size was set based on expected maximum home range size of ~200 (Karanth and Sunquist, 2000) and tiger in Panna tiger reserve in central India, the home range of male and female tigers were 132.7 and 73.6 (Sarkar et al., 2016). Initially, 8*8 grids were superimposed on the landscape geo-referenced map of the study area. A total of 5312 was initially surveyed which consisted of 337 forest beats within the 83 grids. Occupancy modeling framework, which accounts for imperfect detection, to identify the factors that affect the tiger distribution at the approximate scale of a female tiger's home range (Duangchatrasiri et al., 2019) 64 km² -sized grid. We also surveyed the area for prey presence species. We used an occupancy survey method that explicitly accounted for spatial correlation recently designed to assess large-scale occupancy of tigers (Hines et al., 2010).



- **Field protocol:** The tiger occupancy sign survey was performed from December 2018 to April 2019. The survey was conducted in the winter and autumn season. The tiger moves along forest trails to hunt or to locate, avoid, or deter conspecifics (Karanth and Sunquist, 2000). Their passage is marked by tracks and occasional scat deposits (Smith et al., 1989). Fresh signs of tigers and major ungulate prey species in the Ratapani-Kheoni landscape were identified and recorded. We recorded the presence sign of tigers, Nilgai, cattle, sambar, chital, and sloth bear, along with habitat-related variables. Sign detection was assigned only once to each 100m. Trail segment thus yielding the standard (detection) "1" or "0" (non-detection) histories required for occupancy analysis. The sign detection data were aggregated at 1 km length from spatial

replications (Mackenzie et al., 2006; Hines et al., 2010). We used the referent of the single species occupancy model (MacKenzie et al., 2002) developed by (Hines et al., 2010) to analyze the data that were preferred using program presence (Hines, 2006). We first compared the model of (MacKenzie et al., 2002) and (Hines et al., 2010) without additional covariates to choose the appropriate model type for conducting further analysis (Karanth et al., 2011) all model comparisons were based on the Akaike information criterion (AIC) values (Beier, Burnham and Anderson, 2002). We estimate the overall occupancy rate, Ψ , with the result preparing to the whole Ratapani-Kheoni landscape enclosed by the surveyed grids.

Objectives of Research:-

Monitoring of tigers through non-invasive DNA sampling;

Non-invasive genetic analysis to establish tiger presence, minimum tiger numbers, sex, and their distribution.

Short term sub-objectives:-

- Spatial distribution of Tigers.
- Minimum numbers of Tigers along with sex ratio.
- Habitat improvement strategy for fragmented forest areas.
- Make certain wildlife conservation and its continuity.
- Identification of priority areas for tiger conservation.
- Identification of linking corridor with minimum resistance for Tiger movement.
- Identification of pinch point barrier (bottleneck) within the connecting linkage.
- Identification of landscape area facing human-animal conflict along with the prescription of mitigation strategy.

Long term objectives:-

- Tiger population stability in the sanctuary.
- Degrees of genetic relatedness exists between the intra and inter-adjointing sub metapopulation of the landscape.
- Identification of areas of the landscape can support the residential and transient population.
- Tiger occupancy in the landscape.
- The pattern of movement during dispersal in the landscape.

Activities Undertaken:-

Fieldwork and most of the analysis work completed.

Cost of the Project:- 37.44 lakhs

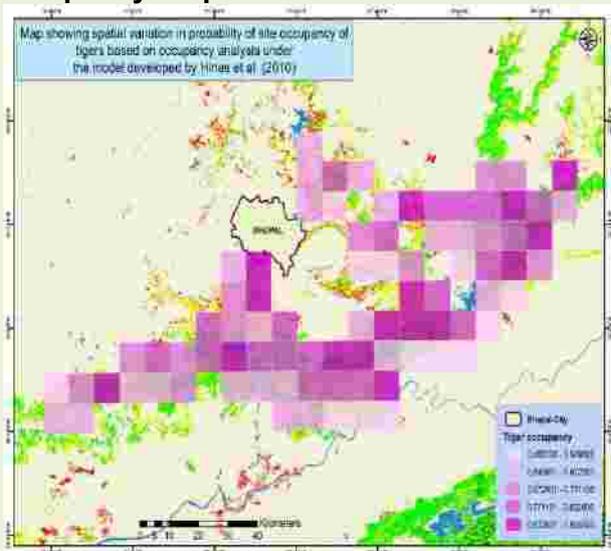
Expected Outcome of Research:-

- 1) Minimal tiger population, tiger spatial distribution map, tiger habitat suitability map by Binomial Multiple Logistic Regression (BMLR) analysis, molecular characterization of every captured tiger database will be used as forensic evidence, established DNA bank of tigers will be used in further tiger genomic studies, the importance of corridors as connected stepping stones in maintaining genetic exchange for genetic vigor of wildlife, the utility of the wildland block (stepping stone) concept will find out, the importance of weak linkages for tiger dispersal and movements between tiger conservation prioritization units in the Ratapani-Kheoni landscape of Madhya Pradesh.
- 2) The project findings will help to prepare a landscape management plan for the scientific conservation of wildlife, habitat, and human-wildlife interaction management.
- 3) Information regarding land use and occupancy of individual tigers will prove very precious as provide baseline data in EIA studies.

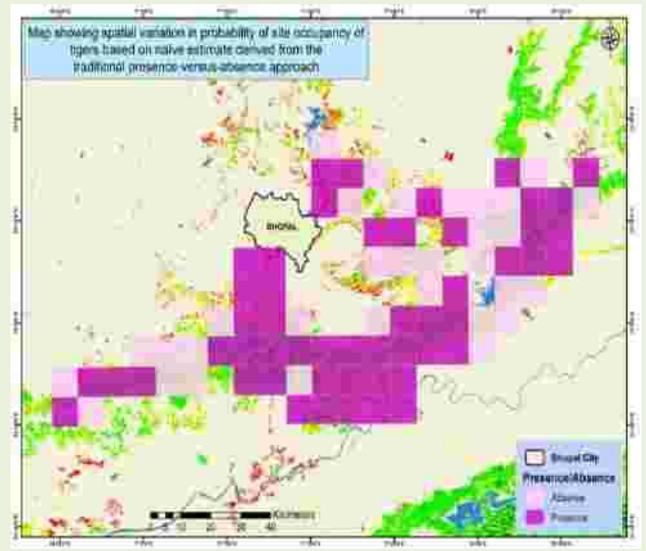
Green management of tiger human interphase prescriptions, Habitat Suitability analysis for tiger occurrence, Identification and demarcation of Tiger Conservation Prioritization Units (TCPUs) and their connecting linkages, Minimum number of unique tigers are 19 were identified based on Their DNA in Ratapani-Kheoni landscape, Dispersal movement of minimum unique tigers identified by opportunistic camera trap method since last five years. Dispersal movement is also identified by recaptures in the DNA method.

Ratapani Tiger populations have very little shared ancestry with the populations namely Ratapani, Satpura, Kanha, Bandhavgarh based on structure analysis of any of the four populations. Overall it does not appear that Ratapani is more closely related or connected to any of these three populations within the landscape.

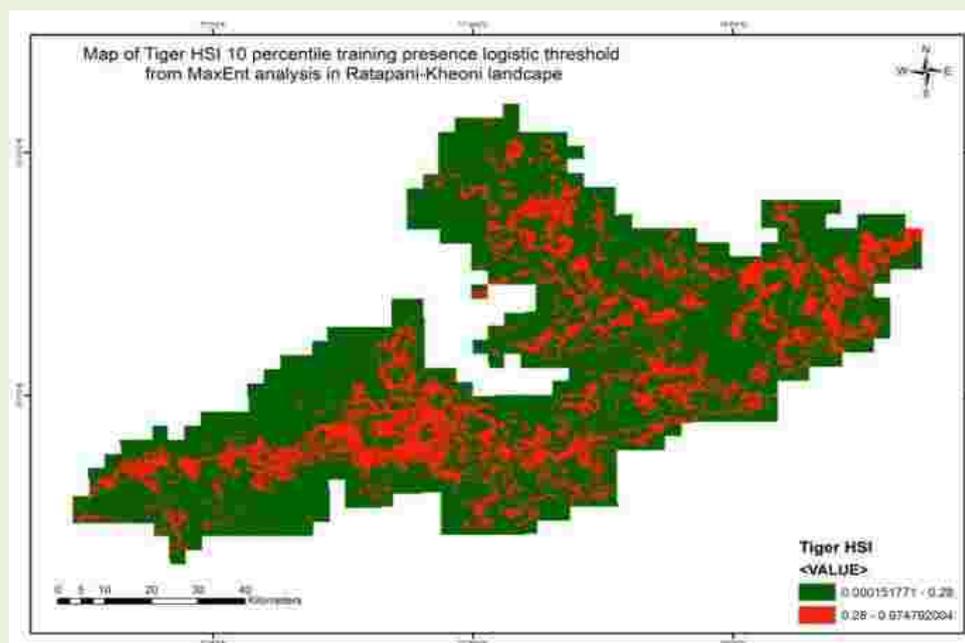
Occupancy output:



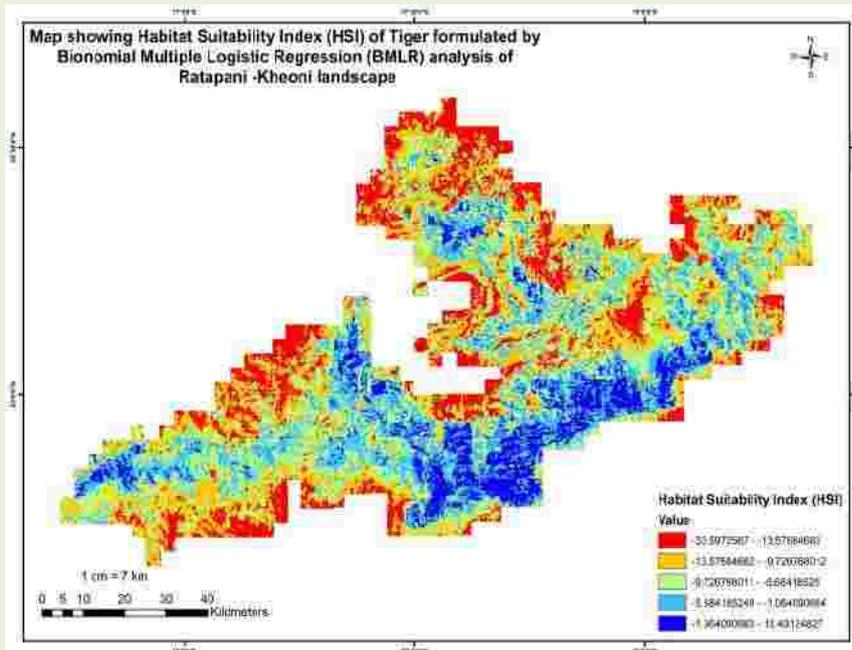
Occupancy of tiger in Ratapani-Kheoni Landscape



Based on naïve estimate derived from the traditional presence-versus-absence approach



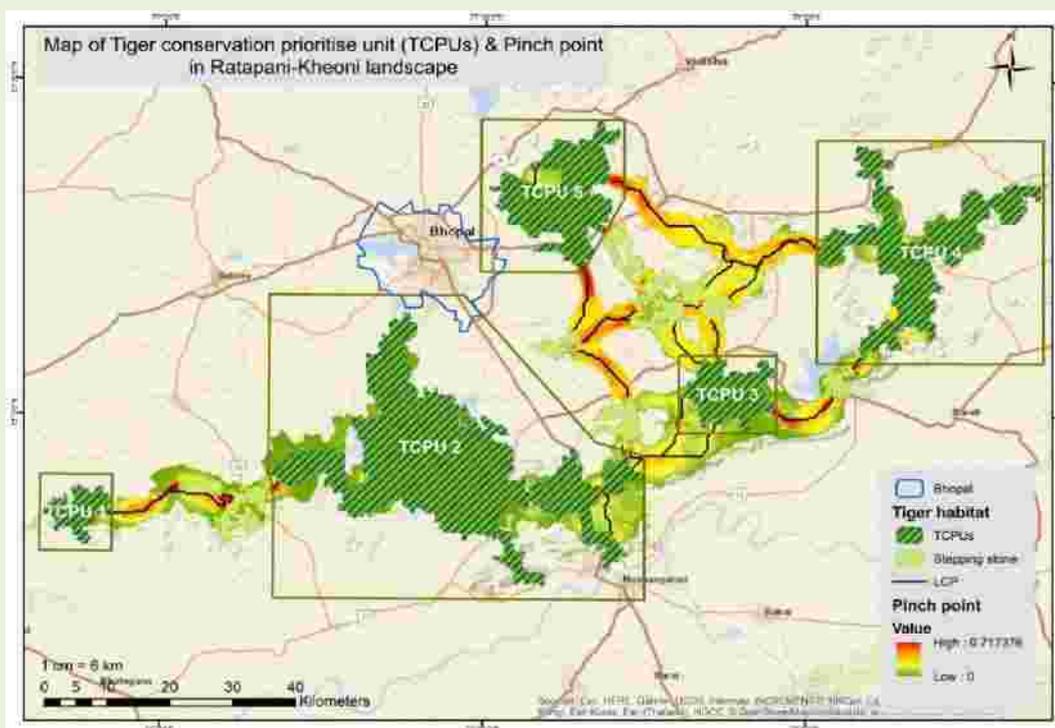
MaxEnt output for probability of tiger occurrence spatial distribution



HSI class	Area in km ²
Most-suitable	665
Suitable	1522
Moderate-suitable	1934
Least-suitable	1875
Non-suitable	1229
Total study area	7225

BMLR output for Habitat suitability Index

Green and sustainable scientific management of tiger bearing human dominated landscape. Landscape level plan for green policy making.



Landscape level plan showing TCPUs and their connecting weak linkages

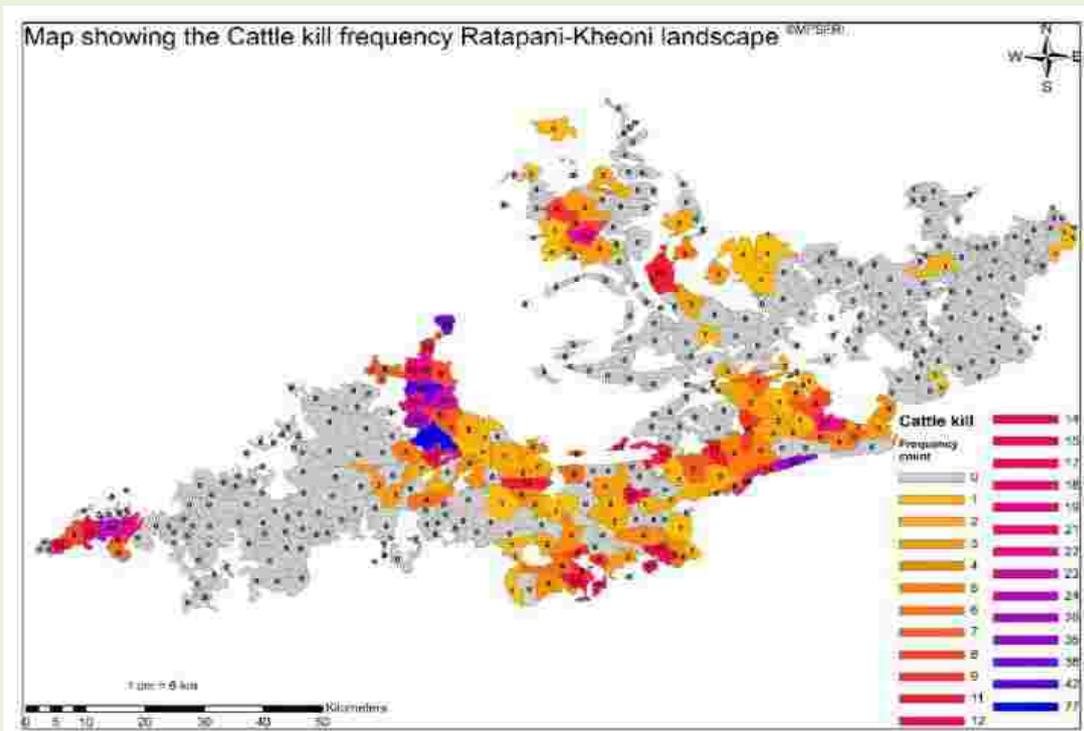




Plate- 1, Field survey for DNA scat collection at Mudiyakheda beat, Garhi range, Raisen Division



Plate -2, Field survey for DNA scat collection at Samardha beat, Samardha range, Bhopal Division



Plate- 3, DNA sample collection process demonstration at STR and discussion about scientific sustainable conservation



Plate- 4, Field survey for DNA scat sample collection at Samastipura beat, Samardha range, Bhopal Division



Plate- 5, Pugmark tracing during tiger sign mark survey at Bori beat, Satpura Tiger Reserve



Plate-6, Tiger saliva sample collection in Prempura beat, Samardha range, Bhopal Forest Division

Other Significant Achievements :- Re-wilding of tiger programme in their natural habitats in MP



1. Under the re-wilding of tiger programme in their natural habitats by Madhya Pradesh Forest Department, Dr. Aniruddha Majumdar, Scientist of the institute has deployed radio-collar on a male tiger and also provided hand holding exercise on monitoring through radio-telemetry at Kahna Tiger Reserve Mandla, Madhya Pradesh between 05/02/2021 and 06/02/2021.
2. To assess prey base of cheetah at Nauradehi Wildlife Sanctuary, handholding training programme have been conducted by the department. Dr. Aniruddha Majumdar, scientist of the institute has trained frontline forest staff on line transects and vehicle transect exercise. In total 98 frontline forest staff of various ranges of this wildlife division have received training programme between 09/02/2021 and 10/02/2021.

Regular activities

1. Title of the Project:- Maintenance of Monitoring and Evaluation Facilities and Database of Predators Prey in Madhya Pradesh.

Why this Project :-

Maintenance of Monitoring and Evaluation Facilities and Database of Predators Prey in Madhya Pradesh

Objectives of Research:-

- Organization of training / workshop programme for different forest division.
- Visit of conflict areas of the state.
- Data analysis of predators and prey as desired by department time to time.
- Maintenance of data base.
- Renewal of Radio Collar activation etc.

Activities Undertaken :

- Maintenance of Tiger database, herbivore and carnivore database of the year 2016, 2017 and 2018 and add on the new data.
- Maintenance of iridium data of radio collars and their charges.
- Demonstration and checking of Radio telemetry equipments i.e. Radio Collar, Multichannel Receiver and Antenna at the time of distribution to various PAs.
- Renewal of Radio Collar Licence charges form Department of Telecommunications, New Delhi, Ministry of Communications, Government of India.

- Data for herbivore density and carnivore encounter rate has been analysed and sent to the following offices for inclusion in working plan –
 - Divisional Forests Office, South Sagar – 2010 and 2014
 - Working Plan Office, Shivpuri – 2018
 - Divisional Forests Office, Rajgarh – 2018
 - Chief Conservator of Forests, Ujjain – 2018
 - Chief Conservator of Forests, Betul – 2018
 - Chief Conservator of Forests, Rewa – 2018
 - Divisional Forests Office, Sheopur – 2018
 - Chief Conservator of Forests, Chhatarpur – 2018
 - Chief Conservator of Forests, Sehore - 2018
 - Chief Conservator of Forests, South Betul – 2018
 - Divisional Forests Office, Obedullahganj – 2018
- Radio telemetry equipments i.e. Radio Collar, Multichannel Receiver and Yagi Antenna distributed and demonstrated to the following -
 - Nauradehi Wildlife Sanctuary, Sagar Division
 - Field Director, Panna Tiger Reserve, Panna
 - Field Director, Satpura Tiger Reserve, Hoshangabad

Deliverable technologies developed in each project for stakeholders, forest professionals, field foresters and other beneficiaries.

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

Population status of tiger co-predators and prey species is the main output of this project including all the details of individual tigers and prey biomass of particular Protected Areas, Territorial Divisions and M.P. Forest Development Corporation Projects. The range-wise results are applicable for the management interventions carrying out by management authorities.

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

Regular monitoring of the reintroduced tigers result in their home range, movement patterns, habitat preference and inter-specific interaction of released animals are indicative of the post-release response of each animal that information is very applicable for park management and animal protections.

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.).

Findings of the study will assess the maximum quantity of water to be abstracted from Chambal River leaving the sufficient water for the safe guard of major aquatic endangered species i.e. Gharial, Muggar and Dolphin. Assessment of water quality will give information on various kind of water pollution which may be controlled by the concerned authorities.

2.2 NAME OF THE DIVISION : FOREST BOTANY AND ECOLOGY

2.2.1. NAME OF THE BRANCH : 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.

Regular Activities:- One

1. Maintenance of Forest herbarium, SFRI Jabalpur.

Project Summary

1. Title of the Project : - Maintenance of Forest herbarium, SFRI Jabalpur.

Why this Project:-

A herbarium is a collection of preserved plant specimens and associated data used for scientific study. The specimens may be whole plants or plant parts; usually in dried form, mounted on a sheet of paper. The specimens in a herbarium are often used as reference material in describing plant taxa, study of geographic distributions, and stabilizing of nomenclature. Herbarium also preserves a historical record of change in vegetation over time. In some cases, plants become extinct in one area or may become extinct altogether. In such cases, specimens preserved in a herbarium can represent the only record of the plant's original distribution. Herbarium also are very useful as a source of plant DNA for use in taxonomy and molecular studies.

Plant specimens collected from different forest areas were dried and mounted on a white mount board. Plant specimens were identified with the help of taxonomical criteria and herboft. Specimens were maintained through chemical treatment at regular intervals.

Objective of Research :- Maintenance of old specimens and herbarium software

Activities Undertaken :- Cleaning and protection of herbarium sheets. Maintenance of Herbarium software

Cost of the Project:- Rs. 21000/-

Expected Outcome of Research :

At present, there are 20364 specimens of different forestry species in Forest herbarium of SFRI, Jabalpur. These specimens represent 3478 species of 1231 Genus which belongs to 206 families according to Benthom and Hooker Classification system. These specimens are useful for scientific study and for identification purpose.

Deliverable technologies developed : –

SFRI has developed Digital herbarium data and plant identification software (Herboft) which is useful for plant identification purpose for researchers and field foresters.

Other significant achievements during the years:-

- Imparted training and demonstration of Herbarium preparation and its management
- Training on carbon estimation has been given to trainees of forest department

2.2.2 NAME OF THE BRANCH: FOREST ECOLOGY AND ENVIRONMENT

Mandate

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

Completed Projects: - One

1. Preparation of Management Plan of RET Species - For Proposed Acharya Shankar International Vedant Sansthan in Godadpura of Punasa Range, Beat Mandhata near Omkareswar of Khandwa District Madhya Pradesh
Submitted to - Principal Secretary, Culture Department, Government of Madhya Pradesh, Vallabh Bhavan, Bhopal

On-going Projects :- Two

2. 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. Forest Deptt., Bhopal
3. 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. Forest Deptt., Bhopal

Project Summary :-

Completed Projects :

1. **Title of the Project : Preparation of Management Plan of RET Species - For Proposed Acharya Shankar International Vedant Sansthan in Godadpura of Punasa Range, Beat Mandhata near Omkareswar of Khandwa District Madhya Pradesh**

Why this Project :

Preparation of Management Plan of RET Species.

Activities Undertaken :-

A team of experts from State Forest Research Institute Jabalpur visited the sites for proposed Acharya Shankar International Vedant Sansthan located in Comptt. No. 211PF situated in Beat Mandhata of Punasa Range of Khandwa Forest Division. Proposed work was discussed with the Chief Conservator of Forest, Khandwa. The information of the proposed site was collected from the office of forest division, Khandwa.

