वार्षिक अनुसंधान प्रतिवेदन

ANNUAL RESEARCH REPORT

2023-2024

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

State Forest Research Institute, Jabalpur (M.P)

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Cover photo

Front cover: wild elephant habitat
Sanjay-Bandhavgarh habitat linkage.
(Photo courtesy: Dr. Mayank Makrand Verma)

Bandhavgarh Tiger Reserve
(Photo courtesy: Dr. Aniruddha Mazumdar)

Back cover

Bandhavgarh Tiger Reserve
(Photo courtesy: Dr. Aniruddha Mazumdar)

Glimpses of various training and extension activities in SFRI, Jabalpur
Photo courtesy: S.S. Raghuwanshi
Neetesh Soni

FROM THE DIRECTOR'S DESK

The process of carbon absorption is being affected due to reduction in the forest area. After the industrial revolution, there has been an increase in the amount of carbon dioxide emissions at the global level. The effects of greenhouse gases are increasing excessively, due to which the average temperature is increasing, whose effect on climate is increasing day by day. Due to this mankind is facing severe crises. The entire ecosystem of water, air, land, forest, which are essential factors for human civilization are getting affected. As a solution to the crisis, everyone is dependent on a strong ecosystem and for this it is very important to have superior forest, but the forest covered area is also deteriorating continuously. Many forest species have reached an endangered state. There is a great need for research for the development and protection of forests. In this direction, continuous efforts are being made for the protection of forests and wildlife species through ongoing forest research work, but for the all-round development of human civilization, there is an urgent need for human awareness and selfless conservation of natural resources.

The forestry practices system has reached it's centenary year in 2022. So, to commemorate the 100 years of forestry practices in the state and also with this glorious past on wildlife research and management, Madhya Pradesh Forest Department has jointly organized an international conference on "Wildlife Conservation: Emerging scenario & way forward" with M.P. State Forest Research Institute.

The Institute is doing important work in the field of lac cultivation, under which forest committee members are being trained on lac cultivation and conservation. This will strengthen forest-based livelihoods, which will improve rural economy and well being.

A Memorandum of Understanding (MoU) has been signed between State Forest Research Institute, Jabalpur and Government Model Science College, Jabalpur on 04/03/2024 with the aim of promoting research work on forestry, wildlife and environment. After the signing of the MoU, both the institutes will be jointly organizing seminars, webinars, training and workshops and in future the scientists, research officers and professors of both the institutes will be benefitted through the sharing of knowledge and expertise.

14 research projects were completed, 18 research projects are ongoing and 10 regular activities were carried out. During this year 18 research papers/articles were published in various journals and 12 technical bulletins and brochures were published for extension of the research findings to the beneficiaries at the grassroot level. The institute also prepared the Annual Research Report 2022-2023 and hosted it on the website. The Journal of Tropical Forestry and Marketing information newsletter "Vandhan Vyapar" were published.

The continuous support and guidance by the Honorable members of the Board of Governors and Research Advisory Committee of the institute is greatfully acknowledged.

Our sincere acknowledgment is due to the MP Forest Department and to all the esteemed state and national funding agencies for having belief in us and the budgetary provisions made by them.

I am also very happy with the dedicated administrative and scientific colleagues of the institute for showing team spirit and their efforts in fulfilling the tasks and achieving the targets assigned to them.

The Annual Research Report 2023-2024 will prove useful for you to get acquainted with the research activities of the State Forest Research Institute. Your suggestions are always welcome for the further development of research activities and nature conservation in future. Your useful suggestions will act as a guide in taking us to new heights.

(Pradeep Vasudeva)
PCCF & Director

1. THE INSTITUTE

1.1 INTRODUCTION

State Forest Research Institute, Jabalpur (SFRI) came into existence on 27th June, 1963 for the scientific development of forestry sector in the state of Madhya Pradesh following the recommendations of tenth Silvicultural Conference held at Dehradun in 1961. It was granted autonomy on 29th October, 1994 and was registered on 2nd August, 1995 as a society under M.P. Societies Registration Act 1973. Over the years the institute has developed as a educational, training, research and consultancy organization at the state and national level and is carrying out need based adaptive and applied research programmes for the Forest Department as well as forest dependent communities. 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 & wildlife 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 Vandhan Vyapar provide informatics preveling market need of NTFPs in mandis and the trade in the communities. '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, lac, gene-bank, glass-house, mist-chambers, shade-net houses, poly houses, botanical garden, bambusetum, tissue culture, The administrative block, houses fully renovated state of art EIA, soil and seed testing laboratories, a mobile soil testing laboratory. conference halls, lecture room, museum, herbarium, auditorium, library and documentation centre and the laboratroes. The hostels and officers' rest house, provides furnished accommodation and is renovated now. The institute also provides residential accommodation to its employees inside the campus.

1.2 VISION, MISSION AND GOALS

Vision

To serve as a nodal centre of research in order to provide scientific support to the state and its people on matters related to forestry, wildlife and climate change with particular emphasis on conservation, productivity, sustainable utilization and scientific management of natural resources while becoming a self sustaining center of prominence and repute in the region

Mission

To focus on various applied research programs, evaluation of implementation of various schemes, policies, and upgradation of skills of the personnel of the forest department in order to realize the vision of SFRI and Sustainable Development Goals (SDGs) of the sector.

Goals

To conduct study and research on:

a. Conservation of forests, wildlife and ecosystem services
b. Enhancement of productivity of natural forests ,plantations, and trees outside forests to meet the requirement of local communities and industries
c. Efficient and sustainable utilization of biodiversity and forest resources.
d. Climate change mitigation and adaptation.

1.3 Thrust Areas

A. Forestry

1. Genetic diversity assessment using molecular markers for elite identification of existing candidate plus trees of Teak (*Tectona grandis*) of Madhya Pradesh.
2. Multilocational cum provenance trials of important forestry and bamboo species in different forest divisions of Madhya Pradesh.
3. Collection and *Ex–situ* conservation of medicinal and aromatic plants in Gene-bank of SFRI, Jabalpur and their management.
4. Conservation of Boabab tree (*Adensonia digitata*) through development and extension of it's nursery, plantation and conservation techniques in Dhar District of Madhya Pradesh.
5. Restoration of Botanical Garden of S.F.R.I. Jabalpur.
6. Periodic observations in preservation plots established in different forest types of Madhya Pradesh.
7. Periodic measurement of sample plots laid out in different forest areas of Madhya Pradesh.
8. Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh.
9. Strengthening of Market Information centres for dissemination of Market Analysis of Minor Forest Produce in different agro-climatic zones of Madhya Pradesh.
10. Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important species viz. *Anogeissus latifolia* & *Commiphora wightii.*
11. ''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''।
12. ''मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा का आँकलन''।
13. "मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल्स की सफलता एवं असफलता के कारकों का विश्लेषण"।

14. वन विभाग म.प्र. द्वारा विभिन्न योजनाओं के अंतर्गत वर्ष 2015–16 में किये गये वृक्षारोपणों का अनुश्रवण एवं मूल्यांकन"।

B. Wildlife

1. Ecology of Indian Wolf (*Canis lupus pallipes*) and it's conservation implication in Nauradehi Wildlife Division, Madhya Pradesh
2. Network Project on Conservation of Lac Insect Genetic Resources
3. Hand on experiment on kusmi lac cultivation in Bichhiya village of Umaria Forest Division of Madhya Pradesh
4. म.प्र. जल निगम मर्यादित द्वारा क्रियान्वित बैढन–2, ग्रामीण समूह, चितरंगी ब्लॉक, जिला सिंगरौली, मध्यप्रदेश के जल प्रदाय योजना के अंतर्गत वन्यप्राणियों/बायोडायवर्सिटी पर पड़ने वाले प्रभाव का अध्ययन
5. Maintenance of Monitoring and Evaluation Facilities and Database of Predators Prey in Madhya Pradesh.
6. Study project on wild elephant habitat use and mitigation measures to minimize man-elephant conflict: With special reference to Sanjay-Bandhavgarh habitat linkage of central highlands landscape.

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 mentioned below:

1. 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.
2. Strengthening of Market Analysis centre for technical support in Marketing of Minor Forest Produce in Madhya Pradesh.
3. Selection of species specific root trainer sizes and potting mixes to be adopted by the Forest Department nurseries of Madhya Pradesh for Ten selected tree species.
4. अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यों की अद्यतन स्थिति का आंकलन।
5. Study on leopard (*Panthera pardus L.*) presence, identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of Jabalpur and Indore, Madhya Pradesh
6. AITE: Evaluation of Wild Animals Populations and Habitat in MP, Part I &II
7. Population Habitat Viability Analysis (PHVA) of Hard ground Barashingha (*Cervus duvauceli branderi*) for introduction in Bandhavgarh Tiger Reserve, M.P.
8. International Conference on "Wildlife Conservation: Emerging scenario and Way Forward"
9. Impact Assessment of Proposed Sheopur Kalan & Badoda Towns A Group Water Supply Scheme- Parbati River Sub-project under MPUSIP on Aquatic Fauna, River Hydrology & Ecology and its Mitigation
10. AITE-2022 Evaluation of wild Animals Population and Habitat in Madhya Pradesh (for analysis of sign survey for carnivore species and beat status of Tiger & Leopard in Madhya Pradesh)

1.5 TRANSFER OF TECHNOLOGY

1. राज्य औषधीय पादप बोर्ड, उड़ीसा से आये 15 किसानों के समूह हेतु पांच दिवसीय (दिनांक 21.02.2024 से 25.02.2024 तक) प्रशिक्षण एवं परिचयात्मक (exposure visit) दौरा–सह–प्रशिक्षण कार्यक्रम।
2. मध्य प्रदेश राज्य की जैव विविधता एवं पारिस्थितिक तंत्र सेवाओं के मूल्यांकन एवं प्रबंधन हेतु विभिन्न वनमण्डलों के प्रशिक्षकों की दो दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन।
3. मिश्रित प्रजातियों की नर्सरी तकनीक एवं रूट ट्रेनर के संबंध में दो दिवसीय प्रशिक्षण।
4. Scientific method of Lac cultivation.
5. Training cum awareness and orientation programmes regarding forestry research for the newly recruited trainee forest rangers and forest guards and students from universities.
6. Participation in exhibitions and fairs.

1.6 Environmental Impact Studies

1. Environmental Impact Assessment on Flora, Fauna & Socio economic status of local communities and action to be taken to mitigate impact of Kopra Medium Project at Nauradehi Wildlife Sanctuary, Sagar District (M.P)

1.7 ADMINISTRATION

The administration of the State Forest Research Institute Society is governed by a Board of Governors, comprising of 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 & CWLW, 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 (Research/Extension & Lok Vaniki) M.P. , Bhopal	Member
12.	PCCF (Land Management) , MP, Bhopal	Member
13.	PCCF (CAMPA), MP, Bhopal	Member
14.	Chairman, State Expert Appraisal Committee (SEAC) M.P, Bhopal	Member
15.	Director General, MP Council of Science & Technology, Bhopal	Member
16.	Emeritus Scientist	Member (Nominated by Govt. of MP)
17.	Emeritus Scientist	Member (Nominated by Govt. of MP)
18.	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 & CWLW, 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

1.8 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	2
4	Assistant Director (ACF)	2	0
5	Forest Ranger	3	1
6	Dy. Ranger	1	6
7	Forester	1	1
8	Forest Guard	15	10
	Total	**26**	**21**
	Scientist		
1	Forest Ecologist	1	0
2	Forest Geneticist (Scientist-E)	1	1

S.No	Forestry Professionals	Sanctioned	Working
3	Seed Specialist (Scientist-E)	1	1
4	Tree Improvement Specialist	1	0
5	Forest Botanist	1	0
6	Biodiversity Scientist	1	0
7	Marketing Specialist	1	0
8	Wildlife (Scientist - B)	5	1
	Total	**12**	**3**
	Technical		
1	Statistical Assistant (Sr. Research Officer)	1	1
2	Technical Assistant (Social–economics), (Sr. Research Officer)	3	1
	Technical Assistant (Contingency)		2
3	Technical Assistant (Forestry Research), (Sr. Research Officer)	9	5
	Technical Assistant		2
4	Technical Assistant (Consultancy/Extension), (Sr. Research Officer)	1	0
5	Technical Assistant (Library), (Sr. Research Officer)	1	1
6	Technical Assistant (Documention) (Sr. Research Officer)	1	1
7	Technical Assistant (Computer) (Sr.Research Officer)	1	1
8	Lab Technician, (Sr. Research Officer)	6	1
	Lab Technician		1
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	0
13	Field Assistant	3	1
	Total	**36**	**20**
	Non-Technical		
1	Head Clerk	1	0
2	Accountant	2	2
3	Steno – II	2	0
4	Steno – III	2	0
5	Assistant Grade – II	2	1
6	Assistant Grade – III	4	1
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**	**6**

1.9 WORKING DEPARTMENTS, RESEARCH DIVISIONS AND FACILITATION CELLS OF THE INSTITUTE

Forestry research in the institute is categorized in two departments and faciliatiations cells which are as follows:

A. Forestry Department

A1. Biotechnology Research Division

Research Disciplines

1. Forest Genetics & Tree Improvement
2. Biotechnology
3. Phytochemistry
4. Tissue culture

A2. Conservation Research Division

Research Disciplines

1. Biodiversity Conservation
2. Forest Botany
3. Ethnobotany
4. Forest Ecology & Ecosystem Services

A3. Forest Management Research Division

Research Disciplines

1. Silviculture
2. Soil Science
3. Forest Protection
4. Forest Mensuration
5. Statistics
6. Joint Forest Management

A4. Forest Utilization Research Division

Research Disciplines

1. Timber & Fuel-wood Utilization
2. Medicinal & Aromatic Plants
3. Bamboos
4. Other NWFPs
5. Forest-based Livelihoods
6. Market Information System

A5. Productivity Research Division

Research Disciplines

1. Plant Propagation
2. Seed Technology & Certification

A6. Social Economics Research Division

Research Disciplines

1. Sociological Studies
2. Forest Economics
3. Agroforestry
4. Policy Research

B. Wildlife Department

B1. Animal Ecology Research Division

Research Disciplines

1. Animal Ecology
2. Conservation Biology
3. PHVA studies
4. Re-introduction, Re-wilding and Translocation

B2. Habitat Ecology Research Division

Research Disciplines

1. Habitat Management
2. Ecosytem services valuation of PAs
3. Ecological studies of terrestrial and aquatic animals
4. Ecological studies post relocation of villages

B3. Wildlife Management Research Division

Research Disciplines

1. PA Network
2. Wildlife Management
3. Man-Animal Interactions
4. Landscape Level Planning and Management
5. Corridor Management

B4. Ecotourism and Conservation Education Research Division

Research Disciplines

1. Ecotourism
2. Attended Interpretation
3. Unattended Interpretation

C. Facilitation Cells

1. Environmental Impact Assessment
2. Climate Change, Climate Justice, REDD+
3. Extension, Training & Consultancies
4. Monitoring & Evaluation
5. GIS & Remote Sensing
6. Computer & IT
7. Library
8. Documentation
9. Procurement
10. Common Research Facility

2. RESEARCH ACTIVITIES

Abstract of Research Activities

2023-2024

S. N.	Name of the Research Division	No. of Completed Projects	No. of On-going Projects	Newly Initiated Projects	No. of Regular Activities	Total
1	2	3	4	5	6	7
	Forestry Department					
1	Biotechnology	1	2	-	3	6
2	Conservation	2	4	-	2	8
3	Forest Management	-	1	-	2	3
4	Forest Utilization	1	1	-	-	2
5	Productivity	3	1	-	1	5
6	Social Economics	-	3	-	-	3
	Wildlife Department					
1	Animal Ecology	4	3	-	1	8
2	Habitat Ecology	2	1	-	1	4
3	Wildlife Management	-	1	-	-	1
4	Ecotourism and Conservation Education	-	-	-	-	-
	Facilitation Cells					
1	Environmental Impact Assessment (EIA)	1	-	-	-	1
2	Climate Change, Climate Justice, REDD+	-	-	-	-	-
3	Extension,Training & Consultancies	-	-	-	-	-
4	Monitoring & Evaluation	-	1	-	-	1
5	GIS & Remote Sensing	-	-	-	-	-
6	Computer & IT	-	-	-	-	-
7	Library	-	-	-	-	-
8	Documentation	-	-	-	-	-
9	Procurement	-	-	-	-	-
10	Common Research Facility	-	-	-	-	-
	TOTAL	**14**	**18**	**-**	**10**	**42**

2.1 FORESTRY DEPARTMENT

2.1.1 BIOTECHNOLOGY RESEARCH DIVISION

Mandate

1. Investigations on genetic variation, inheritance pattern and reproductive biology.
2. Exploring correlation between intra-specific variability and habitat characteristics.
3. Selection, testing and development of clones/varieties of commercially important tree species for desired traits.
4. Developing breeding and production populations through provenance, progeny and clonal trials.
5. Field verification of already identified 'candidate plus trees' and conservation of eligible ones to 'plus trees' after their genetic evaluation.
6. Selection of new candidate plus trees of economically important tree species having desired traits, such as faster growth, better form, drought resistance, disease resistance, insect resistance, NTFP production, etc on the basis of intra-specific genetic variability.
7. Development of microsatellite markers for important tree species.
8. Molecular marker based genetic diversity analysis of populations of important forestry species.
9. Full genome sequencing of native tree species.
10. Development of improved varieties with desired quantitative (growth) and qualitative (disease, insect, pest and drought resistance) traits through genetic engineering.
11. Wood forensic studies.
12. Development of bio-informatic tools and data base for priority species.
13. Germplasm evaluation of medicinal plants for active ingredients.
14. Study of seasonal variations in the content of secondary metabolites.
15. Determination of differences, if any, in the percentages of secondary metabolites present in medicinal plant produces of wild and cultivated origin.
16. Phytochemical analysis of forest foods-edible fruits, tubers, etc. for their nutritional values.
17. Phytochemical analysis of forestry plants for their potential utilization in preparation of bio-pesticides and bio-fertilizers.
18. Bio-prospecting for useful organic compounds in micro-organisms, plants and fungi that grow in extreme environments.
19. Evolution/standardization of cost effective micro-propagation (tissue culture) protocols for forestry species whose propagation from seeds or macropropgation is difficult due to scarce availability of mother plants for collection of seeds/cuttings or whose genetically superior candidate 'plus' trees/'plus' plants/'plus' clumps have been identified to produce 'elite' planting material.

Completed Projects :- 01

1. 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.
   Funding Agency: PCCF (Research, Extension & Lok Vaniki) M.P., Bhopal

On-going Projects :- 02

1. Genetic diversity assessment using molecular markers for elite identification of existing candidate plus trees of Teak (*Tectona grandis*) of Madhya Pradesh.
   Funding Agency: PCCF (Research, Extension & Lok Vaniki) M.P., Bhopal
2. Multilocational cum provenance trials of important forestry and bamboo species in different forest divisions of Madhya Pradesh.
   Funding Agency: PCCF (Research, Extension & Lok Vaniki) M.P., Bhopal

Regular Activities :- 03

1. Provenance trial of Litsea (*Litsea glutinosa*).
2. Maintenance of clonal germplasm of *Madhuca latifolia* (Mahua).
3. Maintenance and enrichment of Bamboosetum.

Project Summary:-

Completed Projects

1. Title of the Project : 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.

Why this Project :-

The proposed forestry species were naturally occurred in different agroclimatic zones of Madhya Pradesh but since last few decades due to over exploitation and unscientific harvesting practices designated species are comes under threat category and found only few pockets. Today, it was an urgent need to identify potential pockets and identification of CPTs of proposed species from different agroclimatic zones of M.P. as well as their multiplication through cloning was very essential.

Research Methodology :-

- Identification potential pockets – various agroclimatic zones of M.P.
- Selection of CPTs.
- Standardization of clonal propagation technique.
- Preparation of technical bulletin.

Study Design :-

- Identification of potential pockets - For this, working plans of different forest division were reviewed. Reconnaissance survey was made for identification of potential pockets of designated species from different agro climatic zones of Madhya Pradesh.
- 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 were taken for their selection. For fruit bearing species, flowering and fruiting pattern were taken under consideration.
  b. Passport information of selected of CPTs – Complete passport information was 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.
- Standardization of clonal propagation technique – For this an attempt was taken for standardizing clonal technique.

Objectives of Research:-

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

Activities Undertaken:-

Field tour was conducted in different forest divisions. Stem branches were collected and clonal propagation technique were standardized. Preparation of publication.

Cost of the Project :- Rs. 25.97 Lakhs

Outcome of Research :-

1. In this project 6 commercially important tree species of different categories (critically endangered, endangered and rare) have been selected. The broader objectives of this project were identification of their potential pockets from different agroclimatic zones of Madhya Pradesh, Identification and selection of morphologically and phenotypically superior genotypes as a Candidate Plus Trees (CPTs) and standardization of their clonal propagation technique. For achieving these objectives, reconnaissance survey were made in different agro climatic zones and in different forest divisions of Madhya Pradesh.
2. Under this project for *Buchanania lanzan* 102 trees were surveyed from 9 forest divisions covering 12 ranges and 20 compartments from 9 agroclimatic zones. Out of 102 trees total 36 phenotypically and morphologically healthy trees were selected and marked along with their geo-tagging. Potentially rich areas were found from West Chhindwara, South Panna, South Seoni, Chhatarpur, Sehore, Anoopur, Ashok Nagar, Dewas and Sidhi forest divisions. As for as its clonal propagation was concern found very difficult due to its recalcitrant nature. During the study it was also observed that the wild genetic resource of this species is declining rapidly due to unsustainable harvesting practices of their fruits before ripping.
3. Six agroclimatic zones were found potentially rich for Bija covering 9 divisions and 9 ranges. It was observed that Dindori, South Balaghat, North Balaghat and North Betul areas were richly endowed with *Pterocarpus marsupium* however South Seoni, Shepur, Mandla, Sehore and Raisen were also potentially rich areas of this species. The out standing trees phenotypically candidate plus trees were identified from these areas. The clonal propagation was also found very difficult for Bija however NAA 200 ppm concentration was induced 5% rooting response from juvenile cuttings. During the study it was observed that the natural population of this species is declining day by day due to huge biotic pressure and poor natural regeneration.
4. During reconnaissance survey it was observed that *Ougeinia oojeinensis* (Tinsa) was limited only in 7 agroclimatic zones of Madhya Pradesh which were restricted only in 8 forest divisions covering 8 ranges. The potentially rich areas were found from North Balaghat, South Seoni and Anuppoor forest divisions. The 32 healthy phenotypically superior candidate plus trees have been identified from these areas alongwith their geotagging. From the study it was clearly indicated that this species comes under critically endangered category. Therefore, today it is an urgent need to protect and conserve this valuable timber tree species by increasing its population in the forests. An attempt have also been made for standardizing its clonal propagation protocol but due to its recalcitrant nature root promoting hormone IBA at 500 ppm concentration showed only 3% rooting response.
5. *Adina cordifolia* was reported from 9 forest divisions representing 9 agroclimatic zones. Total 14 ranges and 18 compartments were surveyed during the study. From these areas 150 trees of this species were surveyed for the identification of CPTs. Total 43 genetically superior and sound healthy candidate plus have been identified so for from these areas. It was also noticed that Anuppoor, West Chhindwara, Sidhi, North Balaghat were richly endowed with this species. Due to huge biotic pressure on forests the natural population of this valuable timber tree species is declining rapidly. The other reason was also noticed its poor natural regeneration due to very poor seed germination. An attempt have also been made for standardizing its clonal propagation technique. Root promoting hormone NAA at 500 ppm concentration showed > 5% rooting response when the juvenile cuttings were treated for 30 minute.
6. During reconnaissance survey it was observed that *Grewia tiliifolia* (Dhaman) was found only in 5 forest divisions covering 5 ranges which represents 4 agroclimatic zones. More than 32 trees of Dhaman were visited from these forest areas but most of the trees of selected for CPTs only 5 phenotypically superior candidate plus trees identified from Obedullaganj, Raisen, Anuppoor, West Chindwara and South Seoni forest divisions. From the study it was concluded that Dhaman is comes under critically endangered tree species. There are reasons have been observed for

declining the natural population of this species one of them is irregular flowering habit. Clonal propagation of this species was found very difficult due to its recalcitrant nature and both the root promoting hormones NAA and IBA were failed to induce roots from juvenile cuttings.

7. *Dalbergia latifolia* (Shisham) was also found only in 3 agrocliamtic zones of Madhya Pradesh including 4 forest divisions having 6 ranges with 3 compartments. During the survey 38 trees of this species were visited so far out of which only 10 healthy and morphological superior candidate plus trees have been identified from South Seoni, W.Chhindwara, S.Chhindwara and Sehore forest divisions. So these areas were found potentially rich areas of this species. The declining of natural population of this species may be due to very slow growth and very poor natural regeneration. The vegetative propagation of this species was found very difficult hence difficult to propagate it by clonal propagation. Only new and healthy green shoot were developed from the cuttings.

Achar

Bija

Tinsa

Haldu

Dhaman

Shisham

Bija

Tinsa

Haldu

Dhaman

On-going Projects

1**. Title of the Project:- Genetic diversity assessment using molecular markers for elite identification of existing candidate plus trees of Teak (*Tectona grandis*) of Madhya Pradesh.**

Why this Project:-

The assessment of genetic diversity within and between populations is routinely performed at the molecular level using various laboratory-based techniques such as allozyme or DNA analysis, which measure levels of variation directly.

Genetic diversity may be also gauged using morphological and biochemical characterization and evaluation:

(i) Morphological characterization does not require expensive technology but large tracts of land are often required for these experiments, making it possibly more expensive than molecular assessment. These traits are often susceptible to phenotypic plasticity; conversely, this allows assessment of diversity in the presence of environmental variation.

(ii) Biochemical analysis is based on the separation of proteins into specific banding patterns. It is a fast method which requires only small amounts of biological material. However, only a limited number of enzymes are available and thus, the resolution of diversity is limited.

(iii) Molecular analyses comprise a large variety of DNA molecular markers, which can be employed for analysis of variation. Different markers have different genetic qualities (they can be dominant or co-dominant, can amplify anonymous or characterized loci, can contain expressed or non-expressed sequences, etc.).

In particular, the newer methods incorporate modifications, thereby increasing the sensitivity and resolution in detecting genetic discontinuity and distinctiveness. The advanced marker techniques also utilize newer classes of DNA elements such as retrotransposons, mitochondrial and chloroplast based microsatellites, allowing increased genome coverage. Techniques such as RAPD and AFLP are also being applied to cDNA-based templates (i.e., sequences of complementary DNA obtained by mRNA retrotranscription) to study patterns of gene expression and uncover the genetic basis of biological responses.

Molecular Assessment of Genetic Diversity are usually based on assessing the diversity of an individual using either allozymes (i.e., variant forms of an enzyme that are coded for by different alleles at the same locus) or molecular markers, which tend to be selectively neutral.

Genetic variability within a population can be assessed through:

1. The number (and percentage) of polymorphic genes in the population.

2. The number of alleles for each polymorphic gene.

3. The proportion of heterozygous loci per individual.

Protein methods, such as allozyme electrophoresis and molecular methods, such as DNA analysis, directly measure genetic variation, giving a clear indication of the levels of genetic variation present in a species or population without direct interference from environmental factors.

Madhya Pradesh forests richly endowed with large number of forestry species among them *Tectona grandis* (teak) and *Shorea robusta* (Sal) are the predominant species. State Forest Research Institute has already been identified 305 candidate plus trees of *Tectona grandis* in different forest divisions of Madhya Pradesh. The identified plus trees are the major source of genetic tree improvement programme of this species. Under keeping above consideration the use and application of molecular tools in this project, after collection of data the genetic diversity will be assessed among the selected candidate plus trees. After analysis, highly genetically diversified CPTs will be marked as elite group. After this analysis, their morphological and genetically traits will be compared to justify their genetic and phenotypic relationship.

Research Methodology: -

1. **Collection of leaf samples-**The leave samples of 305 candidate plus trees will be collected from identified candidate plus trees of teak situated in different forest divisions of Madhya Pradesh along with their GPS location.
2. **Methods of DNA extraction using CTAB (Cetyl tri-methyl ammonium bromide) protocol:**

The DNA extraction will be performed using 3.5% CTAB protocol. Approximately 50mg of tissue (fine powdered after LN-2 treatment) will be mixed with pre-warmed (65^0C) CTAB DNA extraction buffer. Pre-heated water-bath for two and half hours. The samples will then be subjected for centrifugation at room temperature (27^oC) for 15 min at 13,000 rpm. Then, the supernatant will be treated with phenol:chloroform-isoamyl alcohol (25:24:1 standard, Hi-Media) for about 10 min, followed by centrifugation at 13,000 rpm for 15 min at room temperature(27^oC). Then equal volume of C:I (Chloroform:Isoamylalcohol 24:1, make Ambresco) will be added and followed by centrifugation at 12,000 rpm for 12min at room temperature(27^oC). To obtain pure DNA RNase (Machery-Nagel) (20mg/ml) treatment will be given to the isolated samples. Allowed for incubation at 37^oC for 40 min in Thermomixer. The supernatant then transferred into fresh centrifuge tube and mixed with pre-chilled 2-Isoproponal (make J.T.Baker) and incubated for 2 hrs at -40^0C (Deep freezer) and then be centrifuged at 13,000 rpm for 15 min at 4^oC. The supernatant will be discarded and the transparent DNA pellet will be retained. The DNA pellet will be washed twice with 70% ethanol and centrifuged at 10,000 rpm for 5 min at 4^0C to remove any remaining salts in tubes. Afterwards, the pellet will be allowed to dry at room temperature (27^oC). After drying, the DNA pellet will be re-suspended in 30 - 50 µL double distilled molecular grade water. Dissolved DNA pellet will then be stored at -40^0C in deep-freezer for long term storage and further analysis such as PCR amplification etc.

3. Microsatellite amplification for genetic diversity study

i. PCR amplifications will perform in 10µl reaction mixture, consisting of approximately 20 ng of template DNA, 50mM KCl, 20mM Tris-HCl (pH 8.0), 1.5 mM MgCl2, 0.4 µM of each primer, 0.2 mM of each dNTP, and Taq DNA polymerase (Promega).

ii. The reaction mixture will subject to amplification using Real Time PCR System (Eppendorf). For an initial denaturing step of 94^0C for 3 min, 40 cycles of 94^0C for 1 min, 50^0C to 58^0C annealing temperature for 30s, 72^oC for 30 second, followed by 72^oC for 7 min. The PCR products will be separate on agarose gel electrophoresis.

4. Scoring of DNA banding pattern for assessing genetic diversity

Scoring of DNA banding patterns obtained through genetic diversity analysis will be done using bioinformatics tool named UPGMA (Unweighted Pair Group Method with Arithmetic Mean) software.

5. Selection of elite group of candidate plus trees-

After collection of data the genetic diversity will be assessed among the selected candidate plus trees. After analysis, highly genetically diversified CPTs will be marked as elite group. After this

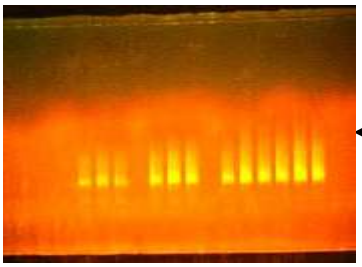
analysis, their morphological traits will be compared to justify their genetic and phenotypic relationship.

Objective of Research:-

- To isolate DNA from leaves of selected CPTs for amplification of genomic DNA.
- To assess the Genetic diversity between the identified CPTs for the identification of genetically distinct group of CPTs as elite material.
- To compare phenotypic and genotypic characters for phylo-genetic study.

Activities Undertaken:-

Recruitment of project staff. Indent for procurement of Molecular Chemicals and other equipments. As per available documents the list of previously selected candidate plus trees of Teak have been compiled along with KML file for 99 CPTs as per available records and GPS location. The diluted Teak primers have been tested for their amplification using RTPCR but poor amplification have been observed and the gel image bands are not clear. The new 83 sequence arrangement of Teak primers have been designed for assessing genetic diversity through primer3 software. Identification of Candidate Plus Tree work is in progress.



DNA Band not found from diluted primers

Cost of the Project: - Rs. 27.60 Lakhs

Expected Outcome of Research:-

1. Candidate Plus Trees are identified in different forest divisions of Madhya Pradesh which were selected under genetic tree improvement programme by State Forest Research Institute Jabalpur. These candidate plus trees were selected on the basis of their phenotypic traits.
2. Normally, long rotation forestry crops such as teak selection of elite material is quite difficult and time taking. This may be possible through their progeny testing which requires number of years to evaluate their field performance and on the basis of progeny performance the CPTs are converted into plus trees.
3. Today biotechnological interventions such as molecular markers are available which can be used for assessing genetic diversity within and between the populations. This will help for the identification of genetically distinct genotype, populations or group of populations for elite selection within a short span of time.
4. In the proposed project after analysis of genomic data of candidate plus trees of teak genetically distinct PT or group of PTs will be identified as a source of elite group on the basis of their genetic makeup.
5. After this analysis, their morphological/phenotypical traits will be compared to justify their genetic and phenotypic relationship because DNA is non manipulable material and environment does not effect on it.
6. This study will help to identify elite germplasm of this valuable timber species for further genetic improvement programme and the DNA of CPTs will be stored in the form of DNA library for further studies.

2. Title of the Project:- Multilocational cum provenance trials of important forestry and bamboo species in different forest divisions of Madhya Pradesh.

Why this Project:-

The literal meaning of provenance defines the place of origin or source. In forest genetic studies, provenance trials are studied about the geographical source of plants or their places of origin from where the plants or seed sources have been collected. In this type of studies, indigenous / local species or species obtained from other places are planted in different multilocations/agro-climatic zones and their growth performance in which their survival percentage, their growth performance are studied from them. Thus, the species whose provenance performs well in different multilocations/agro-climatic zones are propagated and planted on a large scale under genetic and tree improvement programme.

A massive root trainer plantation activities of Aonla, Chirol, Harra, Bahera, Achar, Sissoo, Shisham, Sagon and other forestry species in 63 territorial forest division of Madhya Pradesh has been proposed by Principal Chief Conservator of Forest, Research Extension & Lok Vaniki, Bhopal in which the root trainer plants of above mentioned species will be planted during rainy season 2022. Keeping under above consideration an attempt will also made (as per the availability of seeds) under R & E activities for multilocational cum provenance trials of Bija, Haldu, Tinsa, Dhaman, Achar, Shisham and *Dendrocalamus stocksii* in above proposed plantation activities for observing best performing provenance of these species in various territorial forest divisions.

Research Methodology: -

1. **Seed collection –** CPTs of Bija, Haldu, Tinsa, Dhaman, Achar and Shisham will be selected from Balaghat, Chhindwara, Seoni, Seoni, Chhindwara and Chhindwara provenances respectively. The seeds will be collected from identified CPTs.
2. **Raising of plants –** Collected seeds will be handed over to Conservation Division of SFRI for raising of root trainer plants. *Dendrocalamus stocksii* will multiplied by stem branch cuttings/macro-proliferation.
3. **Species wise Number of plants required for multilocational cum provenances trial**– 20 plants of each proposed species will require for their multilocational cum provenance trials. At each territorial division, 20×6 (provenances) = 120 plants of each species will be require for 1 replication and thus total 120×4(replication) = 480 plants will be required for each division. In this way total 528 plants (including causality replacement) will be required for 1 division. Thus total 528×63 (division) = 33264 will be required. An attempt will also made for raising of *Dendrocalamus stocksii* plants by stem branch cuttings/macro-proliferation. 15 plants of this bamboo species will be planted with 4 replications at 16 forest divisions. In this way total 1056 plants (including 10% casualty) of *Dendrocalamus stocksii* will be required under this project.
4. **Growth data observations** – The various parameters of growth data such as height, girth, survival percent, number of culms per clump will be recorded annually during September and October.
5. **Causality replacement** – The number of plants under causality will be replaced next year after the plantation.

Study Design : The multilocational cum provenances trial will be done at RBD design as mentioned below.

Design of forestry species								
Provenances	**Treatments**	**Replications**	**Treatments**					
Balaghat	T1	R1	T1	T2	T3	T4	T5	T6
Chhindwara	T2							
Seoni	T3	R2	T6	T5	T4	T3	T2	T1
Seoni	T4							
Chhindwara	T5	R3	T4	T1	T6	T5	T3	T2
Chhindwara	T6	R4	T5	T4	T1	T2	T6	T3

Provenances	Treatment	Replications
Jabalpur	*Dendrocalamus stocksii* (Treatment-1)	R1
		R2
		R3
		R4

Plantation site map –

R1	(T1) Balaghat Bija 20(4×4)	(T2) Chhindwara Haldu 20(6×6)	(T3) Seoni Tinsa 20(2×3)	(T4) Seoni Dhaman 20(4×4)	(T5) Chhindwara Achar 20(4×4)	(T6) Chhindwara Shisham 20(4×4)
R2	(T6) Chhindwara Shisham 20(4×4)	(T5) Chhindwara Achar 20(4×4)	(T4) Seoni Dhaman 20(4×4)	(T3) Seoni Tinsa 20(2×3)	(T2) Chhindwara Haldu 20(6×6)	(T1) Balaghat Bija 20(4×4)
R3	(T4) Seoni Dhaman 20(4×4)	(T1) Balaghat Bija 20(4×4)	(T6) Chhindwara Shisham 20(4×4)	(T5) Chhindwara Achar 20(4×4)	(T3) Seoni Tinsa 20(2×3)	(T2) Chhindwara Haldu 20(6×6)
R4	(T5) Chhindwara Achar 20(4×4)	(T4) Seoni Dhaman 20(4×4)	(T1) Balaghat Bija 20(4×4)	(T2) Chhindwara Haldu 20(6×6)	(T6) Chhindwara Shisham 20(4×4)	(T3) Seoni Tinsa 20(2×3)

The above planting design will replicate all 63 divisions.

