वार्षिक अनुसंधान प्रतिवेदन

ANNUAL RESEARCH REPORT

2024 - 2025

Madhya Pradesh State Forest Research Institute

Jabalpur (M.P.)

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


राज्य वन अनुसंधान संस्थान जबलपुर

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With best compliments from :

Director
MPSFRI, Jabalpur

Madhya Pradesh State Forest Research Institute,
Jabalpur (M.P)
मध्यप्रदेश राज्य वन अनुसंधान संस्थान, जबलपुर (म.प्र.)

FROM THE DIRECTOR'S DESK

Madhya Pradesh Forest Department is facing problems of fire and every year a large area of forest destroyed because of fire. The state of forest report indicates a decrease in forest fire incidents in recent years. In the year 2022-23, 17142 fire incidents and in the year 2023-24, 15878 fire incidents occurred. However, approximately 37% of state's forest cover remains vulnerable to large-scale fires. In this context, the department is trying its best efforts to mitigate the problem, but more efforts and new techniques are required. Therefore, Madhya Pradesh Forest Department has sanctioned fire project to SFRI for study and to suggest overall solutions.

With the aim of conservation of wolves in Madhya Pradesh, the institute is undertaking a project through which measures are being undertaken to study the ecology of wolves and its co-existance with local communities. With this study, proper steps can be taken for the protection of the habitat of wolves in the future.

A Memorandum of Understanding (MoU) has been signed between State Forest Research Institute, Jabalpur and Gyan Ganga Institute of Technology, Science and Pharmacy, Jabalpur on 16/01/2025 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 the future scientists, research officers and professors of both the institutes will be benefitted through the sharing of knowledge and expertise.

08 research projects were completed, 19 research projects are ongoing, 06 newly initiated projects and 11 regular activities were carried out. During this year 08 research papers/articles were published in various journals and 02 technical bulletins and brochures were published for extension of the research findings to the beneficiaries at the grassroots level. The institute also prepared the Annual Research Report 2023-2024 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 greatly appreciated without which our efforts could not have achieved their aim.

The Institute is thankful to Madhya Pradesh Forest Department, Madhya Pradesh Minor Forest Produce Federation, Madhya Pradesh State Biodiversity Board, Madhya Pradesh Jal Nigam Limited Project Singrauli, IINRG ICAR, District Minor Forest Produce Cooperative Federation Limited Umaria, MOIL Limited Balaghat Mine, NCL Singrauli and DBT Ministry of Science and Technology, Government of India for providing budget to the Institute for the project works.

In order to transfer knowledge of forestry research by the institute several awareness cum exposure training for Forest Guards, Forest Rangers, School and College students were organized. Also during study tour IFS probationers visited the institute. The SFRI Participated in Kisan Mela, Vigyan Mela and International Herbal Mela to promote forestry research works and generate awareness in farmers, students and others.

I am grateful to all 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 2024-2025 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. Your valuable suggestions will be useful in taking the research works of the institute to new heights.

(Pradeep Vasudeva)
PCCF & Director

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Acknowledgement
Administration, Scientists, Senior Research Officers, Technical Associates & Project Fellows for guidance, cooperation and providing information

Cover photo

Front cover: Grafted Semal (*Bombax ceiba)* MPSFRI.
(Photo courtesy: Dr. Uday Homkar)

Training Programme on Plantation Techniques
(Photo courtesy: Neetesh Soni)

Back cover

Bandhavgarh Tiger Reserve
(Photo courtesy: Dr. Mayank Makrand Verma)

Glimpses of various training and extension activities in MPSFRI, Jabalpur
Photo courtesy: Suraj Singh Raghuwanshi
Neetesh Soni

1. THE INSTITUTE

1.1 INTRODUCTION

The 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 journal namely 'Van-Dhan Vyapar' is published quarterly Vandhan Vyapar provide informatics preveling market need of NTFPs in mandis and the trade in the communities. 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, 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. Molecular characterization, authentication, and multiplication of elite genotype of *Boswelliaserrata* (traina& planch) - with special reference to Madhya Pradesh.
6. Periodic measurement of sample plots laid out in different forest areas of Madhya Pradesh.
7. Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh.
8. Strengthening of Market Information centres for dissemination of Market Analysis of Minor Forest Produce in different agro-climatic zones of Madhya Pradesh.
9. Standardization of Propagation technology for production of quality seedling of *Boswellia serrata, Buchanania lanzan and Shorea robusta*.
10. Standardization of species specific root trainer sizes and potting mixes of five important wild medicinal tree species.
11. Comparative study of MP Teak Timber and Imported Teak Timber.
12. Developing A New Danger Rating System.
13. Criteria for laying fire lines and their effective width.
14. Assessment of impact of fire on vegetation, invasive plants and forest fauna of Madhya Pradesh.
15. Model Ravine reclamation plan through plantation in Ravine lands of Morena district.
16. A Scientific Study on Ecological Impacts and sustainability of Aerial Firefighting in Forests of South Panna Division.
17. जंगल की आग का मृदा संरचना एवं मृदा नमी पर प्रभाव।
18. ''वन गतिविधियों के मूल्यांकन में संयुक्त वन प्रबंधन समितियों (JFMCs) की भूमिका का विश्लेषण'', विशेष रूप से वन अग्नि प्रबंधन पर ध्यान केंद्रित करते हुए।

19. "मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल्स की सफलता एवं असफलता के कारकों का विश्लेषण"।
20. वन विभाग म.प्र. द्वारा विभिन्न योजनाओं के अंतर्गत वर्ष 2015–16 में किये गये वृक्षारोपणों का अनुश्रवण एवं मूल्यांकन"।
21. ग्रीन इंडिया मिशन, म.प्र. द्वारा विभिन्न वन विकास अभिकरणों में वर्ष 2019, 2020, 2021, 2022, 2023 में कॉम्पोनेन्ट A के विभिन्न सब मिशन अंतर्गत वृक्षारोपण कार्यो एवं कॉम्पोनेन्ट B सपोर्ट एक्टिविटी के कार्यो का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पैक्ट असेसमेंट (पी.आई.ए.)।

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. Estimation of Prey Population, Abundance and Dynamics in Madhya Pradesh
4. Maintenance of Monitoring and Evaluation Facilities and Database of Predators Prey in Madhya Pradesh.
5. 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. Study on tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhya Range.
2. Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important species viz. *Anogeissus latifolia* & *Commiphora wightii.*
3. 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।
4. मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा का आँकलन।
5. अन्तर्राष्ट्रीय जैवविविधता दिवस–2024 के अवसर पर जैवविविधता संरक्षण के प्रति जागरूकता कार्यक्रम।
6. 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।

1.5 TRANSFER OF TECHNOLOGY

1. Training programme on "Logging and Timber grading skill up-gradation"
2. Scientific method of Lac cultivation.
3. Training on concept of Soil Moisture Conservation and its Importance in forestry.
4. सूक्ष्म प्रबंध योजना निर्माण हेतु प्रशिक्षण कार्यक्रम।
5. वृक्षारोपण करने की तकनीक पर दो दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन।
6. Training cum awareness and orientation programmes regarding forestry research for the newly recruited trainee forest rangers and forest guards and students from various universities.
7. Participation in exhibitions and fairs.
8. Hands on experiment on kusmi lac cultivation in Bichhiya village of Umaria Forest Division of Madhya Pradesh

1.6 Environmental Impact Studies

1. Preparation of Phytosociological study of main species in and around upto5km. the Manganese bearing area at Balaghat , M.P.
2. Baseline data generation work of Flora Fauna studies for preparation of EIA EMP Report for the three opencast coal mining projects of M/S Northern Coalfields Limited, Singrauli, 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	0
6	Dy. Ranger	1	4
7	Forester	1	2
8	Forest Guard	15	10
	Total	**26**	**19**
	Scientist		
1	Forest Ecologist	1	0
2	Forest Geneticist (Scientist-E)	1	1
3	Seed Specialist (Scientist-E)	1	1
4	Tree Improvement Specialist	1	0
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

S.No	Forestry Professionals	Sanctioned	Working
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

2024-2025

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	-	2	-	3	5
2	Conservation	2	4	-	2	8
3	Forest Management	-	2	2	2	6
4	Forest Utilization	-	-	1	-	1
5	Productivity	1	2	1	2	6
6	Social Economics	2	2	1	-	5
	Wildlife Department					
1	Animal Ecology	-	4	-	1	5
2	Habitat Ecology	1	-	-	1	2
3	Wildlife Management	1	1	1	-	3
4	Ecotourism and Conservation Education	-	-	-	-	-
	Facilitation Cells					
1	Environmental Impact Assessment (EIA)	2	-	-	-	2
2	Climate Change, Climate Justice, REDD+	-	-	-	-	-
3	Extension,Training & Consultancies	-	-	-	-	-
4	Monitoring & Evaluation	-	2	-	-	2
5	GIS & Remote Sensing	-	-	-	-	-
6	Computer & IT	-	-	-	-	-
7	Library	-	-	-	-	-
8	Documentation	-	-	-	-	-
9	Procurement	-	-	-	-	-
10	Common Research Facility	-	-	-	-	-
	TOTAL	**8**	**19**	**6**	**11**	**44**

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 maker 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.

List of project titles with names of funding agency

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:-

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 leave samples-**The leave samples of old and newly selected candidate plus trees will be collect 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 (65ºC) CTAB DNA extraction buffer. Pre-heated water-bath for two and half hours. The samples will then be subjected for centrifugation at room temperature (27ºC) 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(27ºC). 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(27ºC). To obtain pure DNA RNase (Machery-Nagel) (20mg/ml) treatment will be given to the isolated samples. Allowed for incubation at 37ºC 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 -40ºC (Deep freezer) and then be centrifuged at 13,000 rpm for 15 min at 4^{o}C. 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 4ºC to remove any remaining salts in tubes. Afterwards, the pellet will be allowed to dry at room temperature (27ºC). 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 -40ºC 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 94ºC for 3 min, 40 cycles of 94ºC for 1 min, 50ºC to 58ºC annealing temperature for 30s, 72ºC for 30 second, followed by 72ºC 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-

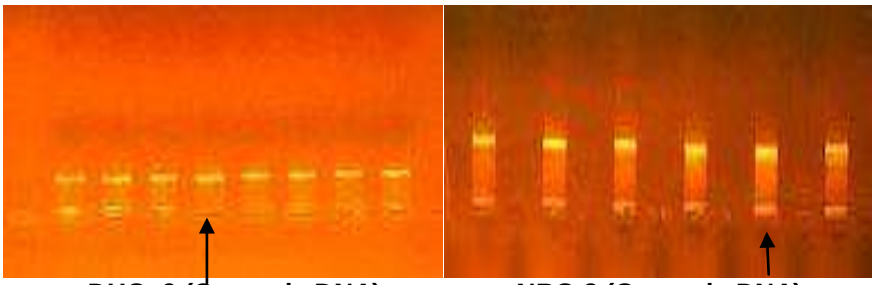
After collection of data the genetic diversity will be assessed among the selected candidate plus trees. After analysis, highly genetically diversified CPTs will be marked as elite group.

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.
- To assess the Genetic diversity within and between the CPTs.
- To identify genetically distinct group of CPTs as elite genotypes.

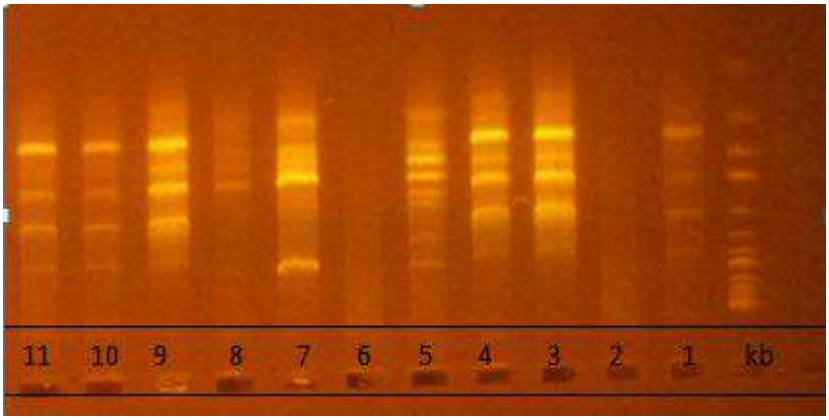
Activities Undertaken –

70 Candidate Plus Trees have been selected 5 old and 65 new CPTs have been identified from Seoni, Chhindwara, Narmadapuram (Bori range), Dewas, Harda, Damoh, Balaghat, Khandwa and Sehore forest divisions. The leaf samples were collected from identified CPTs and stored in deep fridge at -20ºC Temperature. Extraction of DNA from collected leaf sample was performed with standard C-TAB protocol. The Isolated DNA of 70 CPTs were properly preserved in deep fridge at -20ºC Temperature.