Outcome of Research :-

To compensate the loss of forest coverage

Due to this infrastructure activity there will be slight loss of forest coverage in the proposed site. To meet out the loss locally important species are suggested to be planted during the compensatory plantation. Roadside plantation needs to be done on both sides of approach road to minimize the noise and air pollution in the area. It is suggested that small or medium sized trees should be planted under the road side electricity wires and large trees can be planted on the other side.

Regeneration of rare and endangered plants of economic importance including medicinal plants

The project activities will affect the regeneration of some common as well as important species. Conservation efforts for such important species are to be done during and after the construction activity. Some RET plant species are identified in the study area.

These species also needs to be conserved. If these species are disturbed due to developmental activities than shifting/replanting of these species to another site/place should be

done for conservation of these species. For other common and indigenous species plantation should be done. Some herbaceous/climber species are also found in the area, can be planted in a small or large pockets for their ex-situ conservation. These species can be planted by direct seed sowing or planting tubers (for tuberous plants).

On-going Projects:-

1. Title of the Project:- 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.

Why this Project :-

There is no adequate system of management of wild medicinal plants in natural forests. Therefore, this is a time to develop a system that can regulate the harvesting of wild medicinal plants in sustainable manner. In the proposed study attempts will be made to develop species-specific harvesting limits and techniques in natural forests for sustainable forest management.

The outcome of the present study will help to develop the skill of local user community for sustainable harvesting of depleting NTFPs which are under threat due to over and non-scientific exploration in *in-situ* conditions. This sustainable harvesting techniques of economically important NTFPs will not only secure the livelihood of dependent tribal community but also help to conserve vanishing wild genetic resources on their natural habitats.

Research Methodology :-

- Selection of JFMCs area for study & ecological studies and inventory of wild medicinal plants in potentially rich selected site.
- Detailed survey of the inventory of commercially important medicinal plants and NTFPs.
- Site specific prioritization of species of high economic value.
- Phenological study of selected species.
- Determination of species specific sustainable harvesting limit with active community participation.

Study Design:-

After an inventory of forest resources in the selected VFC's/FPC experimental plots were demarcated on the basis of the growing potential of species selected for experimentation in each study site. The experimental plots were divided into 20 equal plots of 10mx10m size for herb species and 25mx25m for tree species. Number of plants in each plot were enumerated and marked in each plot.

Objectives of Research:-

- Ecological study and preparation of inventory of commercially important wild Medicinal plants potentially rich in forest ecosystem.
- Status assessment of commercially important wild medicinal plants in the study site
- Determination of sustainable harvesting limit (SHL) of commercially important MAPs and NTFPs with active community participation.
- Organize training programme for user communities for sustainable harvesting/management of wild medicinal plants and other NTFPs in JFMCs areas.

Activities Undertaken:-

- Vehicle hiring, POL, Project staff for field work, Field staff
- Proforma for data collection for herb, shrub and tree species.
- Proforma for phenological observations
- Proforma for harvesting, regeneration of the different species
- Field survey/observations/data collection & analysis/preparation of project reports, bulletin /organization of training programme for awareness etc.

Cost of the Project : 32.32 lakhs

Expected Outcome of Research:-

- Status assessment of commercially important wild medicinal plants in the study site have been done.
- Inventory of commercially important wild medicinal plants prepared.
- Observations of selected experimental plots for various harvesting treatments for selected NTFP species in selected sites have been taken.
- Observations on phenology and regeneration of selected species in treatment plots is in progress.
- Training programme will be organized for user communities for sustainable harvesting/management of wild medicinal plants and other NTFPs in JFMCs areas.
- Inculcate conservation practices of vanishing wild genetic resources in their natural habitats.
- Skill development of local user community for sustainable harvesting of depleting medicinal/NTFPs which are under threat due to over and non-scientific exploration in *in-situ* conditions.
- Securing the livelihood of dependent tribal communities through sustainable harvesting techniques.

2. Title of the Project:- Phytosociological study of river bank flora from Amarkantak to Mandla with special reference to impact on water quality in river Narmada.

Why this Project:-

Huge quantity of domestic waste, municipal sewage industrial effluents and agricultural run-off are being dumped in river Narmada. Rivers are the most important fresh water resource for human, social, economic and political development has,.. People throw large amount of materials such as flowers etc. which are also responsible for pollution of river water. Narmada river water is the main resource for domestic and irrigation purposes in the study area. So it is very important to estimate the quality of water in the study area.

Research Methodology:-

Phyto-sociological studies of riparian biodiversity will be done at an interval of 05 km from Amarkantak to Dindori & Mandla Forest Division along the river Narmada. The water samples, and phytoplanktons will be collected from the river Narmada from the selected stations for a period of two years excluding monsoon season, Confluence point of rivers, nallahs and industrial discharge points will also be selected for sampling

Study Design :-

1. Phytosociological study of river bank flora

- (a) Systematic ecological methods will be followed for assessment of the status of riparian floral diversity within the study area.
- (b) Assessment of Herb, shrub and tree species will be adopted by standard ecological methods.

2. Physico-Chemical Studies

Physico-chemical studies will be conducted by following procedures laid down in "Standard Methods for Examination of Water and Waste Water." Water samples will be collected in sampling bottles as per the standard method (APHA, 2002; Trivedy and Goel 1986). Observation on some of the parameters such as colour, odour, pH, temperature and dissolved oxygen, etc. will be recorded at the sampling sites to check quality of water on the basis of 37 Physico-chemical parameters.

3. Study on Phytoplankton Diversity

Samples for phytoplankton analysis will be collected by standard methods. The phytoplankton will be identified with the help of keys given by Prescott (1982), Agarkar (1975) and Desikachary (1959).

Objectives of Research:-

- To assess the phytosociological structure of river bank flora
- To assess the spatial diversity of phytoplankton community of river and its correlation with the physico-chemical parameters of the water body.
- To study the physico-chemical characterization of river water to assess pollution level.

Activities Undertaken:-

- Vehicle hiring, POL, Project staff for field work, Field staff
- Proforma for Phyto-sociological study of tree, shrub and herbaceous species
- Proforma for Physico-chemical parameters of water
- Proforma for Phyto-plankton study

Cost of the Project : 25.26 lakhs

Expected Outcome of Research:-

- The survey has been taken in Anuppur, Dindori, Mandla and North Seoni districts.
- Phyto-sociological parameters viz. Frequency, Density, Basal area, Abundance and Importance Value Index (IVI) has been calculated.
- Phyto-sociological study of tree, shrub and herbaceous species has been assessed.
- Identification of phytoplankton has been done in Narmada river.
- Physico-chemical parameters of water have been measured of Narmada River and Confluence Point.
- Physico-chemical parameters of water i.e. Alkalinity, aluminium, BOD, COD, DO, Fluoride, Ca, Mg, pH, EC, Humidity, Nitrate, Nitrite etc. have been analyzed.
- This study will provide structure of riparian biodiversity and quantitative and qualitative information on physico-chemical characteristics of the river water responsible for the degradation of river water and also provide informative data on the phyto-sociology status of riparian flora, diversity of phyto-planktons and terrestrial plants.

2.3. NAME OF THE DIVISION:- GENETICS, TREE IMPROVEMENT AND BIOTECHNOLOGY

2.3.1 NAME OF THE BRANCH:- 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.

Ongoing project:- One

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

Funding Agency: Principal Chief Conservator of Forest, Research, Extension & Lok Vaniki, M.P., Bhopal.

Ongoing project

Project Summary :-

1. Title of the Project :- Identification of potential pockets and selection of candidate plus trees of Bija and standardization of its clonal propagation technique.

Why this project:-

As per IUCN list *Pterocarpus marsupium* (Bija) comes under endangered medicinal tree species category. Earlier it naturally occurred in different agroclimatic zones of Madhya Pradesh. Since last few decades, over exploitation and unscientific harvesting practices of Bija tree owing to its medicinal properties threatens this valuable tree species. Today, its natural population is declining rapidly and it is now available only in few pockets of the state. Therefore, there is an urgent need to domesticate and conserve this valuable medicinal tree species. Naturally Bija is propagated through seeds but its seed germination is also very low as well as this species is highly recalcitrant in nature. Based on these facts this project was undertaken to find out the potential pockets of Bija from different agroclimatic zones of Madhya Pradesh to know about its availability and to standardize clonal propagation technique for its multiplication.

Research Methodology:-

- I. Identification of potential pockets.
- II. Identification & selection of candidate plus trees.
- III. Standardization of clonal propagation technique.

Study Design:-

1. Identification of potential pockets - For this, working plans of different forest division to be reviewed. Reconnaissance survey will also be taken for identification of potential pockets of Bija from different agro climatic zones of Madhya Pradesh.
2. Identification & Selection of candidate plus trees –
 - a. Selection criteria for wood producing tree species - On the basis of their phenotypic/morphological traits for wood producing species such as their height, girth at GBH clear bole, fluting and buttress less, epicormic branches, disease free and well establish crown etc will be taken for their selection.
 - b. Passport information of selected of CPTs – Complete passport information will be prepared for selected CPTs which includes forest division name, range, compartment number, associated species, GIS Mapping of selected CPTs, Land Mark, soil type, topography etc.
3. Standardization of clonal propagation technique – For achieving this objective following clonal propagation technique will be standardized.

- i. Macropropagation : For standardizing this technique the stem branch cutting will be collected then cuttings will be brought in mist chamber and different size of cuttings will be prepared and will be treated with different PPM concentrations of IBA and NAA for different time durations,

So as to ensure optimum concentration and time of treatment of root promoting hormone for maximum rooting response. The treated cuttings will be placed in mist chamber/polypropagators on medium grade sand as culture media. Intermittent misting will be done to cuttings to maintain adequate moisture level. The rooted cuttings (stacklings) will be shifted in 1:1:1 (FYM+sand+soil) and then will be hardened in green house.

- ii. Micropropagation :. For standardizing micropropagation protocol the explants will be collected from identified CPTs and the tissue culture media will be standardized by adding various combination and concentration of plant growth regulators for maximum morphogenetic response in terms of shoot multiplication and rooting response.

Objectives of Research:-

1. To identify potentially rich areas of Bija species from different agro climatic zones of Madhya Pradesh.
2. To select the candidate plus trees of Bija species on the basis of their phenotypic traits.
3. To standardize their clonal propagation technique.
4. To prepare technical bulletin as an extension series of evolved technologies.

Activities Undertaken:-

The working plans of different forest division were reviewed for the occurrence of Bija.

- i. Potential pockets have been identified from Seoni, Balaghat, Sagar, Dindori, Mandla, Damoh, Sheopur Kalan and Indore Forest Divisions. Candidate Plus Trees of Bija have been identified on the basis of their phenotypic traits including bole form, girth, height, fluting and buttress, epicormic branches, well established crown, disease etc. Total 65 CPTs have been identified so far from identified potential pockets.
- ii. The cuttings were collected from CPTs as well as SFRI campus for standardizing clonal propagation technique.
Vertical and horizontal cuttings 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 5000 ppm concentration.
- iii. It was observed that the horizontal cuttings responded for sprouting only and very poor rooting response were observed in 2 to 3 months. Vertical cuttings failed to induce rooting.
- iv. Various combinations and concentrations were tried in culture media but no morphogenetic responses were observed.



Candidate Plus trees of *Pterocarpus marsupium* (Bija)

Rooting of cuttings of Bija
(Rooting response in NAA
500ppm for 30min)



Clonal Propagation of *Pterocarpus marsupium* (Bija) with horizontal & vertical cuttings

Cost of the Project:- 25.97 lakhs

Expected Outcome of Research :

Potentially rich areas of Bija species from various agro climatic zones of Madhya Pradesh will be identified and selection of candidate plus trees of Bija species on the basis of their phenotypic traits for standardization of their clonal propagation technique.

A technical bulletin for dissemination of evolved technologies will be published.

Other Significant Achievements –

Training provided to various stakeholders such as Range Officers, Forest Guards, and Students etc.

2.3.2 NAME OF THE BRANCH:- TREE IMPROVEMENT

Mandate

1. Selection and documentation of candidate plus trees.
2. Superior germplasm selection and maintenance of CSO & SSO.
3. Genetic evaluation of progeny trials and provenance trials.
4. Maintain and enrich bamboosetum of SFRI.

Completed Projects:- One

1. Maintenance and enrichment of SFRI Bamboosetum.
Funding Agency: Director, M.P. State Bamboo Mission, Bhop

Newly Initiated Project:- One

1. Establishment of demonstration plot of *Bambusa tulda* at SFRI, Jabalpur.
Funding Agency: Director, M.P. State Bamboo Mission, Bhopal.

Regular Activities:- Three

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

Project Summary :-

Completed Projects

1. Title of the Project :- Maintenance and enrichment of SFRI Bamboosetum.

Why this Project :-

SFRI, Jabalpur established A Bamboosetum within area of about 1.0 ha. To create awareness among various stakeholders, it is important to collect and introduce other bamboo species for the enrichment of this Bamboosetum along with its maintenance.

Research Methodology:-

- I. Collection of new bamboo species - The germplasm of different bamboo species were collected from different bamboo growing areas of India like Madhya Pradesh, Kerala Forest Research Institute, Kerala, Rain Forest Research Institute, Jorhat and different states of north east for the enrichment of Bamboosetum.
- II. The pits were enriched with soil, sand and FYM in the ratio of 1:1:1. The soil working was taken timely for optimum growth of plants.
- III. Collection of growth data – Height, survival percentage, collar dia, circumference of clumps and number of culms per clumps.
- IV. Preparation of final report.

Study Design:- Spacement 6×6 meter.

Pit size 45×45×45 cm.

Objectives of Research:-

- i. To maintain and introduce new bamboo species in existing Bamboosetum of SFRI.
- ii. To exhibit information of each species of bamboo.
- iii. To prepare a technical bulletin with documentation of Bamboo species.

Activities Undertaken:-

Introduced new bamboo species.

Cost of the Proeject:- Rs.4.50 lakh.

Outcome of Research:- SFRI, Jabalpur established Bamboosetum in an area of 1.0 ha. This Bamboosetum was enriched with 37 new bamboo species belonging to 12 genera. To create awareness among various stakeholders more bamboo species will be introduced for the enrichment of this Bamboosetum along with its maintenance.



Views of bamboosetum of SFRI, Jabalpur

Demonstration activities of different bamboo species to various stakeholders viz forest officials, students, farmers etc.

Newly Initiated

1. Title of the project:- Establishment of demonstration plot of *Bambusa tulda* at SFRI, Jabalpur.

Why this project:-

To observe the field performance of tissue culture raised plants of *B.tulda*.

Research Methodology:-

The planting material for plantation will be obtained from Rain Forest Research Institute, Jorhat and will be planted in SFRI campus. The technical guidance will be provided by the technical staff of the project. The other project activity such as site preparation, fencing, stacking, planting, irrigation, protection, maintenance and watch & ward etc. will be supervised by Research Range Officer, Jabalpur.

Study Design:- Spacement 4×4 meter.

Objective of Research:-

To establish a demo plot of *Bambusa tulda*.

Activities Undertaken:-

Site preparation have been initiated during March-April 2021 but due to non availability of proper hardened plants of *Bambusa tulda* from RFRI, Jorhat, Assam, the plantation programme is rescheduled during March 2022. Correspondence have been made with Director, RFRI, Jorhat regarding availability of plants in November-December, 2021.

Cost of the Proeject :- 6.00 lakhs

Expected Outcome of Research :-

Field demonstration of *B.tulda* plants for demonstration to various stakeholders viz farmers etc.

Regular Activities:-

1. Title of the project :- Provenance trial of Litsea (*Litsea glutinosa*).

Objectives of Research:-

- Provenance trial of *Litsea glutinosa* to conserve its germplasm.

Activities Undertaken : -

- Seedling of eight provenance were planted in 15 replication with spacing of 3m×3m. The performance of Patalkot provenances was found the best over other tried provenances.

2. Title of the project :- Maintenance of clonal germplasm of *Madhuca latifolia* (Mahua).

Objectives of Research:-

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

Activities Undertaken : -

- Clonal orchard has been established in SFRI campus. 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. Title of the project :- Maintenance of Seedling Seed Orchards of *Gmelina arborea*.

Objectives of Research:-

- To get improved planting material.

Activities Undertaken : -

- 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 a candidate plus tree from the orchard.

Other Significant Achievements:-

Training provided to various stakeholders such as Range Officers, Forest Guards, and Students etc.

2.4 NAME OF DIVISION: SEED, SILVICULTURE AND AGRO-FORESTRY

2.4.1 NAME OF BRANCH: 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.

Ongoing projects:- 05

1. 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 (Research Extension & Lok Vaniki), M.P. Bhopal
2. Dissemination of knowledge through training programme for sustainable management and quality fruit collection of chironji to stakeholders.
Funding Agency: PCCF (Research Extension & Lok Vaniki), M.P. Bhopal
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 (Research Extension & Lok Vaniki), M.P. Bhopal
4. अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यों की अद्यतन स्थिति का आंकलन।
Funding Agency: PCCF (Research Extension & Lok Vaniki), M.P. Bhopal
5. रोपणी में रूट ट्रेनर में पौध तैयारी, पौधों में होने वाली बीमारियों का निदान एवं रोपणी प्रबंधन पर प्रशिक्षण एवं प्रदर्शन।
Funding Agency: PCCF (Research Extension & Lok Vaniki), M.P. Bhopal

Regular Activities:- One

1. **Seed, collection, testing & certification**

Funding Agency -SFRI, Jabalpur

Project Summary :-

Ongoing projects

1. **Title of the Project:- Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important tree species viz. *Anogeissus latifolia* & *Commiphora wightii*.**

Why this Project:-

Due to poor germination, short seed longevity period and production of sterile seeds, the project was taken for evaluation of best germplasm and to enhance the germination potential and standardization of the propagation techniques of the targeted species.

Research Methodology:-

1. Survey work was done only for 04 seed zones out of 10 seed zones on the basis of the information of working plans, in different seed zones of M.P. to identify potential areas of targeted species. Trees were marked at selected potential sites for seed collection and germplasm evaluation. General information on phenology and site characteristics were recorded and documented. For development of packages of seed and nursery techniques of selected species, systematic and scientific work was done on morphological, physiological attributes and standardization of potting mixture
2. Besides seed cultivation techniques will be tried through vegetative parts.

3. Observations were recorded on germination potential, GVI, seed vigour, growth of seedlings and survival.

Study Design:- RBD

Objectives of Research:-

1. To identify the potential pockets of *Commiphora wightii* & *Anogeissus latifolia* in Madhya Pradesh.
2. To evaluate germplasm with reference to morphological and physiological attributes.
3. To develop seed technique of quality seed collection, appropriate storage and pretreatments for enhanced seed longevity and germination potential of targeted species.
4. To develop nursery techniques for production of quality planting stock of selected targeted species.

Activities Undertaken:-

Project staff recruitment, site survey work, marking of trees, germplasm collection has been done in 04 seed zones of *Anogeissus latifolia* and one seed zone of *Commiphora wightii*. In each zone 03 sites were selected for identifying the potential pockets. Seed quality were assessed on morphological and physiological parameters. Seeds were stored in different storage conditions to enhance the longevity of seeds. Seeds of various seed zone were treated with various pretreatments to enhance the germination potential of seeds. Preparation of nursery bed, preparation of sowing media, filling of germination tray and poly bags has been done as per demand of project activities. Observations were recorded on germination potential and seed longevity behaviour. Experiments were laid out for techniques developed for production of quality plants through vegetative propagation etc. For standardization of nursery technique different potting mixture (28) were tried for production of quality planting stock.

Cost of the Project:- 34.02 lakhs

Expected Outcome of Research:-

The project is of high practical importance for field utility through identified best germplasm and recommended seed and nursery techniques for production of quality planting stock. It will be of vital significance to enhance the germination potential and growth of seedlings.



Seed Germination seedling and vegetative propagation of *Commiphora wightii*



Seed germination and seedling growth of *Anogeissus latifolia*

2. Title of the Project:- Dissemination of knowledge through training programme for sustainable management and quality fruit collection of Chironji to stakeholders.

Why this Project:-

Buchnania lanzan is an important minor forest produce and multipurpose tree of commercial significance. During the last few decades, excessive and premature harvesting of its fruits from wild has been usually done on account of increasing demand. Many communities have been observed to fell the whole tree for the sake of chironji fruit collection and obtaining quick returns. In discriminate tree cutting and collection of excessive and pre mature fruit from the wild, is a serious threat for in-situ conservation and sustainable utilization. In most part of MP fruits of *Buchanania lanzan* are harvested before ripening. With the result, it fetches low price in the market because of small seed size and low seed quality. Keeping above in view i.e. premature harvesting of fruits of chironji, there is a need to disseminate the knowledge of best harvesting period of chironji fruit / seed with special reference to seed size, seed weight, oil, protein, sugar contain and germination potential of seeds.

Training Methodology:-

The training programme will be imparted to the members of selected villages and forest dependent communities with subordinate staff of MP Forest Department Chhindwara and Panna Territorial forest Division. 10 trainings in each division will be imparted as resource person at suitable places of concerning divisions. Concerning Divisional Forest Officer will be nominate the trainees for training programme and arrange all facilities for trainer and trainees and communicated the date and place of training. During these training effects of collection period on fruit quality will be disseminated through power point presentation and lecture in simple language/posters/pamphlets by the resource person.

In each division 10 villages under JFM committees will be selected as per potentiality of Chironji tree for training programme. Training will be imparted to 40 participants of each village (VFC) and forest staff. Total 800 participants will be trained in two division viz. Chhindwara and Panna Forest Division.

Objectives of Research:-

- To disseminate the knowledge of package of practices comprising of scientific harvesting of fruits of Chironji for quality fruit collection and sustainable management of the species.

Activities Undertaken:-

Project staff recruitment, training material procurement preparation of training material (power point, brochure, banner, flex etc.) tour for 10 sites in Chhindwara Division and 10 sites in Panna Division. Total 30 days travel. 10 training and demonstration programme

will be done in Chhindwara Division and 10 training and demonstration in Panna Forest Division in next coming year due to COVID-19 pandemic.

Cost of the Project:- 14.10 Lakhs

Expected Outcome of Research:-

Enhancing economy of Forest Dependent Communities through quality fruit collection and sustainable management of the species.



Training Course Material

3. Title of the Project:- Training and demonstration programme on establishment and best management of seed production areas, seed technology and nursery management for field foresters.

Why this Project:-

To enhance the basic knowledge on the seed technology and management aspects of nursery of different tree species in the comprehensive manner of the field foresters and other user groups. Efforts will be made to provide scientific information with respect to best management of seed production areas, collection of quality seeds, maturity indices, seed collection and handling, sampling, method of processing, storage, pre-treatment, seed testing, viability, longevity, seed grading, seed dormancy, insect and pests problem before and after collection of seeds and basics of nursery management for production of quality planting material. In order to raise superior plantations, superior planting stock, the training programme is essential for field foresters.

Training Methodology :-

- 04 training programmes were organized during the period. Each training programme was organized for three days at State Forest Research Institute, Jabalpur. In each training programme 25 field foresters/forest guards/foresters/Dy.Rangers/Samiti members (covering R & E, territorial divisions and adjoining buffer zone) were invited for imparting the training on various aspects viz; Best management of production areas, selection of seed stand, Establishment of New Seed Production Area (SPA), Seed collection, Knowledge of seed maturity, Seed extraction and cleaning, Insect and disease problem, Seed storage, Method of seed lot sampling, Test for moisture, purity, weight, germination and vigor, Rapid seed viability estimate, Seed certification, Pre sowing treatments, Seed dormancy and Basics for nursery.
- Total 93 participants were trained during the year. During these trainings desired technology of testing and certification of seeds were demonstrated and training course material were provided for each participant. For selection of seed stands and establishment of seed production area, the field demonstrations were done. Nomination of field foresters were received from the concerning Territorial Divisions & R&E Centers.

Objectives of Research:-

1. Criteria for selection of Seed stands.
2. Establishment and best management of seed production areas.
3. To provide basic knowledge on Seed Technology and Nursery Management.