The spacing of proposed species will be 6×6 mt for Haldu, 2×3 mt for Tinsa, 4×4 mt for Bija, 4×4 mt for Achar, 4×4 mt for Shisham, 4×4 mt for Dhaman and bamboo species at 4×4 mt. Approx 1.5 hectare area in each territorial division will require for proposed forestry and bamboo species.

Objective of Research:-

- To evaluate best performing provenance by multilocational cum provenance trial.

Activities Undertaken:-

Collection of seeds of from CPTs. Root trainer, root trainer mixture, root trainer stands, green shed net, soil, sand, polythene, soil, FYM. Multilocational trial of proposed species in 63 territorial forest divisions for forestry species and 16 divisions for bamboo species.

1. Correspondence made with 16 forest divisions regarding preparation of plantation activities.
2. Seeds of Haldu, Achar, Bija and Shisham have been collected from prescribed areas as per project proposal.
3. Procurement of 1200 plant of D.stocksii. from IWST, Bengaluru.
4. Supply of plants of *Dalbergia latifolia* and *D.stocksii* to DFO Damoh, S.Seoni, N.Balaghat and Gwalior for plantation in provenance trial as per design prescribed in project proposal.
5. Plants of Haldu, Achar and Bamboo species are ready to supply in this monsoon season to remaining forest division.

Cost of the Project: - Rs. 31.83 Lakhs



Expected Outcome of Research:-

Evaluation of best performing provenance from different forest division of proposed species

Regular activity

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

Why this Project:-

Litsea glutinosa commonly known as maida chal belongs to family Lauraceae is an evergreen tree. Its bark contains active alkaloid known as laurotetanine which is a derivative of tannic acid and is very useful in several diseases and also used in cosmetic industries. Due to increased demand of bark by Agarbatti industry, the trees are completely stripped for the extraction of bark. The prevailing destructive practices have threatened the survival of this very precious species in the state of Madhya Pradesh and hence this species becomes under the threatened category. Today, its *ex-situ* conservation is one of the major challenging tasks because it is highly recalcitrant in nature. Keeping under above considerations a provenance trial has been taken up in SFRI campus for its *ex situ* conservation and observing best performing provenance.

Research Methodology:-

A provenance trial of *Litsea glutinosa* has been taken up in SFRI campus in the year 2010-11 with 8 provenances from Jagdalpur-15 , Pachmarhi-15, Baihar – 16, Lalbarra (Balaghat)-20, Patalkot – 15, Rewa – 15, Betul – 15, Langhi (Balaghat)-15 plants (total 126 plants). The plants were raised through stem branch cuttings under mist chamber. The best performing provenance will be evaluated on the basis flowering & fruiting pattern, height and girth.

Study Design:-

Total plants 126
Number of provenances 8
Spacing 3×3 meter

<table>
<tr><td>1. Jagdalpur Total plants = 15 (3 lines of 5 plants each)</td><td>2. Pachmarhi Total plants = 15 (3 lines of 5 plants each)</td><td>3. Lanji (Balaghat) Total plants = 15 (3 lines of 5 plants each)</td><td rowspan="2">4. Lalbarra Balaghat Total plants = 20 (2 lines of 5 plants each in block one and 2 lines of 5 plants each in block two)</td></tr>
<tr><td>5. Patalkot Total plants = 15 (3 lines of 5 plants each)</td><td>6. Rewa Total plants = 15 (3 lines of 5 plants each)</td><td>7. Betul Total plants = 15 (3 lines of 5 plants each)</td></tr>
<tr><td colspan="4">8. Baihar Balaghat
Total plants = 16
(2 rows of 8 plants each)</td></tr>
</table>

Objective of Research:-

- Maintenance and collection of growth data.

Activities Undertaken:-

- Lopping of branches, removal of weeds, soil working, data collection of data on -height, girth, flowering and fruiting etc

Cost of the Project - Rs. 0.50 Lakhs

Expected Outcome of Research:-

As Litsea glutinosa is critically endangered tree species of forest of Madhya Pradesh. By provenance trial of this species the best performing provenance will be evaluated and will be further used for genetic and tree improvement programme.

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

Why this Project:-

Mahua is a versatile fruit bearing tree species which occurred in different forest division of M.P. It is considered as a valuable tree which yields fuel, edible flowers, oil yielding fruits, fuel and timber. The fermented flowers can be used to produce country liquor. The oil obtained from its fruits is used for cooking by tribal. It has been noticed that Mahua is not being planted and old trees are dying due to human interference and natural calamities. Deforestation and increasing population are mainly responsible. Loss of qualitative germplasm is another important factor. If tribal are supplemented with quality planting material such as the grafted plants of quality germplasm which will give early fruiting and tribal can enhance their economy substantially. The germplasm consisting of 36 grafted Mahua plants were planted in 2010-11. At present 26 grafted Mahua plants are available. In this regular activity the flowering and fruiting behavior from grafted mahua plant will be observe.

Research Methodology:-

The germplasm consisting of 36 grafted Mahua plants from 6 plus trees (6 clonal plants from each plus tree) was raised in the SFRI campus during 2010-11.

Study Design:-

SFRI-5	SFRI-4	SFRI-3	SFRI-2	SFRI-1	Damoh
36	30	24	18	12	6
35	29	23	17	11	5
34	28	22	16	10	4
33	27	21	15	9	3
32	26	20	14	8	2
31	25	19	13	7	1

Objective of Research:-

- Maintenance of clonal germplasm and recording of flowering and fruiting time.

Activities Undertaken:-

Pruning of branches, soil working, application of FYM, removal of weeds, data collection on - height, girth, flowering fruiting etc.

Cost of the Project - Rs.0.50 Lakhs

Expected Outcome of Research:-

The germplasm of Mahua can be utilized as genetic resource for further tree improvement programme.

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3. Title of the Project:- - **Maintenance and enrichment of Bamboosetum.**

Why this Project:-

Bamboos are very important for making different kind of items and presently bamboo stands next to timber species. SFRI consist about 1 hectare area covered under various important 37 bamboo species 12 genera. The main objective of proposed regular activities is to maintain and to create awareness among various stakeholders such as farmers bamboo growers, students etc. Bamboosetum plays an important role in ex-situ conservation of different species/varieties of bamboo. The another important objective of proposed regular activity is to enrich with new bamboo species for the enrichment of this Bamboosetum. By the proposed regular activities of enrichment and maintenance of existing Bamboosetum will also help for multiplication of important bamboo species and will also useful to create awareness among the people for physical identification of different bamboo species.

Research Methodology:-

The existed bamboosetum of 1 hectare area including 37 species covering 9 genera will maintained through soil working. The growth data of these species will be recorded in terms of number of culms per clump, height and collar dia. For enrichment of bamboosetum the new bamboo species will be introduce from north east, West Bengal, RFRI, KFRI etc.

Study Design:-

For introducing of new species a spacement 4×4 meter will be applied in a pit size 45×45×45 cm.

Objective of Research:-

To maintain and enrich Bamboosetum of SFRI.

Activities Undertaken:-

Preparation of thalas, irrigation, removal of weeds, soil working, data collection on - height, collar girth, number of culms per clump etc

Cost of the Project - Rs.1.00 Lakhs

Expected Outcome of Research:-

Enrichment of bamboo species in Bamboosetum for further multiplication and conservation.

Other significant achievements.: Potential pockets and CPTs of Bija, Haldu, Tinsa, Dhaman, Achar and Shisham as good genetic resource have been identified from different agroclimatic zones of Madhya Pradesh covering various forest divisions.

2.1.2 CONSERVATION RESEARCH DIVISION

Mandate

1. Identification of biodiversity rich forest areas in the state and assessment of present biodiversity status in them.
2. Identification of locally rare, endangered and threatened species in wild and development of their *in-situ* and *ex-situ* conservation techniques.
3. Assessment of the biodiversity conservation status in the existing MPCAs/PPAs and suggesting need-based management of intervention for improvement.
4. Identification of suitable forest areas for the establishment of new MPCDAs and recording/documentation of base line data on biodiversity in them.
5. Assessment of the functioning of Biodiversity Management Committees (BMCs) and suggesting measures for improvement.
6. Assessment of the status of Access Benefit Sharing (ABS) and suggesting measures for improvement.
7. Assessment of region-specific potential of NTFP production in forests.
8. To investigate into the infestation of various insect pests in forest nurseries, plantations and forest areas; and suggest suitable preventive/control measures, preferably cultural and/or biological control measures.
9. To study the extent and frequency of occurrence of various diseases in forest nurseries, plantations and forest areas; identification of causative organisms and suggesting suitable prophylactic and control measures, preferably cultural and/or biological control measures.

Completed Project : 02

1. राज्य औषधीय पादप बोर्ड, उड़ीसा से आये 15 किसानों के समूह हेतु पांच दिवसीय (दिनांक 21.02.2024 से 25. 02.2024 तक) प्रशिक्षण एवं परिचयात्मक (exposure visit) दौरा–सह–प्रशिक्षण कार्यक्रम।

   Funding Agency: राज्य औषधीय पादप बोर्ड, उड़ीसा

2. मध्य प्रदेश राज्य की जैव विविधता एवं पारिस्थितिक तंत्र सेवाओं के मूल्यांकन एवं प्रबंधन हेतु विभिन्न वनमण्डलों के प्रशिक्षकों की दो दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन।

Funding Agency: मध्य प्रदेश राज्य की जैव विविधता बोर्ड, भोपाल

Ongoing Project: 01

1. Collection and *Ex–situ* conservation of medicinal and aromatic plants in Gene-bank of SFRI, Jabalpur and their management.
   Funding Agency: M.P. State Biodiversity Board, Bhopal
2. Conservation of Boabab Tree (*Adensonia digitata*) through development and extension of it's nursery, plantation and conservation techniques in Dhar District of Madhya Pradesh.
   Funding Agency: M.P. State Biodiversity Board, Bhopal
3. Restoration of Botanical Garden of S.F.R.I. Jabalpur.
   Funding Agency: Director SFRI, Jabalpur
4. Periodic observations in preservation plots established in different forest types of Madhya Pradesh.
   Funding Agency: Director SFRI, Jabalpur

Regular Activities : 02

1. Preparation of quality planting material of RET and other important species
   Funding agency : SFRI, Jabalpur
2. Maintenance of Forest Herbarium, SFRI Jabalpur
   Funding agency : SFRI, Jabalpur

Project Summary:-

Completed Project

1. Title of the Project: राज्य औषधीय पादप बोर्ड, उड़ीसा से आये 15 किसानों के समूह हेतु पांच दिवसीय (दिनांक 21.02.2024 से 25.02.2024 तक) प्रशिक्षण एवं परिचयात्मक (exposure visit) दौरा–सह–प्रशिक्षण कार्यक्रम।

Why this Project:-

राज्य औषधीय पादप बोर्ड, उड़ीसा के चाहे अनुसार औषधीय पौध एवं पारम्परिक फसलों की उन्नत खेती एवं बाजार व्यवस्था पर उनके द्वारा चयनित किसानों को तकनीकी एवं व्यवहारिक प्रशिक्षण प्रदाय कर औषधीय पौध की खेती के लिये प्रोत्साहित करना।

Objectives of Research:-

- राज्य औषधीय पादप बोर्ड, उड़ीसा के 15 किसानों के समूह हेतु पांच दिवसीय प्रशिक्षण एवं परिचयात्मक (exposure visit) दौरा–सह–प्रशिक्षण कार्यक्रम आयोजित किया गया।

Activities Carried out:-

- राज्य वन अनुसंधान संस्थान, जबलपुर में राज्य औषधीय पादप बोर्ड, उड़ीसा से आये 15 किसानों के समूह हेतु पांच दिवसीय (दिनांक 21.02.2024 से 25.02.2024 तक) प्रशिक्षण एवं परिचयात्मक (exposure visit) दौरा–सह–प्रशिक्षण कार्यक्रम आयोजित किया गया। इस कार्यक्रम हेतु राज्य औषधीय पादप बोर्ड, उड़ीसा से वित्तीय सहायता प्रदाय की गयी थी। राज्य वन अनुसंधान संस्थान के नेतृत्व में महाकौशल क्षेत्र के अंतर्गत औषधीय पौध एवं पारम्परिक फसलों पर अनुसंधान कार्य कर रहें विभिन्न शैक्षणिक संस्थाओं एवं सफल उद्यमी किसानों के क्षेत्रों का भ्रमण करवाकर उन्हे औषधीय पौध एवं पारम्परिक फसलों की उन्नत खेती एवं बाजार व्यवस्था पर तकनीकी व्यवहारिक प्रशिक्षण दिया गया।
- प्रतिभागियों को जबलपुर के आासपास के दार्शनिक स्थल जैसे भेड़ाघाट एवं घुघवा नेशनल पार्क का भी भ्रमण करवाया गया।

Cost of the project: Rs.3,71,794/-

कार्यक्रम का शुभारंभ एवं क्षेत्र भ्रमण

2. Title of the Project: मध्य प्रदेश राज्य की जैव विविधता एवं पारिस्थितिक तंत्र सेवाओं के मूल्यांकन एवं प्रबंधन हेतु विभिन्न वनमण्डलों के प्रशिक्षकों की दो दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन।

Why this Project:-

वन विभाग के अधिकतर क्षेत्रीय अमले एवं BMC/JFMC सदस्यों को औषधीय पौधें, खरपतवार एवं अकाष्ठीय लघुवनोपज की पहचान करवाने, जैवविविधता का आंकलन एवं आंकडों का संधारण तथा जैवविविधता आंकलन की समय अवधि की जानकारी देने के लिये एवं BMC/JFMC सदस्यों को जागरूक करने के लिये यह परियोजना तैयार की गयी है।

Methodology:-

मध्य प्रदेश की जैव विविधता एवं पारिस्थितिकीय तंत्र सेवाओं के मूल्यांकन एवं प्रबंधन हेतु मध्य प्रदेश राज्य जैव विविधता बोर्ड, भोपाल द्वारा विभिन्न वनमण्डलों के चयनित प्रशिक्षकों (TOTs) को भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान, कोलकाता के विषय विशेषज्ञों द्वारा प्रशिक्षण दिया गया। दो दिवसीय इस प्रशिक्षण कार्यक्रम की रूपरेखा जिसमे प्रथम दिवस में तकनीकी एवं शैक्षणिक सत्र तथा द्वितीय दिवस में क्षेत्र का परिचयाात्मक दौरा एवं सम्पूर्ण व्यवस्था संस्थान के द्वारा किया गया।

Training Design:- इस दो दिवसीय दिवसीय प्रशिक्षण कार्यक्रम निम्न रूपरेखा में सम्पादित किया गया।

प्रशिक्षण दिवस	कार्यक्रम / विषय
प्रथम दिवस 05/03/2024 10.00 AM - 05.30 PM	• पंजीयन एवं पाठ्य सामग्री वितरण एवं तकनीकी सत्र • कार्यक्रम की रुपरेखा एवं परिचय। • योजना पर प्रशिक्षकों को जानकारी प्रदाय करना। • आमंत्रित विभाग के प्रतिनिधि का प्रस्तुतिकरण। • पॉवर पांइट के माध्यम से एवं व्यवहारिक प्रशिक्षण
द्वितीय दिवस 06/03/2024 9.00 AM - 05.30 PM	• फील्ड में व्यवहारिक प्रशिक्षण • परिचर्चा एवं फीडबैक • प्रमाण पत्र वितरण एवं कार्यक्रम समापन

Objectives of Research:-

- मध्य प्रदेश राज्य जैव विविधता बोर्ड द्वारा चयनित विभिन्न वनमण्डलों के प्रशिक्षकों के लिए मध्य प्रदेश राज्य की जैव विविधता एवं पारिस्थितिक तंत्र सेवाओं के मूल्यांकन एवं प्रबंधन विषय पर दो दिवसीय प्रशिक्षण के माध्यम से विभिन्न मापदण्डो के आधार पर जैव विविधता के आकंडे संकलित करने की जानकारी प्रदाय करना।

Activities Carried out:-

- इस परियोजना के क्रियान्वयन हेतु निम्नानुसार कार्यवाही की गयी। दो दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन किया गया जिसमें 50 प्रतिभागियों हेतु प्रशिक्षण–सह–कार्यशाला का आयोजन किया गया। विभिन्न वन मण्डलों से मध्य प्रदेश राज्य जैव विविधता बोर्ड द्वारा चयनित विभिन्न प्रशिक्षकों को इस प्रशिक्षण–सह–कार्यशाला में आमंत्रित किया गया। प्रशिक्षण हेतु प्रशिक्षक प्रशिक्षणार्थियों का चयन संबंधित वित्त पोषित संस्था के वरिष्ठ अधिकारियों द्वारा किया गया। प्रशिक्षणार्थियों के रुकने एवं भोजन की व्यवस्था के साथ ही दो दिवसीय प्रशिक्षण कार्यक्रम की रूपरेखा तैयार की गई जिसमे प्रथम दिवस में तकनीकी एवं शैक्षणिक सत्र तथा द्वितीय दिवस में क्षेत्र का परिचयाात्मक दौरा भ्रमण परियोजना अंतर्गत राज्य वन अनुसंधान संस्थान, जबलपुर के द्वारा किया गया।

Cost of the project: Rs. 6,53,170/-

Outcome of the Project:-

इस दो दिवसीय प्रशिक्षण–सह–कार्यशाला में मास्टर ट्रेनर्स (TOTs) जैवविविधता के आंकलन की विधि सीखकर अपने क्षेत्र में Biodiversity Management Committees (BMC's) के सदस्यों को जैव–विविधता के विभिन्न पहलुओं को समझेंगे एवं प्रदेश की जैव विविधता एवं पारिस्थितिक तंत्र सेवाओं के मूल्यांकन एवं प्रबंधन के कार्य में दक्षता प्राप्त करेगें।

क्षेत्र भ्रमण एवं प्रमाण पत्र वितरण

Ongoing Project

1. Title of the Project:- Collection and Ex–situ conservation of medicinal and aromatic plants in Gene-bank of SFRI, Jabalpur and their management.

Why this Project:-

The Gene bank of medicinal plants has been established in the year 1996 in the institutes premise. The main objective of constructing this gene bank is to conserve important medicinal and aromatic plant species. The proposed work will be helpful in ex-situ conservation of more medicinal plants (total target is 600 species). This will also helpful in creating awareness among the forest field staff, farmers, students and members of other institutions regarding the identification and conservation practices of these medicinal and aromatic

Research Methodology:- This is not a research project but following works will be carried out under the project.

Detailed action plan:

In State Forest Research Institute, a medicinal plant gene bank is already existed. This gene bank is needed to be strengthened by adding new species or new strains.

a. **Collection of new plants:** Survey will be made in different forest areas, institutions, farmer's field for collection of new species. Beside this seeds will also be procured from different sources to enrich the medicinal plant gene bank.
b. **Development and maintenance of demo plots:** We have already developed several plots like – Medicinal Climborium, Navgrah Vatika, Nakshatra Vatika, seed collection and vegetative cutting collection plots etc. These plots needed to be enriched with new species and regular maintenance.
c. **Development of new plots**: Some open plots of different important species will be developed with proper information regarding the identification and utility of the plant.
d. **Plant utility display:** For each species labels will be prepared showing information regarding its local name, scientific name, uses etc.
e. **Maintenance of gene bank of medicinal plant and infrastructures:** All above mentioned structures including live plants will be maintained under the project.

Study Design:- This is not research project but work will be carried out as scheduled in following table

Work	1st Quarter	2nd quarter	3rd quarter	4th quarter
Staff selection	*			
Collection of plants	*	*	*	*
Procurement of materials	*	*		
Display of plants	*	*	*	*
Report preparation and submission to funding agency		*		*

Activities Carried out: -

- Maintenance of Medicinal plant nursery.
- Collection of plants in five replicates.

Cost of the Project:- 22.37 Lakhs

Expected Outcome of the Project : -

- This work will help in *Ex-situ* conservation of about 600 medicinal and aromatic plant species in the medicinal plant gene bank. This will be a self explanatory presentation.

2. Title of the Project:- Conservation of Boabab Tree (*Adensonia digitata*) through development and extension of it's nursery, plantation and conservation techniques in Dhar District of Madhya Pradesh.

Why this Project:-

This project is designed as per the requirement of the M.P. State Biodiversity Board Bhopal. In this project nursery technique through seed and stem cuttings will be developed. Although plants of this species are prepared in most of the nursery but simple techniques of plants preparation will be developed so that local people of Dhar District will be able to prepare the plants. Similarly, plantation methodology will be developed using all precausions for its success. Awareness programme will be organized in Dhar district for its multiplication, plantation and conservation.

Research Methodology:-

a. **Survey:** Survey will be conducted in entire Dhar district to study the problems regarding conservation of this species. Discussion will also made with officials, field staff and local people especially with traditional healers, botanist etc. regarding the conservation of this species.

b. **Development of nursery techniques:** Survey will be made in different sites of study area for seed collection of this species. Beside this seeds some stem cuttings will also be procured for development of nursery techniques. Nursery technique through seed is already developed but plantlets development through stem cutting to be standardized.
c. **Extension of developed nursery and plantation technique:** Trainings on nursery and plantation will be given to the local people of the Dhar district. Prepared, plantlets will be provided free of cost to the local people of Dhar District and nearby areas (suggested by funding agency) with proper plantation methods to be adopted. This will help in conservation of the species in this area.
d. **Sustainable use of fruits and other parts:** Study will also carry out to identify the local utility of fruits and other parts and present trends/methods of its harvesting. To minimize the over harvesting suitable harvesting methods will be sorted. Information on suitable harvesting methods will be provided to the local people. This will help in conservation of the species in this area.

Study Design:- This is a research project will be carried out as scheduled in following table

Work	1st year	2nd year	3rd year
Staff selection	*		
Surevey, Collection of fruit/cutting for nursery technique.	*	*	
Preparation and Mainantance of plants by Social Forestry Indore.	*	*	
Training, plants and literature distribution.		*	*
Report preparation and submission to funding agency		*	*

Objectives

- To standardize the nursery technique through seeds and stem cuttings.
- To identify the factors effecting sustainability of the species in Dhar district.
- To create awareness programme among the local people for conservation of this species.
- To compile the traditional knowledge of local people regarding the species.

Activities Carried out: - Following experiments are laid in the nursery.

- To study the impact of rooting hormone on vegetative propagation of the species through stem cutting.
- To study the impact of air-layering on plant preparation.
- To study the impact of chemical on seed germination.

Cost of the Project:- 26.32 Lakhs

Expected Outcome of the Project : -

- This work will be helpful in *ex-situ* conservation of Baobab Tree (*Adensonia digitata*) in Dhar area.

Extension of work:

Information regarding the medicinal, economical and environmental value of this species will be shared with forest field official viz. DFOs and field staff of Dhar. Training on nursery, plantation and conservation of this species will be provided to Local administration and people, staff of the forest department so they will help in conservation of this species.

3. Title of the Project:- Restoration of Botanical Garden of S.F.R.I. Jabalpur

Why this Project:-

Madhya Pradesh is one of the largest states of India. Vegetation diversity of the state is typical representative of India biota which includes considerable components from Africa, Europe, Eurasia, Malaya, China and even Japan. Due to wide range of climatic variation and corresponding diversity in vegetation, Madhya Pradesh falls under the well known phyto-geographical zone., “Central

India". The state is endowed with various forest types ranging from dry thorn forests to tropical dry deciduous, tropical moist deciduous and sub-tropical forest types. With its large geographical area, it is a storehouse of vast flora, some of which are under threat and some others are at the verge of extinction. Madhya Pradesh is unique for topographical features, biodiversity and natural heritage. Botanical Survey of India has documented about 2500 species of angiosperms in "Flora of M.P."

As a part of conservation programme, State Forest Research Institute, Jabalpur established a Botanical Garden in 1976 over an area of 4.25 ha. The Botanical Garden harbors 112 tree species including indigenous and endangered species and those of multifarious utility. Besides, there are about 100 species of herbs, shrubs and climbers of medicinal and ethno-botanical importance. SFRI-BG is unique in terms of its scientific arrangement of plants adopting Bentham and Hooker's classification system. The objective for establishing the botanical garden was of scientific and educational utility for various stakeholders e.g. forest officials, students, research scholars, general public etc. It also help to conserve the genetic resources of various forestry species.

The maintenance and strengthen of the botanic garden in different phases will be of vital importance for conservation. Presently botanical garden is lacking proper signage, details of species and aesthetic value. Hence, the project is proposed for the restoration of Botanical garden.

Research Methodology:- Detailed action plan:

A. Maintenance and strengthening of the Infrastructure

- **Repair of barbed wire and chain-link fencing:** The garden was fenced with chain-link fencing. The fencing damaged at several places, requires to be repaired.
- **Repair of Irrigation network:** One overhead tank of 3000 litre capacity with a network of pipes/ macro irrigation system was installed in the garden which needs to be repaired and maintained for its effective working.
- **Maintenance and Construction of Inspection paths**: Both, paver paths and murram paths have been constructed which are required to be maintained and repaired at few places. New paths are also needed to be developed for better surveillance.
- **Repair of light system:** There is need to erect electric poles and to maintain the existing light system for protection purposes.
- **Erection of signage's:** There is need to display information about the trees which can be done by erecting the signage's as a bar code.

B. Maintenance and protection of garden

Routine maintenance will be done for plants conserved in the garden by soil working, application of fertilizers, insecticides and pesticides as and when required and replacement of plants as required.

Study Design:-

i. Civil work - Maintenance of fencing,irrigation and light system.

ii. Proper display of information for each species in different sectors will be given in following way through Bar code-

Botanical Name` `
Family
Local Name
Habit/Habitat
Characters
Flowering/Fruiting
Uses

Objectives

- To maintain and strengthen the infrastructure of the Botanical Garden.
- To Interpret existing forestry species of the garden

Activities Carried out: -

JRF (01), Wages, barcodes stickers, Office expenses, computer stationary, civil material, light system, irrigation material, fertilizers, plants, Preparation of final report and miscellaneous work

Cost of the Project:- Rs.14.24 Lakhs

Expected Outcome of the Project : -

- Erection of sinage's will improve the understanding of forestry species to different stake holders.
- Aesthetic value of the garden will be improved.
- Genetic resources of different forestry species will be available for further improvement program

4. Title of the Project:- Periodic observations in preservation plots established in different forest types of Madhya Pradesh

Why this Project:-

The forest are shrinking and environmental conditions are eroding day by day. In order to improve the environmental conditions, it is necessary to promote conservation, more area under forest and scientific management of existing natural forests. The national forestry policy of 1988 aims at restoring ecology balance and conservation of country's biodiversity through technically viable and ecologically sustainable management practices. The policy stresses on scientific research to reduce the danger of environmental pollution, energy crisis, loss of biological diversity and management of natural resources due to environmental and economic development needs of human civilization.

In present scenario of climate change, the role of natural forests is being increasingly felt for diverse intangible ecosystem services than the tangible economic goods. Due to wide range of climate and corresponding diversity in the vegetation, Madhya Pradesh falls under the well known Phyto-geographical zone viz; "Central India". The characteristic tree species in this zone are Teak, Sal and miscellaneous species. The ground vegetation is dominated by grasses with number of legumes and forbs. The State is endowed with various forest types ranging from dry thorn forests to tropical dry deciduous, tropical moist deciduous, sub tropical and semi evergreen types.

As per the revised classification of Champion and Seth (1968), there are 23 major forest types occurring in the State. In order to represent different forest types of Madhya Pradesh, there are 39 preservation plots established in protected and unprotected forests areas of the state. Of these, 11 preservation plots are old and established in collaboration of Forest Research Institute, Dehradun on the recommendation of IIIrd All India Silvicultural Conference, 1929. Rest of 28 preservation plots are of recent origin and established from 1999 onwards. Preservation plots are miniature nature reserves to represent ecological models of different forest types. Preservation plots (PP) were named as 'miniature nature reserves' by S.K. Seth. According to Ghosh and Kaul (1997), preservation plots were one of the leading examples of nature reserves in the country. They emphasized the need to extend the objectives of management and protection to the flora and fauna. These permanent field laboratories provide excellent opportunity for scientific pursuits under natural conditions within such ecosystems for better understanding of resource economics and management, preservation of natural flora as gene pools in their diversity for future use and baselines for all reference points performance of other ecosystems judged. Rodgers (1991) indicated that the preservation plots covering vast range of forests types in India could play a major role in national efforts to conserve biodiversity.

Most preservation plots have retained their original structure and phytosociology. However, according to recent report the status of some preservation plots have been subjected to varying degree of biotic interferences and developmental pressure and some plots had to be abandoned. The main objective of maintaining preservation plot is to understand the successional behavior of forest biodiversity and climatic climax of the forest. Growth data of miscellaneous species occurring in natural forests have not yet been recorded. The preservation plots will serve the purpose to conduct growth study on successional change in biodiversity status, impact of climate change and carbon sequestration.

Climate change is the most important issue in current time. In the present scenario of climate change, it has become necessary to understand the role and importance of forests to counter such situation. Climate change due to planetary movement is natural and very slow while change due to biotic interference (human pressure) is very fast. The disturbance in carbon cycle is the combined effect of natural process as well as human pressure i.e. excessive exploitation of fossil fuel, deforestation, degradation, forests fire, change in land use pattern, etc.

This project is proposed to know forest composition of various forest types through measuring various parameters i.e. density, frequency, abundance, basal area, IVI and Biodiversity index. It will also help to understand the variations in vegetational associations in particular forest types which in turn provide the different stages involved in ecological succession in future. This project also provide valuable information on climate resilience species in various forest types by correlating various climatic parameters. The study will also useful for future conservation policies for different species through amendment in management plan.

Research Methodology

a. Assessment of phyto-diversity.

b. Assessment of impact on vegetation due to climatic variables.

For Phyto-diversity study-

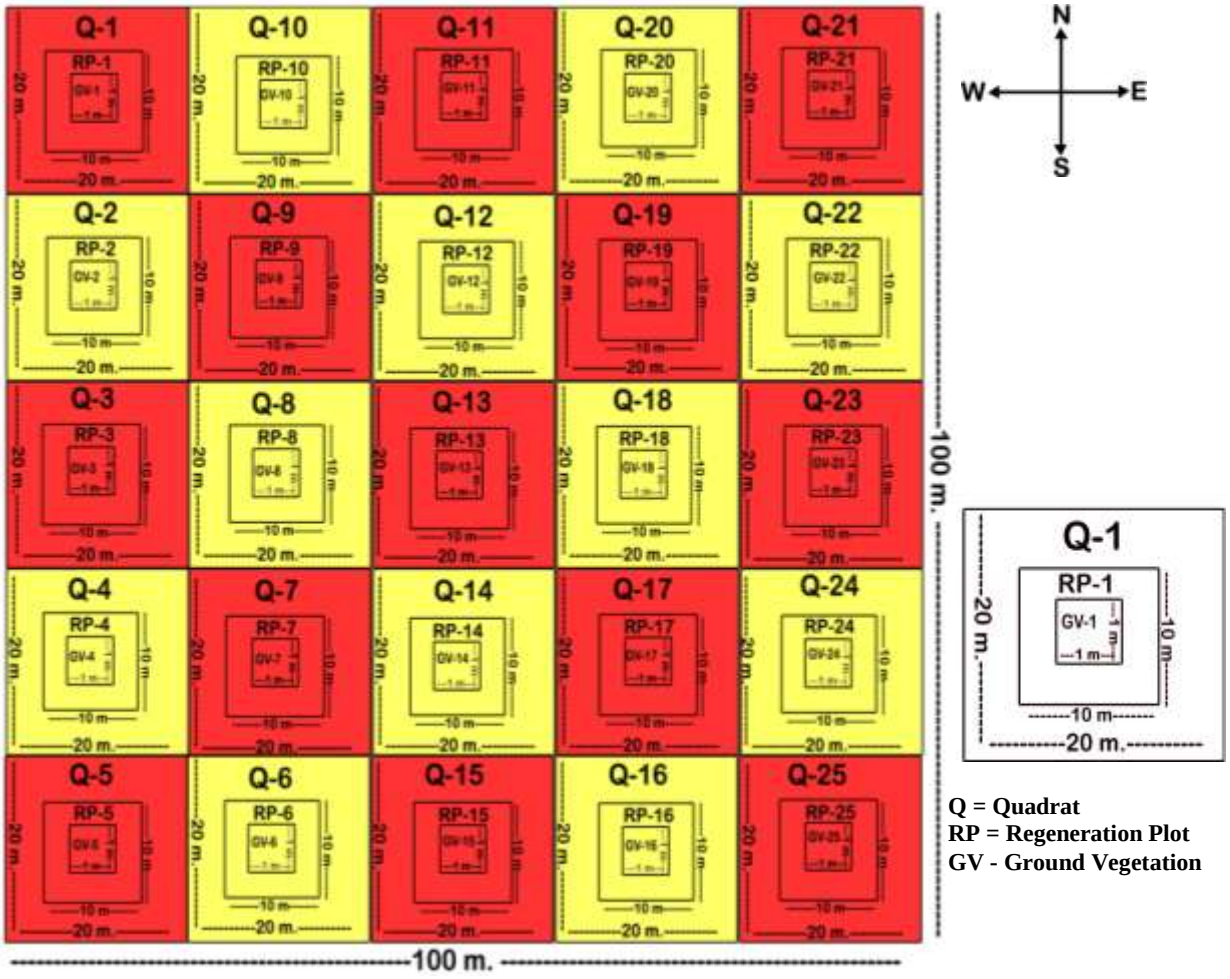
- Every preservation plot will be visited and nearly 01 ha core area of these preservation plot will be evaluated to achieve the target.
- A total of 25 plots of size 20×20 sqm will be laid in each PP for Tree species.
- For regeneration studies one plot of size 10×10 sqm will be laid in each plot.
- Herbaceous studies will be conducted in 25 plots of size 1×1 sqm respectively as per the standards of working plan.
- Litter production will be studied through standard procedure as prescribed by Ovington (1954).
- Soil samples will be randomly collected and a depth of 10-30 cm from 3 different places in each preservation plot for physic-chemical studies.

For study of Impact on vegetation due to climatic variables

For achieving the objective second the following methodology will be adopted. All the collected information viz tree species number, regeneration status, ground flora, tree association and physico chemical properties of soil will be used to assess the impact on forest by co-relating with climatic variables i.e. temperature and rainfall.

Climatic data will be collected from standard metrological observatory. These data will be used to derive the impact of climatic condition on above aforesaid vegetational parameters.. For assess the impact on vegetation due to climatic variables, previously collected growth data i.e. 2012 to 2015 and 2016 to 2019 will be used as baseline data. These baseline information will be used to compare the present collected data during project period.