DHC- 9 (Genomic DNA) **NBC-2 (Genomic DNA)**

The isolated DNA of 70 CPTs were amplified with the help of PCR Machine and the gel images of amplified DNA have been obtained.



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.

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 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. 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, and number of culms per clump will 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 of Beeja, Tinsa, Achar and Dhaman. Root trainer, root trainer mixture, root trainer stands, green shed net, soil, sand, polythene, soil, FYM. Multilocational trial of proposed species in 16 territorial forest divisions for forestry species including bamboo species.

1. Root trainer plants of *D.latifolia, A.cordifolia* and polypoted plants of *D.stocksii* have been distributed to 11 Forest Divisions namely Damoh, S.Seoni, N.Balaghat, Gwalior, Jhabua, Anupoor, Narmadapuram, Ashok Nagar, Sihore, Ujjain & Jabalpur.
2. Correspondence made for procurement of seeds of Achar, Bija, Tinsa & Dhaman species in the month of Dec. 24 & Jan. 25.
3. Only seeds of Achar received from W.Chhindwara F.Div. and handed over to Conservation Div. for preparation of seedlings. Preparation of seedlings of Achar is under progress
4. Annual Growth Data of *D.latifolia,* and *D.stocksii* distributed in 2023 have been collected from Damoh, South Seoni & N.Balaghat F. Divisions.

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 from the state of

Madhya Pradesh and hence this species becomes under threat 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 provenence.

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 on - Height, Girth, Flowering and fruiting etc. Flowering and fruiting have been observed in Pachmarhi provenance (Tree No. 17 & 26), Lanjhi Balaghat provenance (Tree No. 33 & 41), Patalkot provenance (Tree No. 57, 60, 61, 62, 63, 65 & 70), Betul provenance (Tree No. 91), Lalbarra, Balaghat provenance (Tree No. 101, 103, 104 & 109) and Baihar provenance (Tree No. 112 & 116).

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.

I. 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 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. Flowering and fruiting have been observed in SFRI 1 clone (Tree No. 8 & 12), SFRI 2 clone (Tree No. 15 & 17), SFRI 3 clone (Tree No. 21 & 22) and SFRI 4 clone (Tree No. 28 & 30).

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.

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 be maintained through soil working. As per requirement for the enrichment of bamboosetum time to time the new bamboo species are also 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 and soil working.

Cost of the Project - Rs.0.50 Lakhs

Expected Outcome of Research:-

To aware about the different bamboo species to aware about the different bamboo species to various stakeholders, students, farmers etc.

Other significant achievements.: 70 CPTs of Teak have been identified from 9 Forest Divisions of Madhya Pradesh and the DNA of 70 Teak CPTs have been successfully isolated for genetic diversity analysis

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.

List of project titles with names of funding agency

Completed Projects : 03

1. अन्तर्राष्ट्रीय जैवविविधता दिवस–2024 के अवसर पर जैवविविधता संरक्षण के प्रति जागरूकता कार्यक्रम।

   Funding Agency: मध्य प्रदेश राज्य जैवविविधता बोर्ड, भोपाल

2. वृक्षारोपण करने की तकनीक पर दो दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन।

   Funding Agency: मध्य प्रदेश वन विभाग, कक्ष.–विकास, भोपाल

3. Training programme on “Logging and Timber grading skill up-gradation”

   Funding Agency: प्रधान मुख्य वन संरक्षक, कक्ष –उत्पादन, म.प्र. भोपाल

Ongoing Projects: 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. Molecular characterization, authentication, and multiplication of elite genotype of *Boswellia serrata* (traina & planch) - with special reference to Madhya Pradesh. (SFRI, TERI, New Delhi and JamiyaIslamiya, New Delhi)

   Funding agency :– DBT, New Delhi.

4. Restoration of Botanical Garden of S.F.R.I. Jabalpur.

   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: अन्तरराष्ट्रीय जैवविविधता दिवस–2024 के अवसर पर जैवविविधता संरक्षण के प्रति जागरूकता कार्यक्रम।

Why this Project:-

अन्तरराष्ट्रीय जैवविविधता दिवस (International Day For Biological Diversity – IDB) पृथ्वी पर जीवन को बनाए रखने के लिये जैवविविधता के महत्त्व के बारे में जागरूकता बढ़ाता है। अंतरराष्ट्रीय जैव विविधता दिवस 22 मई को मनाने का फैसला लिया गया। हर साल 22 मई का दिन दुनियाभर में अंतरराष्ट्रीय जैविक विविधता दिवस (International Day for Biological Diversity) के रूप में मनाया जाता है। अन्तर्राष्ट्रीय जैवविविधता दिवस के अवसर पर जैवविविधता संरक्षण के प्रति जागरूकता कार्यक्रम का आयोजन राज्य वन अनुसंधान संस्थान, जबलपुर में दिनांक 22.05.2024 को राज्य जैवविविधता बोर्ड, भोपाल की वित्तिय सहायता प्राप्त कर किया गया।

Methodology:- संपूर्ण कार्यक्रम मुख्य रूप में तीन चरणों में सम्पन्न किया गया।

प्रथम चरण (नेचर वॉक) – नेचर वॉक का आयोजन प्रातः 6 बजे से 7.30 बजे तक रहा। इसमें संस्थान के एवं सिटीजन फॉर नेचर, जबलपुर के सदस्यों ने मिलकर दो दलों का गठन किया गया। प्रत्येक दल में एक नेतृत्वकर्ता रखा गया जो कि वनस्पतियों एवं जीवों की जानकारी रखता था। विषय विशेषज्ञों के नेतृत्व में दोनों दलों ने संस्थान परिसर के अलग–अलग क्षेत्रों में घूम कर उस क्षेत्र की जैवविविधता की पहचान एवं प्रकृति में इनकी भूमिका इत्यादि के बारें में विस्तार से जानकारी अपने अन्य साथियों को प्रदाय की। क्षेत्र भ्रमण के बाद संस्थान के मंत्रणा कक्ष मे एक बैठक आयोजित कर आपस में क्षेत्र की जैवविविधता के बारें मे चर्चा की गयी। कार्यक्रम उपरांत धन्यवाद ज्ञापित कर **प्रथम चरण** (नेचर वॉक) का समापन किया गया। इस कार्यक्रम **(नेचर वॉक)** मे भाग लेने के लिये मण्डला से युवा उद्यमी श्री मनीष कुशवाहा एवं श्री सिध्दार्थ गौतम बाईक से सुबह 6.30 बजे संस्थान परिसर पहुचें।

द्वितीय चरण (चित्र कला प्रतियोगिता) – प्रातः 10 बजे से इस सत्र का शुभारम्भ किया गया। इस प्रतियोगिता को तीन वर्गो में विभाजित किया गया। प्रथम वर्ग में प्राथमिक शाला स्तर के विद्यार्थी, द्वितीय वर्ग में उच्च. माध्यमिक शाला स्तर के विद्यार्थियों को सम्मिलित किया गया तथा तृतीय वर्ग में महाविद्यालय के विद्यार्थियों एवं अनुसंधान अध्येताओं को सम्मिलित किया गया।

तृतीय चरण (वाद–विवाद एवं प्रश्नोत्तरी प्रतियोगिता) –इस चरण में वाद–विवाद प्रतियोगिता का आयोजन किया गया। इस प्रतियोगिता में ज्ञानगंगा इंस्टीट्यूट ऑफ टेक्नोलॉजी, मंगलायतन यूनिवर्सिटी जबलपुर के छात्र–छात्राओं एवं राज्य वन अनुसंधान संस्थान के शोध अध्येता एवं संस्थान परिसर के बच्चों ने बढ़–चढ़ कर सहभागिता लेते हुये अपनी प्रतिभा को दिखाया।

विभिन्न प्रतियोगिताओं में 117 प्रतिभागीयों ने भाग लिया। विजेताओं को पुरुस्कार एवं सभी प्रतिभागीयों को प्रमाणपत्र प्रदाय किये गये।

Outcome of the Project:

- Different activities regarding conservation were organized in International Biodiversity day, 2024

Cost of the project: Rs.0.99 Lakhs-

Views of activities carried out

2. Title of the Project: वृक्षारोपण करने की तकनीक पर दो दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन।

Why this Project:-

वृक्षारोपण, वन विभाग का एक महत्वपूर्ण सतत किया जाने वाला कार्य हैं। वन विभाग के अमले को वन क्षेत्रों एवं वनों के बाहर भी वृक्षारोपण कार्य में अपना योगदान देना होता हैं। वृक्षारोपण करते समय बहुत सी बारीकियों का यदि ध्यान रखा जाये तो उस रोपण की सफलता की संभावना बढ़ जाती हैं। क्षेत्रिय अमले में कई बार नये कर्मचारी भी शामिल होते हैं अतः वन अनुसंधानकर्ताओं एवं वरिष्ठ अधिकारियों के अनुभव को समाहित करते हुये वृक्षारोपण की जानकारी प्रदाय करने के लिये यह प्रशिक्षण परियोजना तैयार कर दो दिवसीय प्रशिक्षण–सह–कार्यशाला दो चरणों 5–6 सितंबर एवं 12–13 सितंबर 2024 को आयोजित की गयी।

Training Methodology:- इस परियोजना के क्रियान्वयन हेतु निम्नानुसार कार्रवाही की गई।

- संस्थान द्वारा प्रकाशित तकनीकी पुस्तिकायें वृक्षारोपण मार्गदशिका एवं लेन्टाना उन्मूलन की सी. आर. बाबू की तकनीक सभी प्रतिभागियों को प्रदाय की गई।

- चयनित माह सितंबर 2024 मे दो बार दो दिवसीय प्रशिक्षण–सह–कार्यशालाओं का आयोजन किया गया। जिसमे प्रत्येक सामान्य वनमण्डल से वन क्षेत्रपाल स्तर के अमले को आमंत्रित किया गया।
- प्रशिक्षण हेतु क्षेत्र के प्रशिक्षणार्थियों का चयन सभी वनमण्डलों से संबंधित वन वृत्त के वरिष्ठ अधिकारी द्वारा किया गया। दो प्रशिक्षण में कुल 200 प्रशिक्षणार्थियों को इसका लाभ प्राप्त हुआ।
- संस्थान द्वारा तैयार विडियों वृक्षारोपण कैसे करे दिखया गया।
- प्रस्तावित विषयों से संबंधित समस्त जानकारी पॉवर पांइट के माध्यम से तैयार कर विषय विशेषज्ञों द्वारा प्रशिक्षणार्थियों को प्रदाय की गयी एवं मदन महल जबलपुर के वन क्षेत्र के वृक्षारोपण में ले जाकर व्यवहारिक प्रशिक्षण भी दिया गया।
- प्रशिक्षण उपरांत प्रशिक्षणार्थियों से फीडबैक फार्म में जानकारी प्राप्त कर संकलित की गयी। सभी प्रतिभागीयों को प्रमाणपत्र एवं ग्रुप फोटोग्राफ प्रदाय किये गये।

Objectives of Training :-

- वन विभाग के क्षेत्रीय अमले को वृक्षारोपण की बारीकियों से अवगत कराना।
- वरिष्ठ अधिकारियों/कर्मचारियों/अनुसंधानकर्ताओं के अनुभव का लाभ प्रदाय करवाना।
- सफल वृक्षारोपण क्षेत्रों का भ्रमण करवा कर क्षेत्रीय अमले का उत्साहवर्धन करना।

Activities Carried out:-

- इस परियोजना के क्रियान्वयन हेतु निम्नानुसार कार्रवाही 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. 6,09,181/-