Activities Undertaken:-

- Recruitment of project staff, preparation and printing of training material and procurement of training kit, correspondence through letters, management of lodging-boarding, field visit, laboratory exercise, knowledge sharing, feedback collection, certificate printing and distribution.
- 04 training programmes were organized during the project period. In each training programme will be organized for 03 days. In each training 25 Field Foresters / Forest Guard / Foresters / Dy. Ranger / Rangers / Samiti Members (covering R&E, Territorial Divisions and adjoining buffer zones). Total 93 participants were trained.
- Training programme comprised 10 classroom lectures through power point presentation, 02 lectures during laboratory visit and 01 lecture in field visit.

Certificate of participation were distributed to the participants for attending the training programme.

Cost of the project:- 23.25 lakhs

Expected Outcome of Research:-

The impact of the training is of practical importance for selection of seed stands, establishment and management of seed production areas for quality seed collection under tree improvement programme and raising quality planting material by adopting advanced nursery techniques and management systems.



Training and demonstration programme to field foresters of various forest division and R&E Centers

4. Title of the Project:- अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यों की अद्यतन स्थिति का आंकलन के तहत कार्य।

Why this Project:-

अनुसंधान एवं विस्तार वृत्तवार विभिन्न रोपणियों में अधोसंरचना, कर्मचारियों की कार्यकुशलता, पौध तैयारी हेतु बीज शोध आदि के विषय में मापदण्ड, श्रेणीकरण एवं मान्यता के उद्देश्य से संस्थान द्वारा थर्ड पार्टी के रूप में उत्कृष्ट रोपणियों का पुनः मूल्यांकन।

प्राप्त परिणामों के आधार पर रोपणियों में एक आधुनिक स्वरूप की स्थापना के साथ-साथ तैयार पौधे के प्रमाणीकरण पश्चात् रोपित पौधों की प्रतिशतता एवं वन तथा वन क्षेत्र के बाहर उत्पादकता में वृद्धि। उत्कृष्ट रोपणियाँ को एक बहुआयामी रूप दिया जा सके एवं रोपणी मात्र पौधा तैयारी केन्द्र के साथ-साथ पर्यटन, ज्ञान एवं शिक्षा का केन्द्र एवं मनोरंजन केन्द्र के रूप में स्थापित हो सके।

Research Methodology:-

प्रदेश में प्रत्येक अनुसंधान विस्तार वृत्त द्वारा स्थानीय स्तर पर गठित दल के द्वारा श्रेणीकरण एवं मान्यता विषय पर किए गए परीक्षण एवं मूल्यांकन के आधार पर उत्कृष्ट एवं बहुत अच्छी श्रेणी की 57 रोपणियों की सूची के आधार पर वैज्ञानिक दृष्टि से विभिन्न बिंदुओं पर श्रेणीकरण एवं मान्यता हेतु मूल्यांकन कार्य किया जावेगा। मूल्यांकन कार्य नीचे दर्शित प्रमुख निर्धारित संरचनाओं को ध्यान में रखकर, आंतरिक मूल्यांकन के उपरांत प्राप्त परिणामों एवं रेटिंग के आधार पर किया जाएगा। संस्थान द्वारा किए जाने वाले मूल्यांकन कार्य के समय संबंधित जिले में स्थित रोपणी के प्रभारी सहायक वन संरक्षक भी उपस्थित रहेंगे। इसके अतिरिक्त संबंधित रोपणियों में चल रहे लघु शोध कार्यों की वास्तविक स्थिति का आँकलन कर प्रतिवेदन प्रस्तुत किया जावेगा।

Study Design:-

अपर प्रधान मुख्य वन संरक्षक, भोपाल द्वारा प्रस्तुत मूल्यांकन प्रपत्र के बिन्दुओं पर मौके पर निरीक्षण एवं पंजी अवलोकन के आधार पर।

Objectives of Research:-

- विभागीय स्तर पर रोपणियों के विविध कार्यों का सतत मूल्यांकन।
- उच्च गुणवत्ता के पौधे तैयारी हेतु रोपणी में स्थित प्रमुख संरचनाओं की स्थिति एवं उपयोग।

Activities Undertaken:-

11 अनुसंधान विस्तार वृत्तों की 57 रोपणियाँ का निरीक्षण एवं उच्च गुणवत्ता की पौध तैयारी पर रोपणी में पदस्थ स्थानीय क्षेत्रीय अमले को प्रशिक्षण हेतु दौरा कार्य।

Cost of the Project:- 04.50 Lakhs

Expected Outcome of Research:-

थर्ड पार्टी मूल्यांकन के आधार पर पाई जाने वाली उत्कृष्ट रोपणियों एवं उनसे प्राप्त होने वाले पौधे एवं आय से रोपणी में स्थित क्षेत्रीय अमले में प्रतिस्पर्धा की भावना जागृत करने से, एक नई ऊर्जा एवं उत्साह प्राप्त होगी एवं सभी रोपणियाँ उत्कृष्ट स्थान पाने के लिए प्रयासरत रहेंगे जिससे रोपणी में गुणवत्ता वाले मानक पौध तैयारी एवं आधुनिक अधोसंरचना स्थापित होगी।



अनुसंधान विस्तार की रोपणियों का अवलोकन एवं प्रशिक्षण



अनुसंधान विस्तार वृत्तों की नर्सरियों का अवलोकन

5. Title of the Project:- रोपणी में रूट ट्रेनर में पौध तैयारी, पौधों में होने वाली बीमारियों का निदान एवं रोपणी प्रबंधन पर प्रशिक्षण एवं प्रदर्शन।

Why this Project:- वर्तमान में वानिकी रोपणियों में पॉलिथिन बैग में पौध तैयारी पर प्रतिबंध लगने के कारण पॉलिथिन बैग के स्थान पर अन्य कन्टेनर अर्थात् रूट ट्रेनर को विकल्प के तौर पर लिया जा रहा है। रूट ट्रेनर को उच्च गुणवत्ता की पौध तैयारी हेतु वैज्ञानिक विधि से उपयोग करने के साथ-साथ रोपणी में पौधों में कीट एवं फफूँद से लगने वाली बीमारियों की पहचान एवं निदान पर प्रशिक्षण एवं प्रदर्शन कार्यक्रम के माध्यम से रोपणी में पदस्थ अमले को प्रशिक्षण के माध्यम से अवगत कराना आवश्यक है।

Training Methodology:- 11 अनुसंधान विस्तार एवं लोकवानिकी वृत्त के क्षेत्रीय अमले को विभिन्न बिन्दुओं जैसे: रूट ट्रेनर में उच्च गुणवत्ता की पौध तैयारी करना, रोपणी में तैयार पौधों में कीट एवं फफूँद के प्रकोप की जानकारी एवं उससे बचाव के साथ-साथ नर्सरी प्रबंधन पर प्रशिक्षण कार्यक्रम 05 चरणों में जबलपुर अनुसंधान एवं विस्तार वृत्त में जबलपुर एवं रीवा अनुसंधान विस्तार वृत्त के क्षेत्रीय अमले, इंदौर अनुसंधान विस्तार वृत्त में झाबुआ एवं रतलाम के अनुसंधान विस्तार वृत्त के क्षेत्रीय अमले, भोपाल अनुसंधान विस्तार वृत्त में खण्डवा के क्षेत्रीय अमले, सागर अनुसंधान विस्तार वृत्त में ग्वालियर अनुसंधान विस्तार वृत्त के क्षेत्रीय अमले को शामिल कर प्रशिक्षण कार्यक्रम को सम्पन्न करने हेतु योजना बनाई गई, जिससे सीमित समयावधि में समस्त 11 अनुसंधान विस्तार वृत्तों के क्षेत्रीय अमले को उक्त विभिन्न बिन्दुओं पर प्रशिक्षण दिया जा सके। प्रशिक्षण अवधि 01 दिवस रखी गई जिसमें पावर प्वाइंट प्रजेंटेशन, पोस्टर, पैम्पलेट्स एवं विषय वस्तु से संबंधित आवश्यक प्रशिक्षण सामग्री का उपयोग किया गया।

Study Design:-

02 से 03 अनुसंधान विस्तार वृत्तों के क्षेत्रीय अमले को नजदीकी अनुसंधान विस्तार वृत्त में एकत्र किया जाकर प्रशिक्षण कार्य किया जाना।

Objectives of Research:-

- रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी करना।
- रोपणी में तैयार पौधों में होने वाली बीमारियों का निदान।
- नर्सरी प्रबंधन।

Activities Undertaken:-

- 05 अनुसंधान विस्तार वृत्तों, जबलपुर, भोपाल, इंदौर, सागर एवं सिवनी में जाकर उच्च गुणवत्ता की पौध तैयारी पर रोपणी में पदस्थ स्थानीय क्षेत्रीय अमले को प्रशिक्षण दिये जाने हेतु दौरा कार्य।
- प्रशिक्षण के विषय बिन्दुओं पर प्वाइंट प्रजेंटेशन, पोस्टर, पैम्पलेट्स तैयार करना।
- 11 अनुसंधान विस्तार वृत्तों के क्षेत्रीय स्तर के लगभग 300 व्यक्तियों हेतु प्रशिक्षण एवं प्रदर्शन कार्यक्रम का संपादन।

Cost of the Project:- 02.00 लाख

Expected Outcome of Research:-

उच्च गुणवत्ता की पौध तैयारी हेतु पॉलिथिन बैग के स्थान पर रूट ट्रेनर में पौध तैयारी का कार्य कर प्रजातिवार रूट ट्रेनर की साईज एवं पॉटिंग मिश्रण के मानक तैयार होगा जिससे उच्च गुणवत्ता के पौध तैयार किये जाकर वृक्षारोपण के कार्य को सफल बनाने में उपयोगी सिद्ध होगा।



अनुसंधान विस्तार वृत्तों के क्षेत्रीय अमले को रूट ट्रेनर में रूट तैयारी एवं रोपणी प्रबंधन पर प्रशिक्षण

Regular activity

1. Title of Project : Seed, collection, testing & certification.

Objectives of Research:

1. Seed Collection, testing and certification.
2. Provide quality seeds for future plantation programme.

Activities Undertaken:

- 20 seed samples of teak and other misc. seeds were tested and certified.
- 200 quintals of teak seeds were treated scientifically wherein 127.5 quintals seeds were obtained and disposed to MP Forest Department and other states.

Other Significant achievement:

05 research project proposals formulated and submitted to the funding agency for approval

2.4.2 NAME OF THE BRANCH: 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 users.

Completed project:- 01

1. 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: अपर प्रधान मुख्य वन संरक्षक (अनुसंधान विस्तार एवं लोकवार्निकी) म.प्र. भोपाल

On-going projects:- 01

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: अपर प्रधान मुख्य वन संरक्षक (ग्रीन इंडिया मिशन/वविअ) म.प्र. भोपाल

Regular Activity:- 01

1. मृदा नमूनों का परीक्षण।

Project Summary :-

Completed project

1. **Title of the project :** 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।

Why this project : सभी जीवों का अस्तित्व किसी न किसी रूप में मृदा से जुड़ा हुआ है। धरती की ऊपरी सतह जिसे मृदा या मिट्टी कहा जाता है, सबसे अधिक महत्वपूर्ण है, जहाँ से पौधे आव यक पोषक पदार्थों का ग्रहण करते हैं। जैसे तो नीचे की परतों में चट्टानों तथा खनिज पदार्थों के रूप में पोषक तत्व काफी मात्रा में मौजूद होते हैं, परन्तु इनकी रचना बहुत जटिल होने के कारण पौधे इन्हें सीधे रूप में प्राप्त नहीं कर पाते। इसके विपरीत मृदा में सभी पोषक तत्व सरल रूप में पाए जाते हैं और पौधे इन्हें आव यकतानुसार आसानी से ग्रहण कर लेते हैं। चूँकि पौधों की जड़ें इसी भू-भाग में केन्द्रित रहती हैं, इसलिए मृदा का महत्व सभी पेड़ पौधों की वृद्धि एवं विकास के लिए बहुत अधिक बढ़ जाता है।

सफल रोपणी के लिए मृदा प्रबंधन अति आव यक हो जाता है। सभी प्रकार की मृदायें पौधों को पूर्ण पोषक तत्व देने में असमर्थ होती हैं। अलग-अलग प्रकार की मृदाओं में उपलब्ध पोषक तत्वों का स्तर अलग-अलग होता है, अतः मृदा में उपस्थित पोषक तत्व की जानकारी प्राप्त करने हेतु मृदा परीक्षण आवश्यक है।

प्रदेश के 11 अनुसंधान एवं विस्तार वृत्तों में एक परियोजना के अंतर्गत संस्थान में उपलब्ध चलित मृदा परीक्षण प्रयोगशाला के माध्यम से "मध्यप्रदेश के अनुसंधान एवं विस्तार केन्द्रों में मृदा परीक्षण कर मृदा में उपस्थित पोषक तत्वों की जानकारी प्रदान करना" विषय पर कार्य किया गया। इस चलित प्रयोगशाला के द्वारा विभिन्न क्षेत्रों के मृदा का रासायनिक विश्लेषण कर पोषक तत्वों जैसे कार्बनिक तत्व, नत्रजन, फॉस्फोरस, पोटॉश, कैल्शियम और भौतिक विश्लेषण से पी.एच., घुलनशील लवण (ई.सी.), जल धारण क्षमता इत्यादि का विश्लेषण आवश्यक है।

पौधे के सफल उत्पादन एवं राज्य के अनुसंधान एवं विस्तार केन्द्र की रोपणियों में उच्च गुणवत्ता के पौधे तैयार करने के लिये मृदा नमूनों के परीक्षण हेतु विभिन्न रोपणियों के मृदा नमूनों का परीक्षण करने का लक्ष्य रखा गया।

Research Methodology :

राज्य वन अनुसंधान संस्थान की चलित मृदा परीक्षण प्रयोगशाला के द्वारा विभिन्न अनुसंधान एवं विस्तार केन्द्रों में दौरा कार्यक्रम के दौरान मृदा परीक्षण किया गया। समस्त अनुसंधान विस्तार वृत्तों में डाक, ई-मेल एवं दूरभाष के द्वारा दौरा कार्यक्रम की सूचना दी गई एवं प्रस्तावित दिनांक में दौरा किया गया।

तालिका :- विभिन्न अनुसंधान विस्तार वृत्तों में प्रवास कार्यक्रम एवं प्राप्त मृदा नमूनें

क्र.	अनुसंधान एवं विस्तार वृत्त	प्रथम दौरा दिनांक	प्राप्त नमूनों की संख्या	द्वितीय दौरा दिनांक	प्राप्त नमूनों की संख्या
1.	जबलपुर	18-19/01/2019	12	11-12/11/2019	12
2.	रीवा	21-22/01/2019	32	14-15/11/2019	42
3.	ग्वालियर	24-25/01/2019	29	17-18/11/2019	16
4.	सागर	27-28/01/2019	35	20-21/11/2019	37
5.	भोपाल	30-31/01/2019	33	23-24/11/2019	30
6.	रतलाम	02-03/02/2019	20	26-27/11/2019	20
7.	झाबुआ	05-06/02/2019	50	29-30/11/2019	33
8.	इंदौर	08-09/02/2019	14	02-03/12/2019	13
9.	खण्डवा	11-12/02/2019	36	05-06/12/2019	43
10.	बैतूल	14-15/02/2019	22	08-09/12/2019	23
11.	सिवनी	17-18/02/2019	49	11-12/12/2019	45

दो चरणों में दौरा कार्यक्रम पूर्ण कर अनुसंधान एवं विस्तार वृत्तों से प्राप्त मृदा नमूनों का परीक्षण किया गया। प्राप्त मृदा नमूनों का परीक्षण निम्नानुसार विधियों द्वारा किया गया: -

1. पी.एच - पी.एच मीटर द्वारा
2. धुलनशील लवण- ई.सी. मीटर द्वारा
3. नाइट्रोजन - जेलडॉल विधि
4. फास्फोरस - स्पेक्ट्रोमीटर
5. पोटेशियम - फ्लेम फोटोमीटर
6. कार्बनिक कार्बन - वाकले एण्ड ब्लैक विधि
7. सूक्ष्म पोशक तत्व - एटोमिक एब्जोर्बेन्स स्पेक्ट्रोमीटर

Objectives of Research: -

1. मृदा परीक्षण सुविधाओं को रोपणी तक पहुँचाना एवं रोपणी मृदा में उपलब्ध पोशक तत्वों का परीक्षण करना।
2. मृदा एवं केंचुआ खाद में उपस्थित तत्वों के बारे में जानकारी मृदा स्वास्थ्य कार्ड के माध्यम से उपलब्ध कराना।
3. रोपणी की मृदा परीक्षण के उपरांत मृदा में उपलब्ध पोशक तत्वों के आधार पर खाद की मात्रा के बारे में सुझाव देना।

Activities Undertaken: -

पी.एच मीटर, ई.सी. मीटर, ऑटो-जेलडॉल, नाइट्रोजन एनालाइजर, फ्लेम फोटोमीटर, स्पेक्ट्रोमीटर, एटोमिक एब्जोर्बेन्स स्पेक्ट्रोमीटर (ए.ए.एस), वाकले एण्ड ब्लैक विधि

Cost of the Project : 38.00 lakhs

Outcome of Research: -

रोपणी स्तर पर मृदा परीक्षण के आधार पर मृदा में उपलब्ध आवश्यक पोषक तत्वों की जानकारी दी गई। परीक्षण उपरांत मृदा में उपलब्ध पोशक तत्वों की कमी की पूर्ति हेतु परामर्श अथवा सिफारिश दी गई ताकि रोपणी में उच्च गुणवत्ता के पौधे तैयार किये जा सकें।

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

क्र.	अनुसंधान एवं विस्तार वृत्त का नाम	प्रथम दौरा प्राप्त मृदा नमूने	द्वितीय दौरा प्राप्त मृदा नमूने	कुल मृदा नमूने
1	जबलपुर	12	12	24
2	रीवा	32	42	74
3	ग्वालियर	29	16	45

क्र.	अनुसंधान एवं विस्तार वृत्त का नाम	प्रथम दौरा प्राप्त मृदा नमूने	द्वितीय दौरा प्राप्त मृदा नमूने	कुल मृदा नमूने
4	सागर	35	37	72
5	भोपाल	33	30	63
6	रतलाम	20	20	40
7	झाबुआ	50	33	83
8	इंदौर	14	13	27
9	खंडवा	36	43	79
10	बैतूल	22	23	45
11	सिवनी	49	45	94
कुल मृदा नमूने				646

उपरोक्त सारणी में दर्शाये गये 11 अनुसंधान विस्तार वृत्तों की विभिन्न रोपणियों से प्राप्त कुल 646 मृदा नमूनों का परीक्षण किया गया जिसके अंतर्गत मृदा में पी.एच, ई.सी., कार्बनिक कार्बन, कार्बनिक तत्व, नाइट्रोजन, फास्फोरस, पोटैशियम एवं सूक्ष्म पोशक तत्व (कॉपर, आयरन, मैगनीज, एवं जिंक) का परीक्षण कर संबंधित अनुसंधान एवं विस्तार वृत्त में रिपोर्ट दी गई।

विभिन्न अनुसंधान एवं विस्तार वृत्तों की विभिन्न रोपणियों से प्राप्त मृदा नमूनों का परीक्षण तथा उपस्थित आवश्यक पोशक तत्वों की जानकारी संबंधित अनुसंधान एवं विस्तार वृत्तों को प्रदान की गई, पोशक तत्वों की कमी की पूर्ति हेतु सुझाव दिये गये। इन परिणामों के आधार पर भविष्य में पौधे तैयार करने हेतु रोपणियों में सही मात्रा में उर्वरक का प्रयोग तथा उच्च गुणवत्ता की पौध का उत्पादन किया जा सकेगा। उच्च गुणवत्ता के पौधों को जब वन क्षेत्र में रोपण किया जाएगा तो अधिक से अधिक पौधे जीवित रहेंगे एवं वृक्षारोपण सफल होंगे, इस प्रकार अच्छा वन तैयार हो सकेगा।



MSTL at R&E Jabalpur



Soil sample preparation at Rewa R&E



MSTL at Gwalior R&E

Ongoing project:-

1. Title of the Project:- 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।

Why this Project:- National Afforestation Programme (NAP), a flagship afforestation programme under the aegis of National Afforestation and Eco-development Board (NAEB), Ministry of Environment and Forests, Government of India, is currently under implementation on a massive scale plantation throughout the country by district level forest development agencies (FDAs), an institution carved on the lines of district rural development agency with a view to institutionalizing participatory principles in forest management practices. The programme **aims** at: regeneration and eco-development of degraded forests; increase in the availability of fuel wood, fodder and grasses; increasing production of NTFPs; and, rehabilitation and reclamation of problem sites like alkaline saline soils, deserts, coastal areas, etc. NAP envisages peoples' participation and generation of employment especially for forest dependent communities. The overall objective of the programme is ecological restoration and environmental conservation through peoples' participation in conformity with the objectives as laid down in the National Forest Policy of 1988. Capacity building and skill development of rural communities engaged in afforestation and forest protection activities are among the key components of the programme.

Different forest divisions were selected to run the scheme for the achievement of the above objectives and to evolve forest protection, management and development functions to centralized institutions of Joint Forest Management Committee (JFMC) at the village level, and Forest Development Agency (FDA).

The object of this National project of India is about collection of information regarding Eco-development, degraded forests and other components which is being implemented by Forest Development Authorities of different districts in India. State Forest Research Institute, Jabalpur. (M. P.) has been assigned the task of evaluation of the different works of this project.

Research Methodology:-

The evaluation work was carried out in 36 FDAs for the year 2015-16 and 32 FDAs for the year 2016-17. The sites selected for evaluation under various FDAs were inspected by various monitoring and evaluation teams from the State Forest Research Institute, Jabalpur during the month of June 2020 to July 2020.

Systematic random sampling method was adopted for monitoring and evaluation by selecting more than 30% of the total area treated under various FDAs in the year 2016-17, whereas in the year 2015-16 the 100% evaluation of all the given sites has been done. Grading of various afforestation

activities and quality of works was done on a scale of 1-10. Parameters selected for on site evaluation of plantation were percentage of survival, health of plantation, maintenance, protection measures including fire, grazing, watch & ward, encroachment, illicit felling, record keeping, verification/supervision, involvement of people, species selection.

The afforestation models included Aided Natural Regeneration (ANR), Artificial Regeneration (AR), Silviculture Development (SPD), Medicinal plant (MP) and Bamboo Plantations (BP). The major activities included planting, soil moisture conservation works and entry point activities, as per project proposal of respective FDAs.

Study Design:-

To estimate the plantation under the scheme, three sample plots were laid out in each plantation site. These three sample plot were ocularly selected in good, moderate and low survival condition of plantation. Plant survival and growth were enumerated inside the sample plots.

Objectives of Research:-

1. Monitoring and Evaluation of FDAs.
2. Project Impact Assessment.

Activities Undertaken:-

1. Vehicle hired, POL, Project staff for field work,
2. Field staff, evaluation format for plantation of the sites.
3. Range level Proforma.
4. Proforma for EPA works.
5. PIA works filled by interview with committee members, villagers, field staff & ocular observations.
6. Proforma for "Evaluation format for first concurrent evaluation of forest development agency projects sanctioned under National Afforestation Programme(NAP) scheme" .

Cost of the Project:- 18.51 Lakhs

Expected Outcome of Research:-

1. Measured growth including height of tree species in different forest divisions.
2. Measured survival percentage of tree species in different forest divisions.
3. Socio economic information
4. Reports were prepared on the basis of the information received as per format as well as physical & other verification and discussion with staff and people.
5. Project impact assessment on villagers awareness, employment during execution and implementing forestry works, income as wages, effect on agricultural crop production and fodder production, . soil & water conservation, regeneration status, presence of wild animals, water level, Documents verification, plantation journal, name of the nursery by which the seed and plants received etc.
6. 29 interim reports of the Year 2015-16 and 30 interim reports of the year 2016-17 were prepared and submitted to funding agency APCCF (GIM/ FDA) .