Study Design:- Quadrat method



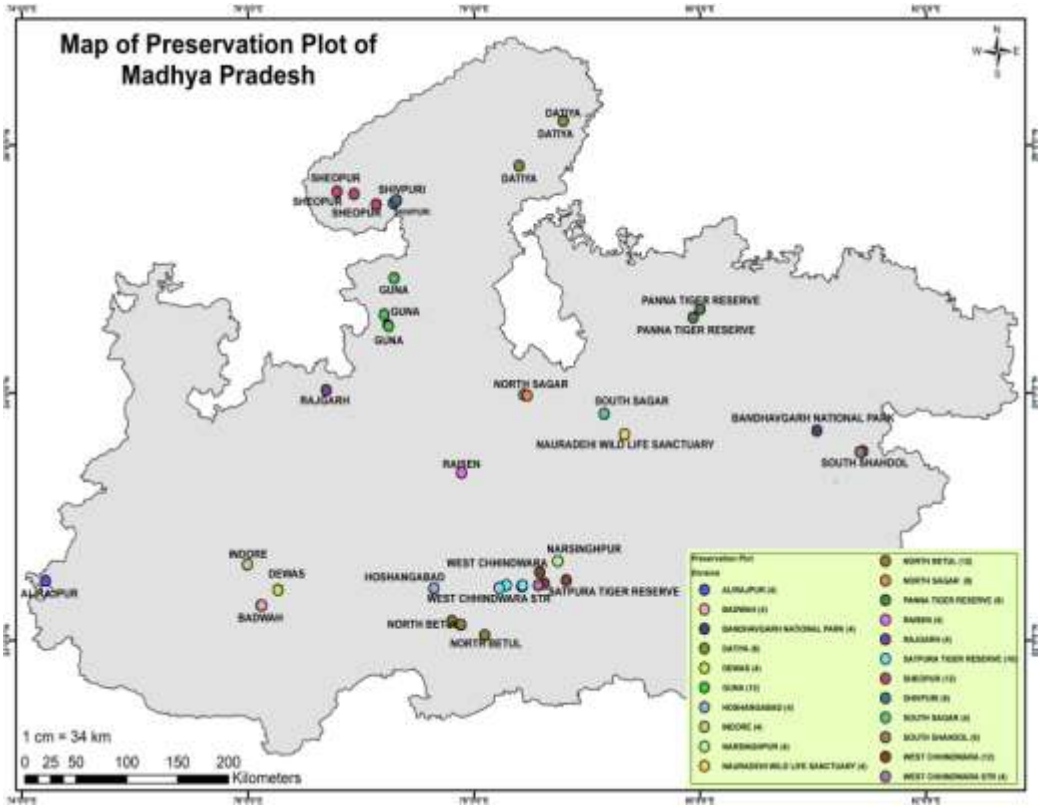
Study area- list and map

The study will be conducted in established all thirty nine preservation plots in 16 forest divisions. These selected 39 preservation plots represent 23 major forest types/degradation stages/edaphic types/ general several types (as per classification of Champion and Seth, 1968) occurring in different forest divisions/National Parks/Sanctuaries of Madhya Pradesh are shown in below table and Map-

Preservation plots in Madhya Pradesh

PP.No.	Divisions	Range	Compt. No.	Forest Type
1	Narsinghpur	Gadarwara	418(A)(old), 309 (New)	Dry peninsular sal forest (5B/C 1C)
2	Hoshangabad	Banapura	261	Slightly moist teak forest (3B/C1C)
3	N. Betul	Betul	248	Dry teak forest (5A/C1B)
4	N. Betul	Ranipur	327(old), 508 (New)	Southern moist mixed deciduous forest (3B/C2)
5	Satpura Tiger Reserve	Bori	52	Southern moist mixed deciduous forest (3B/C2)
6	Satpura Tiger Reserve	Bori	45	Southern moist mixed deciduous forest (3B/C2)
7	Alirajpur	Kathiwara	137(old), 525 (New)	Southern moist mixed deciduous forest (3B/C2)
8	Badwaha	Badwaha	910/284	Southern dry mixed deciduous forest (5A/C3)

PP.No.	Divisions	Range	Compt. No.	Forest Type
9	Dewas	Udainagar	633	Southern dry mixed deciduous forest (5A/C3)
10	W. Chhindwara	Delakhari	P157	Southern dry mixed deciduous forest (5A/C3)
11	W. Chhindwara	Delakhari	P163	Southern dry mixed deciduous forest (5A/C3)
12	W. Chhindwara	Jhirpa	35	*Hardwickia* forest (5 /E4)
13	S. Seoni	Kurai	181	Southern moist mixed deciduous forest (3B/C 2)
	Pench Tiger Reserve	Ari Buffer zone	224	
14	Bandhavgarh Tiger Reserve	Tala	324	Moist peninsular sal forest (3C/C2)
15	Satpura Tiger Reserve	Pachmarhi	302	Dry peninsular sal forest (5B/C1C)
16	Panna Tiger Reserve	Hinouta	521	Southern dry mixed deciduous forest (5A/C3)
17	Noradehi Wildlife Sanctuary	Mohli	RF 107	Northern dry mixed deciduous forest (5B/C2)
18	Panna National Park	Madla	227	Dry bamboo brake (5/E9)-
19	N. Betul	Shahpur	P419	Riparian fringe forest (4E/RS1)
20	Sheopur	Karahal	P528	*Anogeissus pendula* forest (5/E1)
21	Sheopur	Sheopur	RF 229	Dry grassland (5/DS4)
22	Datia	Goraghat	202	Ravine thorn forest (6B/C2)
23	Satpura Tiger Reserve	Pachmarhi	298	Dry peninsular sal forest (5B/C1C)
24	S. Sagar	Garhakota	896	*Butea* forest (5/E5)
25	Indore	Indore	256	Dry savanah (5/DS 2)
26	Sheopur	Badhar	213	*Boswellia* forest (5/E2)
27	N. Sagar	Khurai	RF71	Southern tropical riverain forest (5/1S1)
28	N. Sagar	Khurai	RF 69	Secondary dry deciduous forest (5/2S1)
29	N. Shahdol	Gopharu	RF281	Dry peninsular sal forest (5B/C1C)
30	N. Shahdol	Gopharu	295	*Boswellia* forest (5/E2)
31	Shivpuri	Pohri	P75/P765	Khair forest (5/1S1)
32	Shivpuri	Pohri	P69	*Ziziphus* scrub (6B/DS1)
33	Guna	Guna	404	Very dry teak forest (5A/C1a)
34	Guna	Raghavgarh	458	Khair forest (5/1S1)
35	Guna	North Guna	Old-P473 New - P481	Khair forest (5/1S1)
36	Raisen	Raisen	387	Dry grassland (5/ DS4)
37	Rajgarh	Rajgarh	314	Dry deciduous scrub (5/DS1)
38	Datia	Seodha	115	*Anogeissus pendula* forest scrub (5/E1/DS 1)
39	W. Chhindwara	Delakhadi	89 A	Dillenia pp in Southern tropical dry deciduous forest (5A/C3)



Activities carried out:-

Physical Inputs:-TA/DA/POL, Wages and material for field work, Soil analysis work, Office expenses, Computer stationary, Preparation of final report and miscellaneous work

Cost of the Project:- Rs. 13.80 Lakhs

Expected Outcome:-

Objectively Verifiable Indicators (OVI's):- Frequency, Density, Abundance, Basal area, IVI, Biodiversity index, Litter production, Soil analysis, Standard meteorological observations.

Means of Verification (MOV's):- Lay out of plots in core area, Measurement of height and girth, counting of trees, regeneration, herbaceous plants and collection of meteorological data through standard meteorological station.

Regular Activities :

1. Title of the Project:- Preparation of quality planting material of RET and other important species.

Why this Project:-

Earlier during 2016-17 one project was sanctioned by the Research, Extension and Lok Vaniki Wing of Forest department for RET plants preparation. During this project period all nursery management works were carried out under this project. This project was stopped by the funding agency. After that Due to pandemic and unavailability of Budget the nursery is not properly maintained.

The balance amounts of Rs. 22.32 lakh were deposited in revolving fund and during 2018-to 2021 an amount of Rs. 9.2 lakh was received from plant selling. This amount also deposited in the revolving fund.

In the above project it was mentioned that the amount received from the selling of plants will be deposited in the revolving fund. The balance amount of the project and the amount received from the selling of plants will be utilised in preparation of more RET plants in subsequent years.

Thus this project is designed to prepare more plants of RET and other important species for their restoration. Amount received from selling of plants will be further deposited in revolving which will be used in maintenance of nursery and preparation of more plants in coming future.

Research Methodology:-

Following works will be carried out under the project.

a. **Collection of planting material:** Survey will be made in different forest areas for collection of seeds of RET species. Seeds and planting material will be collected or procured from the known source for mass multiplication**.**
b. **Preparation of plantlets:** Plants will be prepared by using suitable nursery techniques.

Study Design:-

Based on availability of seeds of RET species survey will be conducted in to collect the planting material. Nursery schedule will be followed to prepared quality planting material. Species having disposable importance will be selected for multiplication

Objectives of Research:-

1. Preparation of planting material of RET and other important species.
2. To enrich the revolving fund for making self sustain nursery.

Activities Carried out-

- Procurement of material
- Filling of polybags
- Plant preparation through seeds and cuttings

Cost of the project: Rs. 9.04 Lakhs

Outcome of the Project : -

- Plantlets of different RET and other important species are prepared.
- This work is helpful to provide plantlets of RET and other important species to user groups.

2. Title of the Project:- Maintenance of Forest Herbarium, SFRI Jabalpur.

Why this Project:-

Herbarium plays a central role in authentic identification of plant material, biodiversity conservation, habitat identification of rare, endangered, threatened and endemic plants, documentation of traditional knowledge, study of molecular taxonomy, to check bio-piracy of intellectual property, environmental management etc. It is the permanent preservation and management of collections of plants/plant parts. The development of virtual and searchable herbarium database will provide taxonomic information for authentic identification and important data with regards to different species.

Research Methodology:-

1. Plant/plants parts were collected from the field probably at the time flowering and fruiting.
2. Collected samples were dried in blotting sheets for at least one week.
3. Samples were mounted on white mount board sheets with details like collection number, name of collector, locality, habit, habitat, distribution, flowering, fruiting, local name, scientific name, family, uses.
4. Specimens were disinfected and preserved by using mercuric chloride solution (0.1%) to make specimens unpalatable to insects.
5. Lamination of specimens were also done for disinfection and preservation from pathogens, insects and mites.
6. These specimens were digitized by developing herbsoft for easy identification for various stakeholders..

Study Design :

1. SFRI-Herbarium is unique in terms of its scientific arrangement of plants/plant parts adopting Bentham and Hooker's classification system.
2. Database of taxonomic information of forestry species was designed to develop virtual and searchable herbarium through herbsoft.

Objectives of Research:-

- Maintenance of old specimens and herbarium software

Outcome of the Project : -

- SFRI has a rich forest herbarium since 1963. Presently all species which present in herbarium was digitized and can be indentified through software (Herbsoft).
- Total specimens – 20364 Total family – 198 Total Genus – 1231 Total Species – 3478

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

a. Developed Nursery techniques of RET species.
b. Development of nursery techniques of root trainers (Training given to the staff of social forestry and territorial).
c. Helping people by giving them knowledge about plantation.

2.1.3 FOREST MANAGEMENT RESEARCH DIVISION

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 SFD, FDC and other users.
7. Finding the growth development of crop stands for different species in different site quality classes and in different agro climatic zones.
8. Designing the experiments and analysis of data for preparing the conclusion from the projects for all te research branches of the institute.
9. Training on 'Establishment, maintenance and periodic measurement of sample plots to departmental personnel and students.'

Ongoing Project : 01

1. 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 Activities : 02

1. मृदा नमूनों का परीक्षण।
   Funding Agency: SFRI, Jabalpur
2. Priodic measurement of sample plots laid out in different forest areas of Madhya Pradesh
   Funding Agency : SFRI, Jabalpur

Ongoing Project

Project Summary:-

1. 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 species wise.
- 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:-

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

Activities Undertaken:-

- Data entry has been completed for 33 sample plots
- Data analysis work is in progress.

Cost of the project : Rs. 2.40 Lakhs

Expected Outcomes of Research:-

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

Deliverable technologies developed in each project for stakehaolders, forest professionals, field foresters and other beneficiaries-

Compilation of all the crop parameters and volume of the felled trees to create an initial database for forecasting used for forest professionals, field foresters.

Regular activity :

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

Why this Project :-

- विभिन्न वनमण्डलों में किए जा रहे वृक्षारोपणों को सफल बनाने के लिये।
- वृक्षारोपण स्थल की मृदा में उपलब्ध पोषक तत्वों की मात्रा ज्ञात करने ।
- पोषक तत्वों की पूर्ति के लिए सिफारिश।

Research Methodology:-

- मृदा नमूनों की तैयारी
- मृदा नमूनों का भौतिक एवं रासायनिक परीक्षण

Study Design:- मृदा नमूनों का भौतिक एवं रासायनिक परीक्षण।

Objective of Research:- मृदा परीक्षण कार्य

Activities Undertaken:-

- मृदा नमूनों की तैयारी
- मृदा नमूनों का भौतिक एवं रासायनिक परीक्षण

- मृदा स्वास्थ्य कार्ड तैयार करना

  Cost of the Project :- Rs. 5.00 Lakhs

Expected Outcome of Research : -

- विभिन्न वनमंडलों, वन विकास निगम एवं संस्थान के विभिन्न विभागों से प्राप्त लगभग 1868 मृदा नमूनों का परीक्षण कर संबंधितों को रिपोर्ट प्रदाय किया।
- मृदा परीक्षण की रिपोर्ट के आधार पर वृक्षारोपणों को अधिक से अधिक संख्या में सफल बनाना।

2. Title of the Project:- Periodic measurement of sample plots laid out in different forest areas of Madhya Pradesh.

Why this Project :-

Sample plots are measured periodically for growth studies. Crop parameters are calculated for estimating growth.

Research Methodology:-

- Dia meter and height of the trees are measured for the calculation of crop parameters.

Study Design:- Dia meter and height of the trees are measured for the calculation of crop parameters.

Objective of Research:-

- Periodic measurement of sample plots laid out in different forest areas of Madhya Pradesh.

Activities Undertaken:-

- Dia and height of the trees are measured for the calculation of crop parameters.

  Cost of the Project :- Rs. 7.77 Lakhs

Expected Outcome of Research : -

- Initial database for growth studies will be created for guidance, reference and comparison.

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

- Initial database for growth studies will be created for guidance, reference and comparison for forest professionals, field foresters

Note :- Due to lack of funds this work could not be done this year but the work will be carried out under new project 'Periodic measurement of sample plots laid out in different forest areas of Madhya Pradesh' for next 5 years and sanctioned by SFRI, Jabalpur.

Other Activities

1. A training module prepared for training programme on “Preparation of plants using Root Trainer process and plantation”.
2. In the month of April and May 2022 training was given to field staff on “Preparation of plants and its plantation in the field by root trainer techniques at SFRI given lecture and Hands on training in nursery.
3. Lecture was given regarding circle level training programme for "Preparation of plants and its plantation in the field by root trainer techniques on 16 June 2022, Sagar circle, Damoh Forest Division, Range Tejgarh and compartment no.PF-37.

2.1.4 FOREST UTILIZATION RESEARCH DIVISION

Mandate

1. Timber and Fuel-wood utilization
2. Medicinal and Aromatic plants
3. Market Information System
4. Bamboos
5. Gums, resins & other NWFP's
6. Forest-based Livelihoods

Completed Projects : 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

Ongoing Projects : 01

1. Strengthening of Market Information centres for dissemination of Market Analysis of Minor Forest Produce in different agro-climatic zones of Madhya Pradesh.

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

Project Summary:-

Completed 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 tribal's 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 20 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 in 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 quarterly newsletter Van Dhan Vyapar 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.

Objective 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.

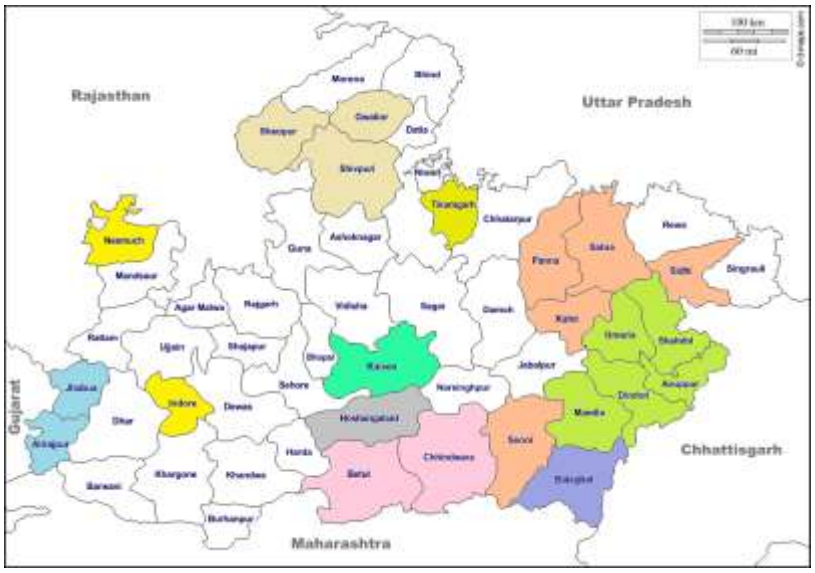
Activities Undertaken:-

- Compilation of market information and publication of Van Dhan Vyapar.
- Compilation of information on location of village markets, market days, MFP traded, etc.
- Collection of data with regard to prices- procurement price at first point level in different village markets /Haats.
- Compilation of market information and dessimination through quarterly newsletter Van Dhan Vyapar

Cost of the project: Rs.10.00 Lakhs

Outcome of the project:-

- Total 40 markets of 23 Districts were surveyed. During the survey districts namely Katni, Panna, Satna, Sidhi, Umaria, Dindori, Shahdol, Anuppur, Tikamgarh in Katni centre, Chhindwara, Betul, Seoni, Hoshangabad in Chhindwara centre, Shivpuri, Sheopur, Gwalior districts in Shivpuri centre, Jhabua, Alirajpur, Indore and Neemuch districts in Indore centre and Mandla, Balaghat, Raisen districts in Jabalpur centres were covered.



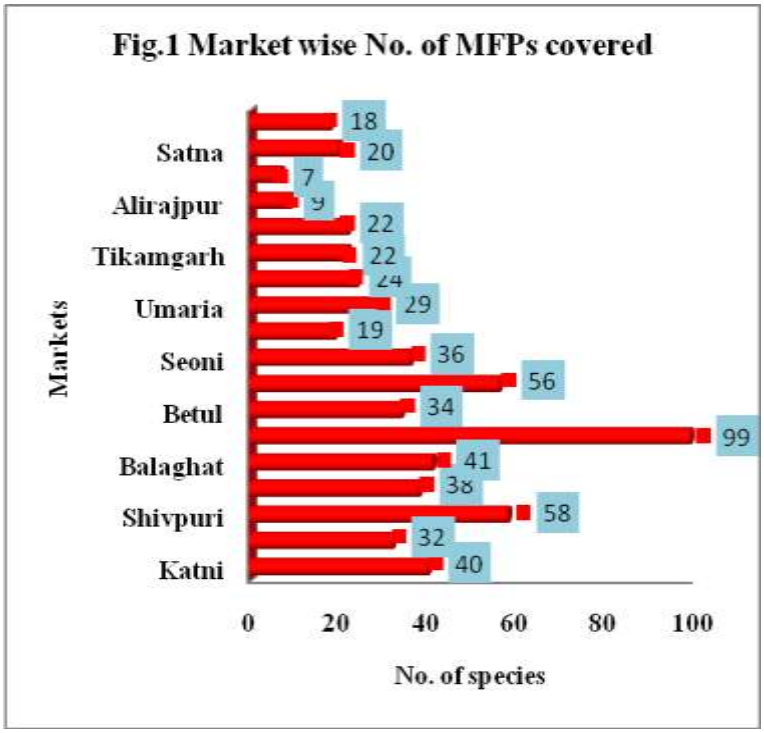
- Market information of commercially and economically important medicinal and Non Timber Forest Produce traded and marketed during the different seasons recorded and collected.
- These information were collected through personal interviews and telephonic communication.
- The market rates of total 99 important Non Timber Forest Produce was recorded and collected. 99 MFP species from Neemuch mandi, 58 species from Shivpuri Mandi, 56 from Indore, 41 from Lamta district Balaghat, 40 from Katni Mandi, 38 from Karahal district Sheopur, 36 from Barghat District Seoni, 34 from Betul (Betul Padhar and Chicholi), 32 from Mandla (Mandla, Anjania and Mawai), 29 from Umaria, 24 from Alirajpur, 22 from Tikamgarh, 22 from Dindori, 20 from Satna, 19 from Chhindwara (Chhindwara, Tamia, Delakhari and Damua), 18 from Gwalior (Gwalior and Mohna), 9 from Anuppur and 7 species from Pawai district Panna.

Plate - 1: Collection of MFPs information from the trader of Chindwara

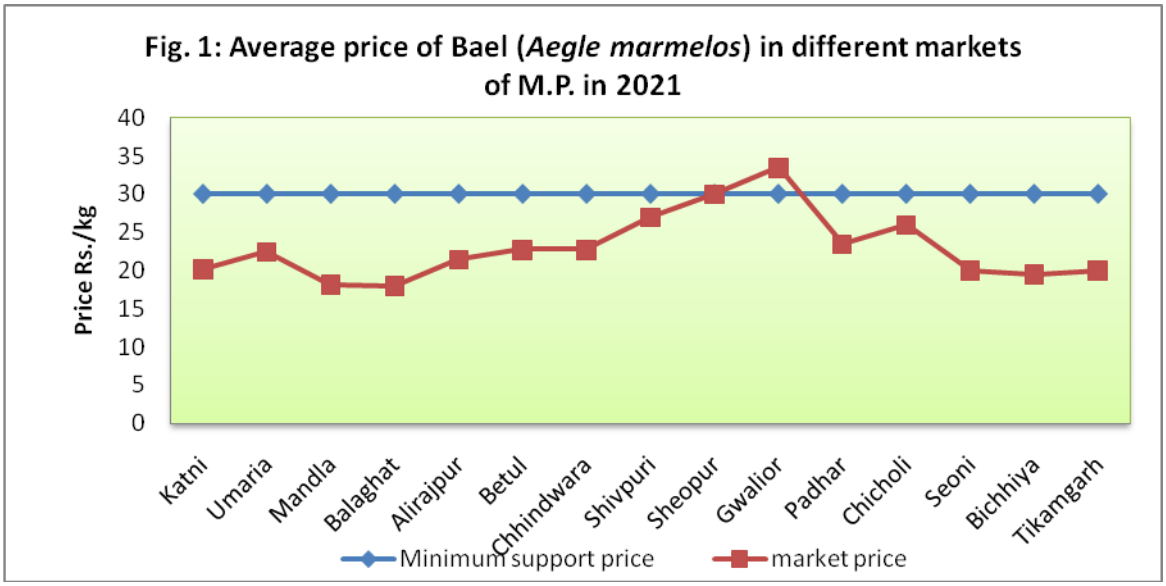
Plate - 2: Visit weekly market Manikpur, district Dindori

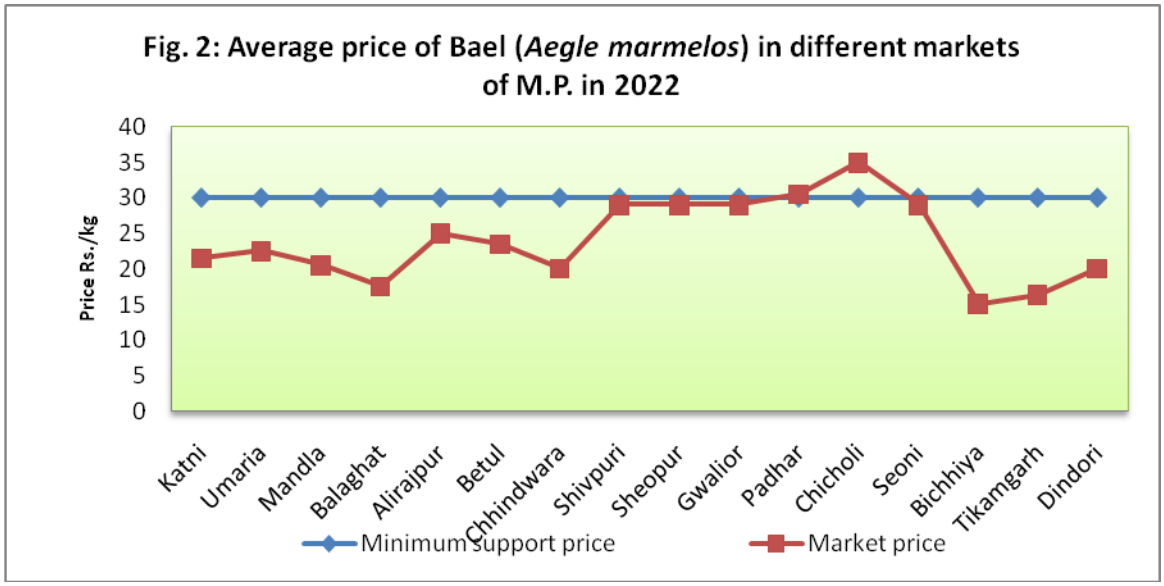
Plate – 3: Collection of MFPs information from the Trader of Shivpuri

Plate - 1: Survey of MFPs Trader in Tamia District Chhindwara

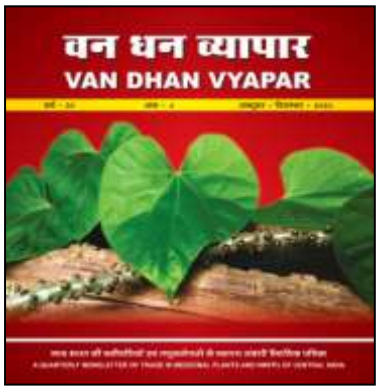


- Monitoring of Minimum Support Price (MSP) of the notified 32 important MFPs of Madhya Pradesh, quarterly surveys were undertaken in the months of February-March 2021, May-June 2021, August-September 2021, November-December 2021, February-March 2022, May-June 2022, August-September 2022, November-December 2022 and prices of purchased MFP by village level, block level and district level traders were collected.

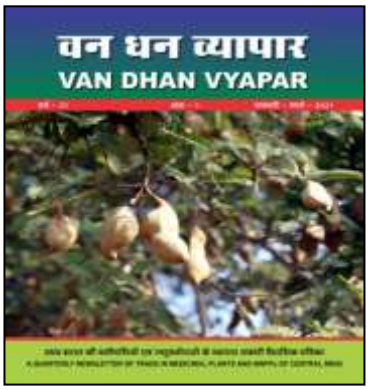




- The Volumes such as Van Dhan Vyapar Vol. 20 (1&2,3,4), Vol. 21 (1,2,3,4) and Vol. 22 (1,2,3,4) were prepared and 4000 copies published.



Vol. 20. issue – 4.
(Oct. – Dec.) Year 2020

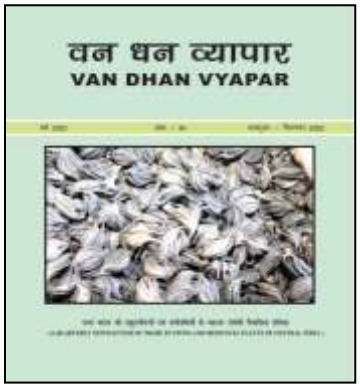


Vol. 21. issue –
1 (Jan – March), Year 2021

Vol. 21. issue -2
(April - June) Year 2021

Vol. 22. issue -2
(April – June) Year 2022

Vol. 22. issue- 3
(July – Sep.) Year 2022



Vol. 22. issue -4
(Oct. – Dec.) Year 2022

- The above published issues were distributed free of cost through post to Honorable Forest Minister, Secretary of Forest, Principal Chief Conservator of Forest, Head of Forest, all PCCF, APCCF, CCF and CF of other sections, DFOs of all the Forest Division, Wild life institutes, Organizations, Farmers, Traders, Manager of Van Dhan Kendra JFMCs members, etc.

Ongoing Projects

1. Title of the Project:- Strengthening of Market Information centres for dissemination of Market Analysis of Minor Forest Produce in different agro-climatic zones of Madhya Pradesh.

Why this Project:-

- Socio-economically, NTFPs act as a lifeline for forest-dependent communities, especially the tribal population. Studies show that in states like Madhya Pradesh, more than 80 percent of forest dwellers depend exclusively on NTFPs for their livelihood. Furthermore, a significant portion of landless persons engage in daily wage labor associated with NTFP collection, while others view NTFP collection as a supplementary source of income.
- Rural populations often face poor returns from NTFPs due to lack of market information, inadequate bargaining power and limited knowledge about processing standards and value-added interventions.
- In response to these challenges, initiatives such as Marketing Information Systems (MIS) have been instrumental in providing reliable and timely market information to empower communities to take informed decisions regarding marketing of medicinal plants and other NTFPs.
- In 2001, a State level Market Information Project was initiated and a Marketing Information System (MIS) cell was established in SFRI for collection, analysis and dissemination of market data related to non-timber forest products. Over the past 23 years, this project has operated consistently, generating valuable data and regularly disseminating market information through the quarterly Newsletter Van Dhan Vyapar.

Objectives of Research:-

- To strengthen the existing market information System (MIS) for dissemination of Market Analysis of Non-Timber Forest Produce (NTFPs) at state and National Level
- Collection of Market information such as part-wise and product-wise rates (Rs./kg) of various NTFPs from different areas and mandis of Madhya Pradesh.
- Publication & dissemination of Quarterly Newsletter of Van Dhan Vyapar.

Research Methodology:-

The study will be covered in two years from the date of sanction. Survey and data collection will be done through physical and virtual modes.

Study Design/Action plan:-

i. Survey of different markets and mandis of NTFPs
ii. Collection of information from different traders
iii. Collection of market rates
iv. Collection of seasonal market arrival of MFPs in district markets.
v. All the field data will be collected in prescribed **Field Data Sheet**
vi. Scrutiny and verification of collected market data
vii. Computation of market data
viii. Drafting and editing of report
ix. Finalization of report
x. Printing and proof reading of report
xi. Publication of VAN DHAN VYAPAR Newsletters

The survey and data collection as per following action plan:-

Table 1.- Action plan

S. No.	*Name of Agro-climatic zones*	*Name of Districts*	*Mode of Survey and data collection under different quarters*							
			1st year				2nd year			
			1	2	3	4	1	2	3	4
1	Chhattisgarh plains	Balaghat	P	V	V	V	P	V	V	V
2	Northern hills zone of Chhattisgarh	Mandla, Dindori, Umaria	V	P	V	V	V	P	V	V
3	Kymore Plateau & Satpura hills	Panna, Katni, Seoni, Sidhi	P	V	V	V	P	V	V	V
4	Vindhayan Plateau	Sagar, Raisen,Vidisha	V	P	V	V	V	P	V	V
5	Central Narmada valley	Hoshangabad	P	V	V	V	P	V	V	V
6	Grid region	Gwalior, Shivpuri, Sheopur, Morena	V	V	V	P	V	V	V	P
7	Bundelkhand zone	Chhatarpur, Tikamgarh, Niwari	V	V	P	V	V	V	P	V
8	Satapura Plateau	Chhindwara, Betul	V	V	V	P	V	V	V	P
9	Malwa Plateau	Neemuch, Indore, Mandsour	V	V	P	V	V	V	P	V
10	Jhabua hills	Alirajpur	V	V	P	V	V	V	P	V
11	Nimar Valley	Khandwa, Burhanpur	V	V	V	P	V	V	V	P
P - Physical Mode		***V – Virtual Mode (Through Telephone, Whatsapp and email)***								

Financial Inputs:- Rs. 10.00 Lakhs

Expected Outcome of Research:-

- After the completion of the data analysis, report will be drafted in the form of booklet known as Van Dhan Vyapar. 4 quarterly issues for each year will be prepared and published for the dissemination of :-
  i. Mandis of NTFPs in the state
  ii. Market rate (Rs./kg) of each plant, plant part and plant products as NTFPs available in the said market/mandi
  iii. Traders survey, cataloguing of traders
  iv. Market analysis
  v. Supply chain of various NTFPs.

2.1.5 FOREST PRODUCTIVITY RESEARCH DIVISION

Mandate

1. Seed collection, testing and certification.
2. Seed storage and treatment.
3. Research on seed biology, seed biochemistry, seed physiology and seed technology with regards to seed pre treatments and storage of seeds to enhance germination and longevity of seeds.
4. Plant propagation and nursery management.

Completed Project : 03

1. Selection of species specific root trainer sizes and potting mixes to be adopted by the Forest Department nurseries of Madhya Pradesh for Ten selected tree species.

   Funding Agency: PCCF (Research Extension & Lok Vaniki), M.P. Bhopal
2. 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
3. मिश्रित प्रजातियों की नर्सरी तकनीक एवं रूट ट्रेनर के संबंध में दो दिवसीय प्रशिक्षण।

   Funding Agency: Madhya Pradesh Rajya Van Vikas Nigam, M.P. Bhopal

Ongoing projects:- 01

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

Regular Activities:- 01

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

   Funding Agency -SFRI, Jabalpur

Project Summary :-

Completed project

1. **Title of the Project**:-**Selection of species specific root trainer sizes and potting mixes to be adopted by the Forest Department nurseries of Madhya Pradesh for Ten selected tree species.**

Why this Project:-

In present scenario on ban of polythene bags in forest nurseries, it is become necessity of alternatives of polythene bags. So, in place of polythene bags, root trainer may be an alternative of aforesaid material.

Research Methodology:-

Fresh seeds were collected from identified superior trees by hand plucking and peak maturity of targeted species. After collection seeds were dried in open air and were tested for viability, moisture content and germination percentage for development of packages of nursery techniques in reference to standardization of root trainer cell size with various potting mixture for selected species, work was done on following lines:

1. Collection of seeds.
2. Seed testing was done for viability, moisture and germination percentage.
3. Different seed sowing media was tried for better germination percentage.
4. Seed sowing in various root trainer cell size with various potting mixture.

5. Seed sowing in nursery bed and germination tray.
6. Experiment was laid out in the greenhouse of the institute and Social Forestry Nursery, Jabalpur.
7. The experiments were laid out in Complete Randomized Block Design (CRBD) with various treatments with three replicates in each treatment. 30 plants were required for each treatment with three replicates in every experiment.

36 potting mixtures were composed with various fertilizers and chemicals. Different size of root trainers was used for standardization of root trainer cell size with potting mixture. Fumigation with various insecticides and fungicides was also done as per requirement of the disease in plants. Observations were recorded on germination potential, seedling growth, survival percentage, root fiberocity, root volume, sturdiness and quality index. Potting mixture was analyzed for its physico-chemical properties prior applied into root trainer and after the completion of experiment. 05 experiments were done to achieve the following objectives.

Objectives of Research:-

- To standardize the potting mixture of targeted species for better growth and survival of plants.
- To standardize the root trainer cell size for optimum growth of targeted species.
- To standardize the planting period of seedlings under root trainer cell size for plantation programme.
- To standardize spacing of seedlings in root trainers for better growth and survival of plants.

Activities Undertaken:-

- Seed collection, Seed testing, Production of plants.
- Procurement of chemicals and fertilizers.
- Procurement of various sizes of root trainers.
- Seed collection of 10 targeted species for production of plants for experimental work.
- Preparation of potting media.
- Filling of root trainers with different potting mixture.
- Preparation of nursery bed.
- Seed sowing in nursery bed, germination tray and root trainers. Observation was recorded on germination potential.
- Testing of potting media before and after experiment.
- Watering and weeding.
- Fumigation with various insecticides and fungicides will also be done as per requirement of the disease in plants.
- Observation was recorded on growth and survival of plants and other parameters after six month of sowing.

  Cost of the Project:- 17.76 Lakhs

Outcome of Research:-

- Standardized the potting mixture of targeted species for better growth and survival of plants.
- Standardized the root trainer cell size for optimum growth of targeted species.
- Standardized the planting period of seedlings under different cell size of root trainer for plantation programme.
- Evaluate growth performance with and without spacing of seedlings in different root trainer cell sizes for better growth and survival of plants.
- 400 cc cell sizes were found to be best of all targeted species for production of quality planting stock.
- Species wise various potting mixture were find out for higher growth, survival and rooting response of all species.
- Final report completed and submitted to funding agency within stipulated time limit.