Outcome of the Project:-

इस दो दिवसीय प्रशिक्षण में कुल 200 प्रशिक्षणार्थियों को इसका लाभ प्राप्त हुआ।

3. Title of the Project: Training programme on "Logging and Timber grading skill upgradation"

Why this Project:-

वर्तमान परिवेश में वनों का महत्व सभी को दृष्टिगोचर हो रहा है। वनों का मानवीय जीवन से सीधा संबंध है। अतः वनों के विनाष को रोकना, उनका संरक्षण एवं प्रबंधन महत्वपूर्ण है।

वनों के विकास के लिये वन वर्धन एवं प्रबंधन अति आवश्यक साधन है। वन वर्धन एक कला एवं विज्ञान है, जिसके द्वारा वनीकरण कार्य किया जाता है। इसी तरह वन प्रबंधन से वनों की वृद्धि एवं जंगली जीव जन्तु के मध्य एक अंतः क्रिया (Interaction) द्वारा समन्वय स्थापित होता है। जिससे पर्यावरण व्यवस्था प्राकृतिक रूप से अनवरत चलती है। चूंकि वानिकी कार्यों का मुख्य उद्देश्य वनों का संरक्षण एवं विकास होता है, इसी क्रम में विरलन व्यवस्था एक महत्वपूर्ण कार्य होता है क्योंकि बिना विरलन/काष्ठ दोहन व्यवस्था द्वारा वन संरक्षण एवं प्रबंधन का कार्य असम्भव है। काष्ठ दोहन के द्वारा प्राप्त उत्पादन को ही बाजार में विक्रय किया जाता है।

वानिकी दृष्टिकोंण से काष्ठ विदोहन एक महत्वपूर्ण प्रक्रिया है। इसके द्वारा न केवल पारिस्थतिकीय तंत्र को उन्नत बनाने में मदद मिलती है बल्कि वन विभाग को राजस्व भी प्राप्त होता है।

इसके अतिरिक्त पुनरूत्पादन को भविष्य की मुख्य क्रॉप में परिवर्तित करने हेतु अनुकूल परिस्थितियां प्राप्त होती हैं जिससे भविष्य के वन बनाने में मदद मिलती है। विगत वर्षों में इमारती लकड़ी के मूल्यों में काफी वृद्धि हुई है और बाजार मांग की तुलना में उत्पादन में कमी होती जा रही है। अब समय आ गया है जब सही वैज्ञानिक तकनीक से दोहन कार्य कर अधिक उत्पादन किया जाए तथा दोहन के दौरान होने वाली छति को कम से कम किया जाए।

काष्ठ विदोहन की प्रक्रिया को विभिन्न चरणों, जैसे विदोहन किये जाने वाले कूप का सीमांकन, चिन्हांकन, विदोहन योजना तैयार करना, कटाई, लगुण, व्यापारिक काष्ठ वर्गीकरण, परिवहन एवं काष्ठागार प्रबंधन इत्यादि में संपादित किया जाता है। प्रक्रिया के अंतर्गत सभी कार्य महत्वपूर्ण होते हैं। अतः इन कार्यों को करने हेतु सक्षम व योग्य कर्मचारियों एवं मजदूर वर्ग की आवश्यकता होती है। इन सक्षम एवं योग्य कर्मचारी की व्यवस्था करना एक महत्वपूर्ण हिस्सा होता है अतः ऐसे कर्मचारियों को समय–समय पर शासन से प्राप्त निर्देशों/अधिनियमों एवं सम्पूर्ण काष्ठ विदोहन प्रक्रिया से अवगत कराने हेतु यह प्रशिक्षण/रिफ्रेशर कोर्स "Logging and Timber Grading Skill Upgradation" बनाया गया था।

कार्यविधि –

प्रशिक्षण कार्यक्रम दो चरणों 10 एवं 11 सितम्बर, 2024 तथा 18 एवं 19 सितम्बर, 2024 को राज्य वन अनुसंधान संस्थान में आयोजित किया गया। दो दिवसीय प्रशिक्षण कार्यक्रम राज्य वन अनुसंधान संस्थान में आयोजित किये गये। इस प्रशिक्षण में निम्नानुसार कार्य सम्पादित किये गये –

- प्रशिक्षण कार्यक्रम हेतु प्रशिक्षण मॉड्यूल तैयार किया गया।
- काष्ठ विदोहन एवं निर्वर्तन हेतु समन्वित विभागीय दिग्दर्शिका की पठन सामग्री एकत्रित कर प्रशिक्षणार्थियों हेतु प्रतियां तैयार की गई।
- मुख्यालय द्वारा निर्धारित उत्पादन मंडलों एवं क्षेत्रीय वन मंडलों से सम्पर्क कर प्रशिक्षणार्थियों की सूची तैयार की गई।
- प्रशिक्षण कार्यक्रम में विषय विशेषज्ञों श्री एस.के.एस. तिवारी, सेवानिवृत्त वन संरक्षक, श्री एन.एस. बघेल, सेवानिवृत्त मंडल प्रबंधक एवं श्री अमित पाण्डेय, वरिष्ठ अनुसंधान अधिकारी राज्य वन अनुसंधान संस्थान, जबलपुर के व्याख्यान द्वारा सैद्धांतिक प्रशिक्षण, वीडियो, सामूहिक चर्चा एवं व्यवहारिक प्रशिक्षण देकर प्रशिक्षण कार्य सम्पन्न किया गया।
- प्रशिक्षण उपरांत सभी प्रशिक्षणार्थियों को प्रमाण पत्र प्रदान किये गये।

दोनों चरणों में उपस्थित वनमण्डलवार प्रशिक्षणार्थियों की संख्या निम्नानुसार है –

प्रथम चरण (10 एवं 11 सितम्बर, 2024)		
क्रं.	वनमण्डल का नाम	प्रशिक्षणार्थियों की संख्या
1	विदिशा सामान्य	3
2	दक्षिण पन्ना सामान्य	3
3	उत्तर पन्ना सामान्य	3
4	देवास सामान्य	3
5	रायसेन उत्पादन	3
6	छिंदवाड़ा उत्पादन	2
7	सिंगरौली सामान्य	3
8	दक्षिण सागर	3
9	दक्षिण शहडोल	4
10	टीकमगढ़	3
11	उमरिया	2
12	नरसिंहपुर वनमंडल	4
13	मण्डला पूर्व	2
14	अशोक नगर	1

द्वितीय चरण (18 एवं 19 सितम्बर, 2024)		
क्रं.	वनमण्डल का नाम	प्रशिक्षणार्थियों की संख्या
1	दक्षिण पन्ना सामान्य	2
2	उत्तर पन्ना सामान्य	3
3	जबलपुर सामान्य	3
4	दक्षिण शहडोल सामान्य	4
5	सिवनी उत्पादन	3
6	हरदा उत्पादन	3
7	खण्डवा उत्पादन	3
8	खरगौन सामान्य	2
9	पूर्व मंडला सामान्य	2
10	अनूपपुर	4
11	उमरिया	10
12	प.मण्डला	2
13	सतना (सामान्य)	3
14	मंडला उत्पादन	2

15	उत्तर शहडोल	5
16	मंडला उत्पादन	3
17	अनूपपुर	5
कुल संख्या		**52**

15	सीधी	3
16	भोपाल	1
17	इंदौर	1
18	नरसिंहपुर	3
19	उत्तर सागर	2
20	ग्वालियर	2
कुल संख्या		**58**

प्रशिक्षण कार्यक्रम की प्रमुख झलकियां

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.

Kali Haldi *(C.caesia*) plot

Kali Haldi (*C.caesia*) plot

Daru haldi (*Barberis aristrata*)

Five replicates of one species

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 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 the air-layering on plant preparation.
- To study the impact of chemical on seed germination.
- Technical bulletin is under publication.

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.

Plants provided to DFO Dhar

Plants preparation in Malwa demo Nursery of Social Forestry, Indore

Visit of members of Biodiversity Board Madhya Pradesh in Nursery


Discussion with fruit sellers


Discussion with field staff and villagers


Discussion with scientis TFRI regarding the subject


Digitata planted in TFRI, Jabalpur

3. Title of the Project:- Molecular characterization, authentication, and multiplication of elite genotype of Boswellia serrata (traina & planch) - with special reference to Madhya Pradesh. (SFRI, TERI, New Delhi and Jamiya Islamiya, New Delhi)

Funding agency: – DBT, New Delhi.

Why this Project:-

Boswellia serrata is an economically important aromatic, gum-resin–yielding, non-timber forest tree species with high pharmaceutical properties such as anti- inflammatory, anti cancerous, cardiotonic, anti-diabetic, arthritis, liver fibrosis and hepatoprotective. With increasing demand for resin, unsustainable harvesting practices, anthropogenic threats, and lack of regeneration have resulted in the rapid decline of populations of the species. *B. serrata* is now reported as a rare species in the Red Data Book of India (Modi and Mathad, 2016). Despite its economic importance, knowledge of the genetic resources of this species is scanty.

Though seed is the only source of propagation of the *B. serrata*, its rate of germination is very low due to short viability and poor pod setting. To meet the growing demand and ensure its sustainable availability, *B. serrata* needs to be conserved. It is absolutely essential to identify authenticate elite/superior genotype using molecular marker technique and develop mass multiplication technique for conservation, sustainable utilization of *B. serrata*.

Research Methodology

Detailed action plan:

As per the objectives of the project SFRI's research activities will be as follows

1. Survey and collection of Boswellia accessions (0-24 months) Survey from different naturally growing areas of the Boswellia will be done following the visit to different forest areas for population assessment. Boswellia accession will be collected from different forest division of Madhya Pradesh. In addition, a few accessions will be collected from other states of India which will be used as outlier. A list of selected descriptors will be prepared for collection of passport data in the field. This will also include phenotypic data, photographs and GPS data of the tree. The fresh leave samples, seed and bark extract collected will we sent for molecular and biochemical analysis.
2. Maintenance of rooted cuttings (6-24 months) Cuttings from candidate plus trees will be collected and rooted cuttings will be maintained at the nursery, SFRI, Jabalpur for further use.
3. Methods of vegetative propagation and nursery technique will be developed at State Forest Research Institute, Jabalpur.

The identified diverse germplasm with desirable traits which have immense value and utility in breeding programs will be maintained in nursery.

Study Design & Objectives:-

Objectives/ works	1st year	2nd year	3rd year
1. Survey and collection of Boswellia accessions (0-24 months) - SFRI	yes	yes	-
2. Maintenance of rooted cuttings (6-24 months)- SFRI	yes	yes	-
3.Identification of elite B. serrata genotypes based on quality specifications of extracted gum as per API standards using HTPLC fingerprinting	yes	yes	-
4. Standardisation of DNA isolation, and AFLP/GBS technique (0-6 months)	yes	-	-
5. Assessment of genetic diversity using AFLP/GBS marker (7-30 months)	yes	yes	yes
6. Standardization of in vitro propagation protocol for elite B. serrate genotype	yes	yes	yes
7. Analysis of genetic fidelity among regenerated plantlets using molecular markers	-	-	yes
8. Development of nursery technique and conservation of core germplasm.- SFRI	-	yes	yes
9. Compilation of data and preparation of final Project Completion Report	-	-	yes

Cost of the Project:- Rs. 11.31 Lakhs

- Samples of leaves were collected from the Jabalpur.
- Samples of Gum were collected from Sheopuri, Khandawa and submitted to TERI for further studies.
- Seeds collected from Jabalpur and used for development of nursery technique.
- Seeds also provided to TERI and JMI for further studies.

Prepared plants are maintained in SFRI Nursery and some plants provided to TERI for further studies

Expected Outcome:-

- Documentation and genetic diversity of Boswellia serrata will be available.
- Establishment of a well characterized and genetically diverse core germplasm that will be conserved as ex situ for future utilization.
- Well characterized germplasm with economically important metabolites will be available. 4. Standardization of in-vitro propagation will not only help in its conservation but also low-cost multiplication and sustainable availability to the herbal industries.
- The technology developed in this project may be patented and published in the journals of international repute.

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

Why this Project:-

Madhya Pradesh is one of the largest state 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: -

- Cleaning of the area is done.
- Trunks of all trees were treated with mixture of copper sulfate and lime for protection.
- New species are collected and will be planted in coming rainy season.