The ultimate outcome of the monitoring and evaluation is to assess the availability of ground water by soil and water conservation measures, the extent to which the water bodies have got recharged and any qualitative and quantitative increase of fodder production thereby improving the livelihood opportunities of village communities of forest division area. Regeneration and eco-development of degraded forests, increase in the availability of fuel wood and grasses, increasing production of NTFPs. NAP encourages peoples' participation and generation of employment especially for forest dependent communities. Due to this programme the ecological restoration and environmental conservation through peoples' participation has been achieved. Capacity building and skill development also increased in rural areas.



FDA work of Umariya (plantation year 2015-16) ANR model



FDA work of Datiya (2016-17) - ANR model

Regular activity :

1. Title of the Project:- मृदा नमूनों का परीक्षण ।

Why this Project :-

मध्यप्रदेश वन विभाग द्वारा प्रतिवर्ष विभिन्न वनमण्डलों में वृक्षारोपण का कार्य किया जाता है। वृक्षारोपण को सफल बनाने के लिये उस क्षेत्र की मृदा में उपस्थित पोशक तत्वों की मात्रा ज्ञात करने हेतु एवं वहां की मृदा लगाई जाने वाली प्रजाती के अनुकूल है अथवा नहीं इस हेतु वहां की मिट्टी का परीक्षण किया जाना आवश्यक है। इस कारण विभिन्न वनमण्डलों से वृक्षारोपण के पूर्व मृदा नमूने परीक्षण हेतु राज्य वन अनुसंधान संस्थान जबलपुर की मृदा परीक्षण प्रयोगशाला में भेजे जाते हैं। इस प्रयोगशाला में प्राप्त मृदा नमूनों का परीक्षण कर मृदा में उपस्थित पोशक तत्वों के बारे में जानकारी दी जाती है एवं पोशक तत्वों की कमी की पूर्ति हेतु सुझाव दी जाती है।

Research Methodology:-

मध्यप्रदेश वन विभाग के विभिन्न वन मण्डलों से प्राप्त मृदा नमूनों को सुखा कर, कूट कर, पीस कर तैयार किया जाता है। इसके पश्चात् मृदा परीक्षण कार्य हेतु मृदा में उपस्थित आवश्यक पोशक तत्वों नाइट्रोजन, फॉस्फोरस, पोटेशियम, पी.एच, ई.सी, कार्बनिक कार्बन, सूक्ष्म पोशक तत्व, (कॉपर, मैंगनीज, जिंक, आयरन) आदि का निम्नानुसार विधि से परीक्षण किया जाता है।

पी.एच.	पी.एच मीटर
ई.सी.	ई.सी. मीटर
कार्बनिक कार्बन	वाकले एण्ड ब्लैक विधि
नाइट्रोजन	ऑटो जेलडॉल नाइट्रोजन एनालाइजर
फॉस्फोरस	स्पेक्ट्रोमीटर
पोटेियम	फ्लेम फोटोमीटर
सूक्ष्म पोशक तत्व (कॉपर, आयरन, मैगनीज, एवं जिंक) –	एटोमिक एब्जोर्बान स्पेक्ट्रोमीटर (ए.ए.एस)

Objective of Research:- मृदा परीक्षण कार्य

Activities Undertaken:-

पी.एच मीटर, ई.सी. मीटर, ऑटो-जेलडॉल, नाइट्रोजन एनालाइजर, फ्लेम फोटोमीटर, स्पेक्ट्रोमीटर, एटोमिक एब्जोर्बान स्पेक्ट्रोमीटर (ए.ए.एस), वाकले एण्ड ब्लैक विधि

Expected Outcome of Research : - विभिन्न वनमण्डलों द्वारा किये गये वृक्षारोपणों को अधिक से अधिक संख्या में सफल बनाने।

राज्य वन अनुसंधान संस्थान जबलपुर में स्थित मृदा विज्ञान प्रयोगशाला के माध्यम से मध्यप्रदेश के विभिन्न वनमण्डलों से प्राप्त मृदानमूनों का परीक्षण किया जाता है। मृदा में उपस्थित आवश्यक पोशक तत्वों की जानकारी संबंधित वनमण्डल को प्रदान की जाती है। इन परिणामों के आधार पर खाद की मात्रा की अनुशंसा दी जाती है ताकि जब वृक्षारोपण किया जाए तो उसमें अधिक से अधिक पौधे जीवित हों एवं वृक्षारोपण सफल हो।



Soil Lab

Other significant achievements:

1. New project submitted on मिट्टी के भौतिक एवं रासायनिक गुणों पर जंगल की आग का प्रभाव।
2. Provided necessary information regarding Soil lab and Mobile Soil Testing Van to Trainee Range forest officers from Uttarakhand Forest Academy Betul circle, Social forestry circle Betul & M.Sc Students etc.

2.4.3 NAME OF THE BRANCH : 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.
4. Strengthening agro-forestry database development programme and to serve as a repository of information.
5. Socio-economic study in various fields

On-going Projects:- 03

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 (Research Extension & Lokvaniki) M.P., Bhopal

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

Funding Agency: PCCF (Research Extension & Lokvaniki)M.P., Bhopal

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

Funding Agency: PCCF (Research Extension & Lokvaniki)M.P., Bhopal

Project Summary:-

On-going Projects

1. **Title of the Project:-** 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।

Why this Project:-

कृषकों की खेती को लाभप्रद बनाने एवं आय में वृद्धि के उद्देश्य को ध्यान में रखकर कृषक समृद्धि योजना के अंतर्गत कृषि वानिकी के तहत कृषकों की निजी भूमि में शासन स्तर पर पौधा रोपण का जो अभियान प्रारम्भ किया गया था, उसके प्रति कृषकों का क्या रवैया है, क्या कमियां हैं, यह अभियान सफल रहा या असफल इसका कारण, कृषि वानिकी पद्धति अपनाकर खेती करने से कृषकों को होने वाली लाभ एवं हानि आदि तथ्यों को प्रकाश में लाने तथा भविष्य में ऐसी योजना के क्रियान्वयन से पूर्व गुण-दोष पर विचार कर उचित रणनीति तैयार करने हेतु अनुसंधान करने का दायित्व फंडिंग एजेन्सी ने सौंपा था।

Research Methodology:-

- चयनित जिलों में हितग्राहियों (कृ.स.यो. के अंतर्गत वृक्षारोपण करने वाले कृषकों में से सा. आ.सर्वेक्षण के लिए चयनित कृषक) का चयन करने हेतु प्राथमिक सर्वेक्षण।
- प्रत्येक जिलों से 5 प्रतिशत कृषकों का आनुपातिक प्रतिनिधित्व के आधार पर चयन।
- सामाजिक वानिकी वृत्त द्वारा कृषि वानिकी पद्धति के अंतर्गत कृषकों की निजी भूमि में स्थापित प्रदर्शन प्रक्षेत्र का अध्ययन के लिए चयन और पौधों की वृद्धि संबंधी आँकड़ों का संग्रहण।
- समूह रोपण एवं खेत के मेड़ों में किए गए रोपण से कृषि उत्पादन पर पड़ने वाले प्रभाव से संबंधित आँकड़ों का संकलन एवं विश्लेषण।

- लागत-लाभ अनुपात (Cost Benefit Ratio) हेतु कृषकों के वृक्षारोपण एवं कृषि फसलों की खेती में व्यय एवं आय के आँकड़ों का संकलन तथा विश्लेषण।
- चयनित जिलों में कृषि वानिकी पद्धति के अंतर्गत खेती करने वाले कृषकों की सूची तैयार करना।
- चयनित जिलों के ग्रामीणों एवं किसानों से उनके मॉडल, कृषि वानिकी पद्धति के आँकड़ों का संकलन एवं विश्लेषण कर नवीन मॉडल की रूपरेखा प्रस्तुत करना।

Study Design:-

- अध्ययन क्षेत्र से सामाजिक-आर्थिक सर्वेक्षण हेतु 5 प्रतिशत कृषकों का (परियोजना में दी गयी तालिकानुसार) वैज्ञानिक विधि से चयन।
- हितग्राहियों के रोपण स्थल से पौधों की वृद्धि, जीवंतता एवं वृक्षारोपण का कृषि पर प्रभाव ज्ञात करने के लिए पौधों के मापन आँकड़ों का संकलन एवं साक्षात्कार।
- निजी भूमि में कृषि वानिकी पद्धति के तहत स्थापित प्रदर्शन प्रक्षेत्र से पौधों की वृद्धि एवं जीवंतता ज्ञात करने के लिए पौधों के मापन आँकड़ों का संकलन।
- प्रदर्शन प्रक्षेत्र में पौधों जीवंतता ज्ञात करने के लिए कुल रोपण में से प्रत्येक तीसरी लाईन के पौधों की गणना एवं वृद्धि दर ज्ञात करने के लिए 10 प्रतिशत पौधे की छाती गोलाई तथा ऊँचाई ज्ञात करना।
- मेंड़ में रोपे गये अपेक्षाकृत छोटे 15 प्रतिशत पौधों की कालर गर्थ एवं ऊँचाई ज्ञात करना।
- चयनित जिलों में वन विभाग, स्थानीय स्रोत से प्राप्त जानकारी अनुसार कृषि वानिकी पद्धति से खेती करने वाले कृषकों की सूची तैयार करना एवं साक्षात्कार लेकर मॉडल की उपादेयता से संबंधित आँकड़े एकत्र करना।
- आँकड़ों का वर्गीकरण, श्रेणीकरण एवं विश्लेषण।
- प्रदर्शन प्रक्षेत्र के पौधों का मापन कर आँकड़े एकत्र करना।

Objectives of Research:-

1. कृषक समृद्धि योजना के अंतर्गत कृषि वानिकी के तहत कृषकों की निजी भूमि में कृषि वानिकी के प्रति रुझान, सफलता एवं कृषकों की भावी आय में योगदान का आँकलन।
2. अनुसंधान विस्तार वृत्त द्वारा कृषकों की निजी भूमि में स्थापित प्रदर्शन प्रक्षेत्र का अध्ययन कर प्राप्त परिणामों के आधार पर कृषि वानिकी मॉडल के संबंध में सुझाव प्रस्तुत करना।

Activities Undertaken:-

- परियोजना स्टाफ का चयन, अध्येतावृत्ति, पारिश्रमिक, वाहन किराया, पीओएल, कार्यालयीन एवं आकस्मिक निधि का उपयोग।
- प्राथमिक सर्वेक्षण एवं सामाजिक आर्थिक सर्वेक्षण हेतु चयनित जिलों का दौरा।
- मेंड़ में रोपण से संबंधित अनुसूची।
- चयनित जिलों में प्रारम्भिक सर्वेक्षण कर सामाजिक आर्थिक सर्वेक्षण के लिए कृषकों का चयन।
- सर्वेक्षण कार्य में सहयोग के लिए श्रमिकों का सहयोग एवं उनके पारिश्रमिक का भुगतान।

Cost of the Project:- Rs.16.40 Lakhs

Expected Outcome of Research:-

- कृषक समृद्धि जैसी योजनाओं के माध्यम से वृक्षारोपण के प्रगति की समीक्षा हो सकेगी तथा ऐसी योजनाओं के प्रति कृषकों के रुझान का पता चल सकेगा।
- कृषि-वानिकी के प्रयोग से कृषकों की लाभ-हानि का आँकलन प्राप्त होने से कृषकों को मार्गदर्शन एवं प्रेरणा प्राप्त होगी।

- मालवा का पठार कृषि जलवायु प्रक्षेत्र में सफल पाए गये कृषि वानिकी मॉडल के परिणामों से कृषकों को कृषि वानिकी एवं वृक्षारोपण के प्रति निर्णय लेना सरल होगा।
- परियोजना क्षेत्र में कृषि-वानिकी मॉडल के प्रचार-प्रसार की रणनीति तैयार करने में मदद मिलेगी।
- प्रचार-प्रसार निर्देशिका तैयार कर वनमंडल के माध्यम से कृषकों तक पहुँचाना।
- निर्देशानुसार कृषकों को दृश्य-श्रुत्य माध्यमों से अवगत कराना।



जिला-आगर मालवा: में कृषक समृद्धि योजना के तहत निजी भूमि में रोपित किये गए पौधों का अवलोकन एवं मापन



जिला-आगर, तहसील-बड़ोद, ग्राम-आम्बादेव में कृषक समृद्धि योजना के तहत श्री रघुनाथ सिंह आर्य के निजी भूमि में स्थापित प्रदर्शन प्लाट के पौधों का अवलोकन एवं मापन

2. Title of the Project: मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा का आँकलन।

Why this Project:-

महुआ एवं अचार गुठली जहाँ म.प्र. के ग्रामीण अंचलों विशेषकर गरीब, पिछड़े, अनुसूचित जाति एवं अनुसूचित जन जाति के आजीविका में महत्वपूर्ण स्थान रखते हैं, वहीं यह वन उत्पाद व्यापार जगत में भी आर्थिक बल प्रदान करते हैं। वर्तमान में महत्वपूर्ण लघु वनोपज महुआ फूल एवं अचार गुठली के संग्रहण एवं व्यापार की औपचारिक जिलेवार जानकारी उपलब्ध नहीं है। महुआ फूल की भांति अचार गुठली का संग्रहण एवं व्यापार भी निजी क्षेत्रों में स्वतंत्र रूप से किया जाता है। इस कारण मध्यप्रदेश के विभिन्न जिलों में कितना उत्पादन/संग्रहण होता है, इसके वैज्ञानिक आधार पर विश्वसनीय आँकड़े उपलब्ध नहीं हैं।

महुआ एवं चिरौंजी के सम्बन्ध में द्वितीयक आँकड़ों एवं अध्ययनों से प्राप्त परस्पर विरोधाभासी निष्कर्षों के आधार पर सही आँकलन लगा पाना संभव नहीं है। इसके साथ ही अधिकांश अध्ययन जंगल की भूमि में पाये जाने वाले वृक्षों पर आधारित है, राजस्व भूमि के वृक्षों से प्राप्त उत्पादन/संग्रहण संबंधी विश्वसनीय आँकड़े उपलब्ध नहीं हैं, जिनके आधार पर म.प्र. में महुआ फूल एवं अचार गुठली की कुल उत्पादन/संग्रहण मात्रा का आँकलन किया जा सके।

इस परियोजना में सम्पूर्ण वन एवं राजस्व क्षेत्रों से इनके व्यवस्थित वैज्ञानिक विधि से उत्पादन/संग्रहण का आँकलन किया जाना प्रस्तावित है। इस अध्ययन से प्राप्त निष्कर्षों के आधार पर म.प्र. वन विभाग को इनकी दर एवं संग्रहण नीति के निर्धारण में मदद मिलेगी। महुआ एवं अचार गुठली के कच्चे माल की उपलब्धता के आधार पर नयी इकाइयों की स्थापना, भण्डारण व्यवस्था, विपणन प्रक्रिया साथ ही रोजगार का एक स्रोत तैयार कर लाभ का व्यापार बनाया जा सकेगा।

Research Methodology:-

- द्वितीयक आँकड़ों, साहित्य के द्वारा महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण क्षेत्रों की स्थिति, महत्वपूर्ण आँकड़े एकत्र करना।
- मध्यप्रदेश राज्य लघु वनोपज सहकारी संघ, भोपाल एवं वनमंडल कार्यालय, स्थानीय फुटकर एवं थोक बाजार के व्यापारियों से महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा की जानकारी एकत्र करना।
- मध्यप्रदेश के 52 जिलों में महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण वाले जिलों की खोज करप्रत्येक तहसील के दो गांवों का वैज्ञानिक विधि से सामाजिक-आर्थिक सर्वेक्षण के लिए चयन, सर्वेक्षण की तैयारी, अनुसूची (प्राथमिक संग्राहक एवं व्यापारी के लिए) का निर्माण।
- परियोजना स्टॉफ का चयन एवं सर्वेक्षण कार्य के लिए उन्हें प्रशिक्षण प्रदान करना।
- प्रत्येक गाँव के 5 प्रतिशत संग्राहक परिवारों का सामाजिक-आर्थिक सर्वेक्षण द्वारा साक्षात्कार लेकर संरचित अनुसूची के माध्यम से आँकड़े एकत्र किये जायेंगे।
- जिलेवार महुआ फूल एवं अचार गुठली का व्यापार करने वाले स्थानीय थोक एवं फुटकर व्यापारियों का साक्षात्कार लेकर आँकड़े एकत्र किया जाएगा।
- आँकड़ों के विश्लेषण द्वारा महुआ फूल संग्रहण की मात्रा में कमी और वृद्धि के कारणों को ज्ञात किया जाएगा।
- वरिष्ठ अधिकारियों एवं विषय विशेषज्ञों से चर्चा एवं उनके द्वारा प्राप्त महत्वपूर्ण सुझावों के आधार पर आवश्यकतानुसार महुआ फूल एवं अचार गुठली के संग्रहण उपरांत मूल्य, गुणवत्ता, भण्डारण एवं मूल्य संवर्द्धन के संबंध में आवश्यक वैज्ञानिक विधि एवं उपाय सुझाए जायेंगे।

Study Design:-

- अध्ययन क्षेत्र का चयन।
- संग्रहण क्षेत्र वाले गाँवों के 10 प्रतिशत संग्राहकों का साक्षात्कार।
- सामाजिक-आर्थिक सर्वेक्षण द्वारा अनुसूची अनुसार संग्राहकों से आँकड़ों का संकलन।
- संग्राहकों की निजी भूमि में महुआ एवं अचार गुठली के पेड़ों का मापन।
- आँकड़ों को कम्प्यूटर में फीडकर उनका वर्गीकरण, श्रेणीकरण एवं विश्लेषण।
- जिले के फुटकर एवं थोक व्यापारियों से साक्षात्कार लेकर जानकारी का संग्रहण।

Objectives of Research:-

- मध्यप्रदेश प्रदेश में जिलेवार महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा का आँकलन।

- महुआ फूल एवं अचार गुठली के उत्पादन एवं संग्रहण में आने वाली समस्याओं का अध्ययन तथा उनके निदान के उपाय सुझाना।

Activities Undertaken:-

- परियोजना स्टाफ का चयन, अध्येतावृत्ति, पारिश्रमिक, वाहन किराया, पी.ओ.एल., कार्यालयीन एवं आकस्मिक निधि का उपयोग।
- प्राथमिक सर्वेक्षण एवं सामाजिक आर्थिक सर्वेक्षण हेतु जिलों का दौरा।
- संग्राहकों से संबंधित अनुसूची तैयार करना।
- व्यापारियों से संबंधित अनुसूची तैयार करना।
- चयनित गाँव के संग्राहकों का साक्षात्कार।
- सर्वेक्षण कार्य में सहयोग के लिए श्रमिकों का सहयोग एवं उनके पारिश्रमिक का भुगतान।

Cost of Project:- Rs.64.63 Lakhs

Expected Outcome Research:-

- आँकड़ों के संकलन के दौरान ग्रामीणों की उत्सुकतानुसार महुआ एवं अचार गुठली के महत्व से परिचित कराने का कार्य किया गया, जिसके कारण लोगों में वृक्षारोपण और उनके संरक्षण की उत्सुकता देखी गयी।
- जिलेवार महुआ एवं अचार गुठली की कुल उत्पादन/संग्रहण मात्रा का आँकलन।
- महुआ एवं अचार गुठली के उच्च, मध्यम एवं निम्न उत्पादन क्षेत्रों की पहचान।
- महुआ एवं अचार गुठली के उत्पादन/संग्रहण, प्रसंस्करण, मूल्य संवर्धन आदि में आने वाली समस्याओं की पहचान एवं निदान के उपाय।
- महुआ एवं अचार गुठली की उत्पादन/संग्रहण मात्रा ज्ञात होने से माँग-पूर्ति के अनुसार कीमत निर्धारण द्वारा ग्रामीण आदिवासियों के हितों का संरक्षण संभव।
- वास्तविक उत्पादन/संग्रहण मात्रा के आँकलन द्वारा संबंधित उद्योग में निवेश की संभावना।
- महुआ एवं अचार गुठली की उत्पादन/संग्रहण मात्रा को बढ़ाने के लिए प्रभावी कदम उठाना आसान होगा।
- महुआ एवं अचार गुठली की संग्रहण मात्रा का आँकलन प्राप्त होने से शासन को इससे संबंधित नीति निर्धारण में सहायता मिलेगी।



जिला-होशंगाबाद, तहसील-वनखेड़ी,
ग्राम-झिरिया में महुआ/अचार गुठली संग्राहकों
से चर्चा एवं साक्षात्कार



जिला-होशंगाबाद, तहसील-वनखेड़ी,
ग्राम-झिरिया में महुआ वृक्ष का मापन कार्य



जिला-होशंगाबाद, तहसील-वनखेडी, ग्राम-झिरिया में स्थानीय फुटकर व्यापारी से महुआ के कय विक्रय की जानकारी एकत्र करते हुए



जिला-बालाघाट, तहसील-किरनापुर, ग्राम-कण्डराकला में महुआ संग्राहक परिवारों से साक्षात्कार एवं चर्चा



जिला-बालाघाट, ग्राम-गांगुलपारा में महुआ संग्राहक परिवारों से साक्षात्कार एवं चर्चा



जिला-रीवा, तहसील-गुढ, ग्राम-पोखरा इटारपहाड़ में महुआ संग्राहकों का सर्वेक्षण कार्य

3. Title of the Project:- देवास जिले में लोकवानिकी प्रबन्ध योजना क्रियान्वयन का अनुश्रवण एवं मूल्यांकन।

Why this Project:-

म.प्र. शासन ने निजी भूमि स्वामियों तथा सामुदायिक भूमि पर खड़े वनों का वैज्ञानिक प्रबंधन प्रारंभ करने व क्षेत्र में वनोपज एवं औषधियों का रोपण कर कृषकों को समृद्ध बनाने की दृष्टि से एक योजना को प्रारंभ किया, जिसे "लोक वानिकी" के नाम से जाना गया।

ज्ञात हुआ कि अधिकांश कृषक जिन्होंने लोक वानिकी प्रबंध योजना के तहत अपने निजी भूमि के वनों को सम्मिलित किया था, उन्होंने कुछ वर्षों बाद भू-राजस्व संहिता की धारा 240-241 के अंतर्गत अपने वनों को स्थापित कर लिया है। इस परियोजना के माध्यम से लोक वानिकी प्रबंध योजना एवं भू-राजस्व संहिता की धारा 240-241 के तुलनात्मक अध्ययन द्वारा ज्ञात करने का प्रयास किया जाएगा कि कौन सी योजना कृषकों, वन एवं पर्यावरण के लिए सर्वाधिक सुविधाजनक एवं लाभकारी है तथा लागू की गयी योजना पर सतही अमल हुआ है या नहीं, हानि-लाभ, कमियां एवं सुझाव द्वारा उपयुक्त प्रतिवेदन प्रस्तुत किया जाएगा।

Research Methodology:-

- देवास जिले से लोक वानिकी प्रबंध योजना एवं मध्यप्रदेश भू-राजस्व संहिता की धारा 240-241 से संबंधित द्वितीयक आँकड़ों का संग्रहण एवं अध्ययन।
- चयनित कृषकों के पक्ष में समय-समय पर जारी आदेशों का संकलन एवं स्थलीय परीक्षण में उपयोग।
- लोक वानिकी प्रबंध योजना के अंतर्गत अध्ययन के लिए हितग्राहियों का चयन।