Plant production in different cell size of root trainers with various potting mixture

Root volume and fiberocity in different cell size of root trainers with various potting mixture

Root structure in different cell size of root trainers with various potting mixture

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

Why this Project:-

अनुसंधान एंव विस्तार द्वारा विभिन्न वन वृत्तों अतंर्गत स्थित रोपणियों में उच्च गुणवत्ता के पौधें तैयार करने तथा लघु शोध कार्य हेतु रोपणी में विभिन्न संरचनाओं को स्थापित करनें बावत् राशि प्रदान की गयी। इन रोपणियों के विविध कार्यो के सतत् मूल्यांकन, लघु शोध कार्यो एवं संरचनाओं की स्थिति, उपयोग एवं रोपणियों का श्रेणीकरण हेतु यह प्रस्ताव प्रस्तुत किया गया।

Research Methodology:-

- रोपणियो की अधोसंरचना का मूल्यांकन, श्रेणीकरण एवं मान्यता कार्य।
- अभिलेखों का परीक्षण, कर्मचारियों की कार्य कुशलता एवं पौध तैयारी हेतु स्थल पर प्रशिक्षण कार्य।

Study Design:- रोपणी भ्रमण

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:-

- लगभग 37 रोपणियों का उद्देश्य प्राप्ति हेतु भ्रमण किया गया।
- रोपणियों में चल रहे शोध कार्य हेतु आवश्यक सुझाव दिये गये।
- संरचना के रखरखाव एवं अधिकतम उपयोग हेतु आवश्यक सुझाव दिये गये।

Cost of the Project:- 04.50 Lakhs

Expected Outcome of Research:-

- अधोसंरचना में सुधार के फलस्वरूप रोपणियों को बहुआयामी स्वरूप देना।
- ईको पर्यटन का विकास करना।
- कर्मचारियों की कार्य कुशलता में दक्षता में वृद्धि।

Achievements:-

- समस्त 57 चार एवं पाँच स्टार रोपणियों की अधोसंरचना का मूल्यांकन, श्रेणीकरण एवं मान्यता कार्य किया गया।
- अंतिम प्रतिवेदन तैयार कर वित्तीय पोषित संस्था को प्रस्तुत किया जा चुका है।

रोपणियों का निरीक्षण

पौध गुणवत्ता आँकलन

दस्तावेजों का परीक्षण एवं सत्यापन

3. Title of the Project:- मिश्रित प्रजातियों की नर्सरी तकनीक एवं रूट ट्रेनर के संबंध में दो दिवसीय प्रशिक्षण।

Why this Project:-

वर्तमान परिवेश में जलवायु परिवर्तन के कारण पॉलिथिन में पौध तैयारी पर शासन द्वारा रोक लगाई गई, जो कि अत्यंत आवश्यक है। अतः पॉलिथिन बैग के स्थान पर रूट ट्रेनर जिसे प्रो ट्रे भी कहा जाता है, को विकल्प के तौर पर आवश्यक समझा गया। प्रो–ट्रे में पौध तैयारी से जलवायु परिवर्तन के कारण होने वाले किसी भी तरह के दुष्प्रभाव को रोका जा सकेगा, साथ ही पॉलिथिन बैग में तैयार पौधों को वृक्षारोपण हेतु रोपण स्थल तक पहुँचाने के लिए परिवहन के समय पौधों की जड़ों में होने वाली क्षति से भी बचाया जा सकेगा। रूट ट्रेनर्स प्रौद्योगिकी के सिद्धांत में शामिल हैंः (i) प्राथमिक जड़ों और उसके बाद की माध्यमिक जड़ों के तेजी से विकास के लिए उचित वातावरण प्रदान करना, (ii) मुख्य जड़ प्रणाली, द्वितीयक एवं तृतीयक जड़ प्रणाली को विकसित करना। पॉली बैग में उगाए गए पौधों में जड़ों के सिकुड़ने की समस्या से निपटने के लिए रूट ट्रेनर्स का तेजी से उपयोग किया जा रहा है। रूट ट्रेनर में पौध तैयारी से पॉलिथिन बैग की तुलना में कम लागत आती है, साथ ही एक बार नर्सरी तैयारी में रूट ट्रेनर क्रय करने के बाद बार–बार उपयोग किये जा सकते हैं। इन्हीं बिन्दुओं को ध्यान में रखते हुए मध्यप्रदेश राज्य वन विकास निगम लिमिटेड, भोपाल द्वारा उनके पत्र क्र./व.वि.नि./परि.नि./2023/698, भोपाल दिनांक 10/05/2023 एवं पत्र क्र./1239 दिनांक 07/06/2023 के द्वारा प्रशिक्षण दिए जाने एवं विभिन्न परियोजना मण्डल से भेजे जाने वाले क्षेत्रीय अमले की सूची संस्थान को भेजी गई। जिसके तारतम्य में संस्थान द्वारा उनके द्वारा सुझाए गए विषय मिश्रित प्रजातियों की नर्सरी तकनीक एवं रूट ट्रेनर के संबंध में दो दिवसीय प्रशिक्षण एवं प्रदर्शन कार्यक्रम का आयोजन किया गया।

Research Methodology:-

- रोपणियो की अधोसंरचना का मूल्यांकन, श्रेणीकरण एवं मान्यता कार्य।
- मध्य प्रदेश राज्य वन विकास निगम के 11 परियोजना मण्डलों के क्षेत्रीय अमले को मिश्रित प्रजातियों (हर्रा, बहेड़ा, आंवला, बांस, महुआ, अचार, सागौन, खमेर एवं करंज आदि) की नर्सरी तकनीक एवं रूट ट्रेनर के संबंध में 30 प्रशिक्षणार्थियों, जिसमें परियोजना परिक्षेत्र अधिकारी, सहायक परियोजना क्षेत्रपाल, वनपाल एवं वनरक्षक पद के अधिकारी एवं कर्मचारियों को प्रशिक्षण हेतु आमंत्रित किया गया।
- आमंत्रित प्रशिक्षणार्थियों का पंजीकरण कर उन्हें प्रशिक्षण सामग्री प्रदाय की गई। दो दिवसीय प्रशिक्षण कार्यक्रम में 28 प्रशिक्षणार्थी उपस्थित हुए।
- प्रशिक्षण में व्याख्यान/पावर प्वाइंट प्रस्तुतिकरण के साथ–साथ क्षेत्र में व्यावहारिक प्रशिक्षण एवं प्रदर्शन के द्वारा अपनाई जा रही तकनीक के बारे में जानकारी से अवगत कराया गया। प्रशिक्षण की विषय सूची के मुख्य बिन्दु निम्नानुसार थे –
  - ✓ वैज्ञानिक तरीके से बीज तकनीक का उपयोग कर मिश्रित प्रजातियों के उच्च गुणवत्ता की पौध तैयारी।

- ✓ रूट ट्रेनर का परिचय, रूट ट्रेनर में पौध तैयारी हेतु आवश्यक अधोसंरचना की जानकारी।
- ✓ रूट ट्रेनर में भरे जाने वाले पॉटिंग मिश्रण की तैयारी एवं उसमें उपलब्ध पोषक तत्वों की जानकारी।
- ✓ रूट ट्रेनर में उच्च गुणवत्ता की पौध तैयारी के साथ नर्सरी में उनका प्रबंधन।
- ✓ रोपणी में पौधों में लगने वाले रोगों के निदान हेतु आवश्यक जानकारी।
- ✓ रूट ट्रेनर में तैयार पौधों का वृक्षारोपण क्षेत्र में ले जाने हेतु परिवहन एवं रखरखाव।
- ✓ रूट ट्रेनर पौधों की रोपण तकनीक एवं क्षेत्रीय अमले को रोपणी एवं रोपण में आने वाले समस्याओं का उनके द्वारा चर्चा के दौरान बताए जाने पर आवश्यक निदान।
- ✓ पॉटिंग मिश्रण हेतु उपयोग में ली जाने वाली केंचुआ खाद का निर्माण एवं गुणवत्ता की जानकारी।

- इसके अतिरिक्त व्यवहारिक ज्ञान दिए जाने हेतु क्षेत्रीय अमले को बीज प्रयोगशाला में ले जाकर बीज की गुणवत्ता को ज्ञात करने एवं उच्च गुणवत्ता की पौध तैयारी हेतु बीज की भूमिका के बारे में प्रदर्शन कर आवश्यक जानकारी दी गई।
- क्षेत्रीय अमले को रूट ट्रेनर में तैयार हो रहे पौधों की गुणवत्ता की जानकारी प्रदाय करने के लिए रोपणी में ले जाकर रूट ट्रेनर में तैयार पौधों के जड़ों के विकास एवं गुणवत्ता हेतु रूट ट्रेनर से पौधे निकालकर उनका मापन एवं रूट वॉल्यूम आदि की आवश्यक जानकारी से अवगत कराया गया।
- रूट ट्रेनर में तैयार पौधों के रोपण हेतु क्षेत्रीय अमले को रोपण स्थल पर ले जाकर उनके द्वारा रूट ट्रेनर पौधों का रोपण कराया गया एवं परिवहन की आवश्यक जानकारी का प्रदर्शन कर व्यवहारिक ज्ञान दिया गया।
- प्रशिक्षणार्थियों को दिए गए प्रशिक्षण एवं उससे होने वाले लाभ पर चर्चा, उनके द्वारा रूट ट्रेनर में मिश्रित प्रजातियों के पौध तैयारी हेतु क्षेत्र में आने वाली समस्याओं एवं संदेह का निराकरण कर प्रशिक्षण के संबंध में प्रतिक्रिया (Feedback) प्राप्त की गई। प्रशिक्षण उपरांत प्रशिक्षणार्थियों को ग्रुप फोटोग्राफ एवं प्रमाणपत्र वितरित किए गए।

Study Design:- रोपणी भ्रमण

Objectives of Research:-

- विभागीय स्तर पर रोपणियों के विविध कार्यों का सतत मूल्यांकन।
- क्षेत्रीय अमले को मिश्रित प्रजातियों के उच्च गुणवत्ता के पौध तैयारी के संबंध में वैज्ञानिक तकनीक से अवगत कराना।
- रूट ट्रेनर में पौध तैयारी एवं नर्सरी प्रबंधन।
- रूट ट्रेनर में तैयार पौधों की जड़ों के विकास एवं गुणवत्ता के बारे में प्रशिक्षण एवं प्रदर्शन द्वारा अवगत कराना।
- रूट ट्रेनर में तैयार पौधों के परिवहन एवं रोपण से संबंधित जानकारी प्रदाय करना।
- रोपणी में लगने वाले कीट एवं रोगों से बचाव के संबंध में जानकारी प्रदाय करना।
- गुणवत्तायुक्त केंचुआ खाद तैयार कर रोपणी में उपयोग।

Cost of the Project:- 03.00 Lakhs

Expected Outcome of Research:-

- मध्य प्रदेश राज्य वन विकास निगम के 11 परियोजना मण्डलों के क्षेत्रीय अमले को मिश्रित प्रजातियों (हर्रा, बहेड़ा, आंवला, बांस, महुआ, अचार, सागौन, खमेर एवं करंज आदि) की नर्सरी तकनीक एवं रूट ट्रेनर के संबंध में 30 प्रशिक्षणार्थियों, जिसमें परियोजना परिक्षेत्र अधिकारी, सहायक परियोजना क्षेत्रपाल, वनपाल एवं वनरक्षक पद के अधिकारी एवं कर्मचारियों को प्रशिक्षण हेतु आमंत्रित किया गया जिसमें 28 प्रशिक्षणार्थी प्रशिक्षण हेतु उपस्थित हुए, जिन्हें उक्त दर्शित विभिन्न विषय बिन्दुओं पर प्रशिक्षण दिया गया। प्रशिक्षण पश्चात् परियोजना की अंतिम प्रतिवेदन तैयार कर प्रबंध संचालक, मध्य प्रदेश राज्य वन विकास निगम लिमिटेड, भोपाल को प्रेषित किया गया।


प्रशिक्षण कार्यक्रम – व्याख्यान


प्रशिक्षण कार्यक्रम – व्यावहारिक ज्ञान एवं क्षेत्रीय भ्रमण

Ongoing projects

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

Why this Project:-

Natural regeneration and distribution of these species in natural forest is decreased in past few years, due to overexploitation and poor seed germination. Representation of these species in forest area are lacking so quality seed collection and nursery technique should be standardized for increasing their density in forest.

Research Methodology:-

- Seed collections - 10 seed zones with 03 sites in each zone.
- Evaluation study on the basis - Morphological and physiological attributes.
- Standardization of vegetative propagation.

Study design: Randomized Block Design (RBD)

Objectives of Research:-

- To identify the potential pockets of *Commiphora wightii* and *Anogeissus latifolia* in Madhya Pradesh and to evaluate germplasm with reference to morphological and physiological attributes.
- To develop seed and nursery techniques of targeted species.

Activities Undertaken:-

- Seeds of *Annogissus latifolia* were collected from 10 seed zones with 30 sites.

- Analysis of seeds with various parameters was done of 10 seeds zones.
- Experiments were done on pre seed treatment, storage condition.
- Various potting mixture were applied on seedlings of 07 seed zones for production of quality seedlings.
- Observations on seedling growth and biomass of 03 zones were completed.
- Data analysis of various experiments output is in progress.

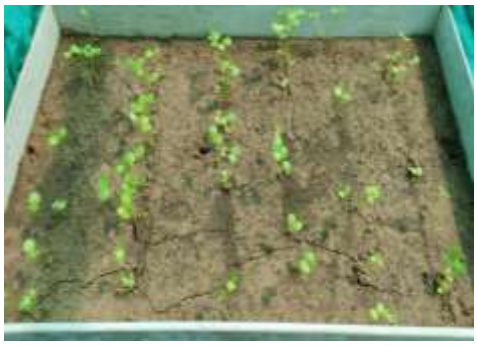
Cost of the Project:- 39.02 lakhs

Expected Outcome of Research:-

- Identified potential pockets.
- Evaluate best germplasm.
- Standardize seed techniques.
- Standardize nursery techniques.
- Technical brochures.

Achievement

- Seed collection from identified superior sources of *Anogeissus latifolia* was completed from 10 seed zones of MP.
- After collection best germplasm was evaluated from the point of view of morphological and physiological parameters.
- Seed and nursery techniques were standardized for production of quality planting stock of *Anogeissus latifolia* and *commiphora wightii.*
- Data analysis work of various parameters related to germplasm evaluation is in under progress.






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:

- 12 seed samples of teak seeds were tested and certified.

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

- Deliverable technologies of standardization of seed and nursery techniques of *Commiphora wightii* and *Anogessus latifolia* was standardized.
- Deliverable technologies of standardization of plant production in root trainers with species specific potting mixture of 10 forestry species viz. *Albizia lebbeck, Albizia procera, Dalbergia latifolia, Dalbergia sissoo, Emblica officinalis, Holoptelia integrefolia, Pongemia pinnata, Terminalia bellerica, Terminalia chebula, Tectona grandis* were standardized.

Other Significant achievement :

- 03 projects were completed and final report submitted to the funding agency.
- 374 field foresters of various forest divisions and R&E circles and college students were trained for plant preparation in root trainers and their management in nurseries, seed technology for plant production in root trainer.
- Infrastructure developed for production of plants in root trainers.
- 03 project proposals were formulated and submitted to the funding agency

Carbon Cell

Objectives

- Estimation of carbon sequestration and carbon pool in different forest types and plantations.
- Coordinate with various research divisions of the institute conducting for research on various aspects of climate change.
- Estimation of carbon sequestration in different samples from working plan / other agency.

Achievements :

- Estimated carbon in 32 leaf litter samples, 32 SOC samples and 11 dead wood samples of Tikamgarh Working Plan.
- Estimated carbon pool of 20 plantations of North Seoni, South Seoni, West Mandla, North Balaghat, South Balaghat Divisions and Pench Tiger Reserve.
- Collected data to estimate carbon pool of 18 plantations of North Sagar, South Sagar, Damoh and South Betul Divisions.

2.1.6 SOCIO ECONOMIC RESEARCH DIVISION

Mandate

1. SOCIOLOGICAL STUDIES

Research Priorities

(i) Studies of changes in the pattern of dependence of tribal and other forest dwelling communities on forests.
(ii) Studies on the role of various tree species in the religio-cultural practices of tribal and other forest dwelling communities.
(iii) Developing models of adaptation to climate change for villages located in the vicinity of forests in order to make them climate smart village.

2. FOREST ECONOMICS

Research Priorities

(i) Estimation of the contribution of various goods and services provided by forests in the gross domestic product.
(ii) Estimation of the quantities of various non-nationalized NTFPs, including medicinal plants, annually collected in the state and their economic valuation.
(iii) Estimation of demand and supply and study of value supply chains of commercially important medicinal and aromatic plant species.
(iv) Wood balance studies.
(v) Assessment of the demand and potential availability of raw material resource for forest based industries.

3. AGROFORESTRY

Research Priorities

(i) Survey and documentation of currently prevailing social forestry, farm forestry bund planting and agroforestry practices, along with their economics.
(ii) Estimation of species-wise trees outside forests (ToFs) in the state.
(iii) Development of suitable agroforestry models for various agroclimatic zones of the state.

4. POLICY RESEARCH

Research Priorities

(i) Impact assessment of various policies, legislations, rules, regulations, government resolutions, schemes, programmes procedures, etc. related to forestry sector, identification of problems/bottlenecks in their implementation and suggesting amendments/modifications, if required.
(ii) Exploring possibilities of Forest Certification and facilitating the forest department in obtaining FSC certification.

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. "मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल्स की सफलता एवं असफलता के कारकों का विश्लेषण"।
   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 तहत् 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 तहत् 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 है, 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 & Study Design:-

- अध्ययन क्षेत्र का चयन
- योजना में सम्मिलित कृषकों का सविचार दैव निदर्शन (Stratified Random Sample) विधि से चयन।
- सामाजिक–आर्थिक सर्वेक्षण द्वारा अनुसूची में कृषकों से आँकड़ों का संकलन।
- सर्वेक्षण हेतु समान आनुपातिक प्रतिनिधित्व के आधार पर कृषकों का चयन कर साक्षात्कार।
- सामाजिक वानिकी वृत्त द्वारा कृषि वानिकी पद्धति के अंतर्गत कृषकों की निजी भूमि में स्थापित प्रदर्शन प्रक्षेत्रों से प्रदर्शन प्रक्षेत्र का चयन तथा रोपण स्थल के पौधों की वृद्धि संबंधी आँकड़ों का संकलन।
- 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) का विश्लेषण।
- चयनित जिलों के ग्रामीणों एवं किसानों से उनके प्रचलित मॉडल, कृषि वानिकी पद्धति के आँकड़ों का संकलन एवं विश्लेषण कर नवीन मॉडल की रूपरेखा प्रस्तुत करना।

Objectives of Research:-

1. कृषक समृद्धि योजना के अंतर्गत कृषि वानिकी के तहत् 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:-

उज्जैन वन वृत्त के अंतर्गत आने वाले वनमंडलों में दौरा कर मौके से वांछित ऑकड़ों का संकलन एवं विश्लेषण।

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।

Present Status:

उज्जैन वृत्त के सभी वनमंडलों के स्थलीय सर्वेक्षण का कार्य पूर्ण किया जाकर ऑकड़ों को कम्प्यूटर में फीड कर विश्लषण का कार्य किया गया। अंतिम प्रतिवेदन तैयार करने का कार्य जारी है।

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

Why this Project:-

मध्यप्रदेश महुआ उत्पादन संग्रहण में एक महत्वपूर्ण स्थान रखता है। प्रदेश के गरीब एवं आदिवासी समुदाय के भोजन एवं आजीविका का प्रमुख स्त्रोत है। महुआ के व्यापार पर कई महत्वपूर्ण व्यापारिक उद्योग धंधे स्थापित हैं, जिनसे सरकार को आय प्राप्त होती है। इसी प्रकार चिरौंजी जो कि अचार के वृक्षों से निकलती है, जिसका देश विदेशों में निर्यात कर बहुमूल्य विदेशी मुद्रा प्राप्त की जाती है। प्रारम्भिक अध्ययन में पाया गया है कि महुआ के वृक्षों का नया रोपण नही हो रहा है, पुराने वृक्ष कमजोर होकर नष्ट हो रहें हैं, आदिवासियों की वनों में स्थित वृक्षों पर निर्भरता बढ़ती जा रही है। वनों से महुआ फूल संग्रहण के पूर्व संग्राहकों द्वारा संग्रहण स्थल में आग लगाकर सफाई की जाती है, इससे कई बार जंगल में भयानक आग लग जाती है, जिससे जैव विविधता एवं जंगली पेंड़ पौधों का नुकसान होता है। संग्राहक अचार गुठली संग्रहण करने के लिए अवसर पाकर अधिक आय की लालसा में वृक्ष काटकर गुठली का संग्रहण करते हैं, जिससे वृक्ष धीरे–धीरे कम होते जा रहे हैं। वर्तमान समय में औपचारिक रूप से महुआ फूल एवं अचार गुठली के संग्रहण मात्रा के आँकड़े उपलब्ध नही हैं। जंगल के वृक्षों का आँकलन वन मंडलों की कार्य आयोजना से कर उत्पादन का आँकलन किया जा सकता है, लेकिन कृषकों की निजी एवं राजस्व भूमियों में महुआ एवं अचार के वृक्षों की संख्या अज्ञात होने के कारण ऐसा करना संभव नही था। इस अध्ययन से महुआ एवं अचार वृक्षों की संख्या का आँकलन प्राप्त होने पर उत्पादन मात्रा का आँकलन किया जाना संभव होगा। सरकार को प्राथमिक संग्राहकों की आय एवं रोजगार को बढ़ाने के लिए ठोस कदम उठाने में सहायक हो जाएगा।

Research Methodology & Study Design :-

- द्वितीयक आँकड़ों, साहित्य के द्वारा महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण क्षेत्रों की स्थिति, महत्वपूर्ण आँकड़े एकत्र करना।
- परियोजना स्टॉफ का चयन एवं सर्वेक्षण कार्य के लिए उन्हें प्रशिक्षण प्रदान करना।
- जिलेवार स्थानीय एवं थोक व्यापारियों से साक्षात्कार।
- 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।
- महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण वाले जिलों का प्रारम्भिक सर्वेक्षण कर संग्रहण क्षेत्र वाले गाँवों का 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।
- मध्यप्रदेश के 52 जिलों में मौजूद 385 तहसीलों में कुल 54,903 गाँव विद्यमान है (मध्यप्रदेश शासन डायरी 2020)। अतः प्रत्येक तहसील से 02 गाँवों का सविचार दैव निदर्शन पद्धति से चयन।

- प्रत्येक गाँव के 5 प्रतिशत (अधिकतम 15 न्यूनतम 5) अर्थात् अधिकतम 11,550 और न्यूनतम 3850 संग्राहक परिवारों के सामाजिक–आर्थिक सर्वेक्षण द्वारा साक्षात्कार लेकर संरचित अनुसूची के माध्यम से आँकड़े निर्धारित प्रपत्र में एकत्र किये जायेंगे।
- जिलेवार महुआ फूल एवं अचार गुठली का व्यापार करने वाले स्थानीय व्यापारी, साप्ताहिक बाजार एवं जिले के थोक व्यापारी से साक्षात्कार लेकर इन प्रजातियों के व्यापार, कीमत निर्धारण प्रक्रिया, मूल्य संवर्द्धन, भण्डारण विधि एवं उत्पादन/संग्रहण में होने वाली कमी व वृद्धि के बारे में आँकड़े एकत्र किया जाकर उनका अध्ययन एवं विश्लेषण किया जाएगा।
- एकत्र किए गये आँकड़ों के विश्लेषण द्वारा अनुकूल एवं प्रतिकूल दोनों परिस्थितियों की संग्रहण मात्रा को प्रतिबिम्बित कर सकेगें।
- 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।
- एकत्र किए गये आँकड़ों का अध्ययन एवं विश्लेषण।

Objectives of Research:-

- मध्यप्रदेश 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:-

मध्यप्रदेश के 52 जिलों में सामाजिक–आर्थिक सर्वेक्षण द्वारा महुआ फूल एवं अचार गुठली के संग्राहकों, व्यापारियों का साक्षात्कार एवं चर्चा द्वारा अति महत्वपूर्ण जानकारी एकत्र करने का कार्य किया गया। इसके साथ ही संबंधित जिले के वनमंडल में स्थलीय अधिकारियों एवं कर्मचारियों से जानकारी एकत्र की गयी। एकत्र किए गये ऑकड़ों को कम्प्यूटर में फीड कर विश्लेषण किया एवं अंतिम प्रतिवेदन तैयार कर प्रेस में छपने के लिए दिया गया।

Cost of Project:- Rs.64.63 Lakhs

Expected Outcome Research:-

- 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 संवर्द्धन आदि में आने वाली समस्याओं की पहचान एवं निदान के उपाय।
- महुआ फूल 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।

Present Status : अंतिम प्रतिवेदन तैयार कर छपने के लिए प्रेस में दिया गया है।

3. Title of the Project:- मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल्स की सफलता एवं असफलता के कारकों का विश्लेषण।

Why this Project:-

प्रदेश में समय–समय पर विभिन्न कृषि वानिकी मॉडल्स का अध्ययन कर खेती से औसत आय बढ़ाने के लिए कृषकों को सलाह देकर अपनाने पर बल दिया गया है। इन समस्त प्रयासों को अपेक्षाकृत सफलता नही प्राप्त हो सकी है, जिसका उत्तरदायित्व समय–समय पर बदलती प्राकृतिक, मानवीय एवं

सामाजिक घटनाओं को जाता है। इन समस्त घटनाओं का अध्ययन कर प्रदेश के विभिन्न कृषि जलवायु क्षेत्रों में अपनाए जाने वाले कृषि वानिकी मॉडलों का अध्ययन कर उनकी सफलता एवं असफलता के कारकों को प्रकाश में लाने की आवश्यकता है, जिस पर गहन विचार विमर्श कर असफलता के कारकों को दूर कर सर्वग्राही तकनीक प्रस्तुत करना तथा सफल कृषि वानिकी मॉडल्स के अवधारणाओं को लागू करने के लिए कृषकों को मार्गदर्शन की आवश्यकता है।

परियोजना में इन्ही उपरोक्त अवधारणाओं को मूर्त रूप देने के लिए राज्य वन अनुसंधान संस्थान, जबलपुर एवं प्रदेश के अन्य शोध संस्थानों द्वारा कृषि वानिकी मॉडल्स पर किए गये अध्ययन के आधार पर प्रदेश में प्रचलित पूर्व के कृषि वानिकी मॉडल्स की वर्तमान स्थिति का अध्ययन कर उनकी सफलता एवं असफलता के कारकों को प्रकाश में लाने का प्रयास किया जाएगा।

Research Methodology & Study Design:-

- वर्ष 2000, 2010 एवं 2014 में राज्य वन अनुसंधान संस्थान, जबलपुर द्वारा प्रदेश के विभिन्न कृषि जलवायु क्षेत्रों में कृषि वानिकी मॉडल्स का अध्ययन किया था। प्रस्तुत परियोजना के माध्यम से पूर्व में कृषि वानिकी मॉडल्स का अध्ययन किया जाकर वर्तमान स्थिति में लाभ–हानि का आँकलन करते हुए, लाभप्रद मॉडल्स के बारे में प्रतिवेदन प्रस्तुत किया जाएगा। साथ ही उपयुक्त कृषि वानिकी पद्धति का सुझाव प्रस्तुत किया जायेगा।
- अध्ययन क्षेत्र का चयन।
- चयनित जिलों के प्रत्येक कृषि वानिकी मॉडल्स के कृषकों का साक्षात्कार एवं स्थल अवलोकन द्वारा संरचित अनुसूची में साक्षात्कार (structured interview) लेकर निम्न बिंदुओं पर जानकारी एकत्र की जाएगी।
- परियोजना से संबधित पूर्व में स्थापित अन्य कृषि वानिकी पद्धति अपनाने वाले कृषकों का पता चलने पर मौके पर उनको भी अध्ययन में सम्मिलित किया जाना प्रस्तावित है।
- लागत–लाभ अनुपात (Cost Benefit Ratio) हेतु विभिन्न गतिविधियों में कृषकों द्वारा किए गए सभी व्ययों एवं उसके स्वयं के श्रम दिवसों तथा समस्त प्राप्तियों एवं उनके बाजार मूल्यों का पूरा लेखा जोखा परियोजना दल द्वारा रखा जायेगा। जिसे प्रतिवेदन लेखन में उपयोग किया जाएगा।
- प्राप्त आँकड़ों का विश्लेषण कर अन्तिम परियोजना प्रतिवेदन तैयार कर वित्त पोषक विभाग को प्रस्तुत किया जायेगा।
- आँकड़ों को कम्प्यूटर में फीडकर उनका वर्गीकरण, श्रेणीकरण एवं विश्लेषण।

Objective of Research:-

- मध्यप्रदेश के विभिन्न कृषि जलवायु क्षेत्र में पूर्व में प्रचलित कृषि–वानिकी मॉडल्स की वर्तमान स्थिति का अध्ययन।
- पूर्व प्रचलित कृषि–वानिकी मॉडल्स की सफलता एवं असफलता के कारणों की पहचान।
- सफल कृषि वानिकी मॉडल्स की रूपरेखा प्रचार–प्रसार हेतु प्रस्तुत करना।

Cost of the Project:- Rs. 39.964 Lakhs

Expected Outcome of Research:-

- उपयुक्त कृषि वानिकी मॉडल्स से कृषकों के लिए लाभ–हानि का लेखा–जोखा उपलब्ध रहने से सुविधानुसार क्षेत्र में वृद्धि या कमी पर्याप्त अवसर उपलब्ध होगा।
- कृषि जलवायु क्षेत्रवार सफल कृषि वानिकी पद्धतियों का प्रलेख।
- उपयुक्त कृषि वानिकी पद्धति का सुझाव अन्य कृषकों एवं शासन के लिए मार्गदर्शी अभिलेख।

Prasent status :

वर्ष 2015–16 के वृक्षारोपण मूल्यांकन कार्य में संलग्नता एवं वर्ष 2023 में विधान सभा तथा 2024 में लोकसभा के कारण कार्य प्रारम्भ करने में विलंब हुआ। साथ ही On-going 02 परियोजनाओं के ऑकड़ों का विश्लेषण एवं अंतिम प्रतिवेदन प्रस्तुत करने का कार्य किया जा रहा था। वर्तमान में इस परियोजना का कार्य प्रारम्भ कर दिया गया है।

2.2 WILDLIFE DEPARTMENT

2.2.1 ANIMAL ECOLOGY RESEARCH DIVISION

Mandate

1. Predator and prey population monitoring *in-situ* condition
2. PHVA of locally extinct or newly introduced species in various protected areas of Madhya Pradesh
3. Re-introduction/re-wildling/translocations of carnivores and herbivores
4. Capacity building of frontline forest staff on predator and prey monitoring
5. Conservation of lac insects in central India

Completed Project: - 04

1. Study on leopard (*Panthera pardus L.*) presence, identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of Jabalpur and Indore, Madhya Pradesh

   Funding agency : PCCF (Wildlife) M.P., Bhopal,
2. AITE: Evaluation of Wild Animals Populations and Habitat in MP, Part I &II

   Funding agency : PCCF (Wildlife) M.P., Bhopal,
3. Population Habitat Viability Analysis (PHVA) of Hard ground Barashingha (*Cervus duvauceli branderi*) for introduction in Bandhavgarh Tiger Reserve, M.P.

   Funding agency : PCCF (Wildlife) M.P. Bhopal through Bandhavgarh Tiger Reserve, M.P.
4. International Conference on “Wildlife Conservation: Emerging scenario and Way Forward”

   Funding agency : PCCF (Wildlife) M.P. Bhopal

Ongoing Projects:- 03

1. Ecology of Indian Wolf (*Canis lupus pallipes*) and it’s conservation implication in Nauradehi Wildlife Division, Madhya Pradesh

   Funding agency : PCCF (Wildlife) M.P., Bhopal
2. Network Project on Conservation of Lac Insect Genetic Resources

   Funding agency-ICAR Indian Institute of Natural Resins and Gums, Ranchi, Jharkhand
3. Hand on experiment on kusmi lac cultivation in Bichhiya village of Umaria Forest Division of Madhya Pradesh

   Funding agency- DFO, Forest Division Umaria

Regular Activities:- 01

1. Maintenance of Ornamental nursery and circular rose garden using the fund of Lac research project

   Funding agency : SFRI, Jabalpur

Project Summary

Completed Project

1. Title of the Project:- Study on leopard (*PantherapardusL.*) presence, identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of Jabalpur and Indore, Madhya Pradesh

Why this Project:-

During the last decades, data advocate many wildlife populations have recovered largely because of protection from over exploitation and the emergence of technology and application of wildlife

management with the increase in wildlife population locally, human-wildlife conflicts have also increased. When large cats live in proximity to humans, some amount of conflict between them is inevitable.

The increasing human population, changing land use practices, soaring demands from our urban population and more recently fast expanding economic activity have started straining the delicate balance at which leopard survive.

Initially this proposal was submitted for the urban area of Jabalpur only. The urban area of Indore is also included in the proposed study based on the recommendations made by Research project evaluation Committee members of Office of Principal Chief Conservator of Forest (Wildlife), Madhya Pradesh Forest Department. It was observed that, leopards are entering inside the housing complexes, residential colonies, university complexes of both Jabalpur and Indore in regular interval. The sudden venturing of leopards inside the human habitation has created tremendous pressure on the forest department of both Jabalpur and Indore. To address this complex conservation issue and also to augment domain knowledge on source sites of straying leopard in the urban areas, the present study has been proposed.

Research methodology: -

Identification of source sites of stray leopards and their causal factors of straying in and around the urban areas of Jabalpur & Indore:

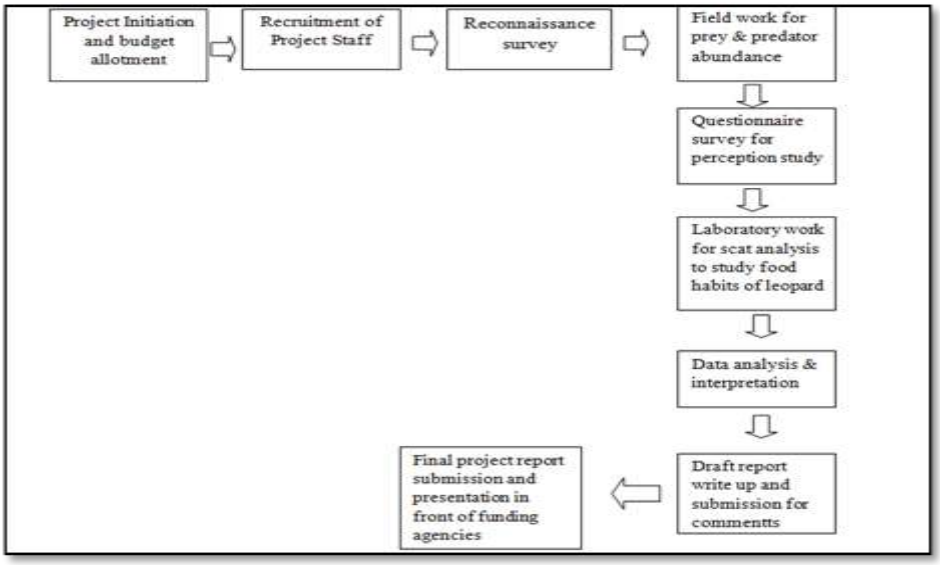
- Reconnaissance surveys and sign surveys for occupancy estimation
- Camera trapping for leopard abundance estimation
- Kill monitoring and Scat Analysis for food habits study

Developing suitable strategy to reduce man-leopard interaction amicably in the urban landscape:

- Identification of leopard-human interaction zones using secondary data collected which will be analyzed using Arc GIS 10.3.
- Perception of people towards human-leopard interaction
- Developing Habitat Suitability Model Map for leopard land-use pattern

Study Design :-

- Project Initiation and budget allotment
- Recruitment of Project Staff
- Reconnaissance Survey
- Field work for prey & predator abundance
- Questionnaire survey for perception study
- Laboratory work for scat analysis to study food habits of leopard
- Data analysis & Interpretation
- Draft report write-up and submission for comments
- Final project report submission and presentation in front of funding agencies



Objectives of Research:-

1. To identify source sites of stray leopards and their causal factors of straying in and around the urban areas of Jabalpur and Indore.
2. To study perception of people towards human-leopard interaction.
3. To develop suitable strategy to reduce man leopard interaction amicably in the urban landscapes

Activities Undertaken:–

Draft report submitted to PCCF Wildlife letter no/AED/1980 dated 14/08/23.

Cost of the Project:- 43.07 lakhs

Outcome of Research:-

- A total of 17.6 (+5.4) leopards were found in Jabalpur while a total of 23 (+4.8) leopards were found in Indore.
- The number of herbivorous species were also assessed in the wildlife sanctuaries, urban forest and nature reserves like Dumna, Thakur Tal of Jabalpur and RalaMandal, DevGudaria, Choral of Indore.
- The Jabalpur range was found to be the primary location of human-leopard negative interactions. The Madanmahal beat at this said range was identified as the zone with the highest intensity of negative interactions, along with Bargi range. The areas extending from Dumna to Bhita and Temar have been identified as experiencing a medium level of human-leopard negative interactions.
- In Jabalpur, Dumna Nature Park was identified as the primary leopard habitat, along with a sizable unprotected area near Jabalpur Airport. However, anthropogenic disturbances and developmental projects pose risks to these habitats. Forest patches in the study area could potentially serve as leopard movement corridors, but they face depletion due to various developmental projects.
- In Indore, the Ralamandal Wildlife Sanctuary provides habitat for leopards, but surrounding areas have experienced fragmentation due to construction and urbanization. Highways, road expansion, industrial development, and agricultural expansion pose threats to identified corridors in the area

- Analysis scat samples from Indore and Jabalpur revealed that the Chital was the most significant contributor to the leopard's diet in both urban areas. Feral dogs were also found to be highly preferred by leopards in urban areas, which could explain their frequent presence near human settlements
- The study also examined the diet of leopards in Indore and found that livestock is included in their diet. The high incidences of cattle lifting in Indore suggest that leopards may prefer targeting livestock as they are easier to catch and pose lower risks compared to wild prey. This preference for livestock could be attributed to inadequate livestock herding practices in Indore
- Under the project Psychological survey was conducted on total 2827 families of 73 villages in Jabalpur and 2255 families of total 48 villages of Indore.
- At the beginning of the project, one-day workshop was also organized on "Coexistence with Leopard"in presence of Jabalpur Forest Department, subject expert team of Sanjay Gandhi National Park at Mumbai and various government, non-government along with SFRI team.

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

- This study will be a great help to Forest Department in effectively mitigating the issue of negative interaction between humans and leopards as it involves:
- Development of suitable strategies to reduce man-leopard negative interactions along with organizing awareness programs for different stakeholders.
- Psychological study result was for the understanding and willingness of the people for sharing their space with leopards.

2. Title of the Project:- AITE: Evaluation of Wild Animals Populations and Habitat in MP, Part II

Why this Project:-

The major aim is of the Project to know Population and abundance of tiger, co-predator and prey of all 83 Forest division of Madhya Pradesh under All India tiger Estimation (AITE) 2022 Program.

The data collected During AITE Program

Various Forest Division Of M.P. required Prey and Predator Population estimation for their working plan chapter

In addition to that all tiger reserve of MP time to time Requested for range wise prey density and predator abundance data

So to complement Demand of various forest Division data this proposed project in to prepared prey and predator abundance data for Madhya Pradesh.

Research methodology: -

- Data collection under phase I and Data received from all 83 division of Madhya Pradesh.
- Data verification at SFRI with the help of computer Operators from Respective forest division.
- A database on tiger Shall be Developed in SFRI

Data Analysis:

- Density estimation of Prey base.
- Density estimation of prey base analyzed by using software Distance version 7.5 in all 83 division in 16 circle of Madhya Pradesh Forest division.

Study Design :-

- Summarising, the entire project was based on data collection from field and data entry by computer operators from each 83 division, data scrutiny, verification and rectification by SFRI, data was submitted to NTCA-WII, report writing and submission of report to PCCF (Wildlife) and creation of data base for any further study.

Objectives of Research:-

1. Data Analysis on prey and predator status and abundance
2. Generation of Reports

Activities Undertaken:–

- Draft report submitted to PCCF Wildlife letter no/AED/2155 dated 13/09/23

Cost of the Project:- 47.73 Lakhs

Outcome of Research:-

- Under the All India Tiger Estimation 2022, Forest division and protected area wise analysis was done to include the data of wildlife in various working plan of Madhya Pradesh Forest Department.
- A proper strategy can be prepared for the management of herbivorous, carnivore and their habitat.
- Beat wise information about human disturbance was also analyzed and provided in report. From the above information, a strategy can be prepared to control biological pressure and further to mitigate human wildlife negative interactions.

Conservation implication on prey and habitat

- Significant decrease of Chital density and other prey species have been observed in certain Territorial Divisions & Protected Areas. As chital is the principal prey species of Tiger and co-predators in Central India, so, decrease of Chital population may enhance the possibilities of

cattle lifting cases and can increase human-wildlife conflict. Improvement of habitat of chital and other prey species is recommended in Protected Areas and tiger bearing Territorial Divisions.

- During 5th Cycle of All India Tiger Estimation programme mean tiger population is estimatedas 785 (58). Prey augmentation is required where less prey base is available for tiger and co-predators.
- Highly and moderately disturbed habitats need to be protected for long-term sustenance and growth of wildlife in central India.

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

Both macro (Division) and micro (Range) level prey and predator data was analysed for proper management intervention.

3. Title of the Project:- Population Habitat Viability Analysis (PHVA) of Hard ground Barashingha (*Cervus duvaucelibranderi*) for introduction in Bandhavgarh Tiger Reserve, M.P.

Why this Project:-

The proposed sites for introduction in Bandhavgarh Tiger Reserve is found suitable for Barasingha during an in house survey by the department.

The introduction sites support ball ecological requirement of this deer species as all the causes of local extinction of this cervid needs to be removed, the introduction programme stands justified as far as the IUCN guidelines are concerned.