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

Views of Botanical Garden

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

Other achievements:

MoU signed with

- Gyan ganga Institute of Technology, Jabalpur
- Mangalayatan University, Jabalpur
- Home Science College, Jabalpur.
- Grafting of two colours in on plant of Semhal (*Bombax ceiba*)

Bud stage

Developed flower stage

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.'

List of project titles with names of funding agency

Ongoing Projects: 02

1. Training on concept of Soil Moisture Conservation and its Importance in forestry.

Funding Agency - PCCF CAMPA, Madhya Pradesh, Bhopal

2. Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh.
Funding Agency : SFRI, Jabalpur

Newly initiated Projects: 02

1. जंगल की आग का मृदा संरचना एवं मृदा नमी पर प्रभाव।
Funding Agency : PCCF (Protection), Govt. of M.P., Bhopal
2. सूक्ष्म प्रबंध योजना निर्माण हेतु प्रशिक्षण कार्यक्रम।
Funding Agency : JFM, Govt. of M.P., Bhopal

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 Projects

Project Summary:-

1. Title of the project - "Training on concept of Soil Moisture Conservation and its Importance in forestry"

Why this Project:-

- Soil and moisture conservation is an important aspect for improving the forest productivity.
- So, The knowledge regarding soil moisture conservation (SMC) is essential to field foresters.
- SMC practices such as contour trenches, continuous contour trenches, gabion structures etc. is benefit for field foresters.

Research Methodology:-

- Preparation of training manual of the training programme.
- Identification of prospective trainees by DFOs of 63 forest divisions of MP.
- Organization of three days in-house training programme every month for the field foresters from various forest divisions.

- Each training programme will be participated by 30 trainees.
- 08 traning programmes will be organized in a year which will be participated by trainees.
- Classroom lectures involving audio-visual aids will be used for training purpose.
- Field visits will be conducted for demonstration of various soil moisture conservation techniques.
- Feedback will be obtained on the trainees regarding the training programme and for improvisation of further training programmes.

Study Design:-

- 3 day training programme

Objectives of project:-

- Skill development and capacity building of field foresters regarding soil and water conservation techniques.

Activities Undertaken:-

- 08 traning programmes will be organized in a year which will be participated by trainees.

Cost of the project : Rs. 41.40 Lakhs

Expected outcome of the Project:-

- Knowledge up-gradation and skill development of approx. 240 field foresters who will serve as master trainers in the field of soil and moisture conservation techniques.

Deliverable technologies developed in each project for stakehaolders, forest professionals, field foresters and other beneficiaries – Forest professionals & Field foresters.

टीप – प्रशिक्षण कार्यक्रम के आयोजन हेतु प्राप्त राशि के अनुसार दो प्रशिक्षण कार्यक्रम कराये गये है। शेष प्रशिक्षण कार्यक्रम राशि प्राप्त होने के उपरांत कराये जायेंगे।

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

Why this Project:-

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

Research Methodology:-

- Collection of growth data of sample plots.
- Grouping into different site qualities, forest types and 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.

Newly initiated Projects

1. Title of the project:- जंगल की आग का मृदा संरचना एवं मृदा नमी पर प्रभाव।

Why this Project:-

वनों में लगने वाली आग वनस्पति एवं मिट्टी दोनों को ही प्रभावित करती है। वन भूमि पर जंगल की आग का प्रभाव बहुत जटिल है। यह मिट्टी के कार्बनिक पदार्थो, वृहद एवं सूक्ष्म पोषक तत्वों, मिट्टी के भौतिक गुणों जैसे बनावट, रंग पी.एच., बल्क डेंसिटी इत्यादि गुणों को प्रभावित करती है। जंगल की मिट्टी पर आग का प्रभाव विभिन्न कारकों जैसे आग की तीव्रता, ईधन भार एवं मिट्टी की नमी पर निर्भर करता है। वन की आग के अत्यधिक तापमान एवं अधिक अवधि होने के कारण गंभीर परिणाम प्राप्त होते है।

इन सभी कारणों को देखते हुये अग्नि प्रभावित क्षेत्र एवं जहॉ अग्नि नहीं है उस क्षेत्र की मृदा का परीक्षण कर उनके परिणामों से अवगत होने के लिये यह परियोजना तैयार की गयी है।

Research Methodology:-

- इस परियोजना के अंतर्गत अध्ययन हेतु वनमंडल का चयन किया जावेगा।
- चयनित वनमंडल के जिन वन परिक्षेत्रों में आग लगने की घटना घटी हो, अध्ययन हेतु चयनित किया जाकर उन स्थानों से मृदा नमूनों को एकत्रित किया जावेगा।
- इसके साथ ही अग्नि प्रभावित क्षेत्र से लगे वन क्षेत्र जहाँ आग नही लगी, वहाँ की मृदा का नमूना भी एकत्रित किया जायेगा।
- मृदा परीक्षण में मृदा के विभिन्न भौतिक एवं रासायनिक पैरामीटरों जैसेः– मृदा नमी (Moisture), जलधारण क्षमता (WHC), मृदा का टैक्सचर (Texture), मृदा संगठन (Mechanical Analysis), बल्क डेंसिटी (Bulk density), मृदा का पी.एच. (pH), विघुत चालकता (EC), कार्बनिक कार्बन (OC), कार्बनिक पदार्थ (OM), एवं पोषक तत्व जैसे नाइट्रोजन, फास्फोरस एवं पोटेशियम आदि का परीक्षण किया जायेगा एवं परीक्षण के उपरांत प्राप्त परिणाम के आधार पर मृदा के ऊपर वन अग्नि के प्रभाव का अध्ययन कर निष्कर्ष निकाला जावेगा।

Study Design:- इस हेतु चयनित किए गए वनमण्डल पश्चिम मण्डला के लगभग 25% परिक्षेत्र के 10% बीट के स्थलो का Randomly चयन शोध कार्य हेतु किया जाएगा। इसके अंतर्गत चयनित क्षेत्र में जिग जैग (zig zag) पद्धति से प्रति हेक्टेयर क्षेत्र से 5–5 मृदा नमूने अग्नि प्रभावित क्षेत्र से एवं लगे हुए बिना अग्नि प्रभावित क्षेत्र से एकत्रित कर 1–1 मृदा नमूना तैयार किया जायेगा। इस तरह से मृदा नमूनों की लगभग 10% सेम्पलिंग की जायेगी।

Objectives of project:-

- जंगल की आग का मृदा संरचना एवं मृदा नमी पर प्रभाव का अध्ययन करना।

Activities Undertaken:-

- चयनित वनमण्डल में अग्नि प्रभावित क्षेत्र चयन।
- मृदा नमूनों को एकत्र करना।
- मृदा परीक्षण प्रयोगशाला में मृदा की भौतिक एवं रासायनिक पैरामीटरों का विश्लेषण।

Cost of the project : 3.82 लाख

Expected outcome of the Project:- इस परियोजना के माध्यम से वनों में लगने वाली आग से प्रभावित स्थलों की मृदा संरचना एवं मृदा नमी पर प्रभाव का अध्ययन कर वहाँ की मृदा की स्थिति का पता लगाना।

Deliverable technologies developed in each project for stakehaolders, forest professionals, field foresters and other beneficiaries – अध्ययन उपरांत प्राप्त परिणामों के आधार पर भविष्य की रणनीति बनाने हेतु सुझाव प्रेषित किये जायेंगे।

2. Title of the project:- सूक्ष्म प्रबंध योजना निर्माण हेतु प्रशिक्षण कार्यक्रम।

Why this Project:- वन प्रबंधन में स्थानीय समूदायों की भूमिका को अधिक सशक्त बनाने एवं सामंजस्य बनाये रखने के लिए सूक्ष्म प्रबंध योजना तैयार की जाती है। सूक्ष्म प्रबंध योजना निर्माण का कार्य ग्राम वासियों की सहभागिता एवं आपसी सामंजस्य द्वारा वन समिति विकास के लिये किया जाता है।

Research Methodology:- इस परियोजना के क्रियान्वयन हेतु निम्नानुसार कार्रवाई की जावेगी।

- ये प्रशिक्षण कार्यक्रम 63 वनमंडल के क्षेत्रीय वनकर्मियों के लिये आयोजित किया जायेगा जिसमें वनरक्षक से लेकर वनक्षेत्रपाल स्तर के कर्मचारी/अधिकारी सम्मलित होंगे। संस्थान द्वारा सूक्ष्म प्रबंध योजना निर्माण के प्रशिक्षण हेतु एक प्रशिक्षण पुस्तिका तैयार की जावेगी।
- प्रत्येक माह में एक बार तीन दिवसीय प्रशिक्षण–सह–कार्यशाला का आयोजन किया जायेगा। प्रशिक्षण–सह–कार्यशाला संस्थान में आयोजित की जावेगी जिसमें विभिन्न वन मण्डलों के क्षेत्रीय अमले को आमंत्रित किया जावेगा।
- प्रत्येक प्रशिक्षण में 30 प्रशिक्षणार्थी होंगे।
- वर्ष में कुल 10 प्रशिक्षणों का आयोजन किया जायेगा। मध्यप्रदेश के कुल 63 वनमण्डलों में से प्रत्येक वनमण्डल से 5–5 प्रशिक्षणार्थियों को प्रशिक्षित किया जायेगा इस प्रकार कुल 315 प्रशिक्षणार्थी प्रशिक्षित किये जायेंगे। प्रशिक्षण हेतु क्षेत्र के क्षेत्रीय अमले का चयन संबंधित वनमण्डलाधिकारी द्वारा किया जावेगा।
- प्रशिक्षण के दौरान फीड बैक के माध्यम से प्रशिक्षणार्थियों को होने वाली समस्याओं एवं उनके सुझावों को संकलित कर वित्तपोषित संस्था को भेजा जावेगा।

Study Design:- सूक्ष्म प्रबंध योजना निर्माण हेतु तीन दिवसीय प्रशिक्षण कार्यक्रम का आयोजन किया जाएगा। सभी 10 प्रशिक्षण राज्य वन अनुसंधान संस्थान जबलपुर में वन मण्डल स्तर पर चयनित क्षेत्रीय अमले को दिये जायेंगे।

Objectives of project:- वन विभाग के क्षेत्रीय अमले के लिये प्रशिक्षण देकर उनमें सूक्ष्म प्रबंध योजना तैयार करने की क्षमता एवं दक्षता बढ़ाना।

Activities Undertaken:- 10 प्रशिक्षण राज्य वन अनुसंधान संस्थान जबलपुर में वन मण्डल स्तर पर चयनित क्षेत्रीय अमले को दिये जायेंगे एवं प्रतिवेदन तैयार किया जायेगा।

Cost of the project : 51,75,000/–

Expected outcome of the Project:-

- ''सूक्ष्म प्रबंध योजना निर्माण प्रशिक्षण'' परियोजना के द्वारा क्षेत्रीय अमला, ग्रामवासियों की सहभागिता से अपने कार्यक्षेत्र की सूक्ष्म प्रबंध योजना तैयार करने में सक्षम हो सकेगा, जिससे उस क्षेत्र का वन संसाधन एवं ग्रामीण संसाधन संबंधी संपूर्ण विकास हो सके।
- इनमें प्रस्तावित बहुउद्देशीय कार्य–योजनायें, चहुँमखी, ग्राम विकास की अवधारणा को मूर्तरूप देने में सफल रहेगी।

Deliverable technologies developed in each project for stakehaolders, forest professionals, field foresters and other beneficiaries – प्रशिक्षण उपरांत परिणामों के आधार पर सूक्ष्म प्रबंध योजना तैयार किये जाने हेतु सुझाव प्रेषित किये जायेंगे। यह प्रशिक्षण क्षेत्रीय अमले के लिये लाभप्रद रहेगा।

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।

Deliverable technologies developed in each project for stakehaolders, forest professionals, field foresters and other beneficiaries – वन विभाग के क्षेत्रीय अमले, हितग्राहियों के लिए

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.