- अध्ययन के लिए लघु, मध्यम एवं बड़े भू-खण्ड धारी हितग्राहियों का चयन।
- भू-राजस्व संहिता की धारा 240-241 के प्रबन्ध योजना के अंतर्गत अध्ययन के लिए हितग्राहियों का चयन।
- लोक वानिकी प्रबंध योजना एवं भू-राजस्व संहिता की धारा 240-241 के प्रबन्ध योजना की शर्तों का क्रियान्वयन संबंधी अध्ययन, कृषक के योजना क्षेत्र का अवलोकन, चर्चा एवं फोटोग्राफ तथा संरचित अनुसूची द्वारा आँकड़ों का संकलन।
- प्रबंध योजना में किसान संघ की भूमिका का अध्ययन के लिए संघ के सदस्यों का साक्षात्कार।
- प्रबन्ध योजना एवं धारा 240-241 के अंतर्गत पालन में कमियाँ, समस्याएं एवं सुझाव से आँकड़ों का संकलन।
- स्थलीय कृषकों के क्षेत्र से एकत्रित आँकड़ों के प्रथम दृष्टया परिणामों एवं तकनीकी बिन्दुओं पर वन विभाग के वरिष्ठ अधिकारियों से चर्चा कर अनौपचारिक अभिमत प्राप्त करना, जिन्हें आवश्यकतानुसार प्रतिवेदन में सम्मिलित किया जाएगा।
- एकत्र किए गये आँकड़ों का विश्लेषण कर अंतिम प्रतिवेदन प्रस्तुत किया जाएगा।

Study Design:-

- अध्ययन क्षेत्र का चयन।
- प्रारंभिक सर्वेक्षण द्वारा योजना में सम्मिलित देवास जिले में (04 तहसीलों से) कुल ग्रामों एवं कृषकों में से सामाजिक-आर्थिक सर्वेक्षण के लिए 10 प्रतिशत सेम्पल का वैज्ञानिक पद्धति से चयन।
- सामाजिक-आर्थिक सर्वेक्षण द्वारा अनुसूची में कृषकों से आँकड़ों का संकलन।
- आँकड़ों को कम्प्यूटर में फीडकर उनका वर्गीकरण, श्रेणीकरण एवं विश्लेषण।
- लोक वानिकी प्रबंध योजना एवं भू-राजस्व संहिता की धारा 240-241 के प्रबन्ध योजना की शर्तों का क्रियान्वयन संबंधी अध्ययन, कृषक के योजना क्षेत्र का अवलोकन, चर्चा एवं फोटोग्राफ तथा संरचित अनुसूची द्वारा आँकड़ों का संकलन।
- योजनान्तर्गत सम्मिलित हितग्राही कृषकों के प्राकृतिक वनों में 40x40 फीट का सेम्पल प्लॉट डालकर पौधों का मापन, पुनरुत्पादन, औषधीय प्रजातियों आदि से संबंधित आँकड़े एकत्र करना।
- योजना क्षेत्र से निवर्तन किए गये पौधों के प्रतिस्थापन स्वरूप रोपे गये पौधों की वर्तमान स्थिति एवं ग्रोथ का अध्ययन।

Objective of Research:-

- लोक वानिकी प्रबंध योजना एवं भू-राजस्व संहिता की धारा 240-241 के क्रियान्वयन का अनुश्रवण एवं मूल्यांकन।

Activities Undertaken:-

- परियोजना स्टाफ का चयन, अध्येतावृत्ति, पारिश्रमिक, वाहन किराया, पीओएल, कार्यालयीन एवं आकस्मिक निधि का उपयोग।
- देवास जिले की 04 तहसीलों में प्राथमिक सर्वेक्षण के लिए देवास जिले का दौरा।
- प्राथमिक सर्वेक्षण के द्वारा सामाजिक आर्थिक सर्वेक्षण के लिए हितग्राही कृषकों का चयन।
- लोक वानिकी प्रबंध योजना में सम्मिलित हितग्राही कृषकों से संबंधित जानकारी का संकलन।
- धारा 240-241 के अंतर्गत सम्मिलित हितग्राही कृषकों से संबंधित अनुसूची।
- कृषक संघ की भूमिका के लिए अध्यक्ष एवं सदस्यों का साक्षात्कार।

- अध्ययन एवं मापन कार्य में सहयोग के लिए श्रमिकों का सहयोग एवं उनके पारिश्रमिक का भुगतान ।

Cost of the Project:- Rs. 10.60 Lakhs

Expected Outcome of Research:-

- लोक वानिकी प्रबंध योजना एवं भू-राजस्व संहिता की धारा 240-241 के क्रियान्वयन एवं पालन में आने वाली बाधाओं की जानकारी हो जाने पर उनको सरलीकृत करना आसान होगा ।
- योजना के सरलीकरण स्वरूप का आवलोकन एवं अध्ययन कर कृषकों को मनचाही योजना के अंतर्गत अपने वनों का वैज्ञानिक प्रबन्धन करना सरल हो जायेगा ।
- लोक वानिकी प्रबंध योजना एवं भू-राजस्व संहिता की धारा 240-241 के तुलनात्मक अध्ययन द्वारा प्राप्त कमियों को दूर कर अन्य जिलों के लिए लागू करना आसान होगा ।



जिला-देवास, तहसील-कन्नौद, ग्राम-बुरुटः
कृषक श्री शैलेश पिता प्रेमनारायण जी का लोकवानिकी प्रबंध योजना के अंतर्गत साक्षात्कार ।



जिला-देवास, तहसील-कन्नौद, ग्राम-भिलाईः
कृषक श्री रामभरोसे जी के प्राकृतिक वन में सागौन के वृक्ष का मापन कार्य करते हुए



जिला-देवास, तहसील-कन्नौद, ग्राम-ननासा के कृषक श्री लखन सिंह जी की भूमि में 40X40 का सेम्पल प्लॉट डालकर वृक्षों का मापन कार्य करते हुए ।

2.5 NAME OF THE DIVISION : SOCIAL ECONOMICS, MARKETING AND MENSURATION

2.5.1 NAME OF THE BRANCH : SOCIAL ECONOMICS AND MARKETING

Mandate

1. Forests and human well being: dependence for livelihood.
2. Valuation of ecosystem services, climate change and carbon markets.
3. Demand, supply and marketing of forest products and MIS.
4. Standardizing protocols for harvesting, primary processing and value addition of NTFPs.
5. Forest history.

Completed Project: - 01

1. Sequestered carbon in roadside plantations and parks and gardens: of potential contribution in climate mitigation in Jabalpur Smart City and Katni district.

Funding Agency: EPCO, Bhopal, M.P.

Ongoing Project:- 01

1. Network project on conservation of lac insect genetic resources. Funding agency - ICAR network project through Indian Institute of Natural Resin and Gums, Ranchi.

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

Newly Initiated Project:- 01

1. Strengthening of Market Analysis centre for technical support in Marketing of Minor Forest Produce in Madhya Pradesh.

Funding Agency: MP State Minor Forest Produce (Trade & Dev.) Cooperative Federation, Bhopal

Project Summary

Completed Project

1. Title of the Project:- Sequestered carbon in roadside plantations: an assessment of potential contribution in climate mitigation in Jabalpur Smart City and Katni district.

Why this Project:-

This study suggests suitable strategies that can be helpful in reducing climate change impacts by mitigation techniques. The challenges of climate change can be efficiently overcome by the storage of carbon in terrestrial carbon sinks viz. plants, plant products and soils for longer periods. Adoption of carbon sequestration measures can considerably reduce the rise in atmospheric CO₂ level.

A project was taken up to highlight the potential of roadside trees and parks and gardens in climate change mitigation. The main objectives of the study were to find the total carbon sequestration in roadside plantations, parks and gardens, identification of suitable trees for roadside plantations and parks and gardens, find rates of variations of carbon sequestration with species and age and finally assessment of potential contribution of roadside plantations in climate change mitigation.

The study areas i.e. Jabalpur and Katni were selected to implement climate change mitigation strategies in perspective of Jabalpur being a smart city and Katni, which has industrial effluents.

Research Methodology: –

The methodology for assessment of total carbon sequestration by trees in parks and gardens in Jabalpur and Katni district was based on the following steps:-

1. Collection of secondary data on parks and gardens: Proforma used to obtain secondary information of parks.
2. **Selection of parks and garden** : Classification of parks and gardens in Jabalpur and Katni.

S.N.	Classification	Size/ Area in ha.	Sampling
1.	Large parks/gardens	05 to 09	100%
2.	Medium parks/gardens	02 to 04	50%
3.	Small parks/gardens	01 and less	25%

3. Selection of trees in parks and gardens
4. Stratification of trees on the basis of species and age
5. Sample design for large (05 ha and above) parks: A non-destructive sampling approach was adopted to estimate the above ground tree biomass in different trees. An attempt was made to select sample plots in all large gardens having size of more than 05 ha and more and in all density classes. Nested two stage sampling approach was adopted to sample trees. A super plot of 250m x 250m size, was laid in each of the several sites. Four sample plots, each of 31.62m x 31.62m (0.1 ha) size, were laid within each super plot. During the survey, it was found that there are 43 roadside plantations found mainly in city and colony roads of Jabalpur Smart City.

Study design:-

1. Selection of sample plants for measurement
2. Growth parameters measurements
3. Calculation of stem volume
4. Calculation of stem biomass
5. Calculation of sequestered carbon in different plant parts (above and below ground), leaf litter and soil.
6. Estimation of the total carbon sequestered
7. Estimation of total carbon sequestered in all the road side plantations in the districts.
8. Estimation of the total carbon sequestration potential

Objectives of Research:-

1. To estimate carbon sequestration by different species in roadside plantations and parks and gardens of in Jabalpur and Katni.
2. To study variations in rates of carbon sequestration with species and age.
3. To identify suitable tree species for roadside plantations and parks and gardens.
4. To assess the potential contribution of roadside plantations in climate change mitigation.

Activities Undertaken:-

1. Collection of secondary data on parks and gardens
 2. Selection of parks and garden
 3. Selection of trees in parks and gardens
 4. Stratification of trees on the basis of species and age
 5. Growth parameters measurements
 6. Calculation of stem volume and stem biomass
 7. Calculation of sequestered carbon in different plant parts (above and below ground), leaf litter and soil.
 8. Estimation of the total carbon sequestered.
 9. Estimation of the total carbon sequestration potential.
- 43 roadside plantations found mainly in city and colony roads of Jabalpur Smart City. A total of 629.658 tons of carbon were estimated by 2,755 trees of 19 different age groups. These 2,755 trees belonged to 58 different species.
 - In Katni 32 roadside plantations were found mainly in city and colony roads. A total of 590.391 tons of carbon have been estimated of 2,498 trees of 15 different age groups. These 2,498 trees belonged to 46 different tree species.

- Most common tree species on basis of number of occurrences found on the roadsides in Jabalpur and Katni are Gulmohar (*Delonix regia*), Peltophorum (*Peltophorum pterocarpum*), Kassod (*Cassia siamea*), Karanj (*Millettia pinnata*), Ashok (*Polyalthia longifolia*), Amaltas (*Cassia fistula*), Nandi Flame (*Spathodea campanulata*), Neem (*Azadirachta indica*) and Nilgiri (*Eucalyptus tereticornis*).
- In Jabalpur, there are 200 parks and gardens out of which 43 parks and gardens of large, medium and small size were sampled. In sampled parks and gardens, a total of 584.834 tons of carbon was estimated by 3,815 different trees. On basis of sample selection a total of 1346.870 tons of carbon may be recorded by trees in parks and gardens of Jabalpur after averaging carbon content per park and garden.
- In Katni, there are 62 parks and gardens out of which 27 parks and gardens of large, medium and small size were sampled. In sampled parks and gardens a total of 339.95 tons of carbon was sequestered by 1,538 different trees. On basis of sample selection, a total of 584.83 tons of carbon may be recorded by trees in parks and gardens of Katni after averaging carbon content per park and garden.
- Most common tree 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*), Saptarni (*Alstonia scholaris*), Kaner (*Cascabela thevetia*), Gulmohar (*Delonix regia*) and Peltophorum (*Peltophorum pterocarpum*).

Cost of the Project:-16.0 Lakhs

Outcome of Research:-

Five criteria were identified for selection of species viz., aesthetic, environmental, utility, hardiness and air pollution for opting out suitable tree species for roadsides and parks and gardens. It was found that there are 12 species which have all qualities of above selected criteria. These species are fast growing, evergreen and also have good tolerance in extreme climate events and may play an important role in reducing air pollution level. The species of all values are as follows 1) Bargad (*Ficus benghalensis*), 2) Gulmohar (*Delonix regia*), 3) Karanj (*Millettia pinnata*), 4) Kassod (*Cassia siamea*), 5) Mahaneem (*Ailanthus excelsa*), 6) Neem (*Azadirachta indica*), 7) Omar (*Ficus racemosa*), 8) Pipal (*Ficus religiosa*), 9) Peltophorum (*Peltophorum pterocarpum*), 10) Safed Siris (*Albizzia procera*), 11) Shisham (*Dalbergia sissoo*) and 12) Siris (*Albizzia lebbbeck*). Species like Shisham, Siris and Gulmohar have also been reported as having showing good air pollution tolerant index by earlier studies. Apart from these species, other species like Saptarni (*Alstonia scholaris*), Kadamb (*Neolamarckia cadamba*), Bottle palm (*Hyophorbe laginicaulis*), Tecoma (*Tecoma stans*) and Ashok (*Polyalthia longifolia*) may also be preferred on basis of requirements of the plantations. These are well suited on roads, parks and gardens.



Verification of field data in Katni and Jabalpur

On-going project

1. Title of the Project:- Network Project on Conservation of Lac Insect Genetic Resources.

Why this Project:-

The project was started to identify and documentation the occurrence of lac insect and their host plant in different districts of Madhya Pradesh, Maharashtra, Goa and Dama & Diu, *in-situ* and *ex-situ* conservation of the biodiversity of local lac insect species/races and breed which is declining

due to anthropogenic activities and climate change. In this project training workshops are being organized in lac growing and non lac areas to create awareness and generate additional sources of income of forest dependant people, farmers and Van samiti members through lac cultivation.

Research Methodology:-

- Collect and conserve lac-insect under *ex-situ* condition
- Carry out on-farm trials on lac cultivation technologies
- Training of adopted/selected farmers in collaboration with IINRG for *in-situ* conservation
- Conduct need based and location specific studies on lac-insects and/ or host plants-
 - a. Study of lac associated fauna
 - b. Study of lac host plant diversity
 - c. Study of socio economic status of lac growers

Study Design:-

1. **Collect and conserve lac-insect under *ex-situ* conditions-** Screening and performance of collected lac samples in gene bank on selected parameter viz., initial density of settlement, initial mortality, density after 30 days of settlement, male and female sex ration, male cell length, final density of female cell at crop maturity, fecundity and resin output etc.
2. **Carry out on-farm trials on lac cultivation technologies-** Lac cultivation techniques like site selection of suitable sites, pruning of host plants, inoculation of Broodlac samples, pest management and harvesting of mature lac demonstration to selected framers and providing broodlac bundles for inoculation on pruned tree and estimation of production of each plants.
3. **Training of adopted/selected farmers in collaboration with IINRG for *in-situ* conservation-** Lac cultivation training workshop by scientific methods made by Power point/ poster presentation and field demonstration of lac cultivation technologies.
4. **Conduct need based and location specific studies on lac-insects and/ or host plants**
 - a. **Study of lac associated fauna-** One meter stick of lac samples was collected from host trees and kept inside the 60 mesh nylon net bags. The mouth of net bags was tied and kept under room temperature for proper aeration. Fauna that emerged were collected and separated based on their identification under the microscope based on morphological characters of lac associated fauna.
 - b. **Study of lac host plant diversity-**Coordinates of the quadrates (30 x 30 m) were recorded with the help of G.P.S. All the plants of lac host species of height >1.5m and girth at breast height (GBH) > 10 cm standing in the quadrates were enumerated and their GBH were measured with the help of a measuring tape. Tree height measurements were taken with the help of an altimeter. Observation of GBH and height for individual trees were recorded, along with the names of the lac-host species in prescribed datasheet for observe on growth and phyto- sociological parameters viz. host plant density, Frequency, Basal area, Relative frequency, Relative density Relative dominance and Importance Value Index.
 - c. **Study of socio economic status of lac growers-**Tabular analysis will be calculated by different parameters of socio economic condition, viz, age group, family size, educational status, land holding capacity, host plant holding, production potential of lac , share in annual income, marketing behavior of lac growers following Pal *et al* 2014

Objectives of Research:-

1. Conduct survey of the area for lac insects and host plants
2. Collect and conserve lac-insect under *ex-situ* condition
3. Carry out on-farm trials on lac cultivation technologies
4. Training of adopted/selected farmers in collaboration with IINRG for *in-situ* conservation
5. Conduct need based and location specific studies on lac-insects and/ or host plants

Activities Undertaken:-

- Collection and multiplication of collected local lac insect population host plant species in *ex-situ* condition
- Study of productivity linked parameters of collected lac insect biodiversity.

- On farm trials and demonstration of lac insect cultivation technologies in different districts of Madhya Pradesh
- Lac cultivation trails made on *Zizyphus mauritiana* to new productivity potentials of kusmi and rangeeni strain
- Promote lac cultivation with Kusum tree as major host plants in different districts of Madhya Pradesh
- Identification of sites and organized training programme for *in-situ* conservation of lac insect/host plants
- Creation of self help groups, producer groups of lac cultivation in highly lac production areas of Madhya Pradesh
- Studies of socio economic status of lac growers of Madhya Pradesh and Maharashtra
- Studies for identification of lac associated fauna on different host plants in cultivated/Non cultivated areas of Madhya Pradesh
- Assessment of lac host plant diversity in different districts of Madhya Pradesh
- Identification of problem of marketing between lac producers and lac traders
- Report writing and publication of research findings.

Cost of the Project:-13.5 Lakhs

Expected Outcome of Research:-

Ex-situ conservation of lac insect genetic Resources in field gene bank, Screening and performance of lac insect of Madhya Pradesh, Generation of additional source of income for farmers and *in-situ* conservation of lac insect, Potentiality of lac production on *Zizyphus mauritiana* trees, Increasing number of farmers to take Kusmi lac cultivation and creating awareness, Public awareness about *in-situ* conservation of lac insect, Promotion of lac cultivation by organized group, Socio-economic profile of lac growers, production status, host plant utilization etc. Identify diversity of lac associated fauna for increasing production of lac, Identify diversity of lac host plant for lac cultivation in selected, Identify marketing problems of lac from selected districts, Quarterly report submission of 1,2,3 Quarters, Submission of annual progress report to funding agency and Publication of three research paper/articles in peer reviewed journals.

Occurrence of lac host plant in 47 districts of Madhya Pradesh and 27 districts of Maharashtra obtained from field survey Broodlac samples of all districts of MP and Maharashtra shall be preserved in gene bank of SFRI. This broodlac will be distributed to farmers to promote the cultivation of lac on Kusum and Ber trees.

Conservation of different lac-insect populations. A cadre of master trainers shall be generated for promoting, knowledge sharing and capacity building of the adopted/ selected farmers of lac cultivation.



Pruning demonstration in Village Malepar, Bhandara



Pruning demonstration in Village Malepar, Bhandara



Making bundles of broodlac and inoculation in Bodli village, Umaria district



Distribution of broodlac and inoculation in village Mediyaras, Anuppur

Newly Initiated Project

1. Title of the Project:- **Strengthening of Market Analysis centre for technical support in Marketing of Minor Forest Produce in Madhya Pradesh.**

Why this Project:-

Madhya Pradesh is endowed with wide diversity of MFP. The collection of these MFP is an important source of self sustenance and of income. Earlier due to absence of any systematic marketing network in Central India, trade was unknown in both demand and price structure. There was lack of information on prices of MFP at different market levels. Collection of MFP does not give commensurate returns to tribals many times though several hours are put into collection, the earnings are much below minimum wages. They get low returns and are dependent on trader at the first point of sale. The market channel for MFP is long with a number of intermediaries. There is lack of awareness about the product and its market value. A state level market information project for non wood forest products was undertaken 2001 and a MIS Cell established at SFRI for market data collection, analysis and dissemination. The project has been on-going for past 16 years and useful data has been generated. In 2011, the MIS Cell was strengthened further with establishment of 5 Market Analysis Centres located in different agro climatic zones of the State viz., Chhindwara (Satpuda agro climatic zone), Bhopal (Vindyan Plateau), Katni (Kymore Plateau) Indore (Malwa Plateau) and Shivpuri (Gird Region). In the present proposal it has been proposed to make Van Dhan Vyapar quarterly News letter more informative by increasing and improving its content including information on Vindhyan herbal products.

Research Methodology:-

Survey of NTFPs traders of 5 Market Analysis Centres located in different agro climatic zones of the State viz., Chhindwara (Satpuda agro climatic zone), Bhopal (Vindyan Plateau), Katni (Kymore Plateau) Indore (Malwa Plateau) and Shivpuri (Gird Region). Collect market price and purchase price data, from district level to National Market, New Delhi for publication of Van Dhan Vyapar News letter and monitoring of MSP.

Study Design:-

- Collect, analyze and report periodic market information for Van Dhan Vyapar.
- Survey in selected village markets in each zone for study of effect of MSP.
- Assist in compilation of information on availability of processed material.
- Survey for collection of selected NTFPs in M.P.

Objectives of Research:-

- To strengthen the current MIS to assist in collection of market information on prices and products in local, regional & national markets.
- To monitor MSP for selected MFPs in the state and suggest improvements to ensure good returns and increase efficiency in marketing.

- To undertake study for collection of selected NTFPs.

Activities Undertaken:-

- Compilation of market information and publication of Van Dhan Vyapar.
- Compilation of information on location of village markets, market days, MFP traded, etc.
- Electronic linking with M.P. MFP Federation, TRIFED, etc.
- Collection of data with regard to prices- procurement price at first point level in different village markets /Haats.
- Quarterly market survey in all markets for publication of Van Dhan Vyapar News letter.

Cost of the Project:- 10.0 lakhs

Expected Outcome of Research:-

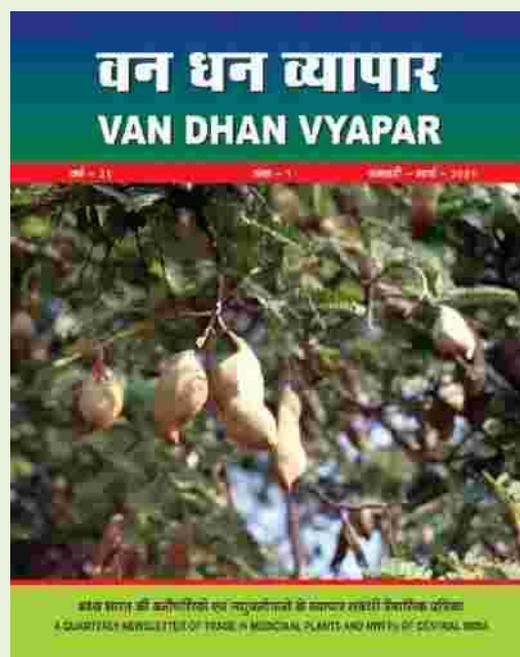
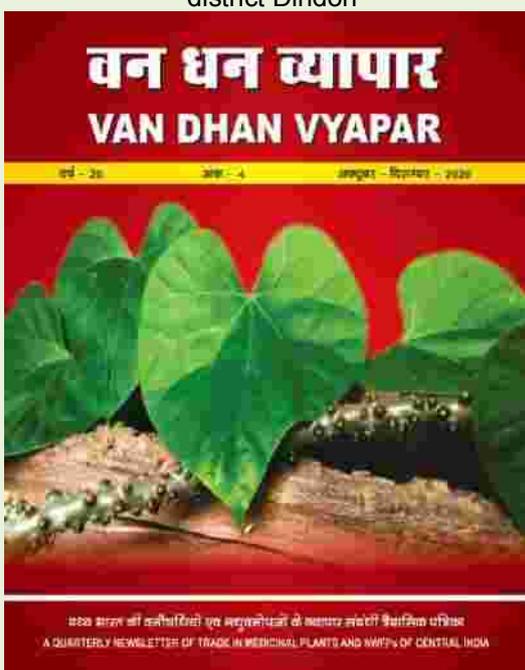
- Survey of 145 NTFPs traders and Publication of Van Dhan Vyapar Vol. 21 (2, and 4) and Vol. 22 (1) shall be done.
- The collected and compiled data of selected NTFPs, Traders, important NTFPs Markets, market prices of MFPs, collection areas, important village markets of NTFPs, market days shall be very much useful for M.F.P. Federation, Bhopal. This information can be used by all MFP Cooperative Societies, Samities, progressive farmers, Vaidyas, all CCFs, DFOs for their use.