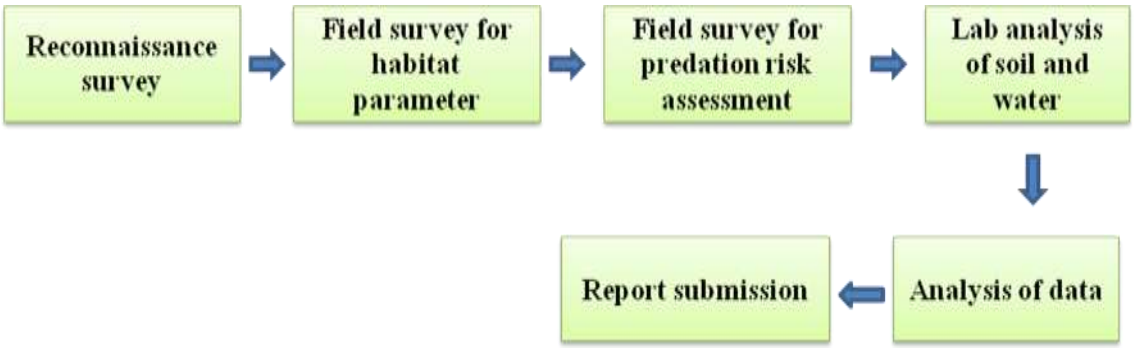
A detail population Habitat Viability Assessment is the need of the hour before carrying the introduction programme.

Research methodology: -

- Reconnaissance survey for the proposed release sites.
- Detail vegetation sampling based on working plan protocol shall be done.
- Other habitat parameter shall be also collected.
- Data shall be analysed and draft report prepared
- Final report shall be submitted within 3 months

Study Design :-

- Project staff recruitment shall be done for field data collection
- Field data collection shall be done in Kanha as well as in proposed releasing sites at Bandhavgarh to compare both sources sites and releasing sites.
- Data analysis shall be done and PHVA shall be done
- Report writing work shall be done
- Submission of final report



Objectives of Research:-

1. To compare various habitat parameters of the barasingha in source sites of Kanha and the proposed releasing sites at Magdhi Range of Bandhavgarh
2. To compare basic parameters of the barasingha in grassland areas of Kanha, with proposed introduction site Magdhi of BTR and adjacent meadows for the establishment of barasingha population.
3. To study viable population of Barasingha for introduction
4. To explore the possibility of expansion of the free-ranging barasingha population and suggest measures for habitat and connectivity improvement in proposed introduction site.

Activities Undertaken:–

- Initially 37 Barasingha were released in Bandhavgarh on 26th March 2023, later 11 more were trans located from Kanha during March 2024.
- Final report was submitted to PCCF Wildlife letter no/AED/1632 dated 26/06/23

Cost of the Project:- 3.91 lakhs

Outcome of Research:-

- Under the project, with the aim of increasing the habitat and geographical environment of Barasingha, replacement has been made from Kanha Tiger Reserve to Bandhavgarh Tiger Reserve. In which the institute has also studied suitable habitat sites along with population habitat viability by availed data.
- At the initial level, the institute has suggested replacement of a total of 60 Barasingha from Kanha Tiger Reserve to Bandhavgarh. The Government of India has given permission for translocation of 50 Barasingha.
- Based on the suggestion given by the institute, 48 Barasingha has been successfully translocated from Kanha to Bandhavgarh.

Risk factor & suggestion

- Habitat suitable area in Bandhavgarh is restricted in few patches, so creation of more suitable swampy habitat is need of the hour in phase wise and precaution need to be taken based on their possible movement across the Bandhavgarh, when they would be released in the wild.
- Our assumption for Population Viability Analysis was based on 15% mortality in the wild condition. If Mortality goes beyond this limit, immediate action needs to be taken to curb down the mortality.
- We have surveyed during peak summer at Magdhia to assess the available food and water resources of Barasingha and found the enclosure habitat is suitable for Barasingha and similar situation was also observed in other adjoining grassland like Mili, Jogiwada etc. we recommended the inter connecting of grasslands at Bandhavgarh otherwise hard release programme may face risk of mortality due to lack of available food.
- Regular monitoring of prey and predator population was recommended especially at the probable hard releasing sites of Barasingha at Bandhavgarh.

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

- PHVA of Baraisngha for introduction in new habitat

Work activities under Barasingha project

4. Title of the Project:- International Conference on "Wildlife Conservation: Emerging scenario and Way Forward"

Why this Project:-

Madhya Pradesh, often called as the "Heart of India", is a state in central India and total geographical area of the state is 3,08,252 sq km. Madhya Pradesh is a forest rich State and Recorded Forest Area (RFA) in the State is 94,689 sq km of which 61,886 sq km is Reserved Forests, 31,098 sq km is Protected Forests and 1,705 sq km is un-classed Forests. This state is also referred to as wildlife state with twenty-five wildlife sanctuaries and ten national parks offering a chance to witness wild animals in their natural habitat.

At a time when the numbers of many animal species are declining, this state has played a pivotal part in India's wildlife conservation programs. From preserving tiger population, to being the state with the highest leopard, vultures and gharial (an 'endemic' crocodile species) population to having successfully increased the population of the highly endangered Barasingha (a hard ground swamp deer), successful reintroduction of gaur or Indian Bison, Madhya Pradesh has come a long way in protecting the natural order and habitat for animals.

The forestry practices system has reached it's centenary year in 2022. So, to commemorate the 100 years of forestry practices in the state and also with this glorious past on wildlife research and management, Madhya Pradesh Forest Department is jointly organizing an international conference on "Wildlife Conservation: Emerging scenario & way forward" with M.P. State Forest Research Institute.

Research methodology: -

a) Papers were invited under following four themes

1. Wildlife Population Management
2. Wildlife Habitat Ecology

3. Wildlife Policy Issues and Challenges

4. Human-Wildlife Conflict and Mitigation Measures

b) Research papers were scrutinized by theme coordinators, co-coordinator and theme associates

c) All papers were categories into oral and poster categories

d) Recommendations were adopted in conference proceeding and released by Honorable CM on International Tiger Day dated 29th July 2023.

Study Design :-

Conference brochure was published online on SFRI's website as well as MPFD's website and MP Tiger Foundation Society's website for large circulation. All Papers were scrutinized and actual conference was held at Kanha Tiger Reserve in three different venues. Logistic and conference organizing committees were formed to foresee the conference and technical committees were formed to oversee all paper related matters. Conference proceeding was prepared by theme coordinators and other technical committee members.

Objectives of Research:-

1. To provide opportunity for academicians, practitioners, professionals, researchers and policymakers engaged in working on various emerging issues on wildlife management.
2. To provide a platform to be acquainted with latest developments and trends in the ongoing research in various dimensions of wildlife management.
3. To provide a forum to understand variety of species-specific conservation strategies evolving in the country.

Activities Undertaken:–

- As per the instructions of the Honourable Chief Minister of Madhya Pradesh Government, International Wildlife seminar was organized from 27/04/2023 to 29/04/2023 by Madhya Pradesh Forest Department at Kanha Tiger Reserve, Mandla.
- The seminar was inaugurated by the Honorable Governor Madhya Pradesh Government, Honorable Chief Minister of Madhya Pradesh Government, Honorable Forest Minister of Madhya Pradesh Government and Madhya Pradesh Forest Department In the presence of senior staff, public representatives and Director State Forest Research Institute, Jabalpur Completed.
- The main theme of the said 3-days seminar - Wildlife conservation, emerging scenario and future and the strategy was under which a total of 235 participants took part in the following four subject's including12 international participants.
- Theme1. Wildlife population management2. Habitat ecology and management 3. Wildlife policy Issues and challenge 4. Human Wildlife Conflicts and mitigation measures
- In the seminar, senior officials of Madhya Pradesh Forest Department i.e.Dr. J.J. Datta andDr. H.S. Panwar were honored by Life Time Achievement Award for their important contribution in wildlife management.

Cost of the Project:- Rs. 1.5 Crore

Outcome of Research:-

- The proceedings of the International wildlife seminar were released by the Honorable Chief Minister Madhya Pradesh Government in the function for International Tiger Day on 29th July 2023

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

- This conference addressed social aspects of human-wildlife conflict mitigation measures, compensation to local communities and approaches on economic assessment of crop losses caused by wild animals.
- It helped to evolve partnerships through mutual learning and collaboration across various stakeholders working on wildlife conservation
- It will also help to collate information on latest knowledge generated through use of, technologies, scientific and indigenous methods and related information from the field.

On-going project

1. Title of the Project:- Ecology of Indian Wolf (Canis lupus pallipes) and it's conservation implication in Nauradehi Wildlife Division, Madhya Pradesh

Why this Project:-

- Before re-introduction of tigers in 2018, wolf was considered as the largest predators in Nauradehi Wildlife Sanctuary.
- It is essential to study the present ecological status of wolf and it's co-existence pattern in this tropical forest after re-introduction of tigers
- No study on this issue so far conducted in Madhya Pradesh
- It will help to develop conservation strategy on wolf in this landscape especially to support State Wildlife Action Plan

Research Methodology:-

- Movement and ranging pattern- following radio-collared wolves (n=3) and their pack members (Habib et al. 2021)
- Prey availability- by line and vehicle transects to entire Nauradehi Wildlife Division (Khan et al. 1996)
- Food habits- by analysis of scats and kills (Jethva and Jhala 2003; Maurya et al.2011)
- Ecological niche separation- with other large carnivores- two species occupancy modeling (Mackenzie et al. 1995)
- Perception study- by questionnaire survey and psychological analysis of data (Williams et al 2002)

Study Design:-

Objectives of Research:-

- To study ecology – feeding, ranging movement and breeding of wolf in Nauradehi Wildlife Division
- To study ecological niche separation of wolf with other larger carnivores
- To study perception of local communities on coexisting with wolf
- To develop suitable conservation strategy on wolf

Activities Undertaken:-

- Inception meeting was conducted on 7th March 2024 in presence of SFRI team and Nauradehi Team, in which a strategy for the future of the Wolf Project was prepared and suggestions from the park management for collecting data were also included.
- Surveyed 566 household of 14 villages like Hinota, Hardua, Bagaspura, Gopalpura, Gudakalan, Baleh, Talsemra, Berkheri, Changawan, Mokla, Neguwan, Sarkheda, Simariya for local people perception on wolf.

S.No.	Name of surveyed villages	Number of total household	Surveyed household	Surveyed household %
1	Hinoti	276	30	10.87
2	Hardua	207	22	10.63
3	Bagaspura	210	22	10.48
4	Gopalpura	135	23	17.04
5	Gudakala	320	33	10.31
6	Baleh	750	75	10.00
7	Talsemra	325	33	10.15
8	Muhuasemra	75	8	10.67
9	Berkhedi	225	23	10.22
10	Changua	50	10	20.00
11	Mohkala	325	38	11.69
12	Negua	80	11	13.75
13	Sarkhedi	46	9	19.57
14	Semariya	566	57	10.07

- Under the project, along with wolves, their resource partition with tigers and other co-predators shall be also studied.
- Breeding information of wolf and other indirect evidences were collected.
- Camera trapping exercise, Scat sample collection (74) have been carried out in Mohli Range, Singhpur Range, Jhapan Range, Nauradehi Range, Sarra Range and Dongargaon Range.

Cost of the Project:- Rs. 45.35 Lakhs

Expected Outcome of Research:-

- Distribution pattern of wolf in Nauradehi Landscape
- Breeding habitats (den sites)
- Foraging pattern of wolf and their niche speration with other large carnivores
- Perception of local communities on wolf conservation
- Suitable Conservation strategy for long term survival of wolf in Nauradehi and adjacent area

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

- This project will help to develop baseline information on various ecological aspects of wolf in Nauradehi and it's adjoining area.
- Findings of the present study shall help the management to develop suitable conservation strategy to minimize human wolf interaction.
- Conservation Action Plan on wolf in a human dominated landscape

Field Activities and workshop under wolf research project

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

Why this Project:-

Fast depleting forest cover of the country is a serious threat to the bio-diversity of lac-insects as well as their host-plants. In the absence of human intervention, the unattended species of lac-insects and their host-plants might be lost.

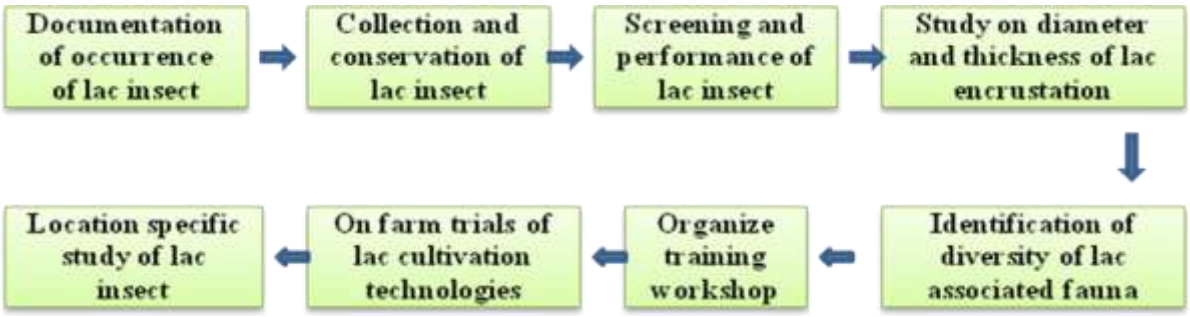
To overcome the situation the project was started to documentation the occurrence of lac insect/host plant, conserving the biodiversity of local lac insect species/races and breed which is decline due to anthropogenic activities and climate change. In this way, lac insect/host plants are needed for in-situ and ex-situ conservation. The Network project on conservation of lac insect genetic resources has a crucial role. Training on scientific method of lac cultivation can increase capacity and knowledge level of farmers on lac cultivation. It can lead to improve productivity of lac and can provide stability in their income.

In this project, there were 8 network Co-operating centers and 3 voluntary center throughout in India with one lead centre ICAR-NISA, Ranchi, under network project on conservation of lac insect genetic resources. There are four states; Madhya Pradesh, Maharashtra, Chhattisgarh and Goa, and one union territory Daman & Diu given, under State Forest Research Institute, Jabalpur, Madhya Pradesh.

Research Methodology:-

- **Collection and conservation of lac insect-** Brood lac samples were collected from different districts of Madhya Pradesh/Maharashtra and conserved on different host plants under ex-situ condition. Screening and performance of collected lac samples also doing in gene bank by selected parameter.
- **Productivity linked performance of lac insect samples:** For this study different productivity parameter viz., initial density of settlement (cm2), initial mortality (%), density after 21 days of settlement (/cm2), sex ratio (male - female %) and Final female density at crop maturity (No. of cell/cm2) were taken.
- **Life cycle of lac insect samples:** The observations on duration of crawler emergence period (days), duration of pre sexual stages (days), duration of male emergence (Days), Lac insect maturity period (days) were recorded
- **Training of farmers / resource persons:** Lac cultivation training workshops were organized in selected sites of Madhya Pradesh to create awareness and promotes lac cultivation on different host plants.
- **Study of socio economic status of lac growers-** Random sampling technique will employed to select lac growers. All the relevant information was collected from the lac producers by personal interview through a pre-tested questionnaire
- **Study on diameter and thickness of lac encrustation-** Measurement was taken at the middle of the lac encrustation length and for shoot diameter at the ends of the encrustation, where lac was not present using vernier calipers. The formula-encrustation thickness= (encrustation diameter covering shoot-shoot diameter) for each shoot was used and averaged.

Study Design:-



Objectives of Research:-

- In-situ and ex-situ conservation of the biological diversity of lac-insect of the country
- To develop the lac insect field gene bank of the institute as center of excellence on lac biodiversity.
- To transfer the lac cultivation technologies in the in-situ conservation areas.

Activities Undertaken:-

- Intensive survey was conducted in 14 blocks of Wardha, Nagpur, Jalna, Amravati district of Maharashtra in which lac insect occurrence found in 3 different blocks (Karanja, Ramtek and Ghansawangi) of Wardha, Nagpur, Jalna districts from rain tree and palas host tree.
- Collected lac insect samples from 15 sites of 11 districts of Maharashtra and conserved in 215 plants/ tree of 8 different host in Regional Field Gene bank .
- The studies on thickness, diameter growth, of lac encrustation in 14 sites of 11 district of Maharashtra were carried out in the year 2023. The study revealed that in Maharashtra maximum diameter thickness of lac insect occurred in Latur in rain tree (16.75 mm), followed by, Nanded in rain tree (14.95 mm), whereas lowest diameter of lac encrustation occurred in Ambad, Jalna in pipal (4.55 mm) followed by Aurangabad in pipal (6.3 mm).
- On the occasion of "second National Lac Insect Day" organized one day capacity building¬ cum training programme on 22 May 2023 at Dongar Bareda village of Jabalpur Forest Division in which 60 progressive farmers, forest committee members have participated.
- To promote commercial viable kusmi lac cultivation, five different kusmi lac cultivation training workshops have been organized at Kuee Mall (Dindori), Bichhiya (Umaria), Kareyam-Rater (Chhindwara), Mawai(Mandla) and Dharao-Parao (Narmadapuram) villages of Madhya Pradesh and in total 251 van samiti member and farmers were trained.
- Socio economic status of 50 lac collecting farmers of Bhandara district of Maharashtra was done to document the impact of lac cultivation for increasing farmer's income. The average farmers collected 69.09 kg lac and earned Rs 16346.6 per annum from lac collection during the study period. Amongst the different sources of income, Income from lac collection ranked first (37.21%) followed by labor work (32.13%), agriculture income (22.81%), and other source of income (7.85%).
- Socio economic status of 22 lac collecting farmers of Indore district of Madhya Pradesh was done during the year 2023. The average farmers collected 69.31 kg lac and earned Rs 26626.36 per annum from lac collection. Amongst the different sources of income, Income from lac collection ranked first (49.92%) followed by labor work (37.54%), agriculture income (11.94%), NTFP collection (4.67%) and Animal husbandry income (1.53%).
- Productivity linked performance of collected lac insect samples were carried out in 9 district of Maharashtra and 5 districts of Madhya Pradesh. In Maharashtra maximum survival female density at crop maturity recorded in Surkuda of Gondia (9.89 cell/cm2) while lowest density was recorded in Beed (1.5 cell/cm2). In Madhya Pradesh maximum survival female density at crop maturity recorded in Barchi of Narsinghpur (8.86 cell/cm2) while lowest density was recorded in Betul (1.13 cell /cm2).
- Life cycle of collected lac insect samples were carried out in 9 districts of Maharashtra and 05 districts of Madhya Pradesh.In Maharashtra, mean shortest maturity period of lac insect was recorded in Sindhkhede Raja of Buldana with 235 days life period while the longest maturity period of lac insect was recorded in Loha of Nanded with 256 days life period. In Madhya Pradesh, mean shortest maturity period of lac insect was recorded in Sarra Pipariya of Mandla with 236 days life period while the longest maturity period of lac insect was recorded in Barchi of Narsinghpur with 249 days life period.

Cost of the Project:- Rs. 12.48 Lakhs


Organisedkusmi lac training workshop in different forest division of Madhya


Celebrated second National Lac Insect Day in DongarBareda, Jabalpur

Expected Outcome of Research:-

- *In-situ* and *Ex-situ* conservation of lac insect genetic resources
- Identification of best performing lac insect–host plants combination for sustainable yield in diverse conditions.
- A cadre of master trainers shall be generated for promoting, knowledge sharing and capacity building of the adopted/ selected farmers of lac cultivation.
- Documentation of the impact of lac cultivation for increasing farmers' income in different areas of Madhya Pradesh and Maharashtra

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

- Identify suitable lac insect-host plant combination for higher and sustained yield for lac growing farmers of Madhya Pradesh and Maharashtra.
- Enhancement the capacity on lac cultivation through training of master trainers and farmers and Transfer of lac Cultivation technologies in the in-situ conservation areas of Madhya Pradesh and Maharashtra.

3. Title of the Project:- Hand on experiment on kusmi lac cultivation in Bichhiya village of Umaria Forest Division of Madhya Pradesh

Why this Project:-

- The forest areas of Nowrozabad range of Umaria forest division of Madhya Pradesh are suitable for kusmi lac cultivation, particularly on Kusum which are quite abundant now. However lack of knowledge on cultivation techniques is found to be the main obstacle. Through lac production in the area, the livelihood of forest committee members and farmers living in forest areas can be strengthened hand holding experiment of lac cultivation.

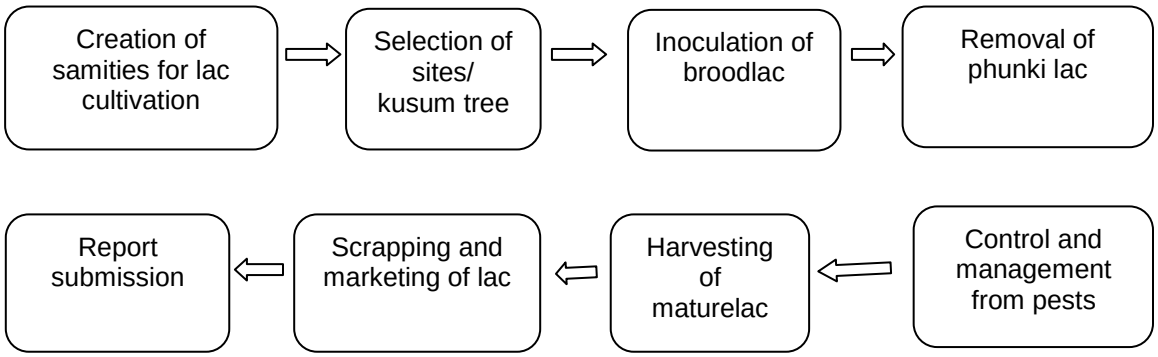
- Previously SFRI Jabalpur organized one day kusmi lac cultivation training workshop in Bichhiya village of Umaria Forest Division on dated 06/09/2023 in which 40 van samiti members and local farmers participated. The above project proposal is proposed for hand holding experiment of kusmi lac cultivation after conducted training workshop.
- Looking at the need of local, capacity workshop is proposed in Umaria Forest Division of Madhya Pradesh. We assume hand holding experiment of kusmi lac cultivation shall enhance awareness and improve quality of cultivation techniques to generate sources of income.
- With this purview DFO, Umaria has sought technical assistance from SFRI, Jabalpur for hand holding of Lac Cultivation to the local communities of Bichhiya village under Umaria Territorial Division vide letter No. 1478/ Umaria Dated 27/09/2023 .

Research Methodology:-

- Hand holding exercise of kusmi lac cultivation technologies- Different hand holding techniques of lac cultivation viz., selection of suitable host tree, Inoculation of lac insect, Removal of Phunki lac, control and pest management of lac cultivation, harvesting and scrapping practices of mature lac will be demonstrate to van samiti members and local communities. The following activities will be supervised by the scientific team of SFRI Jabalpur.

Study Design:-

Flow Chart of lac cultivation



Objectives of Research:-

- To conduct hand holding exercise on lac cultivation by scientific tools and technologies in Bichhiya village of Umaria Forest Divisions of Madhya Pradesh.
- To monitor the implementation of hand holding exercise.

Activities Undertaken:-

- SFRI Jabalpur and Umaria Forest Division have jointly adopted village Bichhiya under Umaria district for hand holding experiment on Kusmi lac cultivation. As this district has high potentiality on kusmi lac production, this collaboration may enhance the productivity and improve the local lac based economy in sustainable manner.
- In total 45 village Forest Committee members were trained and Selection & Marking of 80 kusum trees were done for kusmi lac cultivation in next cropping season.
- Initially 80 kg Kusmi brood lac had been inoculated on 80 kusum trees in the month of February.

Cost of the Project:- Rs.4.99 Lakhs

Expected Outcome of Research:-

- Generation of additional source of income of farmers and van samiti members through lac cultivation.
- To know potentiality of lac production on *Schleichera oleoasa*

Different activities under hand holding exercise of lac insect in Bichhiya village of Umaria division

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

- Van samiti members gained knowledge on scientific techniques of lac cultivation
- Sustainable livelihood opportunities were generated to farmers, van samiti members through lac cultivation in Bichhiya village of Umaria Forest Divisions of Madhya Pradesh

Supporting Activities:

Monitoring and evaluation of tree plantations done in the year 2015-16 by the M.P. Forest Department

As a team leader monitoring and evaluation of plantation were carried out in 12 sites of North Panna, South Panna, Tikamgarh, Rewa and Chhatarpur Forest Division of Madhya Pradesh.

Division	Range	Beat	Compartment
North Panna	Ajaygarh	Barkola	PF 188
South Panna	Raipura	Bagrod	PF 1131
Tikamgarh	Tikamgarh	Bijrawan	RF 11
Tikamgarh	Tikamgarh	Lahorguwa	RF 39
Tikamgarh	Niwari	Birorakhed	RF 222
Rewa	Sirmore	Sarai	RF 100
Rewa	Sirmore	Luke	RF 82
Rewa	Sirmore	Jhiriya	PF 128
Rewa	Atrela	Chand	RF 119
Chhatarpur	Lavkushnagar (Londi)	Bila	Papharayay (Nahar Ke Kinare)
Chhatarpur	Lavkushnagar (Londi)	Bamhori	PF 699
Chhatarpur	Bajna	Basantpura	PF 109

2.2.2 HABITAT ECOLOGY RESEARCH DIVISION

Mandate

1. Monitoring and evaluation of wildlife and their habitats.
2. Capacity building of front line forest staff for data collection and handling of advanced equipment and software
3. Ecological study of forest, grassland and wetland ecosystems of Madhya Pradesh
4. Preparation of wildlife management/Habitat improvement plan for wildlife displaced due to various developmental activities
5. Habitat management studies in core and buffer areas of tiger reserve
6. Impact of wildlife on human habitation and vice versa
7. Monitoring of Re-introduced Tigers in new habitats of Madhya Pradesh
8. Serve as nodal agency to compliment management authorities for scientific inputs.

Completed Projects: - 02

1. Impact Assessment of Proposed Sheopur Kalan & Badoda Towns A Group Water Supply Scheme- Parbati River Sub-project under MPUSIP on Aquatic Fauna, River Hydrology & Ecology and its Mitigation
   Funding agency : Madhya Pradesh Urban Services Improvement Project, Bhopal (M.P.)
2. AITE-2022 Evaluation of wild Animals Population and Habitat in Madhya Pradesh (for analysis of sign survey for carnivore species and beat status of Tiger & Leopard in Madhya Pradesh)
   Funding agency : PCCF (Wildlife) M.P., Bhopal

Ongoing Projects:- 01

1. म.प्र. जल निगम मर्यादित द्वारा क्रियान्वित बैढन–2, ग्रामीण समूह, चितरंगी ब्लॉक, जिला सिंगरौली, मध्यप्रदेश के जल प्रदाय योजना के अंतर्गत वन्यप्राणियों/बायोडायवर्सिटी पर पड़ने वाले प्रभाव का अध्ययन
   Funding agency : म.प्र. जल निगम मर्यादित, परियोजना क्रियान्वयन इकाई, सिंगरौली

Regular Activitiy:- 01

1. Maintenance of Monitoring and Evaluation Facilities and Database of Predators Prey in Madhya Pradesh
   Funding Agency **:** SFRI & PCCF (Wildlife) M.P., Bhopal,

Project Summary

Completed Projects:

1. Title of the Project: Impact Assessment of Proposed Sheopurkalan & Badoda towns a Group Water Supply Scheme-Parvati River Sub-Project under MPUSIP on Aquatic Fauna, River Hydrology & ecology and its mitigation.

Why this Project:-

This proposed project funded by Madhya Pradesh Urban Development Company Limited intends to carry out a specific study to assess the impact of Weir & intake-well constructed across Parvati River on aquatic fauna, river hydrology & ecology. The requirement and extraction of raw water for Sheopur Kalan & Badoda group water supply scheme from Parvati river is proposed to be 14.70 MLD in the year 2018, 25 MLD in year 2033 and 24.85 MLD in year 2048 and the impacts of this long term project are to be predicted in reference to the river ecology, existing flora and fauna and their habitat.

Research Methodology:-

The study was performed by adopting nationally and internationally accepted scientific procedures for field surveys in all the three seasons' i. e. rainy, winter and summer on following points

1. **Selection of reference site-**Reference site was considered the stream site with values of hydrological stress = 0.

2. **Collection of secondary data-**Pre-existing data was collected through various secondary sources. Review of previous studies of this area.

3. **Collection of primary data from study area-**
   - Data collection from reference site and 7 sampling sites of the upstream and downstream
   - Inventory of aquatic and terrestrial flora-fauna and their critical habitats.
   - Identification of breeding/nesting sites and their mapping.
   - Movement pattern of major critical endangered species
   - Observation on various hydrological & ecological (rate of discharge, water velocity, river depth) parameters affecting the major faunal species in the river system.
   - Observation on Physico-chemical properties of river water.
   - Assessment the water availability after water abstraction from the intake well in Parvati River for 50% dependable year, 75% dependable Year and Average Year and its impact.
   - Environmental flow (Rate of discharge, Velocity and Depth) and ambient water flow requirements for various species observed in Parvati River with special reference endangered fauna.
   - Study the anthropogenic activities within study area.
   - Recommendation and mitigation measures for the identified impacts.

Study Design:-

- The study area is proposed to cover about 30 km stretch of Parvati River, 15 km either sides of the project site i.e. upstream and downstream from the proposed Weir & intake well located at upstream side of the near Mandi village including 10 km buffer area of the stretch. Field observation will be carried out as per the points mentioned in methodology.

Objectives of Research :

- Preparation of Initial Environment Examination (IEE).
- To study the present status of biological resources, including species distribution their conservation status, migratory bird species and their habitat conditions, breeding/spawning grounds
- To study the river hydrology, morphology, seasonal variations and data collection on historical flow of the study area
- To assess the impacts water extraction on river ecology, and predict the minimum environmental flow required for the survival of the major aquatic fauna
- To suggest the mitigation measures and prepare the management plan to minimize the adverse impacts

Activities Undertaken :-

- Reconnaissance survey and selection of reference site.
- Meeting with MPUDCL team and officials of Municipal Corporation Office, Sheopur Kalan and Badoda
- Study design and preparation of formats
- Selection of Project staff as per requirements.
- Procurement of material / tools/ instruments/ accessories required for study.
- Preparation of Initial Environment Examination (IEE) report
- Collection of primary data on existing biological resources – Faunal – Floral species distribution, migratory bird species, and their habitat conditions, breeding/spawning grounds.
- Collection of primary and secondary data on river hydrology, morphology and its seasonal variations
- Water quality analysis for pH, DO, EC, COD, BOD etc.
- Study human activities like riparian agriculture, fishing, sand mining, raw water abstraction, cattle trampling and other human activity of the water supply project to Parvati River.
- Review of water supply project DPR for year wise water requirement.

- Procurement of last 10 years classified hydrological data from CWC, New Delhi of study site falling in river Parvati.
- Predict the minimum environmental flow required for the survival of the major aquatic fauna
- Mitigation measures to minimize the adverse impacts of water extraction

Cost of the project- Rs 67.57 Lakhs

Outcome of research:-

- Delineation of the observation sites and layout of study area and collection of secondary data.
- Data on existing environment of the area.
- Number of aquatic animal species found in the study area.
- List of macro-phytes and terrestrial plant species and their distribution in the study area.
- List of migratory bird species and location of their breeding sites.
- Located the way points on study area map.
- Data 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 in different seasons will obtain.
- Water quality data on pH, DO, EC, COD, BOD, Temperature etc. for each segment in different seasons.
- Estimation of required water volume in MLD for particular area
- Receiving of last 10 years classified hydrological data.
- Limit of water abstraction will be estimated looking to the minimum safer requirement aquatic animals.
- Suggestions measures to minimize the adverse impacts will be based on the finding of the study.

Sample collection of macro-invertebrates and macro-phytes.

Data collection for river velocity from Parvati river, Sheopur, using Water flow Probe

Water quality analysis using portable instuments

Expected Impact of the Project findings:-

- Impact prediction for Sheopur Kalan & Badoda group water supply scheme from Parbati River and construction of weir and intake well on survival of the major aquatic fauna and the estimation of minimum required environmental flow for endangered fauna.
- Output data and project findings will be useful for long term water management and habitat management plan for critical endangered species and other sensitive aquatic animals.

2. Title of the Project:- AITE-2022 - Evaluation of Wild Animals Population and Habitat in Madhya Pradesh.(for analysis of sign survey for carnivore species and beat status of Tiger & Leopard in Madhya Pradesh- as Principal Investigator)

Why this Project:-

Population estimation of wild animal species of Madhya Pradesh is the prime focus of this project. Here in this project, the spatial occupancy of different carnivore species through sign survey analysis and to utilize the findings for their management purposes. Wildlife-population is not always static. Its number increases/decreases at different places and at different times.

Research Methodology:-

Analysis of the primary data from all 83 units of Madhya Pradesh, which includes following points:-

- Procurement of phase I data in soft copy, collected during AITE-2022
- Checking and rectification of received data
- Data analysis for beat occupancy for Tiger & Leopard
- Data of encounter rate/ km for all the carnivore species found in Madhya Pradesh using software M-Stripes.
- Data tabulation & report preparation.

Study Design:-

Protocol developed by WII and NTCA in the form of field guide “Monitoring tiger, Co-predators, Prey & their habitats-2017” has been followed.

Objective of Research:-

- To monitor the carnivores in protected areas and territorial divisions of the state.

Activities Undertaken:-

- Procurement of Hard / Soft copies of Wildlife Census data from all 83 Units of Madhya Pradesh Forests Department.
- Processing of data in Ecological Module on M-Stripes Software for obtaining the compiled data in MS Excel sheets for further processing.
- Analysis of encounter rate / km for Carnivore species for all 83 units of Madhya Pradesh.

Cost of the Project:- Rs. 21.35 Lakhs

Expected Outcome of Research:-

- Information on encounter rate/km of all carnivore species found in Madhya Pradesh Segregated the Tiger and Leopard bearing beats of Madhya Pradesh.

Ongoing Projects:

1. Title of the Project: म.प्र. जल निगम मर्यादित द्वारा क्रियान्वित बैढन–2, ग्रामीण समूह, चितरंगी ब्लॉक, जिला सिंगरौली, मध्यप्रदेश के जल प्रदाय योजना के अंतर्गत वन्यप्राणियों/बायोडायवर्सिटी पर पड़ने वाले प्रभाव का अध्ययन।

Why this Project:-

This project funded by M.P. Jal Nigam Limited, Project Implementation Unit, Singrauli. The study on impact of Waidhan-2 multi-village rural water supply scheme, on Biodiversity in Chitrangi Block, District Singrauli. Government of India has recently launched Jal Jeevan Mission (JJM) which aims at providing Functional Household Tap Connection (FHTC) to every rural household by 2024. The programme focuses on service delivery at household level, i.e. water supply on regular basis in adequate quantity and of prescribed quality. The area of Pipeline Distribution under protected area is 84.184 ha. Length of pipeline in protected forest area 184198 m, length of pipeline in revenue area is 657642 m and total length of pipeline is 841840 m. Total study area of Singrauli district 766 km2, pipeline distribution area 336.11 km2 and area of buffer zone 430 km2. Son River covered in project area is 48.683 km. different species of wildlife animals and vegetation is important to manage the ecosystems. Conservation of forest automatically ensures the conservation of a large number of floral and faunal species and, in fact, that of the entire ecosystem. Thus the genetic diversity of an ecosystem can be saved through properly planed forest conservation programme. Wildlife conservation activities mainly involves attempts to prevent any species from becoming extinct the natural habitat.

Research Methodology:-

The study was performed by adopting standard methodology according to National Tiger Conservation Authority for field surveys in the study area on following points.

1. Collection of secondary data:- Pre-existing data was collected through various secondary sources. Review of previous studies of this area.

2. Collection of primary data from study area:-

- Data collection from transects and trails from each beat of the forest.
- Inventory of aquatic and terrestrial flora-fauna and their critical habitats.
- Data collection to estimate floristic composition and structure of the study area.
- Collection of Direct and indirect sign of Carnivore and Ungulates.
- Observation on Physico-chemical properties of Son river water.
- Conduct questionnaire survey to understand the magnitude of their drinking water problem and the perception of local people about the project in the study area.
- Recommendation and mitigation measures

Study Design:-

- The study area is proposed to cover about 766.06 km2 including 10 km buffer area. The pipeline network area is 336.12 km2 and the buffer area is about 429.94 km2 Field observation will be carried out as per the points mentioned in methodology.

Objectives of Research :

- Vegetation survey of study area.
- Assessment of the current wildlife status of the project area through wildlife sign survey, transect line, camera trapping and direct evidence.
- Predict and identify the impact of proposed project on the ecology, existing flora and fauna.
- Habitat improvement plan for existing wildlife of the area.
- Recommend the mitigation measures based on findings of the study.

Activities Undertaken :-

- Reconnaissance survey and selection of sampling sites and review of water supply project DPR

- Collection of secondary data.
- Study design and preparation of formats.
- Selection of Project staff as per requirements.
- Procurement of material / tools/ instruments/ accessories required for study.
- Collection of primary data on existing biological resources – Faunal – Floral species distribution and their habitat conditions.
- Water quality analysis for pH, DO, EC, TDS, ORP, Total Hardness, Turbidity, COD, BOD, Temperature, chloride, Boron, fluoride, nitrate, phosphate, Total coliform etc.
- Social Questionnaire Survey in the villages of study area.
- Mitigation measures to minimize the adverse impacts of the proposed project

Cost of the project- Rs 69.09 Lakhs

Expected Output of Research:-

- Delineation of the observation sites and layout of study area and collection of secondary data.
- Data on existing biodiversity of the area.
- Number of animals species found in the study area.
- List of plant species and their distribution in the study area.
- List of bird species found in the study area.
- Water quality data on pH, DO, EC, TDS, ORP, Total Hardness, Turbidity, COD, BOD, Temperature, Chloride, Boron, Fluoride, Nitrate, Phosphate, Total Coliform etc.