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

List of project titles with names of funding agency

Newly initated Project : 01

1. Developing A New Danger Rating System

Funding Agency: PCCF (Protection) MP, Bhopal

Project Summary:-

Newly initiated Project:

1. Title of the Project:- Developing A New Danger Rating System .

Why This Project

- Enhanced capacity of Field staff of forest in fire danger assessment.
- Improved preparedness and response strategies to forest fires.

Research Methodology:- Data Collection

- Meteorological Data: Data on temperature, humidity, wind speed, and precipitation from Meteorological stations.
- Vegetation Data: Data collection on types of vegetation prone to fire in selected forest areas.
- To collect vegetation data on fire-prone areas in the selected forest areas focus on identifying the types of vegetation that are particularly susceptible to wildfires, including

Study Design : Nil

Objectives of Research-

- Planning and execution of firefighting operations
- Risk reduction and mitigation
- Develop a localized Forest Fire Danger Rating System.
- Improvement in existing methodologies fire danger assessment.
- Training of staff for utilizing the Forest Fire Danger Rating System
- Division wise map will be developed on forest fire prone area
- To minimize the risk of wildfires and their destructive potential by reducing the amount and continuity of fuel load.

Activities Undertaken:- Nil

Cost of the project:- Rs. 3.43 lakhs

Expected Outcome of Research:-

- A functional and localized FFDRS.
- Enhanced capacity of Field staff of forest in fire danger assessment.
- Improved preparedness and response strategies to forest fires.
- Reduction in the incidence and impact of forest fires in the region.

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.

List of project titles with names of funding agency

Completed Project:- 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

Ongoing projects:- 02

1. Standardization of Propagation technology for production of quality seedling of *Boswellia serrata, Buchanania lanzan and Shorea robusta*.

   Funding Agency : PCCF (R&E) Bhopal
2. Comparative study of MP Teak Timber and Imported Teak Timber

   Funding Agency : PCCF (Production) Bhopal

Newly Initiated Project: 01

1. Standardization of species specific root trainer sizes and potting mixes of five important wild medicinal tree species.

   Funding Agency : PCCF (R&E) Bhopal

Regular Activities:- 02

1. Seed, collection, testing & certification

   Funding Agency - SFRI, Jabalpur

2. Carbon Cell

   Funding Agency - SFRI, Jabalpur

Project Summary :-

Completed project

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.

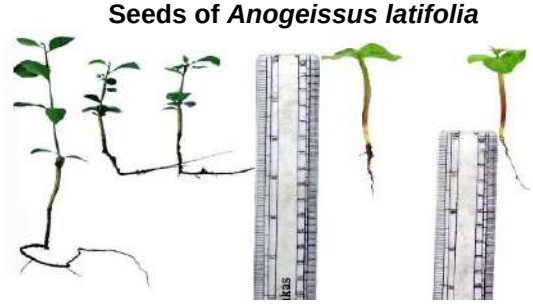
Final findings:

- ***Anogeissus latifolia***
  - Potential pockets were identified for collection of superior germplasm.
  - Best germplasm was evaluated on the basis of morphological and physiological attributes analysis.
  - Seed techniques for enhance the seed longevity and germination potential of targeted species were standardized.
  - Nursery techniques for raising quality planting stock of selected species were standardized.
  - Technical brochures were prepared based on the outcome of research to make it available for practical application in the field by the foresters of the forest department and by the general public.
- ***Commiphora wightii***
  - Best source – Morena Forest Division comes under Seed Zone – I.
  - Best seed collection period – April.
  - Germination percent in the month of April was found to be 52% with treatment T1 (seed soaking in cold water for 24 hrs.) against 20% in control (without treatment).
  - Germination potential in the month of November collected seed was found to be 26% with treatment (T1) against 5% in control (without treatment).
  - Best storage conditions – Seed stored at 4℃ temperature to enhance the longevity upto 7 days against 3 days of control.
  - Seed longevity only 3 days.
  - Best seed sowing container with media – Germination tray with pure Sand.
  - Best potting media – T13 (T0 + 20 gm Rizobium).
  - Vegetative propagation – Highest rooting response was observed 500 ppm GA_3 with 7 mm dia in the month of August – September.

    Final report submitted to the funding agency.

Seeds of *Commiphora wightii*

Seeds of *Anogeissus latifolia*



***C.wightii* : Seeds germination and seedling growth**

Seed sowing of *C. wightii* & *A. latifolia*

Germination of *A. latifolia*


***Anogeissus latifolia*: Seedling growth in different potting media**


***Anogeissus latifolia*: Seedling growth and biomass estimation**


Vegetative propagation, seedling growth and rooting response of *C. wightii*

Ongoing Projects – 02

1. Title of the Project:- Standardization of Propagation technology for production of quality seedling of *Boswellia serrata, Buchanania lanzan and Shorea robusta*.

Why this project

In the present study three species of commercially important, *i.e. Boswellia serrata*, *Buchanania lanzan*, and *Shorea robusta* needs more attention due to its medicinal and commercial value. Natural regeneration and distribution of these species in natural forest is decreased in the past few years, due to over exploitation and poor seed germination.

Research Methodology

For development of packages of seed and nursery techniques of selected species, the systematic and scientific work will be done on following lines:

- Collection of seeds from identified superior sources by hand plucking at peak maturity.
- After collection, seeds will be stored in different containers and open conditions.
- Stored seeds will be tested at the three months intervals from the point of view of seed longevity and germination potential.
- Fresh and stored seeds will be tested with various pretreatments to enhance the germination potential.
- Seed germination capacity will be tested in different conditions and in different sowing media.
- For standardization of nursery technique, size of root trainer and different potting mixture will be tried.
- Seedling growth and survival percentage will be measured in different sizes of root trainers with various potting media.
- 10,000 plants will be prepared under the various activities of the project of each species.
- Produced plants will be distributed to the rural communities and Forest Departments in free of cost under dissemination activities.

Study design: Randomize Block Design (RBD)

Objectives:

- To standardize seed and nursery techniques for raising quality seedlings and for successful plantation of targeted species.

Activities undertaken

- Recruitment of project staff.
- Review of literature were searched.
- Site survey of potential pockets was done for collection of seeds.
- Preparation of experimental plot.
- Preparation of nursery bed.
- Filling of 5000 poly bags.

Cost of project: Rs. 40.00 lakhs

Expected outcome: The impact of the project is of high practical importance for production of quality planting stock of commercially and medicinally important targeted species and sustainable management through using of plants in quality plantation programme.

2. Title of the Project:- Comparative study of MP Teak Timber and Imported Teak Timber.

Why this project

Madhya Pradesh forest department has witnessed a noticeable decline in the demand of teak timber produced from its natural teak forest. This decline was observed due to availability of low cost imported timber in the domestic market. However, it was also observed that this imported timber is comparatively inferior in quality.

Research Methodology

- Literature Review: Review existing research on MP teak timber and imported teak timber.
- The proforma will be prepared to collect the information on previous purchase and sell of local and imported teak from timber supplier (traders) along with their quantity.
- List of timber supplier will be collected from different forest divisions (Indore, Bhopal, Jabalpur and Nagpur).
- A survey will be conducted to collect the information from timber suppliers of Indore, Bhopal, Jabalpur and Nagpur.
- Samples of both timber (MP Teak Wood and Imported) will be collected from the suppliers of Indore, Jabalpur, Bhopal, Nagpur.
- Collected samples will be sent to IWST/IPIRTI/ICFRE for testing their physical, chemical and mechanical properties as available in testing center.
- Above wood quality parameters will be analyzed with standard statistical procedure.
- Consumer preference (builders and furniture merchant) will be interviewed through questioner method and their preferences for both MP Teak and imported teak timber will be analyzed.

- On the above information, strategies will be recommended for increasing the demand of MP teak in timber market.

Study design: Non Random Systematic Sampling

Objectives:

- To compare the physical, chemical and mechanical properties of MP teak and imported teak timber.
- To analyze the price difference between MP teak and Imported teak timber.
- To investigate consumer preference for local and imported teak.

Activities undertaken

- Recruitment of project staff.
- Review of literature.
- Preparation of questionnaire for collecting information regarding choice of consumer in the market.
- Collection of timber supplier list.
- Collection of teak wood samples.
- Survey work.
- Collected samples sent to IWST.

Cost of project: Rs.13.90 lakhs

Expected outcome

- A comprehensive comparison of physical, chemical and mechanical properties of Indian teak wood and imported teak wood.
- An analysis of the price difference between Indian teak wood and imported teak wood.
- Knowledge on consumer preference will be available to prepare the strategies for revitalization of MP teak wood.

Wood sample collection from Jabalpur

Wood sample collection from Bhopal


Discussion with Jabalpur Timber Association


Discussion with Timber Traders of Indore

Newly Initiated Project – 01

1. Title of the Project:- Standardization of species specific root trainer sizes and potting mixes of five important wild medicinal 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 at 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) Seed collection will be done of 05 species viz. *Gmelina arborea* Roxb. (Khamer), *Madhuca longifolia* L. (Mahua), *Melia dubia* (Maha Neem), *Ougeinia oojeinensis* Roxb. (Tinsa), *Sterculia urens* Roxb. (Kullu).
2) Seed testing will be done for viability, moisture and germination percentage.
3) Different seed sowing media will be tried for better germination percentage.
4) Seed sowing will be done in various root trainer cell size with various potting mixture.
5) Seed sowing in nursery bed and germination tray.
6) Experiment will be laid out in the greenhouse of the institute.
7) 38 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.
8) 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.

Study design: Complete Randomize Block Design (CRBD)

Objectives

- 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.

Activities undertaken

- Various activities related to the project will be started in April to June 2025.

Cost of project: Rs. 20.94 lakhs

Expected outcome

- Evaluate potting mixture for raising quality seedlings of 05 targeted species.
- Species wise root trainer size with potting mixture will be standardized.
- Standardized seedling size and period with root trainer cell size and potting mixture for plantation activities.
- Growth performance of seedlings in root trainers with reference to with and without spacing (alternate cell and row).
- Effect of thinning on growth of seedlings.
- Production of quality planting stock in root trainer.

Regular Activities - 02

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.

Achievements:

- 06 teak samples were tested and certified for various standard parameters. These samples received from MPRVVN, Balaghat, Seoni and Jabalpur.
- No demands were received from Forest Department during the year, hence seeds were not collected.

2. Title of Project : 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 :

Samples were collected for estimation of carbon pool of 14 plantations under FDA project.

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

Seed and nursery techniques of *Commiphora wightii* and *Anogessus latifolia* were standardized.

Other Significant achievement :

- 01 project was completed and final report submitted to the funding agency.
- 185 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.
- 06 project proposals were formulated and submitted to the funding agency.
- Project under FDA work of plantation monitoring and evaluation for the year 2015-16 was supervised as an observer.
- Project of plantation monitoring and evaluation under Green India Mission (GIM) for the year 2021-22 and 2022-23 was supervised as an observer.

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.