Survey of NTFPs traders in Village Manikpur, district Dindori



Survey of NTFPs traders in Shivpuri



2.5.2 NAME OF THE BRANCH : FOREST MENSURATION

Mandate

1. Measurements of growth for computing volume and monitoring the development of crop stands, of different species, in different quality classes and climatic zones of the state.
2. Designing of experiment and analysis of data for all branches of the Institute.
3. Compilation of Forest statistics
4. Establishment and maintenance of samples plots and Tree Increment Plots (TIP) for conducting growth studies and computing volume increment of different species in various forest types.

Ongoing Projects: - Two

- 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
- 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

Regular Activity

1. Periodic measurement of 13 sample plots due for measurement in the year 2021-2022.

Ongoing Projects:

- 1. Title of the Project:- 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.**

Why this Project:-

Age of rotation or the age of final felling in a plantation is normally determined in accordance with the objectives of management. In a commercial organization like MPRVVN, the plantations should be harvested at an age when they can fetch the most profitable returns on the costs incurred in raising and maintaining them.

Research Methodology:-

- i. List of rainfed teak plantations was procured from the office of the D.M. concerned.
- ii. The plantations were grouped into suitable age classes.
- iii. In each age class and for each site quality, representative plantations was randomly selected for detailed study.
- iv. Sample plots of area 0.1 ha square in shape was laid out in these plantations to measure G.B.H. and height of standing trees.
- v. Yield in terms of timber and small wood was assessed using the available volume tables, yield tables/outturn tables or from the data available in felling registers of the concerned thinning coupes.
- vi. Selling rates currently prevalent in the sale depot of MPRVVN were used to calculate the economic returns in different years.
- vii. Yearwise costs incurred was calculated for different activities prescribed in the management plan and schedule of rates applicable in the project division.
- viii. All the costs and returns were discounted as the present value at the prevailing rate of bank interest using the standard formula.
- ix. B:C ratio were calculated using standard formulae.

Study Design:-

- Thinning data collected – 105 compartments
- Expenditure incurred in plantation data collected – 69 compartments
- Temporary plots laid out – 30

For Seoni, Behrai, Pandiya Chhapara and Keolari ranges.

Objectives of Research:-

- 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.

Activities Undertaken:-

Correspondence with North Seoni, South Seoni and Seoni Production divisions for providing thinning data.

Cost of the Project : 6.00 Lakhs

Expected Outcome of Research:-

- i. Calculation of 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.
- ii. Determination of 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.
- iii. To fetch the most profitable returns on the costs incurred in raising and maintaining the plantations in a commercial organization like MPRVVN.
- iv. Reduced or increased age of final felling of plantations



Measurement in Behrai and Pandiya Chhapara ranges of Barghat Project Division

2. Title of the Project:- Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh.

Why this Project:-

To compile all the crop parameters and volume of the felled trees to create an initial database for forecasting.

Research Methodology:-

- Collection of growth data of sample plots.
- Grouping into different site qualities, forest types and specieswise.
- Estimation of future productivity.
- Final compilation and report preparation.

Study Design:-

Compilation of all the crop parameters and volume of the felled trees from all sample plot files.

Objectives of Research:-

1. To study the yield for different site qualities, forest types and specieswise.
2. To create an initial database for forecasting, reference.

Activities Undertaken:-

One project staff appointed and stationary procured

Cost of the Project:- Rs. 1.00 lakh was invested in salary and stationary

Expected Outcome of Research:-

- Compilation of all the crop parameters and volume of the felled trees to create an initial database for forecasting.
- Estimation of monetary gains related with the growth of different species
- To compile all the crop parameters and volume of the felled trees to create an initial database for forecasting.

Regular Activity

1. Title of the Project:- Periodic measurement of 13 sample plots due for measurement in the year 2021-2022.

Why this Project:-

To compile all the growth data such as dia and height of trees to create an initial database for forecasting.

Research Methodology:-

- i. Collection of growth data of sample plots.
- ii. Calculation of crop parameters

Compilation of all the crop parameters from all sample plot files.

Objective of Research:-

- To study the yield for different site qualities, forest types and specieswise and to create an initial database for forecasting, reference.

Activities Undertaken:-

Analysis of data done.

Cost of the Project:- Rs. 1.24 lakh

Expected Outcome of Research:-

- Compilation of all the crop parameters.
- Estimation of monetary gains related with the growth of different species
- Creation of an initial database for forecasting.



Sample plot cleaning and numbering on trees in SP13 South Seoni Division

Other significant achievements:-

Statistical support given to other branches of the institute

1. Compilation of Forest Statistics data for Seed Production Areas (SPA) and Seed Orchards (SO) in Madhya Pradesh for forest department.

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 research 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 and action taken report.
- 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 stakeholders 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 2020-21 was compiled and prepared on quarterly basis from April 2020 to March 2021 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 2019-20 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 students

Trainee Forest Range Officers posted in various forest divisions of M.P., Uttarakhand Forest Training Academy Haldwani, Central Academy of Forest Education, Kurseong, Darjeeling, Trainee ACF's from Central Academy of State Forest Service, Coimbatore, Under Graduate Students from Manglayatan university Jabalpur, Trainee Forest Rangers & Forest Guards from Shivpuri, Seoni, Betul 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.

1. Organization of training programmes in Social Forestry Circles of M.P. Forest Department.

05 training programmes on technologies keyword through research regarding preparation of plants in root trainers, remedial measures and management of diseases of plants in nurseries was conducted in March, 2021 at Jabalpur, Indore, Bhopal, Sagar & Seoni approximately 250 field foresters and field staff of nurseries participated in the training programmes.



Training of field foresters and field staff of nurseries in Social Forestry Circles of M.P.

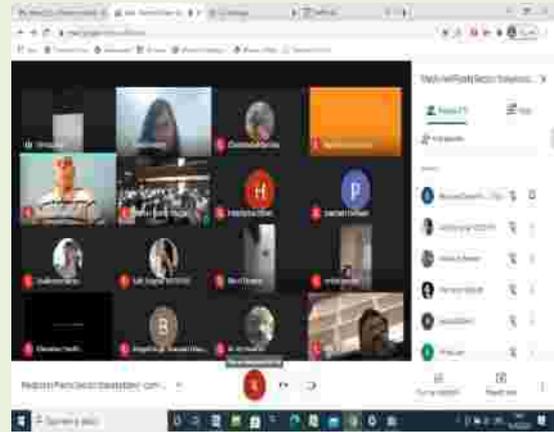
Training programmes were also conducted in Jan.-Feb., 2021 in Social Forestry and Territorial Circles in Sagar, Betul, Mandla, Balaghat for 50 field staff in which subjects pertaining to seed collection, seed technology, nursery techniques, selection of seed stands, seed production areas, its establishment and management and production of vermi-compost was included to enhance the knowledge and skill development.



Field demonstration for selection of seed production areas and vegetative propagation of quality planting material

2. Training of nursery techniques of medicinal plants - Regional Cum Facilitation Center – Central Region SFRI, Jabalpur organized a webinar of nursery techniques of medicinal plants in the month of May, 2021 for the farmers, students and field staff of forest department of C.G. & M.P. in which nursery techniques of 20 species was explained to the 220 participants of the webinar.

3. Organization of seminar on stakeholders of medicinal plants cum buyers sellers meet-
A Seminar on stakeholders of medicinal plants cum buyers sellers meet was organized by Regional Cum Facilitation Center – Central Region SFRI, Jabalpur on 16th March, 2021 in the auditorium of the institute which was participated by approximately 250 participants both physically as well as online.



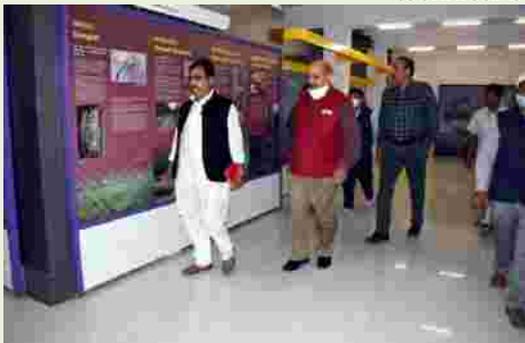
Online and physical participation in the seminar

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

Dr. Kunwar Vijay Shah, Hon'ble Forest Minister, Govt. of MP visited the institute on 30.07.2020 & 18.11.2021 to review the workshop of the Jabalpur forest circle and SFRI, Jabalpur. On this occasion a plantation programme was organized in the medicinal plant gene bank in the institute. Thereafter a visit to the museum of the institute was done by the visiting dignitary followed by a review meeting was conducted regarding the research activities of the institute and forest management activities of Central Circle, Jabalpur and release of technical bulletins by SFRI



Plantation by Honourable Forest Minister in the medicinal plant gene bank and release of technical bulletins by SFRI



Visit of Honourable Forest Minister to the museum of the institute and organization of view meeting

5. Training on "Extension of developed nursery techniques of some NTFPs and medicinal plants species through Social Forestry Circle of M.P Forest Department "

Training on "Extension of developed nursery techniques of some NTFPs and medicinal plants species was conducted in Social Forestry Circle of Indore, Jhabua, Ratlam and Sagar in Dec., 2020. The training was on cultivation techniques of rare and threatened species. About 200 participants comprising field foresters and officers participated in the training programmes



प्रशिक्षण कार्यक्रम में व्याख्यान Classroom session of the training programme

6. Organization of World Environment Day by SFRI, Jabalpur

The institute organized World Environment Day on 5th June, 2020. A plantation programme was organized in the medicinal plant gene bank in the institute which was participated by Director, Officers and staff of the institute. .



Plantation Programmes on World Environment Day at SFRI

Organization of Meetings

S. N.	Meeting	Organised by	Place	Date of organization	Participants
1.	Organization of 36 th meeting of the Board of Governors of the Institute.	Extension and Training Branch, SFRI, Jabalpur	Bhopal	17 th Aug.2020	Chairman and Members of the BOG
2.	Organization of 45 th Research Advisory Committee meeting of the institute.	Extension and Training Branch, SFRI, Jabalpur	Meeting Hall, SFRI- Jabalpur (Webinar)	04 th Nov. 2020	Chairman and Members of the RAC & Forest Officers, Scientists and SRO's of the Institute
3.	Medicinal Plant Sector Stakeholders-cum-Buyer/Seller Meet	RCFC, Central Region, Jabalpur	SFRI Jabalpur	16 th March, 2021	Farmers, buyers and sellers, Pharmaceuticals entrepreneurs, forest officers & students
4.	Beneficial Farming, Primary Processing and Marketing of Ashwagandha	RCFC, Central Region, Jabalpur	One day webinar	28 th Aug.,2020	Farmers, buyers and sellers
5.	Collection, cultivation and marketing of medicinal plants in Chhattisgarh	RCFC, Central Region, Jabalpur	One day webinar	14 th Oct., 2020	Farmers, buyers and sellers

Organization of Seminars/Symposiums/Workshops

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	Orientation programme on Wildlife population monitoring tools and technologies	SFRI-Jabalpur	Wildlife Branch	June, 2020,- March, 2021	Probationary Trainee Range Officers from Seoni, West Mandla, Jabalpur, Betul, Forest Division	-
2.	-do-	-do-	-do-	9 th March, 2021	48 Probationary Range Officers from Uttarakhand Forestry Training Academy, Haldwani	48
3.	Meeting on preparation of hand book / field manual of the SFRI.	SFRI Jabalpur		04 th Sept., 2020		
4.	45th RAC meeting and presentation of various ongoing and proposed projects of the division.	SFRI Jabalpur		04 th Nov., 2020		
5.	Meeting of the Society of Journal of Tropical Forestry as executive committee member.	SFRI Jabalpur		14 th Jan., 2021 and 04 th Feb., 2021		
6.	शाकाहारी वन्यप्राणियों की गणना एवं आंकलन	SFRI Jabalpur	Nauradehi Wildlife Sanctuary	10 th -12 th June, 2020 & 7 th -8 th Feb. 2021		
7.	मध्यप्रदेश के स्तनपायी (Mammals) प्रजातियों	SFRI Jabalpur	Kanha Tiger Reserve	14 th -19 th Sept. 2020		

Organization of trainings

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	Training on nursery techniques of some NTFPs and medicinal plant species.	Bio-diversity branch, SFRI, Jabalpur	Seoni, Betul, Indore, Khandwa, Bhopal, Jhabua, Rewa, Ujjain, Jabalpur, Sagar R&E centre (M.P.)	Dec., 2020 – Jan., 2021	Forest staff of nurseries and plantation work.	760
2.	Amrita Campaign (Awareness generation, QPM)	-do-	Amera Tikra, District Gaurela-Pendra-Marwahi, Chhattisgarh	08 th Jan., 2021	Farmers	43

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
	production, Homestead planting)					
3.	Medicinal Plant awareness programme	-do-	Atoot Bhikhari, District Khandwa	20 th Jan., 2021	Farmers	15
4.	Amrita Abhiyan and medicinal plant collection, farming and trade	-do-	Village Chandoheedol District Sidhi (M.P.)	28 th Jan., 2021	Farmers	42
5.	Good collection, cultivation practices and marketing of medicinal plants	-do-	Village Adegaon, District Seoni (M.P.)	09 th Feb., 2021		52
6.	-do-	-do-	Village Regachori, District Jabalpur (M.P.)	10 th Feb., 2021		51
7.	रोपणियों में तैयार होने वाले पौधों पर विभिन्न बीमारियां एवं उनका निदान विषय पर प्रशिक्षण	PCCF (R/E & Lokvanik) M.P. Forest Deptt., Bhopal	सामाजिक वानिकी वृत्त – जबलपुर, रीवाए इंदौर, रतलाम, झाबुआ, भोपाल, विदिशा, सागर, ग्वालियर	March, 2021	सामाजिक वानिकी वृत्तों का मैदानी अमला	
8.	Seed production areas, quality seed collection, seed technology & nursery management	SFRI, Jabalpur	SFRI, Jabalpur	June, 2020 – March, 2021	Trainee RFO's from Narsinghpur, West Mandla, Betul, Seoni and Jabalpu	06
9.	Training and demonstration programme to Field Foresters.	SFRI, Jabalpur	SFRI, Jabalpur	Dec., 2020 –Feb. 2021	Field foresters Jabalpur, Katni, Chhindwara, Seoni, Hoshangabad, Harda, Mandla, Balaghat, Sagar and Betul	94
10.	Production of quality planting stock in root trainer and	SFRI Jabalpur	R&E Lokvaniki Circle, Jabalpur, Indore, Bhopal, Sagar and Seoni	March., 2021	Field foresters of 11 R&E Lokvaniki Circle	281

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
	nursery management					
11.	Training and exposure to the forestry research activities	SFRI, Jabalpur	SFRI, Jabalpur	Jan.-March 2020	field foresters and students:	238
12.	"Value addition and marketing of NTFPs (plant origin), NTFP products/ medicinal plant"	TFRI, Jabalpur	Meeting hall of TFRI, Jabalpur	08 th March 2020	Rural Primary collectors and Community members	40-50
13.	Training on "Establishment, Maintenance and periodic measurement of sample plots."	SFRI, Jabalpur	SFRI, Jabalpur	Dec.2020	Range officer from Narsinghpur	1

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.	Virtual training programme on environment leadership and life skills	IIFM Bhopal	Virtual	08 th Feb., 2021 to 12 th Feb., 2021	Dr. Archana Sharma
2.	Virtual workshop on Production of guggule plants.	R&E Gwalior	Virtual	09 th Nov., 2020	-do-
3.	Review meeting of all RCFCs through the online video conference, organized by NMPB	NMPB, New Delhi	Video conference	4 th May, 2020 & 16 th June, 2020	Regional director and other officials of RCFC, Central Region
4.	An innovative climate resilient approach to restoration of medicinal plant	Society for Resource Planning, Development and Research, Bhopal	-do-	15 th June, 2020	-do-
5.	Training Programme On "Marketing of Medicinal Aromatic plants"	CCS National Institute of Agricultural Marketing, Ministry of	-do-	24 th July, 2020	-do-

S.N.	Name of the programme	Organized by	Venue	Date	Participants
		Agricultural and Farmers Welfare, Govt. of India Kota Road, Bambala, Jaipur-302033			
6.	5th Meeting of the committee constituted for assessing the work of RCFC for consideration of release of the Grant-in-aid for the year 2020-21	NMPB, New Delhi	-do-	31 st Aug., 2020	-do-
7.	Vriksh Ayush Scheme	NMPB, New Delhi	-do-	22 nd Sept., 2020	-do-
8.	Webinar on Aatm Nirbhar Jabalpur	RDVV, Jabalpur	-do-	18 th Sept., 2020	-do-
9.	Implementation of proposed Vriksha AYUSH Scheme	NMPB, New Delhi	-do-	06 th Oct., 2020	-do-
10.	Online training program of NMPB helpline portal	NMPB, New Delhi	-do-	09 th Oct., 2020	-do-
11.	one day online training (webinar) related to Ayurveda and medicinal plants organized by Solidaridad	NMPB, New Delhi	-do-	12 th Nov., 2020	-do-
12.	Implementation of PFMS/EAT module in various program implemented in the Ministry	NMPB, New Delhi	-do-	22 nd Jan., 2021	-do-
13.	Wildlife Ecology, Rehabilitation and Conservation.	International Scientific Committee, World Academy of Science, Engineering and Technology	Paris, France (Webinar)	17 th -18 th Sept., 2020	Dr. Anjana Rajput
14.	Presentation of Project Report – “Study on Agricultural Crop damage by Wild animals and Its Management in Hoshangabad Circle of Madhya Pradesh.”	PCCF (Wildlife) Office, Bhopal	Meeting Hall, PCCF (Wildlife) Office, Bhopal	21 st Nov., 2020	Dr. Anjana Rajput
15.	45th Research Advisory Committee Meeting	SFRI-Jabalpur	Meeting Hall, SFRI-Jabalpur (Webinar)	4 th Nov., 2021	Director, Forest Officers, Scientist & SRO's SFRI
16.	Procurement of Hydrological data and its financial issue	Technical Officer Madhya Pradesh Urban Development Company, Bhopal	Amarkantak Bhawan, Bhopal	22 nd Nov., 2020	Dr. Anjana Rajput
17.	Central Indian Landscape Symposium (CILS4) theme: Bridges: Collaborative Approaches for	Team CILS4 Network for Conserving	Virtual	28 th , 29 th , 30 th Jan., 2021	Dr. Mayank Makrand Verma

S.N.	Name of the programme	Organized by	Venue	Date	Participants
	Conservation, Livelihoods, and Development.				
18.	Workshop on " Clonal propagation of tree species"	Institute of Wood Science and Technology , Bengaluru	Virtual	07 th Oct., 2020	Dr. Sachin Dixit, Amit Pandey
19.	National Seminar on "Propagation, Management and development of value chain in bamboos"	TFRI, Jabalpur	SFRI, Jabalpur Virtual	10 th Feb., 2021	Dr. S.K. Tiwari
20.	AFRI-TFRI Joint Regional Research Conference "Forestry Research in Western and Central India	Arid Forest Research Institute, Jodhpur (ICFRE) Dehradun)	SFRI, Jabalpur Webinar	25 th Aug., 2020	Shri Giridhara Rao Dr. S.K. Tiwari Shri A. Sarkar Smt. Richa Seth
21.	Clonal propagation of tree species	IWST, Bengaluru	IWST, Bengaluru	07 th Oct., 2020.	Dr. S.K. Tiwari & Dr. A.K. Sharma
22.	Meeting of the Executive Committee of Society of Tropical Forestry Scientists, Jabalpur	Society of Tropical Forestry Scientists, Jabalpur	SFRI, Jabalpur	14 th Jan., 2020.	Director & JTF Executive & Life members
23.	Review meeting with Hon'ble Forest Minister of MP, Mr. Kunwar Vijay Shah.	SFRI, Jabalpur	SFRI Jabalpur	30 th July., 2020	All Forest Officers, Director, Scientists & SRO,
24.	Workshop on Medicinal Plant sector stakeholders cum Buyer-Seller Meet.	RCFC, Jabalpur	SFRI Jabalpur	16 th March, 2021	Stakeholder, Farmers, Scientists, SRO's, Students & Medicinal plants sector entrepreneurs
25.	One Day Seminar On "Medicinal plants sector stakeholder cum – Buyers/ sellers meet"	RCFC, Jabalpur	SFRI Jabalpur	16 th March, 2021	Dr. Pratiksha Chaturvedi
26.	Biodiversity Digital Conference	Global Landscape Forum	Virtual	28 th -29 th Oct., 2020	Dr.Pratibha Bhatnagar
27.	International webinar on plant physiology paradigms toward Agricultural Sustainability Under Climate change	Bihar Agricultural University, Sabour (Bihar)	Virtual	15 th Sept. , 2020	Dr. Sunil Prajapati, SRF
28.	National level webinar on fundamentals of Research Methodology	Acadevo eAsel		29 th Aug., 2020	Dr.Pratibha Bhatnagar J.P. George
29.	Climate-Smart Integrated Framing system	ICAR-National Institute of Abiotic stress Management (NIASM) Baramati, Pune, M.H		18 th Sept., , 2020	Dr.Pratibha Bhatnagar Balram Lodhi, SRF Bharat Singh Aarmo, Field Assistant
30.	Climate change adaptation options in Agriculture: Science and Innovations	National Institute of Disaster Management in collaboration with Rani Lakshmi	Virtual	24 th Aug., 2020	Balram Lodhi, SRF

S.N.	Name of the programme	Organized by	Venue	Date	Participants
		Bai Central Agriculture University, Jhansi			
31.	Technological Advancements for Application in Forest Exploration	Mizoram University, Imphal	Virtual	Aug., 2020	Balram Lodhi, SRF
32.	Aquatic Entomofaunal Diversity in India	Freshwater Biology Regional Center, ZSI, Hyderabad	Virtual	03 rd Sept., 2020	Balram Lodhi, SRF
33.	Taxonomy and its application: Learn from the experts	Zoological survey of India, Western Regional Centre, Pune Maharashtra		09 th Sept., 2020	Balram Lodhi, SRF
34.	'Ozone for life' held on the occasion of 'World Ozone Day' (35 years of ozone layer protection)	ENVIS Center of Biodiversity (Fauna), Zoological Survey of India, Kolkata		16 th Sept., 2020	Balram Lodhi, SRF
35.	Plant Diversity in India India	Dept of Botany in collaboration with IQAC, Bagnan College, Bagnan, Howrah, West Bengal,		Sept., 2020	Balram Lodhi, SRF
36.	National Webinar on Beetle (Insecta: Coleoptera) Diversity of India	Zoological survey of India, Kolkata		01 st Oct., 2020	Balram Lodhi, SRF
37.	Recent advances in underutilized fruits	College of Horticulture Sardarkrushinagar Dantiwada Agriculture University Jagudan		05 th Sept., 2020	Balram Lodhi, SRF
38.	Food and nutritional security amid covid-19 situation	College of Agriculture, Kota (Agriculture University, Kota)		16 th Sept., 2020	Balram Lodhi, SRF
39.	Agro-tourism through underutilized ethnic food	College of Horticulture and Forestry, Central Agriculture University (Imphal), Arunachal Pradesh		17 th Sept., 2020	Balram Lodhi, SRF Dr. Sunil Prajapati, Senior Research Fellow Bharat Singh Aarmo, Field Assistant
40.	अश्वगंधा की लाभकारी खेती ,प्राथमिक प्रसंस्करण एवं विपणन	RCFC, Central Region Jabalpur (M.P.)		29 th June, 2020	Balram Lodhi, SRF Jay Prakash George, SRF Vijay Bahadur Singh, Technical Assistant Rajesh Barman, Field Assistant