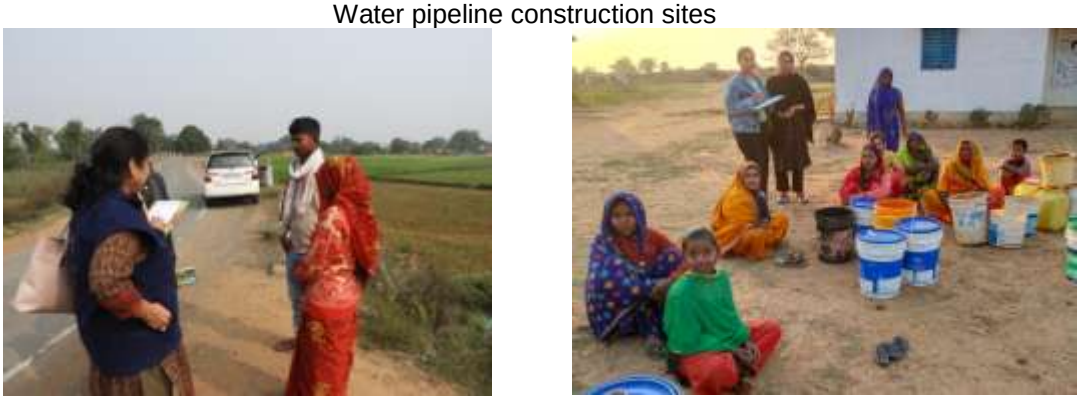
Expected Impact of the Project findings:-

- Present status of biodiversity (flora and fauna) in the study area.


Meeting with GM and Team (Jal Nigam)


Water sample collection

Water pipeline construction sites



Social Survey

Leopard

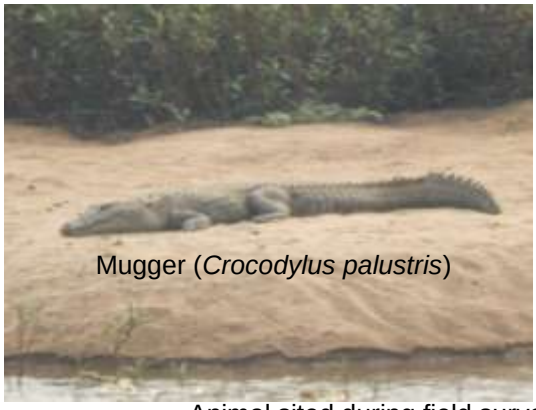
Jackal

Nilgai

Blackbuck

Wild Boar

Indian vulture (*Gyps indicus*)



Mugger (*Crocodylus palustris*)

Ghariyal (*Gavialis gangeticus*)

Animal sited during field survey and captured in camera traps

Regular activities:

1 Title of the 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, 2018, 2019, 2020-21.
- Maintenance of iridium data of radio collars and their charges.
- Renewal of Radio Collar Licence year 2023 from Department of Telecommunications, New Delhi, Ministry of Communications, Government of India
- Demonstration of Radio telemetry equipment i.e. Radio Collar, Multichannel Receiver and Antenna at the time of distribution to various PAs.
- As per the requirement of working plan divisions, data for herbivore density and carnivore encounter rate has been analysed and sent to the following divisions for inclusion in working plan. Details are as follows -
- Working Plan Office, Seoni has required to South Seoni Division wild animals data.

Cost of the Project:- Rs. 68.20 Lakhs

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

1. **Impact Assessment of Proposed Sheopurkalan & Badoda towns a Group Water Supply Scheme-Parvati River Sub-Project under MPUSIP on Aquatic Fauna, River Hydrology & ecology and its mitigation.**

   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, Mugger and Dolphin. Assessment of water quality will give information on various kind of water pollution which may be controlled by the concerned authorities.

2. **AITE-2022 - Evaluation of Wild Animals Population and Habitat in Madhya Pradesh.**

   Information on the spatial occupancy carnivore species of Madhya Pradesh has been calculated through sign survey. Estimated the beat status of tiger and leopard in Madhya Pradesh.

3. **म.प्र. जल निगम मर्यादित द्वारा क्रियान्वित बैढन–2, ग्रामीण समूह, चितरंगी ब्लॉक, जिला सिंगरौली, मध्यप्रदेश के जल प्रदाय योजना के अंतर्गत वन्यप्राणियों / बायोडायवर्सिटी पर पड़ने वाले प्रभाव का अध्ययन**

   Wildlife management plan for exacting wildlife of the area will be prepared. Social status of water problem in the area will be highlighted.

2.2.3 WILDLIFE MANAGEMENT RESEARCH DIVISION

Mandate

1. PA Network
2. Wildlife Management
3. Man - Animal interactions
4. Landscape-level planning and management
5. Corridor management
6. Genomic studies in tigers and other important wild species

Research Priorities

1. Planning a network of Protected Areas (PAs)-National Parks, Wildlife Sanctuaries, Conservation Reserves & Community Reserves to provide an umbrella for long term conservation and sustainable management of wildlife diversity in the state
2. Identification of suitable areas for establishment of new and expansion of existing PAs, their viability studies and preparation of DPRs
3. Management effectiveness evaluation in the existing PAs
4. Focus Group Discussions (FGDs) with various stakeholders and affected communities to elicit their feedback for mitigation of their problems and ascertaining their willing cooperation and participation in protection and conservation of wildlife
5. Standardization of model set of prescriptions for sustainable management of buffer zones of PAs
6. Study of the protection status of wildlife outside PAs – Identification of hot spots, site-specific threat factors and suggestions for their mitigation
7. Standardization of provisions to be included in the working plans of territorial forest divisions related to wildlife protection and conservation and habitat improvement
8. Studies on population trends of various wildlife species outside PAs
9. Identification of species-specific pockets of sizeable abundance outside PAs and their habitat suitability modelling through RS/GIS mapping

10. Identification of pockets of frequent man-wildlife conflicts and study of socio-economic aspects related to the conflicts in these pockets
11. To devise suitable measures for mitigation and adaptation for man-wildlife conflicts
12. To conduct wild health care monitoring programmes of zoonotic diseases
13. Genomic studies in tigers and other important species at landscape level
14. Study of landscape level source-sink dynamics of wild populations
15. Development of land scape level climate change adaptation model keeping into consideration the human-wildlife interface
16. Delineation of wildlife corridors between various tiger reserves of Madhya Pradesh
17. Corridor functionality assessment in the identified wildlife corridors
18. Preparation of guidelines for the habitat improvement and management of corridors

Ongoing Project:- 01

1. Study project on wild elephant habitat use and mitigation measures to minimize man-elephant conflict: With special reference to Sanjay-Bandhavgarh habitat linkage of central highlands landscape.

   Funding agency : PCCF (Wildlife) M.P., Bhopal,

Ongoing Project

Project Summary

1. Title of the Project:- Study project on wild elephant habitat use and mitigation measures to minimize man-elephant conflict: With special reference to Sanjay-Bandhavgarh habitat linkage of central highlands landscape

Why this Project:-

India's endangered Asian elephant population is declining, primarily due to human-elephant conflict and habitat destruction caused by agriculture and infrastructure. The migration of elephants to Bandhavgarh Reserve forest in Madhya Pradesh highlights the loss of habitat in other regions. Effective management requires strategic planning, including habitat mapping, corridor strengthening, and the restoration of forests and migration routes. GIS mapping of human-elephant conflicts and identifying gaps in compensation claims are essential for proactive strategies. Project findings will inform measures to prevent wildlife encroachment, while incorporating conservation into development projects can address budget limitations. Mitigating human-elephant conflict is crucial for farmers facing crop damage and fatalities, with careful consideration of large-scale barriers to preserve migration routes and genetic interchange. Landscape-level planning is required to be taken on account for the presence and movement patterns of elephant clans.

Research Methodology:-

SDM(MaxEnt), LULC, LCP based Elephant suitable habitat analysis and GIS mapping for identification of corridor present and past.

Study Design:-

Data Processing; Potential Vegetation MapLand Use and Land Cover Map (Current scenario);Species Distribution Modelling; Multi Collinearity – Variance Inflation Factor; Maximum Entropy Modelling (MaxEnt); Preference and Impedance Rasters; Least Cost Path Analysis; Preparation of mitigation plan to minimize man-elephant conflict

Questionnaire and Secondary data: Based on the questionnaire survey the tolerance level of the villagers living in the periphery of the forest will be understood.

- The secondary data from the forest department and the villagers will help in studying the previous year's Elephant movement and crop-raided villages.
- Villages will be identified based on the number of Elephant visits in the past years and

suitable conflict mitigation measures will be suggested.

GIS-based proactive management strategy formulation

- The data acquired and processed in GIS will produce the probability of past and future movement of Elephants which will help in identifying previous historic corridors.
- Ecorestoration activities and securing these identified corridors are necessary for habitat management purposes.
- Conflict hotspots will be identified based on HEC level and Elephant movements which will help in the use of HEC mitigation methods based on different hotspots and levels of conflict.

Objectives of Research:-

1. To identify the elephant movement historical passage.
2. To model potential elephant habitats & corridors in central highlands landscape for present and past.
3. To estimate the path followed by elephants in Sanjay-Bandhavgarh habitat linkage.
4. To identify the potential conflict land use areas & suggest site-specific mitigation in the Sanjay-Bandhavgarh habitat linkage.

Activities Undertaken:-

- Elephant sign mark survey completed in Sanjay-Bandhavgarh habitat linkage.
- Occupancy estimation is completed for Elephant presence in Bandhavgarh and Sanjay Tiger Reserve.
- Activities completed regarding “Understanding Human- elephant conflict in Bandhavgarh Tiger Reserve, Madhya Pradesh: Perception, crop raiding pattern and conflict dynamics”

Some interim findings: - Bandhavgarh Tiger Reserve

(I) "TO ESTIMATE THE ASIAN ELEPHANT (Elephas maximus) OCCUPANCY IN BANDHAVGARH TIGER RESERVE, MADHYA PRADESH "

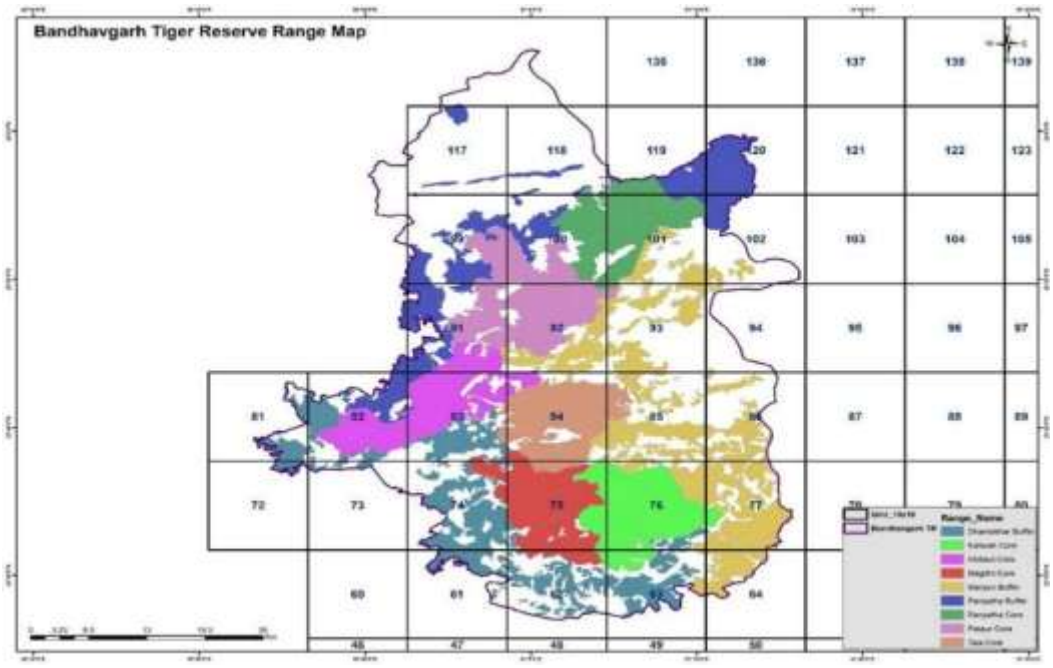


Figure: Map showing geo-reference map of Bandhavgarh Tiger Reserve

In BTR landscape, the best-fitting model with the lowest AIC value is used as the output result. Therefore, the best fitting model is (HFP+Bamboo) psi(.), p(.) (MTWM+AP+HFP), AIC — 1316.37,which is the lowest value among other 62 models.

By examining the best-fit models, it is found that concerning elephant occupancy of the BTR, thevariable of HFP (Human footprint) and Bamboo presence along with the occupancy influences the distribution of elephants across the study area of BTR. In addition, Maximum temperature of warmest month, Annual precipitation and Human footprint influence elephant detection probabilityas seen in the occupancy modelling.

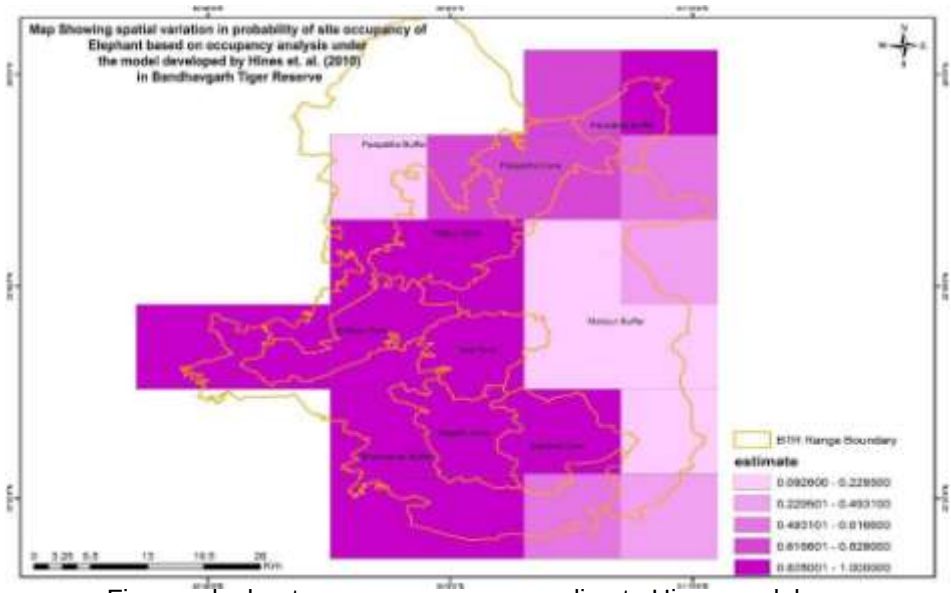


Figure: elephant occupancy map according to Hines model

Elephant occupancy rates between 0.820 and 1.000 indicate high presence, while rates between0.0926 and 0.2295 indicate low presence. Grids 75, 76, 82, 83, 84, 91, 92, 100, 101, and 120 show the highest elephant occupancy, covering Tala core, Magdhi core, Kallwah core, Kitauli core, Pathor core, Panpatha core, and parts of the Dhamokhar, Panpatha, and Manpur buffer zones. Elephant presence is strongly influenced by bamboo abundance and water sources. Elephants occupy 72% (1721.52 km², SE = 356.16) of the potential 2400 km² habitat based on the Hines model.

Figure 12 Elephant presence-absence map by Mackenzie

An assessment of a 2400 km² study area determined that elephants inhabit 1200 km², indicating 58% occupancy based on a naïve occupancy value of 0.58.

Occupancy analysis is crucial for understanding elephant presence and distribution in Bandhavgarh Tiger Reserve. By examining species data alongside environmental variables, we can identify factors influencing elephant occupancy patterns. Using PRESENCE 2.13.47 software, we conduct detailed analyses that reveal the ecological drivers behind elephant movements and habitat preferences. This information is essential for informing conservation strategies and management practices.

Our survey covered a total of 1536.938 km², divided into 24 grid cells (100 km² each). Elephant signs were detected in 12 grid cells, yielding a naïve occupancy of 0.58. According to the Hines model, elephants potentially occupy 72% (1721.52 km²) of the area.

Key findings include:

Occupancy is negatively influenced by Human Footprint (HFP, -207.1017) and Bamboo (- 1077.8414). Detection probability is affected by Maximum Temperature of the Warmest Month (MTWM, -0.4633), Annual Precipitation (AP, -0.0424), and HFP (-0.1402). The lowest AIC model value (1316.37) highlights these significant factors. Human settlements, like in the Manpur buffer, negatively impact elephant occupancy. Although bamboo is a crucial food source, it does not significantly affect distribution. Elephants prefer areas with less human activity and are hindered by high temperatures and wet conditions.

In summary, elephants in Bandhavgarh Tiger Reserve are influenced by human activity, temperature, and precipitation, necessitating conservation efforts to mitigate these factors for effective habitat protection.

(II) "TO ESTIMATE THE ASIAN ELEPHANT (Elephas maximus) OCCUPANCY IN SANJAY-DUBRI TIGER RESERVE, MADHYA PRADESH "

Sanjay-Dubri Tiger Reserve

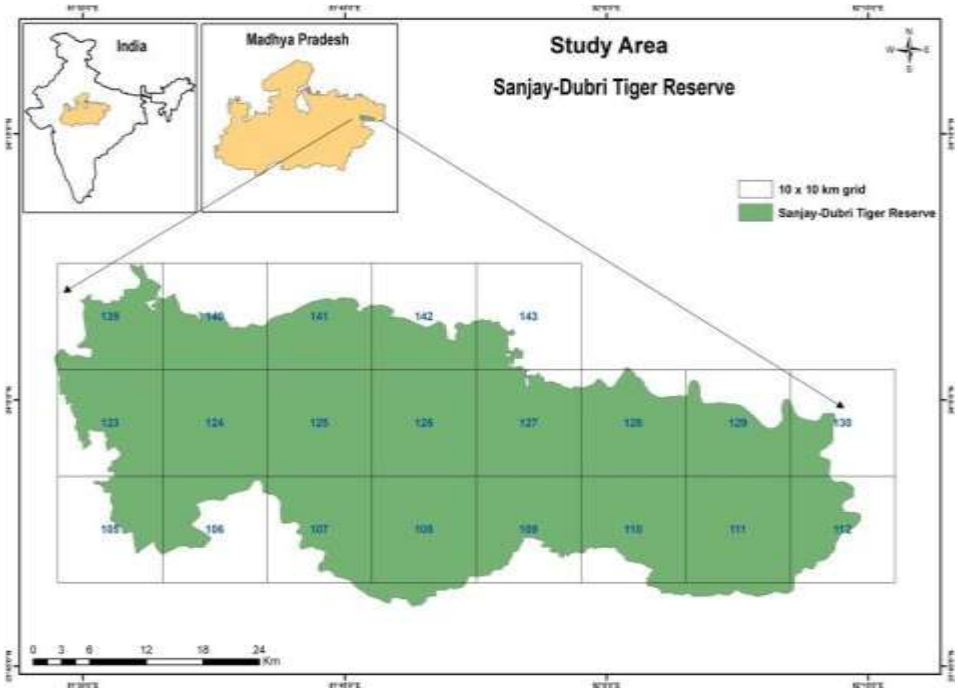
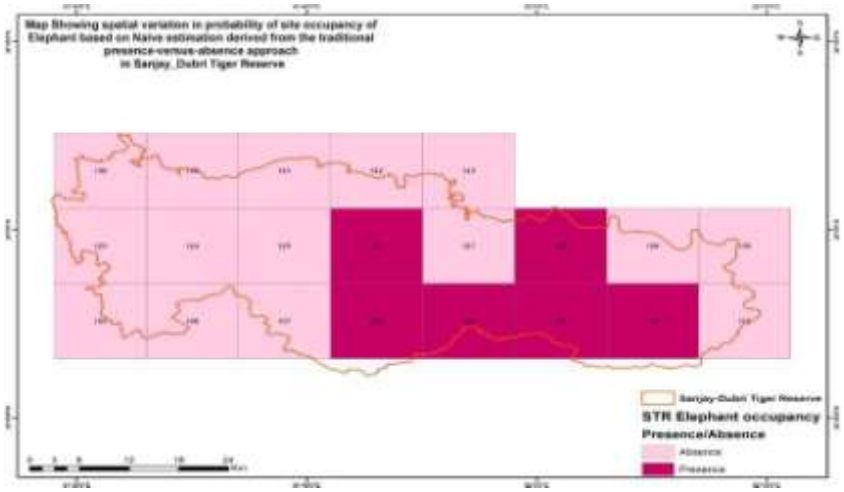


Figure 11 Elephant presence absence map by Mackenzie



According to our assessment of the 2100 square kilometer study region, it has been determined using a naïve occupancy value of 0.428571 that approximately 900.06 square kilometers are inhabited by elephants, indicating that 42.85% of the area is occupied by elephant populations.

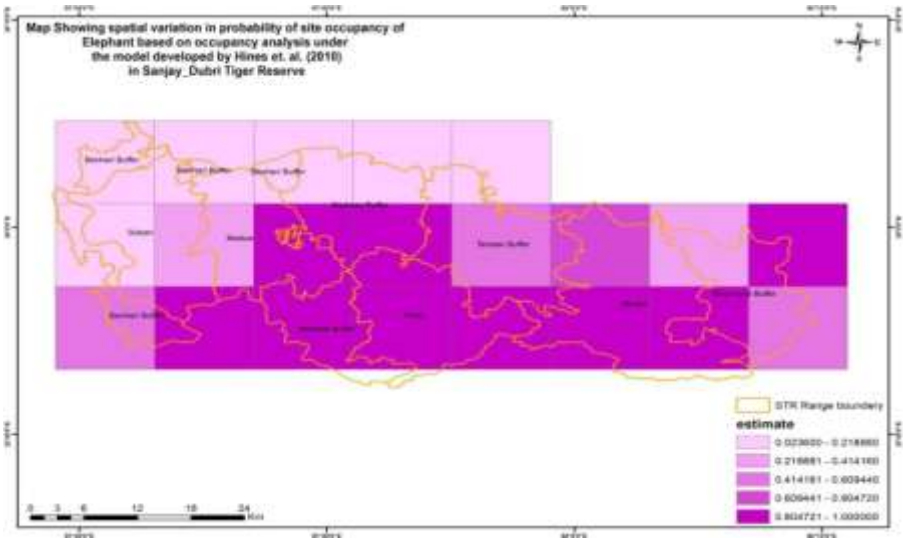


Figure 10 Occupancy estimation map of STR

Mapping of occupancy rates shows the highest elephant occupancy in grids 128, 108, 109, 110, and 111 (0.804 to 1.000), covering areas like Pondi and Mohan. Lower occupancy rates (0.213 to 0.0218) indicate the least occupied areas. Elephant presence is significantly influenced by human footprint, forest cover, and terrain ruggedness. The Hines model estimates elephants occupy 58.09% (1219.89 km²) of the 2100 km² study area (SE = 0.0848 or 8.48%).

Occupancy analysis in Sanjay Dubri Tiger Reserve (STR) is crucial for understanding elephant presence and distribution. By evaluating species data and environmental variables with PRESENCE software, we gain insights into elephant migrations, habitat preferences, and ecological drivers. This information is essential for guiding conservation strategies and protecting their ecosystems.

Our survey of 876.54 km², divided into 21 grid cells, detected elephant signs in 6 cells, with a naïve occupancy of 0.4285 and true occupancy of 42.85%. The Hines model estimates elephants potentially occupy 58.09% (1219.89 km²) of the area

Key findings include:

Occupancy Coefficients (ψ): Human Footprint (HFP) has a coefficient of -0.4029, indicating higher human presence negatively impacts elephant occupancy.

Detection Coefficients (p):

Terrain Ruggedness Index (TRI): -0.3263, suggesting a negative impact on detection probability.HFP: +0.2849, indicating higher detection probability in less disturbed areas.

Forest Cover (FC): -3.8945, showing dense forests obscure signs of elephant presence.

The best-fit model (AIC 1050.86) included HFP, TRI, and FC, emphasizing the importance of these variables.

In summary, elephants in Sanjay Dubri Tiger Reserve are significantly influenced by humanactivity, terrain ruggedness, and forest cover, which is crucial for informed conservation efforts.

(III) "UNDERSTANDING HUMAN-ELEPHANT CONFLICT IN BANDHAVGARH TIGER RESERVE, MADHYA PRADESH: STUDY ON PERCEPTION, CROP RAIDING PATTERN AND CONFLICT DYNAMICS"

DECISION-MAKING SUGGESTIONS

HEC, mainly crop-raiding, is a major challenge in Bandhavgarh, especially for small-scale farmers near the core boundary, enduring losses for five years. Incidents peak during paddy and wheat harvests and summers when elephants target home gardens. Current mitigation measures are rudimentary, with negative attitudes towards coexistence, often linked to religious beliefs. Electric fencing's effectiveness is questionable, given reported breaches. Attention is skewed towards tiger conservation, warranting increased awareness about elephants' ecological importance. Obtaining compensation for crop loss is cumbersome, hindering reporting. Resolving these issues promptly could foster positive conservation attitudes. Future research should focus on understanding village perceptions, utilizing GIS mapping to identify sensitive areas. Communicating awareness about elephant conservation is crucial, alongside government intervention to manage mitigation and compensation. Mitigating damage caused by other herbivores is also essential, with initiatives like chilli smoke and fencing for marginal farmers.

Cost of the Project:- 50.00 lakhs

Expected Outcome of Research

This research aims to estimate elephant corridors, analyze habitats for foraging and shelter, and model elephant distribution using species distribution modeling techniques. It involves comparing present-day vegetation maps with reconstructed maps free from human interference. Climatic and topographic inputs will be used to construct a potential vegetation map, followed by habitat modeling and least cost path analysis to identify potential elephant corridors. The study will analyze changes in elephant distribution and assess the impact of land use on elephant habitat and fragmentation. This research fills a knowledge gap in modeling elephant spatial distribution in Madhya Pradesh and innovatively identifies modified or encroached natural migratory routes.

Other significant achievements.

- **International wildlife conference:** Actively participated in preparation, liaisoning and logistic arrangement of the International Wildlife Conference on "Wildlife Conservation: Emerging Scenario and Way Forward" at Kanha Tiger Reserve, Madhya Pradesh, India, from April 27-29, 2023. Dr. Mayank Makrand Verma served as a theme associate for theme 4: Human-Wildlife Conflicts and Mitigation Measures and also prepared five posters in different themes.
- **Monitoring and evaluation of plantation raised by MPFD:** In 2015-16, we evaluated and monitored 20 plantation sites established by the Madhya Pradesh Forest Department, located in the Satna and Singrauli Forest Divisions of the Rewa circle.
- **AITE 2022:** As a Co-Principal Investigator in the project "AITE 2022: Evaluation of Wild Animal Population and Habitat in Madhya Pradesh," Dr. Mayank Makrand Verma conducted an occupancy analysis using field data with the “AITE-2022 MSTrIPES Desktop software” from April 4 to April 14, 2022, at SFRI Jabalpur.

Drone based Elephant monitoring in Sanjay-Dubri Tiger Reserve

Elephant Sign Mark Survey

Preferred uprooting of the Gurja tree by elephant for feeding in BTR

Elephant Critical Habitat BandhavgarhTiger reserve

Bamboo is preferred by elephant Range- Panpatha, BTR

Tree Lopping by elephant, Range- Pathor,BTR

Elephant breeding Population supported by Pondi Range, STR

Consistent seasonal movement of elephant in SanjayTR from GGNP CG

Elephant Sign Mark survey with feeding behavior observations In BTR

Patrolling for Elephant presence monitoring in Bandhavgarh TR

Borewell destruction by Elephant Heard Range: Tala core, BTR

Patrolling for destruction by heard of elephantin Tala Range, core BTR

House Damage By Elephant Heard in Village- Aamgaon, Range- Pondi, STR

Perception of villagers toward Elephant Village- Aamgaon, Pondi Range, Sanjay TR

Survey for villagers' perception about coexistence In BTR

Elephant Feeding Behavior

Patrolling camp destruction,Panpatha Range,BTR

Fance damage by Elephants,Magdhi Range, BTR

2.3 FACILITATION CELL

2.3.1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) CELL

Mandate

1. Environmental impact assessment and preparation of environmental management plans

Completed Project :- 01

1. Environmental Impact Assessment on Flora, Fauna & Socio economic status of local communities and action to be taken to mitigate impact of Kopra Medium Project at Nauradehi Wildlife Sanctuary, Sagar District (M.P)
   Funding Agency: Water Resource Department, M.P.

Project summary

1. Title of the Project:-. Environmental Impact Assessment on Flora, Fauna & Socio economic status of local communities and action to be taken to mitigate impact of Kopra Medium Project at Nauradehi Wildlife Sanctuary, Sagar District (M.P)

Why this project :-

This project lies on the western periphery of Nauradehi Wildlife Sanctuary. As part of this proposed dam and its submergence area falls under wildlife sanctuary area, so it is essential to study the impact of dam on the wildlife habitat and local communities. Executive Engineer Water Resources Department Sagar, Madhya Pradesh, vide letter no. 1051/karya Sagar, dated 16.03.2021 requested State Forest Research Institute to carry an Environmental Impact Assessment (EIA) study on the impact of Kopra Medium Project on wildlife habitat of Nauradehi Wildlife Sanctuary and its surrounding areas. The proposed study would create a base line information on flora, fauna and Socioeconomic status of local communities. Various environmental (Air, Sound and Water) parameters shall be also

evaluated in addition to wildlife habitat parameters. Suitable mitigation measure can be developed after analysing all collected data. This study may help to develop long term suitable management strategy by Nauradehi Wildlife Sanctuary and also by water resource department Madhya Pradesh.

Research Methodology:

Environmental Impact Assessment (EIA) study is supposed to provide adequate baseline information, which is likely to have implication on project activities on various environmental components and their projections towards the improvement on existing and localized flora and fauna/wild life. Consequently, the study on EIA ultimately provides a set of recommendations to the policy planners and decision makers for safe operation of the projects. As per the guidelines of MoEF Govt. of India for EIA, the area covering 10 km radius from the project site is the study area for the project. The impact assessment have been conducted in the forest area within 10 km radius from the centre of the project site.

Study Design:

Experimental plots was laid to study tree cover, shrub and ground vegetation, regeneration study of forest, status of Rare, Endangered and Threatened (RET) species, Diversity Index

- Wildlife abundance have been assessed using occupancy method and camera trap method
- Environmental pollution have been assessed.
- Socio-Economic status of local communities have been studied through questionnaire survey
- Suitable mitigation measures developed and report have been generated

Objectives of Research :-

- To collect baseline data on existing flora, fauna and socio economic status of the area.
- To assess the probable impacts of the proposed activities on flora, fauna of the area and their habitat within the 10 km impact zone.
- To assess the impact of noise, air and water quality due to proposed activities.
- To suggest mitigation measures for conservation/protection and improvement of flora, fauna, habitats and social status of local communities.

Final Findings:-

- Identification of all potential environmental impacts due to proposed dam construction is an essential step of Environmental Impact Assessment.
- In case of dam construction projects, impacts on biodiversity, air pollution, water pollution and social issues are significant.
- Both direct and indirect environmental impacts have been studied on various environmental attributes due to proposed activity in the surrounding environment, during the operational phase.
- This study have been reveal how the activities being carried out will affect the flora, fauna, wildlife and socioeconomic attribute and mitigation measures have been suggested.
- Final report submitted to funding agency.

Cost of the project:- Rs.47.14 Lakhs

Outcome of Research –

- Identification of all potential environmental impacts due to proposed dam construction is an essential step of Environmental Impact Assessment. This study will reveal how the activities being carried out will affect the flora, fauna, wildlife and socioeconomic attribute and mitigation measures will be suggested.


Views of study sites during data collection on environment assessment

Installing Camera trap at suitable trails.

Collecting data from Camera trap through Micro SD card.

Views of survey work on Social Impact Assessment in Impact zone of proposed Kopra Medium Dam

Views of quadrate study and data collection

2.3.2 CLIMATE CHANGE, CLIMATE JUSTICE, REDD+

Mandate :

- Estimation of carbon sequestration and carbon pool in different forest types and plantations.
- Coordinate with various research divisions of the institute conducting for research on various aspects of climate change.
- Estimation of carbon sequestration in different samples from working plan / other agency.

Achievements :

- Trained 9 research teams constituted for estimation of carbon for monitoring and evaluation of plantation project.
- Estimated carbon pool of 20 plantations of North Seoni, South Seoni, West Mandla, North Balaghat, South Balaghat Divisions and Pench Tiger Reserve.

2.3.3 MONITORING & EVALUATION

Mandate

- Contacting with the SFD and other potential funding agencies for getting the assignment of monitoring & evaluation work of developmental schemes.
- Preparation of project proposals for monitoring & evaluation and submission to the funding agencies concerned.

Ongoing Project : 01

1. वन विभाग म.प्र. द्वारा विभिन्न योजनाओं के अंतर्गत वर्ष 2015–16 में किये गये वृक्षारोपणों का अनुश्रवण एवं मूल्यांकन"।
   Funding Agency : PCCF (Development) M.P.

Ongoing Projects :

1. Title of the Project:- "वन विभाग म.प्र. द्वारा विभिन्न योजनाओं के अंतर्गत वर्ष 2015–16 में किये गये वृक्षारोपणों का अनुश्रवण एवं मूल्यांकन"।

Why this Project :-

- मूल्यांकन के परिणामों के आधार पर भविष्य में किए जाने वाले वृक्षारोपण की रणनीति निर्धारण में सहायक।
- वृक्षारोपण परियोजनाओं के सफल क्रियान्वयन के लिए।
- बेंच मार्किंग के लिए।

Research Methodology:-

- **Volume – I निर्देश तथा वृक्षों की गणना एवं मापन कार्य** – प्रधान मुख्य वन संरक्षक, म.प्र. भोपाल के पत्र क्रमांक/एफ–2/10–3/3410 दिनांक 13 नवंबर 2013
- **Volume - II वन संसाधन सर्वेक्षण एवं वन्यप्राणी उपस्थिति** –
  - प्रधान मुख्य वन संरक्षक, कार्य आयोजना एवं वन भू–अभिलेख म.प्र. भोपाल के पत्र क्रमांक/का.आ./मा.चि./334 भोपाल दिनांक 01.06.2020
  - IPCC 2006, FSI 1996 एवं ecosystem services Improvement Programme (ESIP)
  - भारतीय वन्यप्राणी देहरादून की निर्देशिका
- **Volume - III परियोजना प्रबंध एवं परियोजना के प्रभाव का आंकलन** –
  - ग्रामवासियों, समिति सदस्यों एवं वनविभाग के क्षेत्रीय अधिकारियों/कर्मचारियों के साथ बैठक कर निर्धारित प्रपत्र में जानकारी प्राप्त की गई है।
  - इस वृक्षारोपण का समग्र रूप से क्या प्रभाव पड़ा इसके आंकलन के लिये समिति सदस्यों, ग्रामवासियों एवं वन विभाग के क्षेत्रीय अधिकारियों/कर्मचारियों के साथ बैठक की गई एवं निर्धारित प्रपत्र में जानकारी एकत्र की गई।

Study Design:-

वृक्षारोपणों का Proportional Stratified Random Sampling Technique का उपयोग करते हुए मूल्यांकन हेतु चयन किया गया। 63 वनमण्डलों के अंतर्गत चयनित वृक्षारोपणों में से प्रथम चरण 2022–23 में 180 वृक्षारोपणों का मूल्यांकन किया गया।

Objective of Research:-

- वृक्षारोपणों की सफलता का आंकलन।
- उन कारकों का विश्लेषण जिनके कारण वृक्षारोपण सफल/असफल हुआ।
- वृक्षारोपणों का सामाजिक आर्थिक प्रभाव।
- वृक्षारोपण का प्रभाव।
- वृक्षारोपण क्षेत्र की बेंच मार्किंग।

Activities Undertaken:-

- क्षेत्र सर्वे के समय डाटा एकत्रित करने हेतु निर्देशिकायें तैयार करना।
- क्षेत्र सर्वे
- द्वितीयक आँकडों का एकत्रिकरण
- प्रायमरी आँकडों (जीवित प्रतिशत, वृद्धि, ग्रोइंग स्टाक, बेसल एरिया, प्राकृतिक पुनुरूत्पादन, बायोडायवर्सिटी इन्डेक्स, कार्बन स्टाक, ईको सिस्टम सर्विसेस, वाइल्ड लाइफ प्रजेन्स, कम्युनिटी पार्टीसिपेशन एवं प्रोजेक्ट इम्पेक्ट असिस्मेन्ट) का एकत्रिकरण।
- एक्सेल शीट में आंकड़ों को भरना एवं विश्लेषण कार्य।

मध्यप्रदेश के 63 वनमण्डलों में से प्रथम चरण में चयनित 180 वृक्षारोपणों का मूल्यांकन कार्य वर्ष 2022–23 में पूर्ण कर प्रतिवेदन कार्यालय प्रधान मुख्य वन संरक्षक, वन बल प्रमुख म.प्र. भोपाल की ओर प्रेषित किये जा चुके है। वे वृक्षारोपण जिनके प्रतिवेदन पूर्ण किये गये है उनकी सूची निम्नानुसार है–

Team No	Evaluation Team	Circles and Total No of Plantations	Divisions & No of Plantations
1	**1. Dr. Sachin Dixit, SRO** **2. Sh. Girish Shukla, RO** 3. Sh. Anand Agarwal, FA 4. Sh. Pravindra Gwalvandsh, FG	20 Balaghat : 4 Seoni : 11 PTR : 1 Jabalpur : 4	1. North Balaghat : 2 2. South Balaghat : 2 1. North Seoni : 6 2. South Seoni : 4 3. Narsinghpur : 1 4. Pench TR : 1 1. West Mandla : 4
2	**1. Dr. Awadhesh Sharma, SRO** **2. Sh. Rakesh Jain. SRO** 3. Sh. Sunil Rajak, Forester 4. Sh. CP Misra, FG	20 Indore:5 Khandwa:10 Chhatarpur:5	1. Infore : 2 2. Dhar : 1 3. Jhabua : 1 4. Alirajpur : 1 1. Khandwa : 2 2. Burhanpur : 2 3. Badwah : 1 4. Khargone : 2 5. Badwani:1 6. Sendhwa:2 1. Chhatarpur:5
3	**1. Dr. Aniruddha Majumdar, Scientist B** **2. Sh. KL Verma, SRO** 3. Sh. Rajesh Dixit, FG 4. Sh. Vijay Bahadur, TA	20 Bhopal : 11 Ujjain : 9	1.Bhopal : 2 2.Obaidullaganj:0 3.Raisen : 2 4.Vidisha:3 5.Sehore:2 6.Rajgarh:2 1.Ujjain:3 2.Ratlam:1 3.Mandsaur:1 4.Neemuch:1 5.Dewas:1 6.Shajapur:2

4.	**1. Dr.Uday Homkar,SRO** **2. Amit Pandey, SRO** 3. Sh. Dharmendra Singh Gond, Forester 4. Sh. Arvind Haldkar, Forester	20 Sagar:12 Chhararpur:7 PTR:1	1.South Sagar:4 2.North sagar:2 3.Damoh:6 1.Chhatarpur:0 2.North Panna:2 3.South Panna:2 4.Tikamgarh:3 5.Panna TR:1
5	**1. Dr. Pratiksha Chatruvedi, SRO** **2. Sh. SS Raghuvanshi, SRO** 3. Sh. Vijay Haldkar, Forester 4. Sh. Vinay Kori, FG	20 Rewa 16 Shahdol 4	1.Sidhi:15 2.Singrauli:0 1.North Shahdol:3 2.South Shahdol:2
6	**1. Sh. GS Mishra, SRO** **2. Smt Richa Seth, SRO** 3. Sh. Sajid Ali, Forester 4. Sh. Sant Lal Kudape, FG	20 Rewa 16 Shahdol 4	1.Rewa:6 2.Singrauli:10 2.Satna:0 1.North Shahdol:0 2.South Shahdol:0 3.Umariya:3 4.Anuppur:1
7	**1. Dr. Anjana Rajput, SRO** **2. Dr. Mayank Makrand Verma, SRA** 3. Sh SS Mehta, Forester 4. Sh. Sushil Thakur FG	20 1.Gwalior 9 2.Shivpuri 9 3.Sanjay TR 1 4.Bhopal:1	1.Gwalior:0 2.Datia:0 3.Bhind:1 4.Morena:1 5.Sheopur:7 1.Shivpuri:4 2.Guna:3 3.Ashoknagar:2 1.Sanjay TR:1 1.Obaidullaganj:1
8	**1.Smt. Vandana Thakur, RRO** **2.Sh. Aniruddh Sarkar, SRO** 3.Sh. Basant Rajak, FG 4.Sh, Rakesh Uike, FG	20 Jabalpur 07 Chhidwara 13	1.Jabalpur:1 2.Katni:1 3.East Mandla:3 4.West Mandla:0 5.Dindori:2 1.East Chhidwara:7 2.West Chhidwara:3 3.South Chhidwara:3
9	**1.Dr. SK Masih, SRO** **2.Dr. Jyoti Singh, SRO** 3.Sh. Deendayal Haldkar, FG 4.Sh. Alok Raikwar TA	20 Hoshangabad 3 Betul 8 Rewa 9	1.Hosangabad:1 2.Harda:2 1.North Betul:2 2.South Betul:4 3.West Betul:2 1.Satna:9

द्वितीय चरण के चयनित 180 वृक्षारोपणों में से 140 वृक्षारोपण स्थलों का क्षेत्रीय मूल्यांकन कार्य वर्ष 2023–24 में पूर्ण किया गया है शेष वृक्षारोपण स्थलों का क्षेत्रीय मूल्यांकन कार्य, डाटा एकत्रीकरण, डाटा फीडिंग आदि कार्य प्रगति पर है।

Cost of the Project :- Rs. 2.51 Crore

Expected Outcome of Research : -

- यह मूल्यांकन भविष्य में की जाने वाली परियोजनाओं की सफल क्रियान्वयन में सहायक सिद्ध होगा।









2.3.4 GIS & Remote Sensing

This cell is handled all the activities concerned with geographical information and remote sensing. The cell is entrusted with the following responsibilities:

- Procurement of necessary computer hardware, GIS software, satellite imageries, aerial photographs and equipments and tools required for the interpretation of the remote sensing data.
- Providing the required geographical data, satellite maps, etc. to the research divisions and other cells of the institute.
- Interpretation of satellite imageries.
- Preparation of GIS thematic maps.