List of project titles with names of funding agency

Completed Projects:- 02

1. 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

   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

On-going Projects:- 02

1. मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल्स की सफलता एवं असफलता के कारकों का विश्लेषण

   Funding Agency: अपर प्रधान मुख्य वन संरक्षक अनुसंधान, विस्तार एवं लोक वानिकी भोपाल म.प्र।
2. Strengthening of Market Information System (MIS) for Dissemination of Market Analysis of Minor Forest Produce in Different Agro-climatic Zones of Madhya Pradesh.
   Funding Agency:M.P. State Minor Forest Produce (Trade & Dev.) Federation, Bhopal

Newly Initiated Project : 01

1. ''वन गतिविधियों के मूल्यांकन में संयुक्त वन प्रबंधन समितियों (JFMCs) की भूमिका का विश्लेषण'', विशेष रूप से वन अग्नि प्रबंधन पर ध्यान केंद्रित करते हुए।

Funding Agency: प्रधान मुख्य वनसंरक्षक अनुसंधान, संरक्षण, मध्यप्रदेश वन विभाग

Completed 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:-

- चयनित वनमंडलों से 5 प्रतिशत कृषकों का सविचार दैव निदर्शन विधि (Stratified Random Sample) से चयन।
- किसानों के खेतों में जाकर अवलोकन तथा पौधों के मापन द्वारा आंकड़े एकत्र किया गया।
- उज्जैन वन वृत्त के अंतर्गत 07 वनमंडलों के कुल 24 वन परिक्षेत्रों से कुल 784 गाँवों के 2302 कृषकों द्वारा कृषक समृद्धि योजना के तहत् वृक्षारोपण करने की जानकारी प्राप्त हुई थी।
- कुल 117 कृषकों के निजी भूमि में रोपित कुल 475 वृक्षारोपणों का अवलोकन एवं अध्ययन, साथ ही प्रत्येक वन मंडल से 01 प्रदर्शन प्रक्षेत्र को अध्ययन में शामिल किया गया।
- सामाजिक–आर्थिक सर्वेक्षण द्वारा संरचित अनुसूची में आंकड़ों 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 से सम्बंधित आंकड़ों का संकलन।
- समूह रोपण एवं खेत के मेड़ों में किए गए रोपण से कृषि उत्पादन पर पड़ने वाले प्रभाव का अध्ययन करने के लिए प्राथमिक आंकड़ों का संकलन एवं विश्लेषण।

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 आंकलन।
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 (Present Status) :-

अंतिम प्रतिवेदन तैयार कर वित्त प्रदायकर्ता संस्थान को भेज दिया गया है।

Cost of the Project:- Rs.16.40 Lakhs

Outcome of Research:-

निजी भूमि में वृक्षारोपण के सकारात्मक परिणाम :

1. निजी भूमि में रोपण करने से हरियाली का स्तर बढ़ा है।

2. रोपण से मिट्टी के कटाव में कमी।
3. बाँस रोपण नदी, नालों एवं निजी आवास स्थल के समीप।
4. बड़ी जोत के भू–स्वामियों के खेत के मेंड़ में सागौन और खमेर प्रजाति का रोपण पाया गया।
5. छोटे एवं मध्यम कृषकों में फलदार वृक्षों के रोपण को प्राथमिकता दी गयी।
6. छायादार पौधों का रोपण कृषकों ने अपने आवास के समीप कर उनका संरक्षण किया है।
7. छोटे एवं मध्यम कृषकों द्वारा अनुदान की आशा में रोपण किया।
8. मालवा के कृषकों ने अमरूद, नीबू, संतरा, आम, मुनगा आदि फलदार प्रजातियों के रोपण को प्राथमिकतादी।

निजी भूमि में वृक्षारोपण के नकारात्मक परिणाम :

1. मालवा क्षेत्र की उपजाऊ भूमि जो व्यावसायिक खेती के लिए जानी जाती है, इसलिए कृषि भूमि में वृक्षारोपण के प्रति उदाशीनता देखी गयी।
2. कृषकों में बहु फसली खेती की लोकप्रियता।
3. गर्म जलवायु एवं सिंचाई के लिए पानी की कमी।
4. श्रमिकों की अनुपलब्धता।
5. लागत में वृद्धि।
6. वृक्षारोपण से फसलों की उत्पादकता में कमी।
7. आवश्यकतानुसार वृक्षों के विदोहन एवं विपणन में कठिनाई।
8. औपचारिक विपणन बाजार एवं माँग की अनिश्चितता।
9. परिवार में वृद्धि के कारण भूमि का विखंडन एवं विभाजन।
10. बेल, आँवला जैसी प्रजातियों के फलों की माँग और कीमत में अनिश्चितता।

कृषकों के अनुसार उनकी चुनौतियां एवं समस्याएँ :

1. आवश्यकतानुसार मनचाही प्रजाति के पौधो का रोपण के लिए किसानों को वन विभाग के कार्यालयों में चक्कर लगाना पड़ा, जिसके कारण धन एवं समय दोनों का अपव्यय हुआ।
2. वितरित पौधों की गुणवत्ता में कमी व जल जमाव की स्थिति में पौधे नष्ट हो गये।
3. पौधों की कुल रोपण लागत का तय अनुदान न मिलने के कारण कृषकों ने पौधों का संरक्षण बंद कर दिया या हटा दिया।
4. पौधों के रोपण तकनीक का उचित मार्गदर्शन न मिलना।
5. आवारा पशुओं की छुट्टा प्रथा।
6. प्रायः फसलों की पराली जलाने की प्रथा के कारण पौधों की छति।

कृषि वानिकी की स्वीकार्यता के मार्ग में प्रमुख अवरोध

1. वृक्ष प्रजातियों की जानकारी, उनका चयन एवं उनके व्यवस्थापन तकनीक की अनभिज्ञता।
2. कृषि वानिकी से उत्पादन में वृद्धि करने वाले उच्च गुणवत्ता वाले जनन द्रव्यों का अभाव।
3. कृषि वानिकी के द्वारा तैयार उत्पादों के क्रय–विक्रय पद्धतियों की जानकारी का अभाव।
4. कृषि वानिकी के द्वारा तैयार उत्पादों का औपचारिक बाजार न होने के कारण उचित कीमत प्राप्त न होना।
5. कृषि वानिकी पद्धति अपनाकर खेती करने वाले कृषकों का संगठित न होना एवं निश्चित तथा नियमित बाजार न होना।
6. कृषि वानिकी उत्पादों के लिए औपचारिक विपणन नीतियों का अभाव।
7. कृषि वानिकी उत्पादों के विक्रय पर अवरोध एवं उत्पादों के लिए प्रोत्साहनों की कमी।
8. जटिल नियम एवं कानून।
9. कृषि वानिकी उत्पादों के लिए प्रमाणीकरण के मानकों का अभाव।
10. बैंकों द्वारा लोन प्राप्त करने में प्राथमिकता न दिया जाना।

सुझाव :

निजी भूमि में वृक्षारोपण को बढ़ावा देने एवं कृषकों में वृक्षारोपण को लोकप्रिय बनाने के लिए अध्ययन क्षेत्र के विभिन्न प्रगतिशील कृषकों, काष्ठ के व्यापारियों, वन विभाग के वरिष्ठ अधिकारियों एवं कृषि वैज्ञानिकों से चर्चा उपरांत प्राप्त सुझावों को निम्नानुसार दर्शाया गया हैः–

1. उच्च जोत के भू–स्वामियों को चिन्हित कर वृक्षारोपण के प्रति प्रेरित करने की आवश्यकता।

2. छोटे एवं मध्यम कृषकों के खेतों एवं मेंड़ में रोपण हेतु ऐसे फलदार पौधों की व्यवस्था हो जिनकी छाया से फसलों को कम से कम नुकसान हो। तकनीकी सुझाव भी दिया जाये।
3. मृदा संरक्षण हेतु बाँस पौधों का सही अंतराल पर खेत के मेंड़ में रोपित करने की जानकारी दी जाय।
4. खेत से तैयार होने वाले बाँस को क्रय करना सुनिश्चित किया जाय।
5. बाँस के सही सदुपयोग की जानकारी कृषकों तक पहुँचाना।
6. कृषि जलवायु क्षेत्र वार कृषि वानिकी पद्धति आधारित प्रदर्शन प्लॉट स्थापित किया जाना चाहिए जो क्षेत्रीय जलवायु, भूमि की दशाओं के लिए बहुउद्देश्यीय वृक्ष, फसलें, औषधीय पौधे, घास, दलहनी फसलों के सामंजस्य द्वारा नयी पद्धतियों को विकसित कर आदर्श नमूना प्रदर्शित करने का मापदण्ड पूर्ण कर सके। इसके माध्यम से वृक्ष एवं फसलों के एक दूसरे पर पड़ने वाले प्रभावों, जिसमें कीट–पतंगे, बीमारियां, सूक्ष्म जीव आदि शामिल होना चाहिए।
7. अंतर्राष्ट्रीय बाजारों में कृषि वानिकी और वृक्षारोपण कार्यो एवं पर्यावरणीय सेवाओं से तथा किसानों की निजी भूमि में रोपित वृक्षों से ''कार्बन क्रेडिट'' का लाभ स्वमेव प्रदान करने के लिए प्रदेश/जिला स्तर पर सुव्यवस्थित तंत्र स्थापित किए जाने की आवश्यकता है, जिससे कृषक वृक्षारोपण के प्रति आकर्षित हो सके।
8. विभिन्न कृषि जलवायु वार औषधीय प्रजाति के विकसित पौध एवं बीज की उपलब्धता सम्बंधित क्षेत्र में ही सुनिश्चित हो तथा उत्पादन को क्रय करना सुनिश्चित होना चाहिए।
9. किसानों की भूमि में रोपित वृक्ष प्रजातियों के पातन से सम्बंधित नियमों को सरलीकृत किया जाकर कम समय–सीमा में उचित मूल्य दिलाने का स्पष्ट प्रावधान किये जाने चाहिए।
10. प्रत्येक जिले में कृषि वानिकी आधारित वृक्षों से संबंधित उद्योगों की स्थापना एवं बाय–बैक माध्यम से क्रय–विक्रय के लिए औपचारिक बाजार व्यवस्था हो, जिससे कृषक निजी भूमि में वृक्षारोपण के लिए प्रेरित हों।
11. मालवा क्षेत्र की मिट्टी के लिए उपयुक्त और दैनिक जीवन के लिए उपयोगी प्रजाति विकसित कर कृषकों को उपलब्ध कराना जो कृषि उत्पादन को कम से कम नुकसान पहुँचाये।

मेंड़ में आँवला का रोपण, मंदसौर

नींबू के पौधों का खेत में रोपण, रतलाम

सागौन रोपण, मंदसौर

अमरूद के पौधों का रोपण

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 आंकड़े उपलब्ध नही हैं। जंगल के वृक्षों का आंकलन वन मंडलों की कार्य आयोजना से कर उत्पादन का आंकलन 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 आंकलन प्राप्त होने पर उत्पादन मात्रा का आंकलन 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 :-

1. द्वितीयक साहित्य एवं आंकड़ों का संकलन।
2. परियोजना स्टॉफ का चयन कर अध्ययन एवं सर्वेक्षण कार्य के लिए प्रशिक्षण।
3. मध्यप्रदेश राज्य लघुवनोंपज सहकारी संघ, भोपाल एवं जिले के वनमंडल कार्यालय, स्थानीय फुटकर एवं थोक व्यापारियों से साक्षात्कार एवं ऑकड़ों का संकलन।
4. महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण वाले जिलों का प्रारम्भिक सर्वेक्षण कर संग्रहण क्षेत्र वाले गांवों का सामाजिक–आर्थिक सर्वेक्षण के लिए चयन, संरचित अनुसूची द्वारा प्राथमिक संग्राहक एवं किसानों का साक्षात्कार लेकर जानकारी एकत्र की गयी।
5. मध्यप्रदेश के 52 जिलों में मौजूद 385 तहसीलों में कुल 54,903 गाँव विद्यमान है (मध्यप्रदेश शासन डायरी 2019)। संग्रहण वाले जिले के संग्रहण वाली प्रत्येक तहसील से 02 गाँवों का सविचार दैव निदर्शन पद्धति से सर्वेक्षण के लिए (कुल 770 गाँव) चयन। प्रत्येक चयनित गाँव के 5 प्रतिशत (अधिकतम 15 न्यूनतम 5) संग्राहकों का साक्षात्कार।
6. सामाजिक–आर्थिक सर्वेक्षण द्वारा साक्षात्कार लेकर अधिकतम 11,550 और न्यूनतम 3850 संग्राहक परिवारों संरचित अनुसूची में आंकड़ोंका संकलन।
7. अध्ययन दल द्वारा संग्राहकों के घर एवं खेतों में जाकर उनसे चर्चा कर वांछित जानकारी एकत्र की गई। उत्पादन में कमी एवं वृद्धि के उत्तरदायी कारणों, विपणन व्यवस्था, वृक्षों में कमी एवं वृद्धि के कारण, संग्राहकों एवं व्यापारियों में परस्पर संवाद एवं लेन–देन की व्यवस्था, संग्रहण, भण्डारण एवं विपणन में आने वाली समस्या, महुआ फूल एवं अचार गुठली के संग्रहण में वृद्धि से सम्बंधित सुझावों का संकलन किया।
8. सीमित साधनों और समय सीमा में उपलब्ध संसाधनों से एक निश्चित मापदण्ड अनुसार महुआ फूल एवं अचार गुठली के संग्रहण मात्रा का आंकलन किया गया है।
9. उत्पादन का आंकलन करने के लिए सर्वेक्षण द्वारा संग्रहण क्षेत्रों में किसानों की निजी भूमि में विद्यमान वृक्षों में से प्रति वृक्ष से संग्रहण मात्रा के आंकलन का कार्य किया गया है।
10. एकत्र किए गये आँकड़ों के विश्लेषण द्वारा अनुकूल एवं प्रतिकूल दोनों परिस्थितियों की संग्रहण मात्रा को प्रतिबिम्बित किया गया।
11. विभागीय 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 तथा मूल्य संवर्द्धन हेतु आवश्यक उपाय सुझाए गये।