S.N.	Name of the programme	Organized by	Venue	Date	Participants
					Bharat Singh Aarmo, Field Assistant
41.	Museum and Covid 19: Impact and challenges during lockdown and post lockdown phases	Indira Gandhi National Tribal University, Amarkantak (M.P.)		09 th June , 2020	Dr. Sunil Prajapati, Senior Research Fellow
42.	Underutilized plant species: Future smart crops for food, Nutritional Security and Income Generation	SKUAST-Kashmir, National Agricultural Higher education Project, Shalimar, Shrinagar		20-29 August, 2020	Dr. Sunil Prajapati, Senior Research Fellow
43.	Recent trends in Horticultural Entomology	College of Horticulture, Sardar krushinagar Dantiwada Agricultural University Jagudan		27 th Aug., 2020	Dr. Sunil Prajapati, Senior Research Fellow
44.	Entrepreneurship Master class: Transforming and idea into a successful venture (Virtual Training)	College of Horticulture and Forestry, Central Agriculture University (Imphal), Arunachal Pradesh		07 th 09 th Sept., 2020	Dr. Sunil Prajapati, Senior Research Fellow
45.	National E-Workshop on current scenario of post graduation Research in Agricultural sector	Swami Keshwanand Rajasthan Agrucultural University, Bikaner (Raj.)		09 th -11 th Sept., 2020	Dr. Sunil Prajapati, Senior Research Fellow
46.	Fundamental aspects of ethical issues in Research Practices	College of Horticulture & Forestry, Pasighat, Arunachal Pradesh		22 nd -25 th Sept., 2020	Dr. Sunil Prajapati, Senior Research Fellow
47.	Organic farming :A promising alternative for Indian Agriculture	Uttar Banga Krishi Vishwavidyalaya, West Bengal		01 st Oct., 2020	Dr. Sunil Prajapati, Senior Research Fellow
48.	Utilization of organic waste for soil health management and energy production under changing climate scenario	Sri Karan Narendra Agriculture University, Jobner-Jaipur (Raj.)		06 October, 2020	Dr. Sunil Prajapati, Senior Research Fellow
49.	Advances in basic plant research in relation to climate change	CAAST-CSAWM & Department of Biochemistry, Mahatma Phule Krishi		08 th -9 th Oct., 2020	Dr. Sunil Prajapati, Senior Research Fellow

S.N.	Name of the programme	Organized by	Venue	Date	Participants
		Vidyapeeth, Rahuri, Ahmednagar (M.H.)			
50.	Technical writing	Anand Agricultural University, Anand		16 th -17 th Oct., 2020	Dr. Sunil Prajapati, Senior Research Fellow
51.	Crop simulation modeling (DSSAT)	Agrometer Field Unit Shrinagar in collaboration with SKUAST-Kashmir		26 th Oct., 2020	Dr. Sunil Prajapati, Senior Research Fellow
52.	Applications of Remote Sensing and GIS in Agriculture and Allied Areas	Northern Eastern Space Application Center, Umiam, Meghalaya		02 nd – 06 th Nov., 2020	Dr. Sunil Prajapati, Senior Research Fellow
53.	Higher Education and Research in Natural Resources Management	CAAST-CSAWM		07 th Aug., 2020	Jay Prakash George, SRF
54.	Climate Crisis and Biodiversity Loss	Dept. of Environmental Science and Mitigation, Bharathidasan University, Banaras (U.P.)		22 nd Aug., 2020	Jay Prakash George, SRF
55.	Climate Crisis, Biodiversity Loss: How effective are the global Treaties	ESM, BDU		23 rd Aug., 2020	Jay Prakash George, SRF
56.	Giants of the Brahmaputra Valley- Mega Herbivore distribution & Conservation	Nowgong Girls college, Assam		31 st Aug., 2020	Jay Prakash George, SRF
57.	Climate Change and Urban Environment: Pattern, Externalities and Mitigation	Women's Christian College, Kolkata, India		11 th Sept., 2020	Jay Prakash George, SRF
58.	Integrating energy climate change and development	Mizoram University		08 th Sept., 2020	Bharat Singh Aarmo, Field Assistant
59.	Elements of hydrocarbon explanation and production	Mizoram University		25 th Sept., 2020	Bharat Singh Aarmo, Field Assistant
60.	Visions: How Science and Technology will Revolutionize the 21th century and Fruit juice clarification techniques using membrane technology	Mizoram University		21 st Sept., 2020	Bharat Singh Aarmo, Field Assistant
61.	Pursuing food security in the adverse of acute pandemic and climate chan	College of Horticulture and Forestry, Central Agriculture University	Virtual	2 nd and 3 rd Sept., 2020	Dr. Sunil Prajapati, Senior Research Fellow Balram Lodhi, SRF

S.N.	Name of the programme	Organized by	Venue	Date	Participants
		(Imphal), Arunachal Pradesh			
62.	10 Days online International Training programme on Climate risk assessment and its management through agro meteorological approaches	Dryland agricultural research station, Rangreth, Kashmir	Virtual	21 st - 30 th Oct., 2020	Dr. Sunil Prajapati, Senior Research Fellow
63.	Perspectives of present and future weed research under climate smart agriculture (Online International training course)	Mahatma Phule Krishi Vidhyapeeth, Rahuri (M.H.)	Virtual	17 th -20 th Aug.t, 2020	Dr. Sunil Prajapati, Senior Research Fellow
64.	Research Methodology for Social Science (Ten day training)	Anand Agricultural University, Anand	Virtual	01 st -11 th September, 2020	-do-
65.	Research Methodology for Social Science (Ten day training)	organized by Anand Agricultural University, Anand	Virtual	01 st -11 th Sept., 2020	Dr. Sunil Prajapati, Senior Research Fellow
66.	Webinar on Wetland	Environmental Information System Resource Partner and Salim Ali Center for Ornithology and Natural History (SACON)	Virtual	13 th Jan., 2021	Dr Aniruddha Majumdar
67.	National Workshop on National Science Day. Theme- Future of STI: Impacts on Education Skills and Works	Mahakaushal Vigyan Parashad, Govt Science College- Jabalpur and M.P. Council of Science and Technology	Virtual	27 th -28 th Feb., 2021	Dr Aniruddha Majumdar
68.	Forest Certification in Indian Context	Indian Institute of Forest Management and Ministry of Environment and Forest Climate Change, Govt of India	Virtual	25 th – 26 th Feb., 2021	Dr Aniruddha Majumdar Anirudhwa Sarkar Dr. Anjana Rajput Dr. Jyoti Singh Smt. Richa Seth
69.	Central Indian Landscape Symposium (CILS4) Theme-Bridges: Collaborative Approaches for Conservation, Livelihoods, and Development	Network for Conserving Central India		28 th -30 th Jan., 2021	Dr Aniruddha Majumdar
70.	Why Should we care about our Rivers?	SPROUTS	Virtual	19 th March, 2021	Dr Aniruddha Majumdar

S.N.	Name of the programme	Organized by	Venue	Date	Participants
71.	National Webinar on Covid Vaccine: Myths and Facts	Govt Science College, Jabalpur	Virtual	18 th Feb., 2021	Dr Aniruddha Majumdar
72.	World Tiger Day		Virtual	29 th July 2021	Dr Aniruddha Majumdar
73.	COVID-19 Detection and Management in Big Cats	An Expert Talk by Wildlife Conservation Society, New York, The Habitats Trust, Central Zoo Authority, New Delhi and HCL Foundation New Delhi		2 nd May, 2020	Dr Aniruddha Majumdar
74.	World Migratory Bird Day	HCL Foundation New Delhi		9 th May, 2020	Dr Aniruddha Majumdar
75.	Future of higher education	Shri Vaishnav College of Commerce, Indore		14 May, 2020	Dr Aniruddha Majumdar
76.	Biodiversity and Public Health	Delhi University		19 th May, 2020	Dr Aniruddha Majumdar
77.	Tour Operator for Tigers, United Kingdom	Wildlife & Conservation during Lockdown		21 st May, 2020	Dr Aniruddha Majumdar
78.	Covid-19 and global scenario	Vigyan Bharti, New Delhi		23 th May, 2020	Dr Aniruddha Majumdar
79.	Tales from the Bushes	Jahanuma Wilderness, Bhopal		29 th May, 2020	Dr Aniruddha Majumdar
80.	Tour Operator for Tigers, United Kingdom	Virtual Bike Tigers Travelogue, Pench Diaries		1 st June, 2020	Dr Aniruddha Majumdar
81.	Department of Aquatic Biology and Fisheries University of Kerala	Voice of Youth for Oceans		09 th June, 2020	Dr Aniruddha Majumdar
82.	Harmonizing Tourism in National Parks and Sanctuaries	Responsible Tourism Society of India (RTSOI)		21 st June, 2020	Dr Aniruddha Majumdar
83.	International Tiger Day	We Sparrow, Bhopal		29 th June, 2020	Dr Aniruddha Majumdar
84.	Meeting on dissemination of research techniques developed by SFRI at field level	SFRI, Jabalpur	SFRI, Jabalpur	19 th Nov., 2020	Richa Seth

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 165 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 27 brochures.

Journal Section

The branch is well furnished with a reading room. During the year 13 journals were received.

Achievements during the year

1. Two issues of Vaniki Sandesh Vol.10 No.4, 2019 (Oct.-Dec.) & Vol.11 No.1-2 (Jan.-June) 2020 were published.
2. 14 project reports were documented.
3. A sum of Rs. 8010/- was received from the sale of bulletins, extension series, and other publications
4. 13 periodicals were received and displayed.
5. 95 articles were selected, photocopied, classified and filed into ledger files.
6. 149 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.	FRIM in FOCUS
8.	Journal of Tropical Forestry
9.	Jawahar Vistar Darpan (Hindi)

Sl. No.	Name of the Journal
10.	मध्यप्रदेश वनांचल संदेश
11.	वन विज्ञान
12.	पर्यावरण डाइजेस्ट
13.	Wood is Good : Grow Move, Use Move

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 <i>Boswellia serrata</i> for Nimar tract in M.P.	1971
8	15	Bark Table for <i>Boswellia serrata</i>	1971
9	16	Family Linaceae 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
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

S N.	Bulletin No.	Title	Year
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 <i>Buchanania lanzan</i> 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 विधियाँ।	2014
48	60	सामुदायिक भागीदारी द्वारा अकाष्टीय वनोपजों के मानचित्रण एवं आंकलन विधि मार्गदर्शिका।	2015
49	61	अकाष्टीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2015
50	62	कैमरा ट्रैप मार्गदर्शिका	2016
51	63	अकाष्टीय वनोपज प्रजातियों का अंतःस्थलीय, बाह्य स्थलीय संरक्षण, नवप्रवर्तन – वनवर्धन एवं विकास।	2016
52	64	अकाष्टीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2016
53	65	Volume table of Teak for various divisions of Madhya Pradesh	2016
54	66	Volume table of <i>Shorea robusta</i> (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 स्टॉक 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 फाईंडर 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 (<i>Gmelina arborea</i>) through clonal propagation	2017
64		क्लोनल प्रोपेगेशन द्वारा खमेर (मैलाईना 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 - <i>Andrographis paniculata</i> , <i>Bacopa monnieri</i> and <i>Swertia angustifolia</i>	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

S N.	Bulletin No.	Title	Year
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 वृक्षों 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 वृक्षों 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 कार्यों का सरल भाषा में संकलन : मध्यप्रदेश के संदर्भ में	2019
80	91	Species specific cage designs to rescue & transport the wildlife & nest boxes for birds.	2020

1. 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 लेडिया	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 : वनों से किसानों तक	2000
16.	बाँस : वनों से किसानों तक	2000
17.	सागौन : वनों से किसानों तक	2000
18.	खमेर : वनों से किसानों तक	2000
19.	यूकेलिप्टस : वनों से किसानों तक	2000
20.	बच (एकोरस केलेमस)	2001

Ext. Series	Title	Year
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 फलेक्सिपोसस)	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 <i>Alectra chitrakutensis</i>	2011
34	Monograph on <i>Ceropegia bulbosa</i> and <i>Ceropegia macrantha</i>	2011
35	Monograph on <i>Crateva magna</i> and <i>ficus cupulata</i>	2011
36	Monograph on <i>Dioscorea tomentosa</i> , <i>D. wallichia</i> and <i>d. alata</i>	2011
37	Monograph on <i>Flemingia stricta</i> and <i>F. paniculata</i>	2011
38	Monograph on <i>Guggal (Commiphora wightii)</i>	2011
39	Monograph on Maida tree (<i>Litsea glutinosa</i>)	2011
40	Monograph on Padri tree (<i>Radermachera xylocarpa</i>)	2011
41	Monograph on Shyonaka (<i>Oroxylum indicum</i>)	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, endemic Angiosperms and Pteridophytes in Forest Botanic Garden of State Forest Research Institute, Jabalpur (M.P.)	2014
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 प्रबंधन 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 भण्डारण 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 ग्रैंडिस)	2007
7	बबूल (अकेशिया निलोटिका)	2007
8	खैर (अकेशिया कटेचू)	2007
9	खमैर (मैलाइना आरबोरिया)	2007
10	ऑवला पौधों का विनाश विहीन विदोहन एवं संरक्षण मार्गदर्शिका	2007
11	महुआ रासायनिक उर्वरकों के प्रयोग से महुआ फूल एवं फल की उत्पादकता में वृद्धि	2011
12	जन भागीदारी द्वारा अकाष्टीय वनोपजों का प्राकृतिक वन क्षेत्रों में सतत विदोहन एवं प्रबन्धन तकनीकी का विकास	2012
13	कूल्लू गोंद का सतत विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
14	धावड़ा गोंद का सतत विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
15	सलई गोंद का सतत विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
16	पलाश गोंद का सतत विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
17	वनौषधि विपणन सूचना विश्लेषण केन्द्र	2014
18	बॉस-बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबन्धन	2015
19	खमैर -बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबन्धन	2015
20	कुल्लू-बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबन्धन	2015
21	भिलवा - बीज एवं रोपणी तकनीक	2017
22	माहुल - बीज एवं रोपणी तकनीक	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 (<i>Gloriosa superba</i>)	2019
37	गुग्गल (<i>Commiphora wightii</i>)	2019
38	अश्वगंधा (<i>Withania somnifera</i>)	2019
39	भिलवा (<i>Semecarpus anacardium</i>)	2019
40	चिरायता (<i>Swertia chirata</i>)	2019

S.N.	Title	Year
41	सलई (<i>Boswellia serrata</i>)	2019
42	चित्रक (<i>Plumbago zeylanica</i>)	2019
43	चनाहुर (<i>Marsdenia tenacissima</i>)	2019
44	सफेद मुसली (<i>Chlorophytum borivilianum</i>)	2019
45	कुचला (<i>Strychnos nux-vomica</i>)	2019
46	बायविडंग (<i>Embelia ribes</i>)	2019
47	गिलोय (<i>Tinospora cordifolia</i>)	2019
48	हरा – 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
53	सतावर (<i>Asparagus racemosus</i>)	2020
54	निशोथ (<i>Operculina turpethum</i>)	2020
55	शंखपुष्पी (<i>Evolvulus alsinoides</i>)	2020
56	तुलसी (<i>Ocimum sanctum</i>)	2020
57	स्तीविया (<i>Stevia rebaudiana</i>)	2020
58	कालमेघ (<i>Andrographis paniculata</i>)	2020
59	अग्निमंथ (<i>Premna Integrifolia</i>)	2020
60	सहजन (<i>Moringa oleifera</i>)	2020
61	रक्त चंदन (<i>Pterocarpus santalinus</i>)	2020
62	मलकांगनी (<i>Celastrus paniculatus</i>)	2020
63	केवाच (<i>Mucuna pruriens</i>)	2020
64	मण्डूकपर्णी (<i>Centella asiatica</i>)	2020
65	गोखरू (<i>Tribulus terrestris</i>)	2020
66	बावची (<i>Psoralea corylifolia</i>)	2020
67	सदाबहार (<i>Catharanthus roseus</i>)	2020
68	चंद्रसूर (<i>Lepidium Sativum</i>)	2020
69	अनंतमूल (<i>Hemidesmus indicus</i>)	2020
70	बेल (<i>Aegle marmelos</i>)	2021
71	खस (<i>Vetiveria zizanioides</i>)	2021
72	गुडमार (<i>Gymnema sylvestre</i>)	2021
73	अशोक (<i>Saraca asoca</i>)	2021
74	ब्राह्मी (<i>Bacopa monnieri</i>)	2021
75	ईसबगोल (<i>Plantago ovata</i>)	2021
76	सर्पगंधा (<i>Rauvolfia serpentina</i>)	2021
77	बच (<i>Acorus calamus</i>)	2021
78	उच्च गुणवत्ता के अचार फलों के संग्रहण हेतु अवधि निर्धारण एवं विनाश विहीन विदोहन	2021

S.No. 53 to 78 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.

Details of reading materials available in the library

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. 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 computer peripherals of the institute.
3. To provide Internet Facilities in the Institute without interruption at 50 Mbps 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. Maintenance of Biometrics for attendance of all employees of the Institute.

Information Technology Centre

Information Technology centre has a number of computer systems (Desktop – 70, 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. Presentations of Powerpoint for BOG, RAC, Workshops, Meetings, Seminars and Trainings, etc. has been done successfully.
2. Website of the institute has been upgraded.
3. Provided internet surfing and e-mail facilities to users through LAN and Internet.
4. Maintenance of computer peripherals 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 2020 to March 2021)

Papers published in Journals (National and International)

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.
1.	Sambodhi (ISSN 2249-6661) Taran publication, Haryana	Survey studies on insect pest association with medicinal plants in Madhya Pradesh	Patel Deepika, Bhandari Rita, Homkar Uday, Sharma Jayshree and Patel Ramanuj (2020)	Vol. 43 (04) PP 152-157.
2.	Kala Sarovar (ISSN 0975-7945) The Jour. of Ind.Art Hist.	Occurance, abundance and control of the major insect pest association with medicinal plants in Madhya Pradesh.	Patel Deepika, Bhandari Rita, Homkar Uday, Sharma Jayshree and Patel Ramanuj (2020):	Vol. 26 (02) . Pp 142-144.
3.	Journal of Engineering, Computing, and Architecture (JECA), ISSN no1934-7197.	An observation of different types of soil for growth of <i>stevia rabaudiana</i> in different areas of Jabalpur, M.P.	Nema Gunjan and Homkar Uday	2021 Vol II(2)
4.	Open Science Index, Environmental and Ecological Engineering	Grassland Development on Evacuated Sites for Wildlife conservation in Satpura Tiger, Reserve, India	Anjana Rajput, Sandeep Chouksey, B. Bhandari, S. Chourasia	Vo. 14, Issue 9, pp. 121190, 2020
5.	PNAS (Proceedings of the National Academy of Sciences of the United States of America)	"High frequency of an otherwise rare phenotype in a small and isolated tiger population" (under publication)	Dr. Mayank Makrand Verma	PNAS 2021 Vol. 118 No. 39 e2025273118
6.	International Journal of Biotech Trends and Technology (IJBT)	Quantitative estimation of Embelin from <i>Embelia tsjeriam-cottam</i> A.DC. and <i>in vitro</i> multiplication for production of quality planting stock	S.K. Tiwari, M.P. Goswami and Pankaj Saini	2021
7.	International Journal of Indigenous Medicinal Plants	Quantitative determination of Swertiamarin from <i>Swertia angustifolia</i> an endangered medicinal plant and <i>in vitro</i> multiplication through nodal segments for the production of quality planting stock.	Dr. S.K. Tiwari and Shri M.P. Goswami	2021
8.	International Journal of Ecology and Environmental Sciences.	Studies on lac host plant occurrence in different agro-climatic zones of Madhya Pradesh.	Bhatnagar, Pratibha, Sunil Prajapati, Balram Lodhi and Bharat Singh Aarmo	Year 2020 2(4):197-204.
9.	Climate Change and Environmental Sustainability.	Analysis of temporal changes in rainfall pattern: A case study of Damoh District in Madhya Pradesh (2019).	Shukla, P.K., Pratibha Bhatnagar and Jay Prakash George	Year 2020. Vol. 8 (1):
10.	Indian Journal of Plant Physiology (CebTech)	Variations in annual growth rings in <i>Tectona grandis</i> and <i>Terminalia tomentosa</i> and its correlation to climate	Bhatnagar, Pratibha, Jay Prakash George and P.K. Shukla	Year 2020 Vol. 9 (1)

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.
		change (2020).		
11.	Journal of Tropical Forestry	Abundance estimation of prey and predator species in an area adjoining to submergence area of Sardar Sarovar Project.	Anjana Rajput, A. Majumder, R. Thakur, S. S. Yadav and P.K. Kori	Vol. 36, Issue 3, pp: (1-11), Month: July - September 2020
12.	-do-	“Evolution of new population estimation techniques For male blue bulls based on their unique defecation behaviour”	Dr. Mayank Makrand Verma	January-June, 2021 Vol. 37 (I-II) ISSN 0970-1494
13.	-do-	Tracing timber for origin of wood with special reference to <i>Tectona grandis</i> (teak) using DNA finger printing technique.	Shailendra Kumar Tiwari, Giridhara Rao, Mundrika Singh, Shruti Thakre, A.K. Sharma, Amit Pandey Shailendra Yadav and Sachin Dixit.	2020 Vol.36, January-June, 2020, No. I & II
14.	-do-	Germination characteristics and seedling growth in <i>adina cordifolia</i> as affected by various pre - sowing treatments under storage.	Dr. Archana Sharma	2020 Vol. 36/IV
15.	-do-	Seed technology of <i>Careya arborea</i> (kumbhi) - a high value medicinal tree species.	Dr. Archana Sharma	2020 Vol. 36/III
16.	-do-	Lac host plant diversity in Gondia district of Maharashtra.	Bhatnagar, Pratibha, Balram Lodhi, Anirudhwa Sarkar, Sunil Prajapati and Bharat Aarmo	Year 2020 Vol.36 (III): 28-39
17.	-do-	Abundance estimation of prey and predator species in an area adjoining to submergence area of Sardar Sarovar Project	Rajput, Anjana, Aniruddha Majumdar, Rishika Thakur, Shailendra Singh Yadav and Prashant Kumar Kori	Year 2020 Vol. 36(3): 159-161
18.	Journal of Non-timber Forest Products	Assessment of Demand and Supply of Some Important Medicinal Plants in Madhya Pradesh	Priatibha Bhatnagar, and Rajesh Barman	Year 2020 Vol. 27(3): 159-161
19.	-do-	Economics of cultivation of chlorophytum borivilianum (Safed musli): a case study in Niwari district Madhya Pradesh	Priatibha Bhatnagar, Rajesh Barman and Vijay Bahadur Singh	Year 2020 Vol. 27(3): 159-161