Performed various GIS-RS activities as a Co-PI, GISin the research projects during the year –

1. AITE-2022 Evaluation of Wild Animals Population and Habitat in Madhya Pradesh. [Phase-I & II]
2. EIA on flora, fauna & socio economic status of local communities and action to be taken to mitigate impact of Kopra Medium Project at Nauradehi Wildlife Sanctuary, Sagar (M.P.)

Other activities

1. Providing technical assistance in GIS thematic mapping and analysis works on “Study project on wild elephant habitat use and mitigation measures to minimize man-conflict : with reference to Sanjay-Bandhavgarh habitat linkage of central highlands landscape.”
2. Evalution and Monitoring of 20 plantations of different forest divisons alongwith data analysis and report writing. (As a Team member).
3. Participated International Wildlife Conference on "Wildlife Conservation: Emerging scenario & way forward" at KTR, Mandla organized by MP Forest Deptt & SFRI, Jabalpur on dated 27-29 April, 2023.
4. Participated K.P. Sagreiya memorial lecture on “DNA based technology fight against wildlife crimes in Indian scenario” organized by SFRI & Tropical Forestry Scientist Jabalpur, 100 years of forestry research in Madhya Pradesh dated 30 June 2023.
5. Provided One day “Training with Practical Exercise on GIS and Remote Sensing” for 15 M.Sc. students of Public Health Entomology, dated 7 March 2024 at ICMR-NIRTH, Jabalpur.

2.3.5 EXTENSION, TRAINING AND CONSULTANCY

Mandate

1. Identification and prioritization of the training needs of the state forest department and other stakeholder organizations and preparation of appropriate training modules.
2. Submit appropriate project proposals for training, prepared by various research divisions of the institute to the respective funding organizations.
3. Facilitating the research divisions concerned in organizing the training programmes.
4. Organizing visits of the trainees of various forestry training organizations to the institute.
5. Compilation and publication of the Annual Action Plan and Annual Research Report of the institute.
6. Registration and allotment of IDs to all the research projects and ongoing activities of various divisions.
7. Upkeep of the records of periodical monitoring of the progress and evaluation of the research projects/ongoing activities of various divisions by the Director/Addl. Director (Research Coordinator).
8. Facilitation in the organization/participation in seminars/workshops/ symposia/fairs/exhibitions/ other events.
9. Dissemination of forestry research technologies evolved by the institute.
10. 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 awareness events.
- Providing logistic support of xeroxing audio visual equipments, public address system, binding of research documents.
- Co-ordination with different research divisions and facilitation cells of the institute.
- Providing desired information about research services to the stakeholders.
- 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
- राज्य औषधीय पादप बोर्ड, उड़ीसा से आये 15 किसानों के समूह हेतु पांच दिवसीय (दिनांक 21.02.2024 से 25.02.2024 तक) प्रशिक्षण एवं परिचयात्मक (exposure visit) दौरा–सह–प्रशिक्षण कार्यक्रम।
- मध्य प्रदेश राज्य की जैव विविधता एवं पारिस्थितिक तंत्र सेवाओं के मूल्यांकन एवं प्रबंधन हेतु विभिन्न वनमण्डलों के प्रशिक्षकों की दो दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन।

Dissemination of information

a. Annual Research Report

The Annual Research Report for 2022-23 was prepared, published and hosted on website of the institute.

b. Organization two days training on miscellaneous species nursery technology and root trainer

The State Forest Research Institute, Jabalpur organized two-day training dated 22nd and 23rd June, 2023 on Training and demonstration programme to field foresters of different project divisions of MPRVVN on plant preparation in root trainers and their management in nurseries, nursery techniques of miscellaneous species for plant production in root trainer.

Classroom session and field demonstration programme

c. Two-days training-cum-workshop on "Biodiversity Monitoring Protocol" at State Forest Research Institute, Jabalpur

Two-days residential training-cum-workshop 05.03.2024 and 06.03.2024 was organized at the State Forest Research Institute, Jabalpur for 54 trainers from 18 different forest divisions of Madhya Pradesh to understand the Biodiversity Monitoring Protocol prepared by the Madhya Pradesh State Biodiversity Board in collaboration with IISER Kolkata under Green India Mission.




d. Training cum-exposure visit of farmers of State Medicinal Plant Board, Odisha organized at State Forest Research Institute, Jabalpur.

The five-days (from 21.02.2024 to 25.02.2024) Training cum exposure visit was organized for a group of 15 farmers from State Medicinal Plant Board, Odisha at State Forest Research Institute, Jabalpur. Financial assistance was provided for this program by State Medicinal Plant Board, Odisha.




e. Dissemination of research technologies and strengthening of extension linkages

- **Conducting educational tour and exposure visit of the trainee forest rangers, trainee forest guards and students regarding the research activities of the institute**

Probationary IFS officers, Trainee Forest Range Officers posted in various forest divisions of M.P., trainee Forest Range Officers and trainee Forest Guards from Central Academy of State Forest Service, Burnihat, Assam, Van Vidhyalaya, Betul, Amarkantak, Rajiv Gandhi Sahbhagi Vaniki Training Institute, Lakhnadaun, Indira Gandhi Forest Training School, Pachmarhi, Forest Ranger College, Balaghat, Forest Training School, Shivpuri, Biodiversity Training Centre, Tala, Bandhavgarh, Forest Training Institute, Chail, Himanchal Pradesh, Tamilnadu Forest Department, Chandrapur Forest Academy, Maharashtra, Farmers (Bihar) from Borlaug Institue of South Asia, Jabalpur, G.S. Commerce and Economics College, Jabalpur, Farmers of State Medicinal Plant Board, Odisha, Maharshi Dayanand College of Arts, Science and Commerce, Mumbai, Government Science College, Jabalpur (Eco Club), Government Shyam Sunder Agrawal PG College, Sehora, Jabalpur, Government Home Science College, Jabalpur 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 visited to various laboratories, wildlife department, mist chambers, shade net houses, Lac gene bank, botanical garden, nurseries, museum and herbarium, located in the SFRI campus.







Exposure visit of trainee forest rangers, forest guards and students

- **Training workshop on lac production under Rural Technology Value Added Course**

With the aim of encouraging students and promoting employment through the Rural Technology Value Added Course organized by the Department of Zoology and Biotechnology of Government Science College on 10 February 2024 under the new education policy, the scientists and lac research team of the institute provided detailed information about the advanced technology of lac production to 60 students of the Faculty of Science. In the workshop, important information related to lac insect introduction, lac crop, lac insect life cycle, various lac marketing centers of Madhya Pradesh, process of lac production in Palas, Kusum, Ber and Semilata, lac production capacity and lac processing was provided to the students and awareness was created by providing information related to the importance and utility of lac to the students, so that the students can create new employment opportunities in future through lac production, processing and value addition.




Organizing a one day training workshop on lac production at Government Science College, Jabalpur

- **Experimental demonstration of Kusumi lac cultivation in Bichiya village of Umaria Forest Division of M.P.**

State Forest Research Institute, Jabalpur and Umaria Forest Division have jointly selected village Bichiya under Naurozabad forest range of Umaria Forest Division to make it a model village for Kusumi lac production. Under which, a one-day lac training workshop was organized on 06/9/2023 on the advanced technology of Kusumi lac production by the State Forest Research Institute, Jabalpur with the cooperation of the local Gram Panchayat and Forest Department.

Various works done under Lac Hand Holding Project

f. Collobarion between State Forest Research Institute, Jabalpur and Government Model Science College, Jabalpur

A Memorandum of Understanding (MoU) has been signed between State Forest Research Institute, Jabalpur and Government Model Science College, Jabalpur on 04/03/2024 with the aim of promoting research work on forestry, wildlife and environment. After the signing of the MoU, both the institutes will be jointly organize seminars, webinars, training and workshops and in future the scientists, research officers and professors of both the institutes give the benefit of their expertise in each other's institute and will be impart knowledge to the students.

Other activities of the Institute:

State Wildlife action Plan

राज्य वन अनुसंधान संस्थान, जबलपुर को राज्य स्तरीय प्रतिष्ठानों में तृतीय स्थान प्राप्त हुआ।

विदिशा–रायसेन परियोजना मंडल, भोपाल के अंतर्गत पैंगयाई रोपणी में सागौन के पौधों पर लगने वाले कीट व्हाईट ग्रब के प्रकोप एवं उनके नियंत्रण हेतु रोपणी का भ्रमण एवं मार्गदर्शन


बरघाट परियोजना मंडल, सिवनी के अंतर्गत रोपणी हिर्री संगम में सागौन के पौधों पर लगने वाले कीट व्हाईट ग्रब के प्रकोप एवं उनके नियंत्रण हेतु रोपणी का भ्रमण एवं मार्गदर्शन

नर्मदा समग्र न्यास, भोपाल के प्रशिक्षार्णियों का औषधीय रोपणी एवं बॉटेनिकल गार्डन का भ्रमण


नर्मदा समग्र न्यास, भोपाल के प्रशिक्षणार्थियों का औषधीय रोपणी एवं बॉटेनिकल गार्डन का भ्रमण


नेताजी सुभाषचंद्र बोस केन्द्रीय जेल, जबलपुर, में संस्थान के सहयोग से औषधीय पौधों का रोपण



कोबरा ग्राउंड जबलपुर में आयोजित सूर्या मैराथन के दौरान आगंतुकों को मेडिसिनल और महत्वपूर्ण पौधों के बारे में जानकारी देने के उद्देश्य से आर्मी स्कूल–1 के साथ मिलकर राज्य वन अनुसंधान संस्थान जबलपुर गो–ग्रीन के तहत स्टॉल लगाया और पौधों के बारे में जानकारी प्रदाय की। विशिष्ट अतिथियों को सीता अशोक, लक्ष्मण फल,सतावर, अश्वगंधा, बच जैसे पौधे उपहार में वितरण किये



आर्मी स्कूल क्रमांक 1 जबलपुर में राज्य वन अनुसंधान संस्थान के सहयोग से मियावाकी वृक्षारोपण एवं औषधीय पौध उद्यान की स्थापना




स्वायत्तशासी शासकीय महाविद्यालय जबलपुर की एल्युमिनाई के तत्वाधान में डी.आर.डी.ओ. की ब्राम्होस मिसाइल कार्यक्रम के प्रमुख डा सुधीर मिश्रा की अध्यक्षता में महाविद्यालय परिसर में कुलपति डॉ. कपिल देव मिश्रा एवं अन्य शिक्षकों द्वारा संस्थान के सहयोग से वृक्षारोपण


वन्यप्राणी एवं औषधीय पौध संरक्षण के लिए जबलपुर की समाज सेवी संस्था रेडी टू हेल्प फाउंडेशन द्वारा वैज्ञानिक डॉ. अनिरूद्ध मजूमदार एवं वरिष्ठ अनुसंधान अधिकारी डॉ. उदय होमकर को सम्मानित किया गया।

नेताजी सुभाष चन्द्र बोस मेडिकल कॉलेज, जबलपुर में राज्य वन अनुसंधान संस्थान एवं म.प्र.वन कर्मचारी संघ के द्वारा औषधीय पौधों का रोपण

टिम्बर मर्चेंट एण्ड सॉ मिल ओनर्स एसोसिएशन, जबलपुर द्वारा संस्थान परिसर में औषधीय पौध रोपण कार्य संस्थान के सहयोग से किया गया।

Organization of Meetings

S. N.	Meeting	Organised by	Place	Date of organization	Participants
1.	Organization of 47th meeting of Research Advisory Committee of the Institute	Extenstion and Training Cell, SFRI, Jabalpur	Bhopal	02/01/2024	Chairman and Members of the RAC
2.	MOU with Science College Jabalpur	SFRI, Jabalpur	Meeting hall SFRI, Jabalpur	04/03/2024	10
3.	Inception meeting at Nauradehi on Wolf Project	SFRI, Jabalpur	Nauradehi Wildlife Sanctuary	07/03/2024	12

Participation in Fairs :

S.No.	Event	Date	Place
1.	Participated in district level Counselling & placement Fair Jabalpur organized by - Swami Vivekananda Career Counselling & Placement Cell under Dept. of Higher Education Govt. of Madhya Pradesh at Govt. Model Science College, Jabalpur	26/05/2023	Govt. Model Science College, Jabalpur (M.P.)
2.	Participated in 10th Bhopal Vigyan Mela and Arogya Expo 2023 organized by -M.P. Council of Science & Technology and Prashar Bharti at Bhopal (M.P.)	15/09/2023 to 18/09/2023	BHEL Ground Dasehera ground, Bhopal (M.P.)
3.	Medicinal plant exhibition in Surya Marathon event.	19/11/2023	Kobra ground Jabalpur.

Organization of Seminars/Symposiums/Workshops

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	One day K.P. Sagreiya Memorial lecture on "DNA base technology in fight against wild life crimes in Indian Scenario".	Biotechnology Division	SFRI	30/06/2023	Forest Officers, Scientist and others	100
2.	International conference on "Wildlife conservation : emerging Scenario and Way forward"	MP Forest Department and SFRI	KanhaTiger Reserve, Mandla	27-29 April 2023	Forest Officers, Scientist and others	239

Organization of trainings

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	Training provided to trainee IFS Mr. David Venkatrao Chanak from Katni Division	SFRI	Biotechnology Division, Conservation, Production, Forest Managment Animal Ecology, Habitat Ecology, Wildlife Management Divisions	060/7/2023	IFS trainee	1
2.	Training provided to Shri B.P. Solanki, FRO, Neemuch forest division	SFRI	Biotechnology Division, Conservation, Production, Forest Managment Animal Ecology, Habitat Ecology, Wildlife Management Divisions	07/11/2023	FRO	01
3.	Training provided to trainee IFS Ms. Nidhi Chauhan and Namrata	SFRI	Biotechnology Division, Conservation,	01.12.2023	IFS trainee	02

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
	Bijoria from North Betul and West Chhindwara		Production, Forest Managment Animal Ecology, Habitat Ecology, Wildlife Management Divisions			
4.	Visit organized of B.Sc. Ag. students from RDVV, Jabalpur	SFRI	Biotechnology Division,	08/06/2023	UG Students	70
5.	Training provided to Trainee SDOs from Burnihat, Assam	SFRI	Biotechnology Division, Conservation, Productvity, Forest Managment Animal Ecology, Habitat Ecology, Wildlife Management Divisions	01/08/2023	Trainee SDOs	45
6.	Visit organized of B.Sc. Forestry students from JNKVV, Jabalpur	SFRI	Biotechnology Division	20.09.2023	UG Students	21
7.	Training provided to Trainee Forest Guards from Pachmarhi	SFRI	Biotechnology Division, Conservation, Productvity, Forest Managment Animal Ecology, Habitat Ecology, Wildlife Management Divisions	09/10/2023	Trainee Forest Guards	47
8.	Training provided to Trainee Forest Guards of Bihar from Forest School Betul	SFRI	Biotechnology Division, Conservation, Productvity, Forest Management, Animal Ecology, Habitat Ecology, Wildlife Management	27/10/2023	Trainee Forest Guards	56
9.	Training provided to Trainee Forest Guards from Forest School Amarkantak	SFRI	Biotechnology Division, Conservation, Productvity, Forest Management, Animal Ecology, Habitat Ecology, Wildlife Management Divisions	29/10/2023	Trainee Forest Guards	33
10.	Training provided to Farmers from State Medicinal Plant Board, Odisha	SFRI	Biotechnology Division	21/02/2024	Farmers	11
11.	Training provided to	SFRI	Biotechnology	19/10/2023	Trainee	46

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
	Trainee Forest Guards from Training School, Bandhavgarh		Division, Conservation, Productvity, Forest Management, Animal Ecology, Habitat Ecology, Wildlife Management Divisions		Forest Guards	
12.	Training provided to Trainee Forest Guards from Training School, Lakhnadon	SFRI	Biotechnology Division, Conservation, Productvity, Forest Managment, Animal Ecology, Habitat Ecology, Wildlife Management Divisions	20/10/2023	Forest guards	89
13.	Training provided to Trainee Forest Guards from Training School, Govindgarh	SFRI	Biotechnology Division, Conservation, Productvity, Forest Managment Animal Ecology, Habitat Ecology, Wildlife Management Divisions	25.10.2023	Forest guards	35
14.	Training provided to Trainee Forest Guards from Training School, Shivpuri	SFRI	Biotechnology Division, Conservation, Productvity, Forest Management, Animal Ecology, Habitat Ecology, Wildlife Management Divisions	30/10/2023	Forest guards	68
15.	Training provided to Trainee FRO from Training School, Balaghat	SFRI	Biotechnology Division, Conservation, Productvity, Forest Managment Animal Ecology, Habitat Ecology, Wildlife Management Divisions	04/11/2023	FRO's	49
16.	Training provided to Trainee FRO trainee FRO's from Tamilnadu	SFRI	Biotechnology Division, Conservation, Productvity, Forest Managment , Animal Ecology, Habitat Ecology,	12/.02/2024	FRO's	19

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
			Wildlife Management Divisions			
17.	Training provided to Trainee FRO from trainee FRO's from Chandrapur, Maharashtra	SFRI	Biotechnology Division, Conservation, Productvity, Forest Managment , Animal Ecology, Habitat Ecology, Wildlife Management Divisions	12/.03/2024	FRO's	19
18.	Training provided to Trainee Forest Guards from Training School, Himachal Pradesh	SFRI	Biotechnology Division, Conservation, Productvity, Forest Managment , Animal Ecology, Habitat Ecology, Wildlife Management Divisions	25.11.2023	Forest guards	-
19.	Training and demonstration programme to field foresters of different project divisions of MPRVVN on plant preparation in root trainers and their management in nurseries, nursery techniques of miscellaneous species for plant production in root trainer.	SFRI, Jabalpur	SFRI, Jabalpur	22/06/2023 to 23/06/2023	Field foresters	28
20.	Lecture delivered to students of G.S. College of Commerce and Economics, Jabalpur on various research activities, quality seed collection, certification & testing and nursery management.	SFRI, Jabalpur	SFRI, Jabalpur	20/09/2023	Students	-
21.	Wildlife conservation and scientific techniques of lac cultivation	SFRI, Jabalpur	SFRI, Jabalpur	22/8/2023	Pragati Singhae and Manvi Gubreley, School of planning & Architecture ITO, New Delhi	2
22.				22/9/2023	Kunal Chhinalya, Student, NSCB,	1

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
					Jabalpur	
23.				6/2/2024	M.Sc students (Botany) of Govt. Model Science College, Jabalpur (M.P.)	30
24.				7/02/2024	M.Sc students of Maharishi Dayanand College, Mumbai (M.H.)	5

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.	International Wildlife Conference on "Wildlife Conservation: Emerging scenario & way forward"	SFRI	Kanha Tiger Reserve, Mandla (M.P.)	27-29/04/2023	Dr. S.K. Tiwari Dr. A.K. Sharma Dr. Uday Homkar Dr Pratiksha Chaturvedi
2.	One day K.P. Sagreiya Memorial lecture on “DNA base technology in fight against wild life crimes in Indian Scenario”.	SFRI & JTF	SFRI	30/06/2023	Dr. S.K. Tiwari Dr. A.K. Sharma Dr. Uday Homkar Dr Pratiksha Chaturvedi Smt. Richa Seth
3.	Regional Research Conference (RRC) at TFRI	TFRI	TFRI	18/08/2023	Dr. S.K. Tiwari Dr. Uday Homkar
4.	Meeting attended with HOD at Meeting Hall of GIM BPL of "Sustainable Management of Forest Ecosystem Services" for subject "Training Need Assessment (TMS) on Agroforestry", 'the unique land use GmbH team' Dr. Jochen Statz, Dr. Joachim Schmerebeck, Dr. Atul K. Gupta and Ms. Veronica Lisini Baldi.	SFRI	SFRI	23/08/2023	Dr. S.K. Tiwari
5.	Power Point Presentation on International Bamboo Day at RDVV, Jabalpur; As a Chief Guest.	RDVV	RDVV	18/09/2023	Dr. S.K. Tiwari
6.	Attended Project Evaluation Committee (PEC) At TFRI, Jabalpur.	TFRI	TFRI	04/12/2023	Dr. S.K. Tiwari
7.	Organized meeting with division staff for formulation of formats for data recording, analysis of observations recorded on different parameters.	Forest Productivity Division, SFRI	SFRI Jabalpur	29/05/2023	Division Staff

S.N.	Name of the programme	Organized by	Venue	Date	Participants
8.	Attend meeting on JTF agenda as committee member	SFRI, Jabalpur	SFRI, Jabalpur	29/08/2023 & 25/09/2023	JTF Committee members
9.	Participated in five days National training programme for entrepreneurship development and management for women scientist and technologist	Entrepreneurship development Institute of India, Ahmadabad	Virtual	11/12/2023 to 15/12/2023	26 Women Scientists
10.	Participated in lecture cum workshop programme by Dr. A. K. Gupta (Retd. IFS) on Agroforestry by Conservation Division	SFRI, Jabalpur	SFRI, Jabalpur	23 August 2023	Dr.Pratiksha Chaturvedi, Smt Richa Seth
11.	Meeting on " A need to re – look data analysis in Working Plan Preparation."	SFRI, Jabalpur	SFRI, Jabalpur	24 Nov. 2023	Richa Seth
12.	International Conference on Nature and Natural Science (ICNS-2023)	Rani DurgawatiVishwavidyalaya Jabalpur (M.P.)	Rani Durgawati Auditorium	05/05/2023	Dr. Aniruddha Majumdar
13.	Quinquennial Review Meeting (QRT 2017-2022) meeting of NPCLIGR	ICAR-Indian Institute of Secondary Agriculture, Ranchi, Jharkhand	ICAR-NISA, Ranchi	24/07/2023 to 26/07/2023	Dr. Aniruddha Majumdar
14.	International Tiger Day Celebration	MP Tiger Foundation Society	Khushabhau Thakre - International Convention Centre, Bhopal	29/07/2023	Pradeep Vasudeva, Ravindra Mani Tripathi and Dr.AniruddhaMajumdar
15.	International webinar on webinar series on Biodiversity conservation and sustainable development	Govt. M.S. Golwalkar College Rewa (M.P.)	Online	25/08/2023 to 29.08/2023	Dr. Aniruddha Majumdar
16.	मध्यप्रदेश राज्य के अन्तर्गत वन्यप्राणी गलियारों (वाइल्ड लाइफ कॉरिडोर्स) के संबंध में आयोजित बैठक	MP Forest Dept	Meeting hall, Van Bhawan, Bhopal, M.P.	06/12/2023	Pradeep Vasudeva, Ravindra, Dr.Aniruddha Majumdar and Dr Mayank Varma
17.	11th Coordination Committee Meeting cum Annual workshop of Lac project	ICAR-Indian Institute of Secondary Agriculture, Ranchi, Jharkhand	Online Mode	20/12/2023	Dr. Aniruddha Majumdar BalramLodhi
18.	National Workshop on Wildlife	Dept of Zoology & Biotechnology, Govt. Science College Jabalpur	Govt Model Science College, Jabalpur	08/01/2024 to 12/01/2024	Dr. Aniruddha Majumdar
19.	National Seminar on Frontier Areas of Research in Forest and Wildlife Science	Dept of Forestry wildlife and Environment Science, Guru Ghasi Das Central	Guru Ghasi Das Central University, Bilaspur	24/01/2024 to 25/01/2024	Dr. Aniruddha Majumdar

S.N.	Name of the programme	Organized by	Venue	Date	Participants
		University, Bilaspur (C.G.)	(C.G.)		
20.	Participated as speaker in Rural Technology & Value added course	Dept. of Zoology & Biotechnology, Govt Model Science College, Jabalpur	Govt Model Science College, Jabalpur	10/02/2024	Dr. Aniruddha Majumdar Balram Lodhi Bharat Singh Aarmo
21.	National Science Day Talk on 'Application of Modern tools and technologies' on wildlife research and monitoring	Hitkarini Girls College	Hitkarini Girls College	29/02/2024	Dr. Aniruddha Majumdar
22.	हिंदी राजभाषा में जैवविविधता एवं संरक्षण पर दो दिवसीय कार्यशाला	Zoological Survey of India and Home Ministry, Govt of India	ZSI, Jabalpur	09/03/2024 to 10/03/2024	Dr. Aniruddha Majumdar
23.	Leveraging Water for peace	Shiksha Sanskriti Utthan Nyas, Mahakoshal Prant, Krashi Vigyan Sansthan RDVV, Jabalpur	Online	22/03/2024	Dr. Aniruddha Madumdar
24.	Meeting on wildlife corridors under the state of Madhya Pradesh at Van Bhawan, Bhopal	PCCF Wildlife Madhya Pradesh	Van Bhawan, Bhopal	06/12/2023	PCCF Wildlife, PCCF Working Plan, Director SFRI Director WII, WWF, WCT, Corbett Foundation The Nature conservancy, WR&CS

2.3.6 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.

Journal Section

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

Archive:

The Institute is in possession of some very old records of the state forest department. The old records which were earlier in a very fragile state were repaired and preserved as per techniques made available from National Archives of India,

These records (maps) dates back from the year 1856 when the Imperial Forest Department was established in Central provinces and Berar.

These historical documents reflect the rich heritage of forests, their management systems and the forest dwellers.

A very large collection of maps (202) more than a century old is also available in the Institute

The maps preserved in archives are in tattered condition which may worsen further in future. Therefore digitization of these maps using advanced technology is essential for their long term preservation and making them available for reference in future research activities.

Achievements during the year

1. 05 project reports were documented.
2. A sum of Rs. 950/- was received from the sale of bulletins, extension series, and other publications
3. 16 periodicals were received and displayed.
4. 65 articles were selected, photocopied, classified and filed into ledger files.
5. 165 damaged pages of ledger files were replaced by xerox copies.
6. Prepare, Listing, clean & repairs of old maps (202)

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.	Wood is Good : Grow More, Use More
10.	मध्यप्रदेश वनांचल संदेश
11.	MPCST NEWS LETTER
12.	Annals of Forestry

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

S N.	Bulletin No.	Title	Year
4	9	Standard Volume Table of Teak for S.Chhindwara in M.P.	1971
5	10	Family Ranunculaceae to Polygonaceae in M.P. (Monograph of 13 family)	1971
6	11	Teak growth tables of different ecological forest types in M.P.	1971
7	12	Standard volume tables of *Boswellia serrata* for Nimar tract in M.P.	1971
8	15	Bark Table for *Boswellia serrata*	1971
9	16	Family Linanceae to Berseraceae	1974
10	18	Species for plantation in M.P. (Reprint 1996)	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
34	46	औषधीय पौधौं की खेती की प्रचार प्रसार पत्रिका।	2003
35	47	Medicinal herbs in trade: a study of safed musli (*chlorophytum* species) in Madhya Pradesh	2003
36	48	Collection, processing and marketing of *Buchanania lanzan* in Madhya Pradesh	2005
37	49	मध्यप्रदेश के महत्वपूर्ण आयुर्वेदिक पादप	2005
38	50	आंवला वृक्षारोपण एवं आर्थिक महत्व	2008
39	51	उच्च गुणवत्ता के बीज एकत्रीकरण, भण्डारण, उपचारण, प्रमाणीकरण तथा बीजोत्पादन क्षेत्रों के चयन एवं प्रबंधन पर दिग्दर्शिका।	2008
40	52	Floral Diversity of Kanha Tiger Reserve	2009
41	53	Nursery and Planting technique of Tree Species	2010
42	54	Forest Glossary for All (English – Hindi)	2010
43	55	वृक्षारोपण मार्गदर्शिका	2011

S N.	Bulletin No.	Title	Year
44	56	संग्रहित लाख में समय के साथ वनोपजों में होने वाली कमी का अध्ययन।	2014
45	57	Status of natural gum and gum oleo-resin of M.P.	2014
46	58	बीज प्रक्षेत्र का चयन, बीज उत्पादन क्षेत्र की स्थापना, प्रबंधन, बीज संग्रहण, भण्डारण, उपचारण, परीक्षण एवं रोपणी प्रबंधन	2014
47	59	वानिकी में मेक्रोक्लोनल प्रोपेगेशन तकनीक द्वारा वृक्ष एवं औषधीय प्रजातियों के क्लोनल पौधे तैयार करने की विधियॉ।	2014
48	60	सामुदायिक भागीदारी द्वारा अकाष्ठीय वनोपजों के मानचित्रण एवं आंकलन विधि मार्गदर्शिका।	2015
49	61	अकाष्ठीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2015
50	62	कैमरा ट्रैप मार्गदर्शिका	2016
51	63	अकाष्ठीय वनोपज प्रजातियों का अंतःस्थलीय, बाह्य स्थलीय संरक्षण, नवप्रवर्तन – वनवर्धन एवं विकास।	2016
52	64	अकाष्ठीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2016
53	65	Volume table of Teak for various divisions of Madhya Pradesh	2016
54	66	Volume table *of Shorea robusta* (Sal) for various forest divisions of Madhya Pradesh	2016
55	67	रोपणी मार्गदर्शिका	2016
56	68	Growth table of important coppices origin species for Madhya Pradesh	2016
57	69	वन एवं औषधीय प्रजातियों की रोपणी एवं रोपण तकनीक मार्गदर्शिका	2016
58	70	कट रूट स्टाक विधि : लेन्टाना उन्मूलन की नई तकनीक	2017
59	71	बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण हेतु मार्गदर्शिका	2017
60	72	प्रशिक्षण मार्गदर्शिका – आधुनिक जीपीएस, रेंज फाईडर एवं कम्पास हेतु	2017
61	73	Primary Processing and Drying Techniques of NTFPs	2017
62	74	Directory of Medicinal Plants Traders and ISM Industries in Madhya Pradesh	2017
63	75	Selection of superior races of Khamer (*Gmelina arborea*) through clonal propagation	2017
64		क्लोनल प्रोपेगेशन द्वारा खमेर (*मेलाईना आरबोरिया*) की श्रेष्ठ नस्लो (रेसेस) का चयन	2017
65	76	Quantitative estimation of bioactive compounds through Chemo-fingerprinting (HPLC) for the identification of quality germplasm - *Andrographis paniculata, Bacopa monnieri and Swertia angustifolia*	2017
66	77	औषधीय पौध प्रजातियों की जबलपुर वन वृत्त के वनक्षेत्रों में वर्तमान स्थिति, संख्यात्मक घनत्व एवं उपलब्ध मात्रा का आंकलन ''सर्वेक्षण एवं आंकलन मार्गदर्शिका''	2017
67	78	बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण- 2018 हेतु मार्गदर्शिका	2018
68	79	Volume table of miscellaneous species for various divisions of Madhya Pradesh.	2018
69	80	हमारी कंद संपदा : मध्यप्रदेश में पायी जाने वाली कंद प्रजातियों की पहचान एवं विवरण	2018
70	81	Propagation techniques of economically important endangered and rare species (salai, shisham, achar, maida lakdi and bija) of Madhya Pradesh	2018
71	82	पलाश के वृक्षो में लाख की कृषि प्रक्रिया	2018
72	83	बांधवगढ़ टाईगर रिजर्व के घास मैदानों का पारिस्थितिकीय अध्ययन : वन्य प्राणी प्रबंधन के संदर्भ में	2018
73	84	कुसुम के वृक्षो में लाख की कृषि प्रक्रिया	2019
74	85	Climate Change and Role of Communities in Adaptation and Mitigation	2019
75	86	मध्यप्रदेश की प्रमुख गोंदों के उत्पादन एवं संग्रहण क्षेत्र	2019

S N.	Bulletin No.	Title	Year
76	87	कार्बन का महत्व, पर्यावरणीय घटनाओं से इसका संबंध एवं वनों में कार्बन संचयन का आंकलन ।	2019
77	88	Quantitative estimation of bioactive compounds of 5 commercially important medicinal plants through chemo-fingerprinting (HPLC) for the identification of quality planting material.	2019
78	89	दुर्लभ एवं संकटग्रस्त प्रजातियों की रोपणी तकनीक का प्रचार प्रसार	2019
79	90	वनों एवं वन रोपणियों में लगने वाली कीट व्याधियों एवं उनके निदान पर किये गये कार्यो का सरल भाषा में संकलन : मध्यप्रदेश के संदर्भ मे	2019
80	91	Species specific cage designs to rescue & transport the wildlife & nest boxes for birds.	2020
81	92	Quantitative determination of bio-active compounds of critically endangered and rare medicinal plants Alectra chitrakutensis and Butea superb through chemoprofiling	2021
82	93	Clonal propagation studies of Alectra chitrakutensis and Butea superb critically endangered and rare medicinal plants	2021

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 लेडिंया	1991
5.	ईसबगोल	1994
6.	सर्पगन्धा	1994
7.	रोसा घास	1995
8.	A mechanical device for pre sowing treatment of teak seeds	1995
9.	वृक्षारोपण कैसे करें	1996
10.	S.F.R.I Publications	1999
11.	माइकोराइजा (वैम)	1999
12.	राइजोबियम	1999
13.	एजेटोबेक्टर	2000
14.	पी.एस.बी. (फास्फोरस विलायक)	2000
15.	आँवला : वनो से किसानों तक	2000
16.	बाँस : वनो से किसानों तक	2000
17.	सागौन : वनो से किसानों तक	2000
18.	खमेर : वनो से किसानों तक	2000
19.	यूकेलिप्टस : वनो से किसानों तक	2000
20.	बच (एकोरस केलेमस)	2001
21.	सतावर (एस्पेरेगस रेसीमोसस)	2001
22.	सफेद मूसली (क्लोरोफाइटम बोरिविलियानम)	2001
23.	कलिहारी (ग्लोरिओसा सुपरबा)	2001
24.	सनाय (केसिया आगस्टफोलिया)	2001
25.	सर्पगंधा (रावोल्फिया सर्पेन्टिना)	2001
26.	अश्वगंधा (विथानिया सोमनीफेरा)	2001
27.	मुश्कदाना (एबलेमासकस मास्केटस)	2001
28.	लेमनग्रास (सिंबोपोगन फ्लेक्सिपोसस)	2001