Objectives of Research:-

- मध्यप्रदेश प्रदेश में जिलेवार महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा का आँकलन।
- महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण में आने वाली समस्याओं का अध्ययन तथा उनके निदान के उपाय सुझाना।

Present Status:-

अंतिम प्रतिवेदन तैयार कर वित्त प्रदायकर्ता संस्थान को भेज दिया गया है।

Cost of Project:- Rs.64.63 Lakhs

Outcome of Research:-

- जिलेवार महुआ एवं अचार गुठली की कुल संग्रहण मात्रा का आंकलन।
- महुआ एवं अचार गुठली के उच्च, मध्यम एवं निम्न उत्पादन क्षेत्रों की पहचान।
- महुआ एवं अचार गुठली की संग्रहण मात्रा को बढ़ाने के लिए सुझाव।
- वास्तविक संग्रहण मात्रा के आंकलन द्वारा सम्बंधित उद्योग में निवेश की संभावना।
- मध्यप्रदेश के कुल 9826 ग्रामों में महुआ फूल का संग्रहण किया जाता है।
- महुआ फूल के संग्रहण में कुल 61500 संग्राहक परिवार संलग्न है।
- मध्यप्रदेश में अचार गुठली का संग्रहण 2959 ग्रामों में होता है।
- अचार गुठली के संग्रहण में कुल 11047 परिवारों की संलग्नता।
- महुआ संग्रहण क्षेत्रों (ग्रामों) की संख्यानुसार सर्वाधिक (801) गाँव एवं संग्राहक (3180) छिन्दवाड़ा जिले में एवं सबसे कम गाँवों की संख्या (15) आगर जिले की रही। जबकि सबसे कम संग्राहक (150) ग्वालियर जिले में पाये गये।
- अचार गुठली के सर्वाधिक संग्रहण क्षेत्रों (ग्रामों) एवं संग्राहकों की संख्या (1651) छिंदवाड़ा जिले एवं सबसे कम गांवों की संख्या (6) वाले जिले क्रमशः श्योपुर, शाजापुर तथा भोपाल है। सबसे कम संग्राहकों की संख्या (8) राजगढ़ जिले में पायी गई।
- महुआ फूल संग्रहण वाले कुल ग्रामों में महुआ वृक्षों की कुल संख्या लगभग 3755796 आंकलित की गई है।
- अचार गुठली संग्रहण वाले कुल ग्रामों में अचार वृक्षों की कुल संख्या लगभग 418049 आंकलित की गई है।
- महुआ फूल उच्च संग्रहण में 21 जिलों से कुल 79.49 प्रतिशत संग्रहण।
- मध्यम संग्रहण क्षेत्र में 14 जिलों से कुल 17.53 प्रतिशत महुआ फूलसंग्रहण होता है।
- निम्न संग्रहण में 15 जिलों से कुल संग्रहण मात्रा का 2.98 प्रतिशत महुआ फूल संग्रहीत होता है।
- अचार गुठली के उच्च संग्रहण मात्रा वाले 12 जिले है, जहां से कुल संग्रहण मात्रा का 97.80 प्रतिशत एकत्र किया जाता है।
- मध्यम संग्रहण क्षेत्रों में कुल 13 जिले है, यहां कुल संग्रहण मात्रा का 1.90 प्रतिशत संग्रहण होता है।
- निम्न संग्रहण क्षेत्रों में प्रदेश के 12 जिले सम्मिलित है, यहाँ कुल संग्रहण मात्रा का 0.30 प्रतिशत अचार गुठली का संग्रहण होता है।
- मध्यप्रदेश में महुआ फूल की वार्षिक आंकलित कुल संग्रहण मात्रा 1935377.01 क्विं. एवं आंकलित कुल वार्षिक आय रु. 59538.99 लाख प्राप्त होती है।
- मध्यप्रदेश में अचार गुठली की आंकलित कुल वार्षिक संग्रहण मात्रा 47604.83 क्विं., जिससे कुल वार्षिक आय रु. 6148.47 लाख आंकलित है।
- कुल संग्रहण मात्रा का 91.94 प्रतिशत महुआ फूल एवं 89.44 प्रतिशत अचार गुठली का विक्रय किया जाता है।

महुआ फूल एवं अचार गुठली संग्रहण एवं विपणन में आने वाली समस्याएं तथा सुझाव

समस्याएँ :

- प्राकृतिक आपदाओं का प्रभाव।

- जंगली जानवरों का खतरा।
- रात्रि में जंगली जानवरों का खतरा। गाँव से बेरोजगार युवाओं का शहरी क्षेत्रों में पलायन।
- मूल्य संवर्द्धन एवं उत्पाद आधारित इकाइयों का अभाव।शासकीय सुविधा एवं अनुदान का अभाव।
- औपचारिक बाजार व्यवस्था एवं कीमतों में अनिश्चितता।
- संग्रहण के प्रति नयी पीढ़ी के रुझान में कमी।
- कृषि कार्य की प्राथमिकता के कारण कृषि भूमि में नवीन रोपण से परहेज।
- भण्डारण व्यवस्था का अभाव।

सुझाव :

- महुआ एवं अचार के उन्नत और कम समय में आय प्रदान करने वाले पौधे उपलब्ध कराकर रोपण हेतु प्रोत्साहित किया जाना चाहिए।
- महुआ फूल एवं अचार गुठली का संग्रहण क्षेत्र के समीप भण्डारण व्यवस्था।
- विक्रय दर में स्थायित्व एवं निरंतरता।
- महुआ फूल एवं अचार गुठली के वृक्षों में कमी।
- जंगल में विद्यमान महुआ एवं अचार के पेड़ों का संग्राहकों में समान वितरण।
- महुआ फूल के संग्रहण हेतु उचित साधन एवं नेट आदि व्यवस्था हेतु अनुदान का प्रावधान।
- प्रसंस्करण एवं मूल्य संवर्धन का प्रशिक्षण तथां समुचित उपकरण में अनुदान का प्रावधान।
- उपज के विक्रय हेतु संग्रहण क्षेत्र में सरकारी खरीदी–विक्रय केन्द्रों की स्थापना।
- कीमतों में स्थायित्व एवं औपचारिक बाजार व्यवस्था की आवश्यकता।
- संग्राहकों को मुफ्त बीमा की सुविधा।
- लघु वनोपज महुआ एवं अचार के लिए भी संग्राहकों द्वारा बोनस की मांग।




महुआ फूल के संग्राहको व व्यापारियों का सामाजिक आर्थिक सर्वेक्षण

महुआ व अचार के वृक्षों का मापन

On-going Projects

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

Funding Agency: अपर प्रधान मुख्य वन संरक्षक अनुसंधान, विस्तार एवं लोक वानिकी भोपाल म.प्र.।

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 की 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 कृषि वानिकी मॉडल्स अध्ययन किया गया था। प्रस्तुत परियोजना द्वारा पूर्व के कृषि वानिकी मॉडल्स से खेती में लाभ–हानि का आंकलन करते हुए, लाभप्रद मॉडल्स के बारे में प्रतिवेदन प्रस्तुत किया जाना प्रस्तावित।
- अध्ययन क्षेत्र का चयन कर चयनित जिलों में विद्यमान प्रत्येक कृषि वानिकी मॉडल्स के कृषकों का साक्षात्कार एवं स्थल अवलोकन द्वारा संरचित अनुसूची (structured interview)में ऑकड़ों का संकलन।
- परियोजना से सम्बंधित पूर्व में स्थापित अन्य कृषि वानिकी पद्धति अपनाने वाले कृषकों का पता कर मौके पर उनको भी अध्ययन में सम्मिलित किया जाना प्रस्तावित है।
- लागत–लाभ अनुपात (Cost Benefit Ratio) का ऑकलन।
- प्रदेश में संभावित आँवला, बाँस, मीलिया डूबिया, क्लोनल यूकेलिप्टस, खमेर, सागौन, चंदन एवं महुआ तथा मालवा क्षेत्र में संतरा, नीबू एवं अमरुद के साथ स्थापित कृषि वानिकी मॉडल का अध्ययन और विष्लेषण।
- प्राप्त आंकड़ों का विश्लेषण कर अन्तिम परियोजना प्रतिवेदन तैयार कर वित्त पोषक विभाग को प्रस्तुत किया जायेगा।

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।

Activities Undertaken:

- जबलपुर, नरसिंहपुर, नर्मदापुरम, कटनी, सतना, रीवा, इंदौर, टीकमगढ़, छतरपुर, दमोह, खण्डवा, खरगौन, बुरहानपुर, सिवनी, छिंदवाड़ा, मऊगंज, सीहोर, देवास, रतलाम एवं धार जिलों में सर्वेक्षण का कार्य पूर्ण।
- सर्वेक्षित 21 जिलों से 62 गाँवों के कृषकों द्वारा निजी भूमि में रोपित 67 रोपणों का सर्वेक्षण ऑकड़ों के संकलन का कार्य पूर्ण।
- परियोजनानुसार पूर्व में रोपित 17 जिलों के 99 गाँवों के कृषकों द्वारा निजी भूमि में रोपित 132 रोपणों के सर्वेक्षण कार्य को पूर्ण किया गया।

Prasent status : कार्य जारी है।

Cost of the Project:-Rs. 39.96 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।
- उपयुक्त कृषि वानिकी पद्धति का सुझाव अन्य कृषकों एवं शासन के लिए मार्गदर्शी अभिलेख।
- कृषि जलवायु क्षेत्रवार सफल कृषि वानिकी पद्धतियों का प्रलेख।
- कृषि वानिकी मॉडल्स से उत्पादित कच्चे माल आधारित औद्योगिक इकाइयों की वनों पर निर्भरता में कमी।
- कृषि वानिकी से सम्बंधित धरातलीय स्थिति के आधार पर नीति निर्माण में सहायक।
- भूमि की उर्वरा शक्ति का विकास।
- सामान्य पर्यावरण सुधार।

कृषि वानिकी मॉडल,आँवला के साथ चना एवं गेंहूँ (छिंदवाड़ा)

आम के साथ गेंहूँ की खेती (छिंदवाड़ा)

महोगनी के साथ हल्दी रोपण (सिवनी)

2. Title of the Project: Strengthening of Market Information System (MIS) for Disseminatio of Market Analysis of Minor Forest Produce in Different Agro-climatic Zones of Madhya Pradesh.

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

Why this Project:-

Medicinal and Aromatic Plants (MAPs) and Non Wood Forest Produce (NWFPs) play significant role in the livelihood of rural communities living in villages near fringe areas of forest. They are used in curing their ailments and also as a source of seasonal income. Forests of Madhya Pradesh are quite rich in medicinal plant wealth but often rural population get poor returns from MAPs and NWFPs collected by them largely for two reasons. Firstly, they do not have market information and power to bargain for their produce and secondly, there is a lack of knowledge about acceptable standards for primary processing grading and other value adding interventions like proper storage and packaging.

To address these challenges, initiatives like the Marketing Information Systems (MIS) have played an essential role in providing reliable and timely market data. These systems have empowered rural communities to make informed decisions when marketing their medicinal plants and other Non-Timber Forest Products (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 24 years, this project has operated consistently, generating valuable data and regularly disseminating market information through the quarterly Newsletter 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)**								

Objective 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.

Prasent status :कार्य जारी है।

Cost of the Project:- 10 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.