Papers Published from SFRI

S.N.	Name of the Journal	Title of paper	Author(s)	Year/ Vol. No.
1.	Vaniki sandesh	Volume tables of Miscellaneous Species for Raisen Division	Richa Seth	October 2019-March 2020(vol:10-11)
2.	-do-	Volume tables of Dhawa (<i>Anogeissus latifolia</i>) for Mandla Division	Richa Seth	April 2020-September 2020 (vol:11, no.2 & 3)
3.	-do-	हल्दू की बीज संग्रहण, उपचारण, भण्डारण एवं रोपणी तकनीक।	Dr. Archana Sharma	2020 Vol. 10
4.	-do-	गरारी (कारा) की बीज संग्रहण, भण्डारण, उपचारण, रोपणी एवं रोपण तकनीक।	Dr. Archana Sharma	2020 Vol. 10
5.	-do-	Karanj (<i>Pongamia pinnata</i>): Nursery and plantation techniques.	Dr. Pratiksha Chaturvedi	April-Sept. 2020 Vol 11 No 2&3
6.	-do-	मध्यप्रदेश के बैतूल जिले में गोंदों के संग्रहण की मात्रा एवं संग्राहकों की आय में योगदान का आँकलन।	डॉ. जी. एस. मिश्रा एवं सुनील कुमार प्यासी	2020/Vol No. 11 No. 2&3 Page 18-28
7.	-do-	मध्यप्रदेश के देवास जिले में गोंदों के संग्रहण की मात्रा एवं संग्राहकों की आय में योगदान का आँकलन।	डॉ. जी. एस. मिश्रा एवं सुनील कुमार प्यासी	2020/Vol No. 11 No. 4 Page 37-44
8.	Van Dhan Vyapar	Value chain of <i>Withania somnifera</i> (<i>Ashwagandha</i>) in Madhya Pradesh	Bhatnagar, Pratibha and Rajesh Barman	Year 2020 Vol. 20 (1&2):27-31
9.	-do-	Demand supply market trends of Van Jeera (<i>vernonia anthelmintica</i>) in Madhya Pradesh	Bhatnagar, Pratibha and Rajesh Barman	Year 2020 Vol. 20 (03):4-8
10.	-do-	बेर पोषक वृक्ष पर उन्नत विधि से लाख की खेती	भटनागर, प्रतिभा, भारत सिंह आर्म्स, सुनील प्रजापति एवं बलराम लोधी,	वर्ष 2020 अंक-1 एवं 2:7-12।
11.	-do-	तुलसी (ओसिमम सैंकटम) की खेती तकनीक एवं विपणन	भटनागर, प्रतिभा एवं राजेश बर्मन,	वर्ष 2020 अंक-1 एवं 2:19-22
12.	-do-	मेंथा (<i>Mentha piperita</i>) का प्रसंस्करण, सूखत, जल वाष्प आसवन एवं तेल निकालने की प्रक्रिया संबंधी प्रयोग	सिंह, विजय एवं जटाशंकर	वर्ष 2020 अंक-3: 08-10
13.	-do-	केवकंद सूखत प्रयोग	सिंह, विजय एवं जटाशंकर	वर्ष 2020 अंक-3: 08-10
14.	-do-	सलई वृक्षों (<i>Boswellia serrata</i>) को बगैर क्षति पहुँचाये सलई गोंद विदोहन का वैज्ञानिक तरीका	भटनागर, प्रतिभा एवं राजेश बर्मन	वर्ष 2020 अंक-4:08-10

Paper published/presented in seminars/ symposiums/ workshops/webinar

S. N.	Name of seminars/ symposiums/ workshops/webinar	Title of the paper	Author(s)	Vol. No.
1.	National Seminar on "Propagation, Management and development of value chain in bamboos"	Establishment of Rhizome Bank in SFRI, Jabalpur from Candidate Plus Clumps of different bamboo	S.K. Tiwari, A.K. Sharma, Sachin Dixit and Amit Pandey	2021

S. N.	Name of seminars/ symposiums/ workshops/webinar	Title of the paper	Author(s)	Vol. No.
		species from north east states of India.		
2.	National webinar on आत्मनिर्भर मध्यप्रदेश के परिदृश्य में पारंपरिक के उपयोग एवं संरक्षण हेतु प्रयास। Deptment of Science, Govt. arts and science college Keolari Seoni (M.P.) Date: 24-12-2020	औषधीय पौधों की रोपणी एवं खेती से रोजगार ।	Uday Homkar	-
3.	Webinar on Wildlife Week Organized by Citizens for Nature (CNF), Jabalpur. Date: 7-10-2020.	Floral Diversity: Basis of Survival	Uday Homkar	-
4.	Wildlife Ecology, Rehabilitation and Conservation held at Paris, France on 17-18, September, 2020.	Grassland Development on Evacuated Sites for Wildlife conservation in Satpura Tiger, Reserve, India	Anjana Rajput, S. Chouksey, B. Bhandari, S. Chourasia	Vol. 14, No. 9, 2020
5.	World Forestry Congress	Abstract "Tiger Occupancy in Ratapani Landscape: What is the reason behind tiger presence in proximity of capital Bhopal, Madhya Pradesh, India"	Dr. Mayank Makrand Verma & Satyadeep Nag	XV World Forestry Congress 2021, Seoul, South Korea.

Publication of technical bulletins / brochures

S. No.	Name of technical bulletins/brochures	Authors	Bulletin/ brochure No.
1.	Agnimanth (<i>Premnaintegrifolia</i>)	Brochures published by RCFC, Central Region, SFRI, Jabalpur	
2.	Anantmool (<i>Hemidesmusindicus</i>)		
3.	Ashok (<i>Saraca asoca</i>)		
4.	Babchi (<i>Psoralia corylifolia</i>)		
5.	Bael (<i>Aegle marmelos</i>)		
6.	Brahmi (<i>Bacopa monieri</i>)		
7.	Chandrasur (<i>Lepidium sativum</i>)		
8.	Gokhuru (<i>Tribulusterrestris</i>)		
9.	Gudmar (<i>Gymnema sylvestre</i>)		
10.	Isabgol (<i>Plantago ovata</i>)		
11.	Kalmegh (<i>Andrographis paniculata</i>)		
12.	Kewanch (<i>Mucuna pruriens</i>)		
13.	Mandookparni (<i>Centella asiatica</i>)		
14.	Mankangni (<i>Celastrus paniculatus</i>)		
15.	Nishoth (<i>Operculina turpethum</i>)		
16.	Rakta-chandan (<i>Pterocarpus santalinus</i>)		
17.	Sadabahar (<i>Catharanthus roseus</i>)		

S. No.	Name of technical bulletins/brochures	Authors	Bulletin/ brochure No.
18.	Sahjan (<i>Moringa oleifera</i>)		
19.	Sarpgandha (<i>Rauvolfia serpentina</i>)		
20.	Satavari (<i>Asparagus racemosus</i>)		
21.	Shankhpushpi (<i>Evolvulus alsinoides</i>)		
22.	Stevia (<i>Stevia rebaudiana</i>)		
23.	Tulsi (<i>Ocimum sanctum</i>)		
24.	Khus (<i>Vetiveria zizanioides</i>)		
25.	Introductory brochures about the centre in Hindi		
26.	Introductory brochures about the centre in English		
27.	Seed and Nursery technique of <i>Cariya arboria</i>		Dr. Archana Sharma
28.	Seed and Nursery technique of <i>Adansonia digitata</i>		
29.	Seed and Nursery technique of <i>Terminalia chibula</i>		
30.	Seed and Nursery technique of <i>Sapindus tripholiatus</i>		
31.	Seed and Nursery technique of <i>Terminalia belerica</i>		
32.	उच्च गुणवत्ता के अचार फलों के संग्रहण हेतु अवधि निर्धारण एवं विनाश विहीन विदोहन।		

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 2020-21

Budget head	Opening balance (Rs.in lakhs)	Budget received during the year (Rs. in lakhs)	Total Amount (Rs. In lakhs)	Expenditure (Rs. in lakhs)
10-2406 Non-Plan (Grant-in-aid)	0.00	0,000,000	40,000,000	65,072,099
Deposit Works (Sponsored projects)	64,392,286	30,870,446	95,262,732	45,517,291
Total Rs.	64,392,286	70,870,446	135,262,732	110,589,390

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 2020-21 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 (1.4.20 to 31.3.21) Rs.
On-Going Projects						
1	देवास जिले में लोक वानिकी प्रबंध योजना क्रियान्वन का अनुश्रवण एवं मूल्यांकन'। AF/P/E/19-20/07	APCCF R/E & LV M.P Bhopal	0	1,112,000	1,112,000	144,932
2	मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन 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	2,206,538	1,000,000	3,206,538	1,507,333
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	1,338,729	0	1,338,729	368,872
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	1,010,106	0	1,010,106	899,384

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 (1.4.20 to 31.3.21) Rs.
5	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। SIL/P/E/18-19/18	APCCF R/E & LV M.P Bhopal	1,741,646	0	1,741,646	342,820
6	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	(14,743)	1,088,784	1,074,041	271,534
7	Phenological studies and determination of sustainable 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	1,638,130	1,244,000	2,882,130	567,055
8	Forensic DNA profiling and timber tracing for origin of wood with special reference to <i>Tectona grandis</i> (Teak) & <i>Pterocarpus marsupium</i> (Bija) GEN/P/E/17-18/16	APCCF R/E & LV M.P Bhopal	2,271,979	0	2,271,979	161,214
9	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	1,303,690	724,300	2,027,990	430,392
10	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	278,083	0	278,083	12,210
11	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	292,796	0	292,796	147,622
12	Estimation of wood demand and supply in Madhya Pradesh SEM/P/E/16-17/10	APCCF R/E & LV M.P Bhopal	242,935	0	242,935	34,240
13	Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important tree species viz. <i>Anogeissus latifolia</i> & <i>Commiphora wightii</i> . SD/P/E/19-20/04	APCCF R/E & LV M.P Bhopal	385,620	2,725,000	3,110,620	933,507
14	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	333,620	1,050,000	1,383,620	88,019

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 (1.4.20 to 31.3.21) Rs.
15	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	369,620	1,922,000	2,291,620	331,892
16	अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यो की अद्यतन स्थिति SD/P/E/19-20/09	APCCF R/E & LV M.P Bhopal	0	0	0	0
17	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	(56,082)	1,547,000	1,490,918	505,419
18	Establishment of "Regional - Cum- Facilitation Center (RCFC) for Central Region at SFRI. BD/P/E/17-18/11	(National Medicinal Plants Board) New Delhi	6,360,594	1,840,406	8,201,000	5,392,425
19	Network project on conservation of Lac insect genetic resource SEM/P/E/14-15-05	IINRG Ranchi (ICAR)	460,213	1,350,000	1,810,213	1,800,425
20	Tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhyan range." WL/P/E/17-18/09	PCCF, Wildlife, M.P, Bhopal	534,415	963,000	1,497,415	834,022
21	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	5,838,114	4,568,000	10,406,114	2,194,897
22	Maintenance of monitoring and evaluation facilities and data base of predators prey in Madhya Pradesh" WL/RA/32	PCCF, Wildlife, M.P, Bhopal	6,820,664	0	6,820,664	0
23	Monitoring of re-introduced tigers (<i>Panthera tigris</i>) In Nauradehi Wildlife Sanctuary" WL/P/E/18-19/01	PCCF, Wildlife, M.P, Bhopal	2,861,689	0	2,861,689	843,587
24	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.	64,887	400,000	464,887	410,171
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	(61,680)	1,935,300	1,873,620	1,301,806

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 (1.4.20 to 31.3.21) Rs.
26	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. BD/P/E/19-20/01	Nagar Nigam Jabalpur (M.P.) (Smart City)	(60,859)	193,852	132,993	132,993
27	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.) (Smart City)	173,195	0	173,195	62,113
28	म.प्र. वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्ष 2015-16 (द्वितीय मूल्यांकन) एवं 2016-17 (प्रथम मूल्यांकन) के वर्षों ऋतु में हुए वृक्षारोपण कार्यों का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पेक्ट असिसमेंट किये जाने के संबंध में। SIL/P/E/20-21/01	APCCF JFM/FDA M.P. Bhopal	1,851,300	0	1,851,300	963,558
29	Strengthening of Market Analysis centers for technical support in Marketing of Minor Forest Produce in Madhya Pradesh. SEM/P/E/20-21/02	MP MFP Federation, Bhopal	0	500,000	500,000	134,982
30	Establishment of demonstration plot of <i>Bambusa tulda</i> at SFRI, Jabalpur GEN/P/E/20-21/05	Director, M.P. State Bamboo Mission Bhopal	0	600,000	600,000	0
31	"Identification of best performing bamboo species for enhancement of income of farmers in Madhya Pradesh" SEM/P/E/20-21/06	Director, M.P. State Bamboo Mission Bhopal	0	1,200,060	1,200,060	0
Total Rs.			38,185,199	25,963,702	64,148,901	20,817,424
Completed Project Balance			15,891,118	-	15,891,118	15,891,118
Interest Under Bank			1,024,161	1,945,500	2,969,661	2,900,821
Misce.Project - 3987			6,362,803	1,791,115	8,153,918	1,808,794
Institutional Charge			2,929,005	1,170,129	4,099,134	4,099,134
Gross Total			64,392,286	30,870,446	95,262,732	45,517,291

INCOME (Revolving Funds for the year 2020-2021)		
S.No.	HEAD	Income (In Lakh)
1	Gate Entry Fee	977,488
2	Guest House Charges	70,280
3	Rest House (Hostel) charges	44,280
4	House Rent & Water Charges	745,656
5	Misc Receipts	205,840
6	Plant Supply	303,281
7	Seed Supply	1,360,000
8	Sale of tender Form	3,700
9	Training Fee	42,104
10	Institutional Charge	2,117,537
11	Rent From Allahabad Bank	9,100

INCOME (Revolving Funds for the year 2020-2021)		
S.No.	HEAD	Income (In Lakh)
12	Completed Project Balance TRF	737,383
	Interest Received :-	
13	Interest on FDR	3,170,723
	Grand Total	9,787,372

EXPENDITURE (Revolving Funds) for the year 2020-2021)		
S.No.	HEAD	Expenditure (In lakh)
1	Daily Wages	525,795
2	Repair & Maintainance	1,407,126
3	Travelling Expenditure	22,153
4	Bank Charge	939
5	Electricity	508,430
6	Office Expenses	40,447
7	POL Expenses	541,413
8	Seminar & Meeting Expenses	220,000
9	Stationary Expenses	280,866
10	Audit and Legal Fee	158,179
11	Internet Charges	83,370
12	Nursery	11,358
	Gross Total	3,800,076

Income (Reserve Funds) for the year 2020-21		
	Details	Income
1	POL Recovery	9,000
2	Sale of Book Magzines	
3	RTI Fee	3,466
4	Misc.	83,431
5	Institutional Charges	1,841,537
6	Tender Form Fee	210
7	Interest on FDR	302,093
8	Interest on Saving	115,696
	Total Rs.	2,355,433

Expenditure (Reserve Fund) for the year 2020-21		
1	Repair & Maintenance	0.00
2	Bank Charges	27.00
	Total Rs.	27.00

Details of Accounts Financial Status as on 31st March, 2020				
S.No.	Details	Cash in Bank	F.D.R.	Total
1	Revolving Fund	14,682,388	5,600,000	20,282,388
2	Grant-In-aid	8,381,379	0	8,381,379
3	Deposit Work (Project Funds)	7,350,776	33,300,000	40,650,776
4	Reserve funds	4,346,595	46,499,000	50,845,595
	Total Rs.	34,761,138	85,399,000	120,160,138

9. ESTABLISHMENT

Postings, Transfers, and Retirement_(2020-2021)

Postings :

S.No.	Name	Designation	Date of Joining
1.	Dr. Abhay Kumar Patil	PCCF& Director	08.10.2020
2.	Shri Amit Kumar Singh	Assistant Director	16.03.2021

Transfers :

S.No.	Name	Designation	Date of Relieving
1.	Shri Giridhar Rao (IFS)	PCCF&Director	30.09.2020

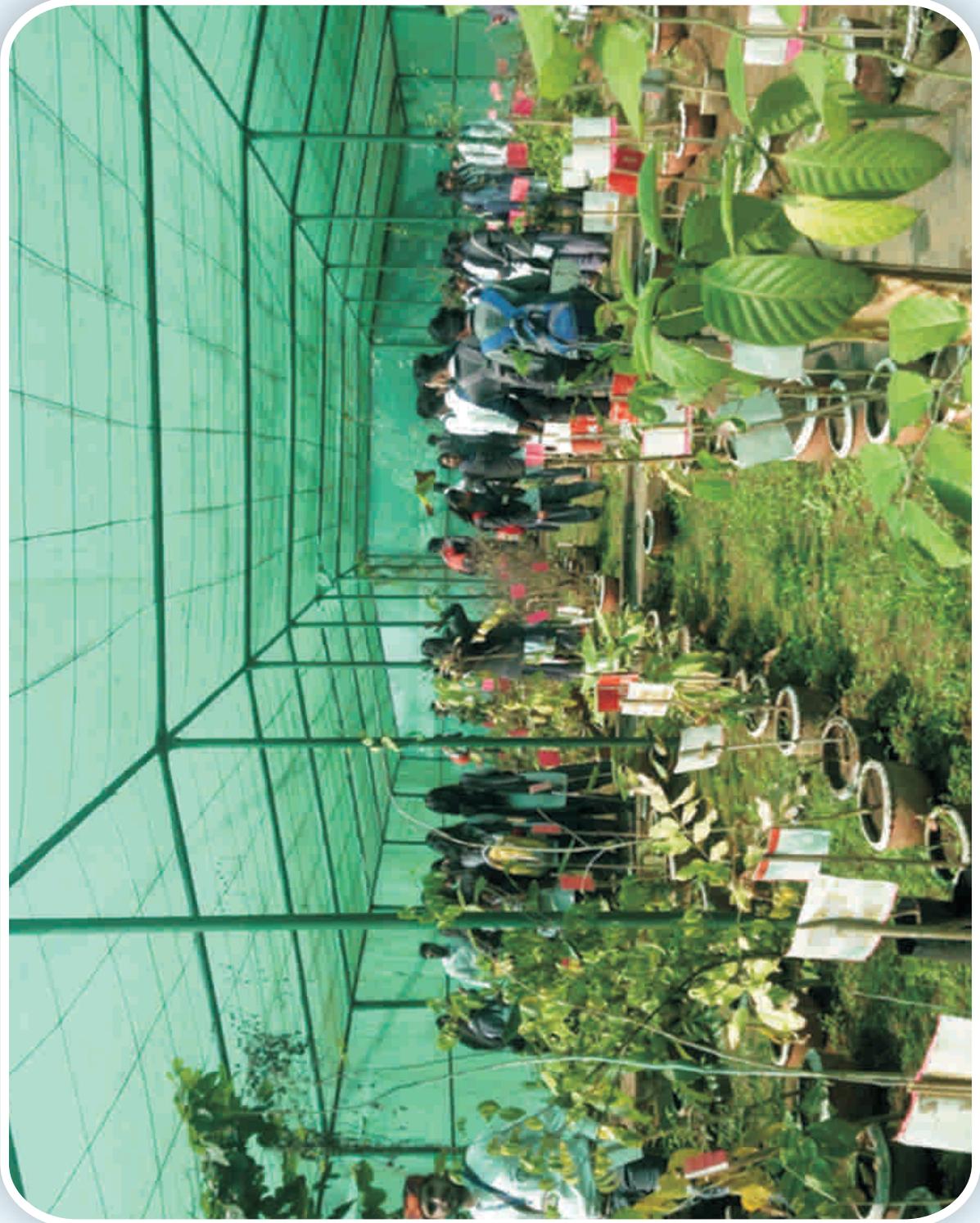
Retirement :

S.No.	Name	Designation	Date of Retirement
1.	Shri Shankar Lal Jhariya	Field Asstt.	30.04.2020
2.	Shri Gunnalal Yadav	Mali	30.06.2020
3.	Shri Jhallu Prasad Kushwaha	Peon	31.07.2020
4.	Shri Shrinivas Chakravarti	Ledger Asstt.	30.09.2020
5.	Shri Mundrika Singh (IFS)	APCCF& Addl. Director	31.01.2021
6.	Shri Gendal	Asstt. Grade-3	31.01.2021
7.	Dr. Pratibha Bhatnagar	Scientist "E"	28.02.2021
8.	Shri Shivdayal Chaudhary	Chowkidar	31.03.2021
9.	Shri Shivcharan Singh Uddey	Field Asstt.	31.03.2021

Temporary project staff engaged during the year (March 2020 to March 2021)

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 2020	March 2021
2.	Alok Sharma	Dy. Director		March 2020	March 2021
3.	Shri Manishpuri Goswami	Consultant (T.O)		March 2019	March 2021
4.	Shailendra Nema	DEO		March 2020	March 2021
5.	Amardeep Rajak	T.A/ Supporting Staff		March 2020	March 2021
6.	Gunjan Nema	DEO		March 2020	March 2021
7.	Prateek Jain	T.A/ Supporting Staff		March 2020	Dec. 2021
8.	Pankaj Saini	Project Asstt.	Extension of developed nursery techniques of some important NTFPs and medicinal plants species through research and extension centers of MP.	Mar. 2020	Mar. 2021
9.	P.S. Bhandari	Field Astt.	Monitoring of re-introduced tigers in Nauradehi Wildlife Sanctuary	Aug. 2020	Apr. 2021
10.	Avinash Yadav	JRF		Aug. 2018	Jul. 2021
11.	Mohd. Ashad Hussain	Field Astt.	Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected	May. 2018	Apr. 2021
12.	Prashant Ku. Kori	JRF.		July-2018	July-2020

S. No	Name	Designation	Project under which appointed	Period	
				From	To
13.	Pratap Rao Vagh	Comp. Opt.	areas of MP	Nov. 2020	Apr. 2021
14.	Shailendra Yadav	Research Associate	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	March 2021
15.	Manish Raj	Computer Programmer		Feb. 2019	March 2021
16.	Mr. Shubham Jain	Computer Operator	Phenological studies and determination of sustainable harvesting limits of some important wild medicinal plants and other NTFPs with active participation of user forest.	Jul. 2020	Jun. 2021
17.	Balram Lodhi	SRF	Network Project on conservation of Lac insect genetic resources.	Aug. 2020	Mar. 2021
18.	Bharat Singh Armo	Field Asstt.		Aug. 2020	Mar. 2021
19.	Shimpi Chourasia	Field Asstt.	Study on Tiger Presence and their dispersal movement in Ratapani-Kheoni.	Oct. 2019	Mar. 2021
20.	Satyadeep Nag	JRF		Oct. 2019	Mar. 2021
21.	Mradul Kumar	Field Asstt.-2		Oct. 2019	Mar. 2021
22.	Suneel Kumar	JRF	म.प्र. में महुआ फूल एवं आचार गुठली के उत्पादन संग्रहण मात्रा का आंकलन।	Jun. 2020	May 2021
23.	Mahendra Patle	Project Asstt.		March 2021	Feb. 2022
24.	Rakesh Purviya	Project Asstt.		March 2020	Feb. 2021
25.	Naresh Singh Marko	Field Asstt.-1		Oct. 2020	Sept. 2021
26.	Sachin Sharma	Field Asstt.-1	देवास जिले में लोकवार्निकी प्रबंध योजना क्रियान्वयन का अनुश्रवण एवं मूल्यांकन।	March 2021	Feb. 2022
27.	Satish Pathak	Field Asstt.-1		March 2021	Feb. 2022
28.	Shakti Shukla	Project Asstt.	Survey Population density and quantitative assessment of medicinal plant for the sustainable development of livelihood generation in Jabalpur forest circle.	Jun. 2020	May. 2021
29.	Jay Prakash Mishra	JRF	Germplasm evaluation and standardization of propagation technology for production of quality planting Stock of Medicinally important tree species viz. Anogeissus latifolia and commiphora.	Jan. 2020	Dec. 2021





Visit of Hon'ble Forest Minister to the museum



Review meeting by Hon'ble Forest Minister



Visit of students to the museum



Visit to the medicinal plant gene bank



Trainee field foresters in seed lab



Lecture session of training programme

Published by
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State Forest Research Institute

(An Autonomous Institute of Department of Forests, Government of Madhya Pradesh)

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