Ext. Series	Title	Year
29.	मेन्था या पोदीना (मेन्था आर्वेसिस)	2001
30.	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 1)	2003
31	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 2)	2007
32	Directory of Medicinal Plants Trades and ISM Industries of Central India	2009
33	Monograph on *Alectra chitrakutensis*	2011
34	Monograph on *Ceropegia bulbosa and Ceropegia macrantha*	2011
35	Monograph on *Crateva magna* and *ficus cupulata*	2011
36	Monograph on *Dioscorea tomentosa, D. wallichia* and *d. alata*	2011
37	Monograph on *Flemingia stricta* and *F. paniculata*	2011
38	Monograph on *Guggal (Commiphora wightii)*	2011
39	Monograph on Maida tree (*Litsea glutinosa)*	2011
40	Monograph on Padri tree (*Radermachera xylocarpa)*	2011
41	Monograph on Shyonaka (*Oroxylum indicum)*	2011
42	Some ethnic plants in cure of various human diseases	2011
43	कमरकस (पलाश) गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं भण्डारण तकनीकों का प्रदर्शन	2012
44	साल बोरर से साल वनो की सुरक्षा	2014
45	Education material on Conservation , multiplication and utilization of rare, 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 भंडारण विधि – मार्गदर्शिका	2018
55	पौधों की विक्रय दरें ।	2018
56	मध्यप्रदेश में पाई जाने वाली प्रमुख गोंदों की विदोहन एवं विदोहनोत्तर तकनीक	2018

Brouchers

S.N.	Title	Year
1	अचार (बुकनेनिया लेन्जन)	2007
2	महुआ (मधुका लेटीफोलिया)	2007
3	बहेड़ा (टरमिनेलिया बेलेरिका)	2007
4	बांस (डेन्ड्रोकेलेमस स्ट्रिक्टस)	2007
5	बीजा (टेरोकार्पस मारसूपियम)	2007
6	सागौन (टेक्टोना ग्रेंडिस)	2007
7	बबूल (अकेशिया निलोटिका)	2007

S.N.	Title	Year
8	खैर (अकेशिया कटेचू)	2007
9	खमैर (मेलाइना आरबोरिया)	2007
10	ऑवला पौधों का विनाश विहीन विदोहन एवं संरक्षण मार्गदर्शिका	2007
11	महुआ रासायनिक उर्वरको के प्रयोग से महुआ फूल एवं फल की उत्पादकता में वृद्धि	2011
12	जन भागीदारी द्वारा अकाष्ठीय वनोपजों का प्राकृतिक वन क्षेत्रों में सतत् विदोहन एवं प्रबन्धन तकनीकी का विकास	2012
13	कुल्लू गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
14	धावड़ा गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
15	सलई गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
16	पलाश गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं विपणन	2013
17	वनौषधि विपणन सूचना विश्लेषण केन्द्र	2014
18	बॉस–बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबनधन	2015
19	खमेंर –बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबनधन	2015
20	कुल्लू–बीज संग्रहण, भण्डारण, उपचारण एवं नर्सरी प्रबनधन	2015
21	भिलवा – बीज एवं रोपणी तकनीक	2017
22	माहुल – बीज एवं रोपणी तकनीकक	2017
23	मुण्डी – बीज एवं रोपणी तकनीक	2017
24	कुम्भी – बीज एवं रोपणी तकनीक	2017
25	मृदा नमूना एकत्रीकरण विधि	2017
26	अश्वगंधा – बीज एवं रोपणी तकनीक	2017
27	कालमेघ – बीज एवं रोपणी तकनीक	2017
28	सर्पगंधा – बीज एवं रोपणी तकनीक	2017
29	जैविक खाद एवं नीम खली वानिकी प्रजातियों के पौधों की वृद्धि में लाभदायक	2017
30	कृषि वानिकी पद्धति के अंतर्गत गेहूँ के साथ क्लोनल यूकेलिप्टस रोपण : लागत एवं आय	2017
31	SFRI ENGLISH BROCHURE (About Institute)	2017
32	SFRI HINDI BROCHURE (About Institute)	2017
33	REGIONAL-CUM-FACILITATION CENTRE, CENTRAL REGION, JABALPUR (RCFC)	2017
34	क्षेत्रीय–सह–सुविधा केन्द्र मध्य क्षेत्र, जबलपुर (आर.सी.एफ.सी.)	2018
35	वृहत् स्तर पर पौधा रोपण कैसे करें	2018
36	कलिहारी *(Gloriosa superb)*	2019
37	गुग्गल *(Commiphora wightii)*	2019
38	अश्वगंधा *(Withania somnifera)*	2019
39	भिलवा *(Semecarpus anacardium)*	2019
40	चिरायता *(Swertia chirata)*	2019
41	सलई *(Boswellia serrata)*	2019
42	चित्रक *(Plumbago zeylanica)*	2019
43	चनाहुर *(Marsdenia tenacissima)*	2019
44	सफेद मुसली *(Chlorophytum borivilianum)*	2019
45	कुचला *(Strychnos nux-vomica)*	2019
46	बायविडंग *(Embelia ribes)*	2019
47	गिलोय *(Tinospora cordifolia)*	2019
48	हर्रा – बीज एवं रोपणी तकनीक	2020
49	बहेड़ा – बीज एवं रोपणी तकनीक	2020

S.N.	Title	Year
50	रीठा – बीज एवं रोपणी तकनीक	2020
51	हल्दू – बीज एवं रोपणी तकनीक	2020
52	खुरासानी इमली – बीज एवं रोपणी तकनीक	2020
53	सतावर *(Asparagus racemosus)*	2020
54	निशोथ (*Operculina turpethum*)	2020
55	शंखपुष्पी (*Evolvulus alsinoides*)	2020
56	तुलसी (*Ocimim sanctum*)	2020
57	स्टीविया (*Stevia rebaudiana*)	2020
58	कालमेघ *(Andrographis paniculata)*	2020
59	अग्निमंथ *(Premna Integrifolia)*	2020
60	सहजन *(Moringa oleifera)*	2020
61	रक्त चंदन *(Pterocarpus santalinus)*	2020
62	मलकांगनी *(Celastrus paniculatus)*	2020
63	केवाच *(Mucuna pruriens)*	2020
64	मण्डूकपर्णी *(Centella asiatica)*	2020
65	गोखरू *(Tribulus terrestris)*	2020
66	बावची *(Psoralea corylifolia)*	2020
67	सदाबहार *(Catharanthus roseus)*	2020
68	चंद्रसूर *(Lepidium Sativum)*	2020
69	अनंतमूल (Hemidesmus indicus)	2020
70	बेल *(Aegle marmelos)*	2021
71	खस *(Vetiveria zizanioides)*	2021
72	गुड़मार *(Gymnema sylvestre)*	2021
73	अशोक *(Saraca asoca)*	2021
74	ब्राह्मी *(Bacopa monnierii)*	2021
75	ईसबगोल *(Plantago ovata)*	2021
76	सर्पगंधा *(Rauvolfia serpentina)*	2021
77	बच *(Acorus calamus)*	2021
78	उच्च गुणवत्ता के अचार फलों के संग्रहण हेतु अवधि निर्धारण एवं विनाश विहीन विदोहन	2021
79	श्योनक	2021
80	पाढ़र	2021

2.3.7 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. approximately 10258 books are available.

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

2.3.8 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 (Intercom) in the Institute.
6. Maintenance of Biometrics for attendance of all employees of the Institute.
7. To maintenance video conferences.

Information Technology Centre

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

Activities carried out during the year

1. Presentations of Powerpoint for BOG, RAC, Workshops, Meetings, Seminars and Trainings, etc. has been done successfully through out the year.
2. Maintained online meetings & conferences through video system.
3. Website of the institute has been upgraded time to time.
4. Provided internet surfing and e-mail facilities to users through LAN and Internet.
5. Maintained all computer peripherals viz., computer systems, printers, scanners, LAN, UPS etc.

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

(April 2023 to March 2024)

Papers published in Journals (National and International)

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.
1.	International Conference on Nature and Natural Sciences, 5th and 6th May, 2023 in RDVV, Jabalpur (M.P.).	Abstract on "Genetic Improvement Program of *Pterocarpus marsupium* (*Roxb*.) In Madhya Pradesh Critically Endangered Medicinal Tree Species"	S.K. Tiwari, A.K. Sharma, Sachin Dixit and Rahul Rathore	-
2.	Journal of Tropical Forest	Germination behaviour and seedling growth as influence by pretreatments of seeds of *Adansonia digitata* under storage	Dr. Archana Sharma, Ram Kumar Kahar, Anju Kathel, Dr. Sachin Dixit	Vol. 39 Jan.-Dec. 2023 No. 1-4
3.	International Journal of Science and Research (IJSR)	Biotechnical approaches to enhance the growth and biomass of *Sapindus trifoliatus* seedlings	Dr. Archana Sharma	Vol 12, Issue 8, August 2023
4.	International Journal of Science and Research (IJSR)	Germination behaviour and seedling growth as influence by pretreatments of seeds of *Cleistanthus collinus* benth under storage	Dr. Archana Sharma, Pradeep Vasudeva	Vol 12, Issue 11, November 2023
5.	Journal of Animal Diversity	Survival strategy-Temporal segregation of different age and sex classes of a Bengal Tiger (*Panthera tigris tigris Linnaeus*) population in Pench Tiger Reserve, Madhya Pradesh, India	Aniruddha Majumder	2023/5(3):43-54
6.	Journal of Non-Timber Forest Products	Dependency on bamboo by local communities in various agro climatic zones of Madhya Pradesh in India	Balram Lodhi, Aniruddha Majumdar, Vijay Bahadur Singh and Imrat Sen	2023/30 (3): 121-127
7.	Journal of Tropical Forestry	"The need for sustainable development goal-based strategic approach to tiger conservation in proximity capital Bhopal"	Mayank Makrand Verma, Ravindra Mani Tripathi, Amitabh Agnihotri and Dharmendra Verma	-
8.	Journal of Tropical Forestry	Assessment of Physicochemical properties of water quality of Narmada River during summer season in Madhya Pradesh.	Jyoti Singh, Ramdeen Bhalavi and Vijay Kumar Haldkar,	Jan.-Dec. 2023/vol. 39 No. 1-4

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.	International conference on "Wildlife conservation: Emerging scenario and way forward"	Mass translocation of captive spotted deer (*Axis axis Erxleben*) through oral sedation method – three case studies	Uday Homkar Ravindra Mani Tripathi and Amitabh Agnihotri.	-

S. N.	Name of seminars/ symposiums/ workshops/webinar	Title of the paper	Author(s)	Vol. No.
2.	Interview on DD, Kisan Network on 28 Jan. 2024, Door Darshan , New Delhi	Safed Musali, Cultivation, processing and Marketing	Dr. Uday Homkar	-
3.	Interview on DD, Kisan Network on 11 Feb. 2024, Door Darshan , New Delhi	Aswagandha, Cultivation, processing and Marketing	Dr. Uday Homkar	-
4.	Souvenirs of State herbal fair 2024 organized by Madhya Pradesh State Minor Forest Produce (Trade & Dev.) Federation, Bhopal	Marorphali (*Helicteresisora*) Price Analysis: Trends and Influences from Regional Markets of Madhya Pradesh and Chhattisgarh	Pratibha Bhatnagar, Rajesh Barman and Alok Raikwar	-
5.	International conference on "Wildlife conservation : emerging Scenario and Way forward"	Assessment of wildlife habitat along proposed doubling of railway line in Sanjay-Dubri Tiger Reserve, Madhya Pradesh	Aniruddha Majumdar, Tanuj Suryan, Janam Jai Sehgal, Satyadeep Nag, Tanveer Rizvi, Ravindra Mani Tripathi and Amitabh Agnihotri	2023
6.	National Seminar on Frontier Areas of Research in Forest and Wildlife Science Organised by:Dept of Forestry wildlife and Environment Science, Guru Ghasi Das Central University, Bilaspur (C.G.)	Population habitat viability analysis (PHVA) OF Hard ground Barasingha (*Cervus duvaucelibranderi*) for introduction in Bandhavgarh Tiger Reserve, M.P.	Aniruddha Majumdar, Ravindra Mani Tripathi, Jyoti Singh and Vijay Haldakar	2023
7.	National Park, Tiger Reserves, WLS and Biodiversity Organised by: Govt. Madhav Saashivrao Golvalkar College,	Monitoring Tiger, Leopard and Prey Scientifically in Madhya Pradesh- A critical Review.	Dr. Aniruddha Majumder	P 43, p 503, 2023
8.	Van Sampada	Wolf	Dr. Aniruddha Majumder	Vol.40, April 2024
9.	Book of Abstract "Wildlife Conservation: Emerging Scenario and Way Forward" (2023).International Wildlife Conference on at Kanha Tiger Reserve, Mandla (M.P.).	Status of anthropogenic grasslands at village relocation sites in Satpura Tiger Reserve, Central India.	Anjana Rajput	-
10.	The 5th Central Indian Landscape Symposium CILS 5	Infrastructure impacts and mitigation strategies to allow for wildlife conservation and connectivity; case study of Ratapani landscape	Dr. Mayank Makrand Verma, Mr.Satyadeep Nag, Dr. Uma Ramakrishnan and Dr. Dharmendra Verma	CILS5 Jugalbandi Feb15-18-2023, Infinity resorts, Kanha Tiger Reserve MP

Publication of technical bulletins / brochures

S. No.	Name of technical bulletins/brochures	Authors	Bulletin/ brochure No.
1.	Van Dhan Vyapar	Alok Raikwar, Rajesh Barman	4-6
2.	Quality plant production in root trainers of *Albizia lebbeck.*	Dr. Archana Sharma	-
3.	Quality plant production in root trainers of *Albizia procera.*	Dr. Archana Sharma	-
4.	Quality plant production in root trainers of *Dalbergia latifolia.*	Dr. Archana Sharma	-
5.	Quality plant production in root trainers of *Dalbergia sissoo.*	Dr. Archana Sharma	-
6.	Quality plant production in root trainers of *Emblica officinalis.*	Dr. Archana Sharma	-
7.	Quality plant production in root trainers of *Holoptelia integrefolia.*	Dr. Archana Sharma	-
8.	Quality plant production in root trainers of *Pongemia pinnata.*	Dr. Archana Sharma	-
9.	Quality plant production in root trainers of *Terminalia bellerica.*	Dr. Archana Sharma	-
10.	Quality plant production in root trainers of *Terminalia chebula.*	Dr. Archana Sharma	-
11.	Quality plant production in root trainers of *Tectona grandis.*	Dr. Archana Sharma	-

4. 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 2023-24

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)	-	80,000,000	80,000,000	83,529,772
Deposit Works (Sponsored projects)	66,225,128	39,007,973	105,233,101	37,756,689
Total Rs.	**66,225,128**	**119,007,973**	**185,233,101**	**121,286,461**

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 2023-24 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 (1.4.23 to 31.3.24) Rs.
On-Going Projects						
1	Maintenance of monitoring and evaluation facilities and data base of predators prey in Madhya Pradesh" **WL/RA/32**	PCCF, Wildlife, M.P, Bhopal (Internal Project - Regular Activties)	6,820,664	-	6,820,664	-
2	मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल की सफलता एवं असफलता के कारकों की पहचान। **FD/SE/P/E/23-24/09**	APCCF R&E Lokvaniki M.P Bhopal	500,000	3,396,000	3,896,000	-
3	Genetic diversity assessment using molecular markers for elite indentification of existing candidate plus trees of Teak (Tectona grandis) Madhya pradesh. **GEN/P/E/21-22/11**	APCCF R&E Lokvaniki M.P Bhopal	2,760,000	-	2,760,000	827,276
4	Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important tree species viz.Anogeissus latifolia & Commiphora wightii. **SD/P/E/19-20/04**	APCCF R&E Lokvaniki M.P Bhopal	1,362,509		1,362,509	687,673
5	Selection of species, root trainer sizes and potting mixes to be adopted by the Forest Department Nurseries of Madhya Pradesh for the ten selected tree species. **SD/P/E/21-22/04**	APCCF R&E Lokvaniki M.P Bhopal	897,727		897,727	411,249

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 (1.4.23 to 31.3.24) Rs.
6	Multilocational cum provenance trials of important forestry and bamboo species in different forest divisions of Madhya Pradesh. **FD/BT/P/E/22-23/07**	APCCF R&E Lokvaniki M.P Bhopal	591,988	1,799,000	2,390,988	300,631
7	विभिन्न परियोजनाओं अंतर्गत किये गये वृक्षारोपण का अनुश्रवण एवं मूल्यांकन। **M&E/P/E/22-23/01**	-	1,687,953	6,275,000	4,587,047	4,091,930
8	Study project on wild elephant habitat use and mitigation measures to minimize man-elephant conflict: With special reerenc to Sanjay-Bandhavgarh habitat linkage of central highlands Landscap. **WL/WM/P/E/22-23/06**	PCCF (CAMPA) Bhopal	4,996,243	-	4,996,243	1,568,807
9	Strengthining of Market Analysis centers for technical support in Marketing of Minor Forest Produce in Madhya Pradesh. **FD/FU/P/E/23-24/06**	म.प्र. लघु वनोपज (व्यापार एवं विकास) सहकारी संघ मर्यादित भोपाल	-	500,000	500,000	51,055
10	"Collection and Ex-situ conservation of medicinal and aromatic plants in Gene-bank of SFRI, Jabalpur and their management". **FD/CON/P/E/23-24/08**	Madhya Pradesh State Biodiversity Board	-	1,000,000	1,000,000	232,690
11	"Conservation of Boabab Tree (Adensonia digitata) through development and extension of its nursery, plantation and conservaton techniques in Dhar district of Madhya Pradesh". **FD/CON/P/E/23-24/12**	Madhya Pradesh State Biodiversity Board	-	800,000	800,000	120,000
12	बायोडायवर्सिटी मॉनीटरिंग प्रोटोकॉल'' के संबंध में 02 दिवसीय प्रशिक्षण कार्यशाला के आयोजन हेतु **FD/CON/P/E/23-24/11**	Madhya Pradesh State Biodiversity Board	-	600,000	600,000	163,170
13	म.प्र. जल निगम मर्यादित द्वारा क्रियान्वित बैढन–2, ग्रामीण समूह जल प्रदाय योजना के अंतर्गत पाईप लाईन बिछाने की अनुमति के संबंध में प्रकरण क्र FP/MP/WATERr/6646/2022". **WD/HED/P/E/23-24/05**	कार्यालय महाप्रबंधक म.प्र. जल निगम मर्यादित परियोजना क्रियान्वयन ईकाई, सिंगरौली	-	6,909,000	6,909,000	3,019,324
14	Ecology of Indian Wolf (Canis lumpus pallipes) and its conservation implication in Nauradehi Wildlife Division Madhya Pradesh **WD/AED/P/E/23-24/01**	Madhya Pradesh Tiger Foundation Society	-	1,834,000	1,834,000	825,250
15	Network project on conservation of Lac insect genetic resource has tentatvely been shoduled on **SEM/P/E/14-15-05**	IINRG Ranchi (ICAR)	224,707	1,024,000	1,248,707	1,248,346
16	Hand on Exercise on lac cultivation in Bichhiya village of Umaria Forest Division of M.P. **WD/AED/P/E/23-24/07**	संचालक जिला लघुवनोपज सहकारी यूनियन मर्यादित उमरिया म.प्र.	-	195,500	195,500	38,001

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 (1.4.23 to 31.3.24) Rs.
17	5 Day's exposure visit by plants Cultivatiors/officials of SMPB. Odisha. **FD/CON/P/E/23-24/10**	State Medicinal Plants Board, Odisha	-	371,794	371,794	92,879
18	Preparation of quality planting material of RET and other important species. **BD/P/I/21-22/07**	State Forest Research Institute Jabalpur (Internal Project - Regular Activties)	709,668		709,668	179,748
19	Restroration of Botanical Garden of S.F.R.I. Jabalpur **FC/P/I/23-24/03**	State Forest Research Institute Jabalpur (Internal Project - Regular Activties)	-	800,000	800,000	15,778
20	Periodic observations in preservation plots established in different forest types of Madhya Pradesh	State Forest Research Institute Jabalpur (Internal Project - Regular Activties)	-	370,000	370,000	-
	Completed Projects					
1	देवास जिले में लोक वानिकी प्रबंध योजना कियान्वन का अनुश्रवण एवं मूल्यांकन''। **AF/P/E/19-20/07**	APCCF R&E Lokvaniki M.P Bhopal	221,230	-	221,230	7,933
2	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 Lokvaniki M.P Bhopal	101,523	-	101,523	88,333
3	रोपणी में रूट ट्रेनर में पौध तैयारी, पौधों में होने वाली बीमारियों का निदान एवं रोपणी प्रबंधन पर प्रशिक्षण एवं प्रदर्शन **SD/P/E/21-22/03**	APCCF R&E Lokvaniki M.P Bhopal	158,302	-	158,302	27,218
4	मध्यप्रदेश में महुआ फूल एंव अचार गुठली के उत्पादन एवं संग्रहण मात्रा का आंकलन। **AF/P/E/18-19/22**	APCCF R&E Lokvaniki M.P Bhopal	1,069,123	-	1,069,123	69,571
5	पश्चिमी मध्य प्रदेश के मालवा का पठार कृषि जलवायु प्रक्षेत्र (क्षेत्रीय वन वृत्त उज्जैन) के अंतर्गत कृषक सम्रद्धि योजना द्वारा कृषि वानिकी के तहत निजी भूमि के रोपण एवं वर्तमान कृषि वानिकी मॉडल का अध्ययन। **AF/P/E/18-19/17**	APCCF R&E Lokvaniki M.P Bhopal	599,933	-	599,933	217,241
6	अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यो की अद्यतन स्थिति का आंकलन **SD/P/E/19-20/09**	APCCF R&E Lokvaniki M.P Bhopal	333,498	-	333,498	59,950

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 (1.4.23 to 31.3.24) Rs.
7	"International Wildlife Conference. **WD/AED/P/E/22-23/08**	APCCF R&E Lokvaniki M.P Bhopal	15,387,925	358,495	15,746,420	15,725,054
8	Sequestered carbon in roadside plantation: an assessment of potential contribution in climate mitigation in jabalpur Smart City ID No. **SEM/P/E/18-19/06**	Enviromental Planning & Coordination Organisation (EPCO), M.P.	54,716		54,716	-
9	Biodversity Assessment of Encroachment removed area of Madan Mahal Hills of Jabalpur and it's surrounding forest area for ecological restoration through plantation and conservation of cleaned area. **BD/P/E/19-20/01**	Nagar Nigam Jabalpur (M.P.) (Smart City)	329,170		329,170	-
10	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)	111,082	-	111,082	-
11	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	7,292,658	-	7,292,658	31,296
12	Capacity building of Frontline Forest staff of Madhya Pradesh for 5th cycle of All india Tiger Estimation Programme 2021-22" **WL/P/E/21-22/02**	PCCF, Wildlife, M.P, Bhopal	141,651	-	141,651	-
13	Tiger presence and their dispersal movements in ratapani-Kheoni landscape of Vhindhyan range." **WL/P/E/17-18/09**	PCCF, Wildlife, M.P, Bhopal	68,327	-	68,327	2,655
14	Monitoring of re- introduced tigers *(Panthera tigris)* In Nauradehi Wildlife Sanctuary" **WL/P/E/18-19/01**	PCCF, Wildlife, M.P, Bhopal	894,947	-	894,947	-
15	Population habitat viability Analysis (PHVA) of Hard ground Barashingha (Cervus duvauceli branderi) for introduction in Bandhavgarh Tiger Reserve M.P." **WD/AE/P/E/21-22/12**	PCCF, Wildlife, M.P, Bhopal	243,811	-	243,811	77,301
16	Study on leopard (Panthera pardus L) presence identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of jabalpur and indore city, Madhya Pradesh" **WL/P/E/21-22/01**	PCCF, Wildlife, M.P, Bhopal	1,810,193	-	1,810,193	370,803
17	AITE: Evalution of wild Animal Populations & Habitat in M.P." **WD/AED/P/E/22-23/02**	PCCF, Wildlife, M.P, Bhopal	1,433,820	-	1,433,820	798,444
18	MII: Data Scrutiny and submission." **WD/AED/P/E/22-23/03**	PCCF, Wildlife, M.P, Bhopal	1,447,952	-	1,447,952	262,907

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 (1.4.23 to 31.3.24) Rs.
19	Strengthining 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	108,532	-	108,532	90,070
20	**"**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	1,354	-	1,354	-
21	Establishment of demonstration plot of bambusa tulda at SFRI, Jabalpur **GEN/P/E/20-21/05**	Director, M.P. State Bamboo Mission Bhopal	119,385	-	119,385	115,874
22	Use of excavated soil for enhancing natural regeneration and plantation activities of Greenko Energy Pvt. Ltd., Rampura forest range, Neemuch district of M.P. **GEN/P/E/21-22/09**	Greenko Energies Private Limited	649,445	-	649,445	154,278
23	Assessment of impact of Doubling of Katni-Singrauli Railline Project on flora, fauna and habitats of Sanjay- Dubri Tiger Reserve (M.P.) **ECO/EIA/P/E/21-22/10**	Ircon International Limited (Govt. of India)	1,970,591	-	1,970,591	365,414
24	Logging and Timber Grading Skill Upgradation Training. **EXT/P/E/22-23/04**	PCCF (Production) M.P. Bhopal	308,411	-	308,411	(122,787)
25	Development of quality planting material of medicinal Plant **BD/P/E/21-22/06**	RCFC Project under Head : Development of QPM	198,005	-	198,005	-
26	रूट ट्रेनर पद्वति से पौधों की तैयारी कर रोपण प्रशिक्षण कार्यक्रम **EXT/P/E/2021-22/13**	Budget Received From Various Divisions for Root Training.	3,259,524	-	3,259,524	-
27	Establishment of "Regional - Cum- Facililtation Center (RCFC) for Central Region at SFRI. (Remark Remaing Amount of Rs. 62,70,420 surrendred to funding agency **BD/P/E/17-18/11**	(National Medicinal Plants Board) New Delhi	218	8,321,034	8,321,252	2,050,832
28	म.प्र. वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्ष 2015–16 (द्वितीय मूल्यांकन) एंव 2016–17 (प्रथम मूल्यांकन) के वर्षों ऋतु में हुए वृक्षारोपण कार्यो का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पेक्ट असिसमेंट किये जाने के संबंध में। **SIL/P/E/20-21/01**	APCCF JFM/FDA M.P. Bhopal	1,454,493	-	1,454,493	-
29	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	1,775,765	-	1,775,765	-

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 (1.4.23 to 31.3.24) Rs.
30	Impact Assessment of proposed **sheopur kalan** & badoda towns as group water supply scheme-Parbati river sub-project under MPUSIP on Aquatic fauna, river hydrology & ecology and its mitigation **WL/P/E/21-22/05**	MP Urban Service Improvement, Bhopal	2,876,790	-	2,876,790	1,959,680
31	मिश्रित प्रजातियों की नर्सरी तकनीक एवं रूट ट्रेनर के संबंध में प्रशिक्षण **FD/P/E/23-24/02**	Madhya Pradesh Rajya Van Vikash Nigam	-	270,000	270,000	66,778
32	Environmental Impack Assessment on Flora, Fauna & Socio Economic Status of Local communities and action to be taken to Mitigate impact of **Kopra medium** project at Nauradehi Wildlife Sanctuary, Sagar .**ECO/EIA/P/E/21-22/08**	Water Resources Department Govt. of Madhya Pradesh	2,567,164	-	2,567,164	463,355
	Total Rs.		**64,165,091**	**34,823,823**	**98,988,914**	**36,891,653**
	Interest from Bank Deposits		417,191	281,929	699,120	-
	GST Received Under Project		1,601,183	-	1,601,183	801,550
	Misce.Project - 3987		41,663	-	41,663	63,486
	Institutional Charge		-	3,902,221	3,902,221	-
	Gross Total		**66,225,128**	**39,007,973**	**105,233,101**	**37,756,689**

INCOME (Revolving Funds for the year 2023-2024)		
S.No.	**HEAD**	**Income (In Lakh)**
1	Gate Entry Fee	950,694
2	Guest House Charges	618,586
3	House Rent & Water Charges	828,125
4	Misc Receipts	69,904
5	Plant Supply	271,625
6	Seed Supply	1,541
7	Sale of tender Form	79,000
8	Training Fee	144,999
9	RTI charges	704
10	Institutional Charge	906,274
11	Laghu Vnopaj Sangh Bhopal	96,830
	Interest Received :-	
12	Interest on FDR	118,546
	Grand Total	**4,086,828**

EXPENDITURE (Revolving Funds) for the year 2023-2024)		
S.No.	**HEAD**	**Expenditure (In lakh)**
1	Daily Wages	1,245,995
2	Repair & Maintenanc	5,330
3	Travelling Expenditure	5,798
4	Electricity	189,839
5	Office Expenses	40,208
6	POL Expenses	15,861
7	Stationary Expenses	5,000

8	GST Expenses	164,407
9	Security Deposite	105,000
	Gross Total	**1,777,438**

Income (Reserve Funds) for the year 2023-24		
	Details	**Income**
1	Soil Testing Charges	124,880
2	RTI Receipt	970
3	POL Charges Recovery	3,000
4	Plant Sale	10,000
5	Institutional Charges	470,625
6	Saving Interest	16,805
	Total Rs.	**626,280**

Expenditure (Reserve Fund) for the year 2023-24		
1	Repair & Maintenanc	-
2	Bank Charges	-
	Total Rs.	**-**

Details of Accounts Financial Status as on 31st March, 2024				
S.No.	**Details**	**Cash in Bank**	**F.D.R.**	**Total**
1	Revolving Fund (Indian Bank)	4,625,425	-	**4,625,425**
2	Grant-In-aid	2,628,746	-	**2,628,746**
3	Deposit Work (Project Funds)	18,133,175	43,300,000	**61,433,175**
4	Sanchit Nidhi	1,461,092	59,499,000	**60,960,092**
5	State Bank of India, Gwarighat (I.W.C.)	21,366	-	**21,366**
6	RCFC Account Remaining Balance in PFMS	6,270,420	-	**6,270,420**
	Total Rs.	**33,140,224**	**102,799,000**	**135,939,224**

5. ESTABLISHMENT

Postings, Transfers, and Retirement (2023-2024)

Postings :

S.No.	Name	Designation	Date of Joining
1.	Shri Pradeep Kumar Vasudeva (IFS)	APCCF & Director	30-06-2023
2.	Smt. Abhishweta Rawat	Forest Ranger	11-09-2023

Transfers :-

S.No.	Name	Designation	Date of Transfer
1.	Shri Amit Kumar Singh	ACF	29-05-2023
2.	Smt. Vandana Thakur	Forest Ranger	18-09-2023

Retirement :

S.No.	Name	Designation	Date of Retirement
1.	Shri Amitabh Agnihotri, IFS	PCCF&Director	30-06-2023
2.	Shri Arvind Haldkar	Forester	30-06-2023
3.	Shri Aniruddhwa Sarkar	SRO	31-08-2023
4.	Smt. Manjula Parihar	Lab Attendant	31-12-2023

Death :

S.No.	Name	Designation	Date of Death
1.	Dr. Shashi Kumar Masih	SRO	13-06-2023

Temporary project staff engaged during the year (April 2023 to March 2024)

S. No	Name	Designation	Project under which appointed	Period	
				From	To
1.	Shubhanjan Ghatak	JRF	Impact assessment of proposed Sheopur Kalan & Baroda towns a group water supply scheme.	Dec. 2021	Oct. 2023
2.	Ashad Hussain	Project Asstt		Dec. 2021	Oct. 2023
3.	Pratap Rao Vagh	Admin. Asstt.		Dec. 2021	Oct. 2023
4.	Ashad Hussain	Project Asstt	म.प्र. जल निगम मर्यादित द्वारा क्रियान्वित बैढन–2, ग्रामीण समूह, चितरंगी ब्लॉक, जिला सिंगरौली, मध्यप्रदेश के जल प्रदाय योजना के अंतर्गत वन्यप्राणियों/बायोडायवर्सिटी पर पड़ने वाले प्रभाव का अध्ययन	Nov. 2023	Jul. 2024
5.	Pratap Rao Vagh	Admin. Asstt.		Nov. 2023	Jul. 2024
6.	Vikas Jain	JRF		Nov. 2023	Jul. 2024
7.	Shalini Jaiswal	JRF		Nov. 2023	Jul. 2024
8.	Ruchira Dakhore	Project Asstt./ Office Asstt.		Nov. 2023	Jul. 2024
9.	Pavitra Ahlawat	Project Asstt.	AITE 2022 Evaluation of wild animals population and habitat in M.P.	Sep. 2022	Jun. 2023
10.	Aleem Khan	JRF		Sep. 2022	Jun. 2023
11.	Divya Paliwal	PA		Oct. 2022	Jun. 2023
12.	Satyadeep Nag	SRF		Nov. 2023	Oct. 2024
13.		JRF		Sep. 2022	Jul. 2023
14.	Amit Jaiswal	Field Asstt.	Study on lepopard (*Panthera oardus L.*) presence, identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of Jabalpur nad Indore, M.P.	Mar. 2023	June 2023
15.	Tanuj Suryan	JRF		Mar. 2023	June 2023
16.	Syed Tanveer Abbas Rizvi	JRF		Mar. 2023	June 2023
17.	Jashandeep Singh	Field Asstt.		Mar. 2023	June 2023

S. No	Name	Designation	Project under which appointed	Period	
				From	To
18.	Jashandeep Singh	Field Asstt.	Ecology of Indian Wolf (*Canis lupus pallipes*) and it's conservation implication in Nauradehi Wildlife Division, Madhya Pradesh	Sep. 2023	Aug. 2024
19.	Bhaskar Panwar			Feb. 2024	Jan. 2025
20.	Noyan Uppadhai	JRF		Feb. 2024	Jan. 2025
21.	Shubham Jain	Comp. Asstt.	Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important species viz. *Anogeissus latifolia & Commiphora wightii*	Apr. 2023	June. 2024
22.	Shailendra Nema	JRF		Apr. 2023	June. 2024
23.	Himanshu Kushwaha	Field Asstt.	Selection of species specific root trainer sizes and potting mixes to be adopted by the Forest Department nurseries of M.P. for ten selected tree species.	Dec. 2023	Mar. 2024
24.	Balram Lodhi	SRF	Network Project on conservation of Lac insect genetic resources.	Jan. 2023	Mar. 2024
25.	Bharat Singh Armo	Field Asstt.		Jan. 2023	Mar. 2024
26.	Rajesh Barman	Field Asstt.	Strengthening of Market Information centres for dissemination of Market Analysis of Minor Forest Produce in different agro-climatic zones of Madhya Pradesh.	Feb. 2024	Jan. 2025
27.	Shailendra Yadav	RA-III	Genetic diversity assessment using molecular markers for elite identification of existing candidate plus trees of Teak (*Tectona grandis*) of Madhya Pradesh	Jun. 2023	Apr. 2024
28.	Suneel Kumar Payasi	JRF	मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल्स की सफलता एवं असफलता के कारकों का विश्लेषण"	Jan. 2024	Dec. 2024
29.	Shubham Tiwari	Project Asstt.		Dec. 2023	Nov. 2024
30.	Kundan Sharma	Field Asstt. Cum- Typist	Collection and *Ex–situ* conservation of medicinal and aromatic plants in Gene-bank of SFRI, Jabalpur and their management.	Nov. 2023	Oct. 2024
31.	Susheel Sonvanshi	Project Asstt.	म.प्र. में महुआ फूल एवं आचार गुठली के उत्पादन संग्रहण मात्रा का आंकलन।	May 2022	June 2023
32.	Ajay Kumar Shah	JRF	पश्चिमी मध्यप्रदेश के मालवा का पठार कृषि जलवायु प्रक्षेत्र (Agro Climate Zone) के लिए उपयुक्त कृषि वानिकी पद्धतियों (Agro Forestry models) का विकास एवं उनका कृषकों की निजी भूमियों पर प्रदर्शन	Sep. 2022	Aug. 2023

S. No	Name	Designation	Project under which appointed	Period	
				From	To
33.	Amardeep Rajak	Comp. Opt.	EIA on flora fauna & socio economic status of local communities and action to be taken to mitigation impact of Kopra Medium project at Nauradehi wildlife sanctuary, Sagar district	Jul. 2022	Nov. 2023
34.	Amardeep Rajak	Comp. Opt.	वन विभाग द्वारा विभिन्न योजनाओं के अंतर्गत किये गये वृक्षारोपण का अनुश्रवण एवं मूल्यांकन।	Dec. 2023	Jan. 2024
35.	Satyam Saxena	Comp. Opt.		Nov. 2022 Dec. 2023	Jun. 2023, Nov. 2024
36.	Sonal Chaturvedi	JRF		Nov. 2022 Dec. 2023	Jun. 2023, Nov. 2024
37.	Priyanka Verma	JRF		Nov. 2022 Dec. 2023	Jun. 2023, Nov. 2024
38.	Anil Kumar Kori	JRF		Nov. 2022 Dec. 2023	Jun. 2023, Nov. 2024
39.	Ajay Lavishkar	JRF		Nov. 2022 Dec. 2023	Jun. 2023, Nov. 2024
40.	Dr. Gunjan Nema	JRF		Nov. 2022 Dec. 2023	Jun. 2023, Jan. 2024
41.	Vikram Singh Dhurvey	JRF		Nov. 2022	Jun. 2023
42.	Imrat Sen	JRF		Nov. 2022	Jun. 2023
43.	Deepa Pradhan	JRF		Dec. 2023	Nov. 2024
44.	Dharmendra Baghele	JRF		Dec. 2023	Jan. 2024
45.	Ramdeen Bhalavi	JRF		Dec. 2023	Nov. 2024
46.	Ajay Kumar Shah	JRF		Jan. 2024	Dec. 2024
47.	Pradeep Kumar Kori	JRF		Dec. 2023	Nov. 2024

Trainee Forest Range officers visited Medicinal Plant Nursery

Trainee Forest Range officers visited Lac Gene Bank

Farmer visited from SMPB Odisha

Trainee forest guards visited at Herbarium

IFS (Probationer) being briefed about Biotechnology

School students in Medicinal Plant Nursery

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