Plate - 1: Collection of MFPs information from the trader of Katni district

Plate - 2: Collection of MFPs information from the trader of Mohgaon, Balaghat district

Plate - 3: Collection of MFPs information from the trader of Tikamgarh district

Plate - 4: Collection of MFPs information from the trader of Shivpuri district

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

List of project titles with names of funding agency

Ongoing Projects:- 04

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. Estimation of Prey Population, Abundance and Dynamics in Madhya Pradesh

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

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

   Funding agency : DFO, Forest Division Umaria

Regular Activity:- 01

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

   Funding agency : SFRI, Jabalpur

Project Summary

On-going projects

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

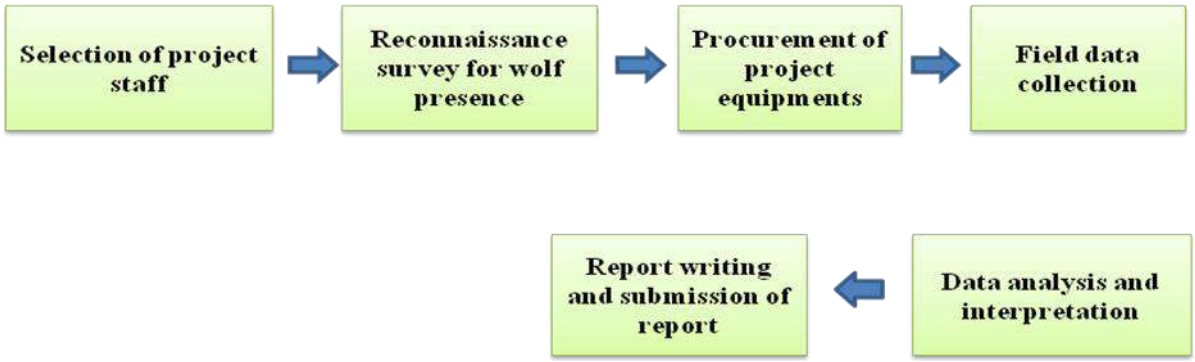
Why this Project:-

- Before re-introduction of tigers in 2018, wolf was considered as the largest predators in Nauradehi Wildlife Division (Veerangana DurgaWati Tiger Reserve, M.P.)
- 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
- Prey availability- by line and vehicle transects to entire Nauradehi Wildlife Division Food habits- by analysis of scats and kills
- Ecological niche separation- with other large carnivores- two species occupancy modelling
- Perception study- by questionnaire survey and psychological analysis of data

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:-

Prey Density Estimation through Line and Vehicle transects

- The project team conducted line and vehicle transects in the entire Nauradehi Forest Range.
- They walked 90 line transects in each beat of the Nauradehi Tiger Reserve.
- Approximately 20 vehicle transects were also completed as part of the survey.
- The outcome of this effort was the successful estimation of prey density, which will inform future project decisions.
- 1st Interim report and UC of 1st installment were submitted to PCCF (Wildlife).

Camera trap analysis

- A total of 469 (444+25) cameras were deployed in the Nauradehi Wildlife Division.
- The combined camera trap data enables us to: analyse temporal patterns (e.g., activity patterns, behavior) and analyse spatial patterns (e.g., habitat use, movement corridors).
- The work on Spatio-temporal analysis is currently ongoing.

Scat data collection for dietary analysis

- A total of 232 scat samples (Fox-24, Hyena 22, Tiger-27, Jackal-47, Wolf-87, Leopard-21, Sloth bear-4) were collected.
- Scat samples were stored in polythene zip locks tagged with GPS locations and were transported to laboratory for further examination.
- The analysis of all these scat samples is currently ongoing for diet analysis.

Perception survey

- Perception Survey conducted in the Nauradehi Wildlife Division in which covered 2170 respondents across 68 villages.

Cost of the project: 45.35 Lakhs

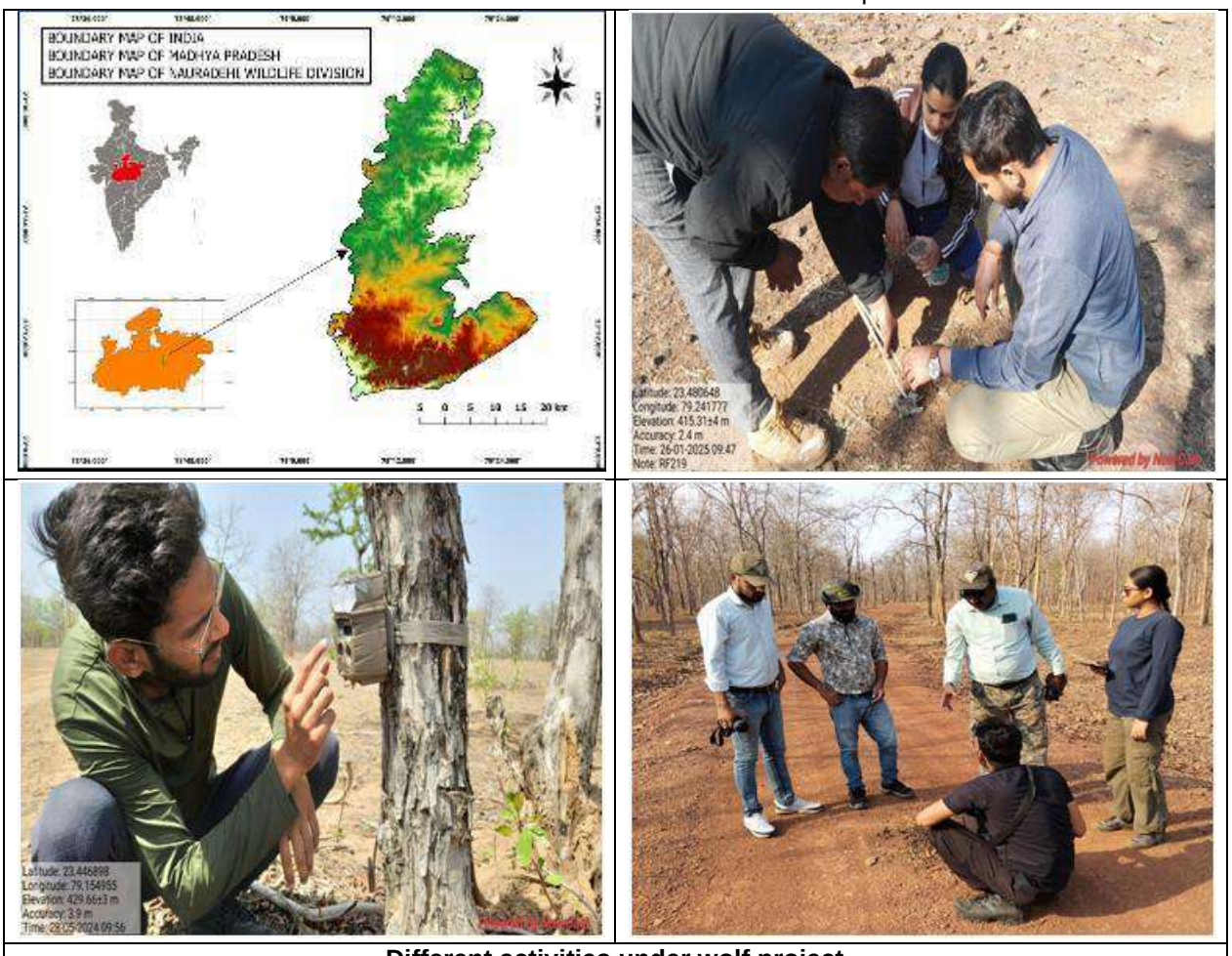
Expected outcome of Research -

- Distribution pattern of wolf in Nauradehi Landscape
- Breeding habitats (den sites)
- Foraging pattern of wolf and their niche separation 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

Outcome of research: Ongoing

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



Different activities under wolf project

2. Title of the project: **Estimation of Prey Population, Abundance and Dynamics in M.P.**

Why this project: The office of Principal Chief Conservator of Forest (Wildlife) has sent a letter to State Forest Research Institute for preparing project proposal on Prey population estimation across various forest habitats in Madhya Pradesh (vide letter No Prabandha/13/8055 dated Bhopal 13/9/23). To comply this, a project proposal has been developed entitled as "Estimation of Prey Population, abundance and dynamics in MP" for submitting it to PCCF (Wildlife) for financial Assistance. This project may help to create data base of prey population in and outside forest areas. It may help to wildlife wing to address issues related to over and low prey base situations.

Research methodology

- Line transect data collected under Phase I shall be received from all 83 forest Divisions of Madhya Pradesh and Phase IV shall be obtained from tiger bearing divisions and Protected Areas.
- In addition to that, prey abundance data shall be also collected from revenue lands of conflict bearing divisions using direct and indirect methods.
- A combination of line transect and occupancy based block count shall be done to estimate population outside PAs.
- All data will be analysed and compared with older data base (2018 and 2022) to assess population dynamics and report writing.

Study design

Objectives of research

- To estimate prey population and abundance from all Forest units of Madhya Pradesh.
- To estimate prey abundance from revenue lands of Madhya Pradesh.
- To assess the prey population dynamics- growth rate, population structure, age sex ratios in and outside the forest area of Madhya Pradesh.
- To develop suitable conservation implication.

Activities undertaken-

Training workshop on Prey Predator Monitoring at Kheoni Wildlife Sanctuary, Madhya Pradesh

- A circle-level training workshop on prey base estimation was held on 17th and 18th October 2024 at Kheoni Sanctuary of Dewas Forest Division, organized by SFRI Jabalpur and Kheoni Sanctuary, as per Letter No. WL/Est./2024/Shahdol circle/F-10-Part III/8370 Bhopal Dated 23/09/2024.
- 60 frontline forest officials from Kheoni Sanctuary, and Dewas Division participated, receiving hands-on training in Carnivore sign survey, line transect,Carnivore & herbivore identification techniques, camera trap installation techniques, inserting data in m-stripes android application and field installation of camera trap.
- The workshop was mentored by Mr. Vikash Mohar (Superintendent, Kheoni Sanctuary) and guided by Dr. Aniruddha Majumdar (Scientist) along with scholars from the Animal Ecology Division.

Training workshop on Prey Predator Monitoring at Panna Tiger Reserve, Madhya Pradesh

- A circle-level training workshop on prey base estimation was held on 14th and 15th December 2024 at Hinauta Training Center of Panna Tiger Reserve, organized by SFRI Jabalpur and Panna Tiger Reserve, as per Letter No. 5696, dated 25/11/2024.
- 100 frontline forest officials from Panna Tiger Reserve and scholars from WII, Dehradun participated, receiving hands-on training in Carnivore sign survey, line transect, inserting data in m-stripes android application and field installation of camera trap.
- The workshop was mentored by Mr. Ravindra Mani Tripathi (Dy. Director SFRI), Mrs. Anjana Suchitra Tirkey (FD, Panna Tiger Reserve), Mr. Mohit Sood (Dy. Director, Panna Tiger Reserve) and guided by Dr. Aniruddha Majumdar (Scientist) along with scholars from the Animal Ecology Division.

Training workshop on Prey Base estimation at Shivpuri Circle, Madhya Pradesh

- A circle-level training workshop on prey base estimation was held on 21st December 2024 at Shivpuri Forestry Training School, organized by SFRI Jabalpur and Ashoknagar Forest Division, as per Letter No. 5696, dated 25/11/2024.

- 92 frontline forest officials from Ashoknagar, Guna, Shivpuri, and Madhav National Park participated, receiving hands-on training in line and vehicle transects, data entry using the M-STrIPES app, and field data collection.
- The workshop was mentored by senior forest officials and guided by Dr. Aniruddha Majumdar (Scientist) along with scholars from the Animal Ecology Division.

Prey density estimation through line and vehicle transect method in Ashoknagar Division

- The project team conducted 23 vehicle transects across the revenue areas of Ashoknagar district, covering Ashoknagar, Chanderi, Isagarh, Mungaoli, and Shadora ranges between 14th January to 23rd January 2025.
- A total of 62 line transects were surveyed three times between January 21 and January 24, 2025, following the All India Tiger Estimation protocol.
- Perception Survey conducted to know community perceptions of Human-Wildlife Interactions in Ashoknagar Division in which covered 49 respondents of Ashoknagar district.
- Data collection was completed in Ashoknagar district and a report was submitted to DFO Ashoknagar and PCCF Wildlife.

Prey density estimation through line and vehicle transect method in Shajapur Division

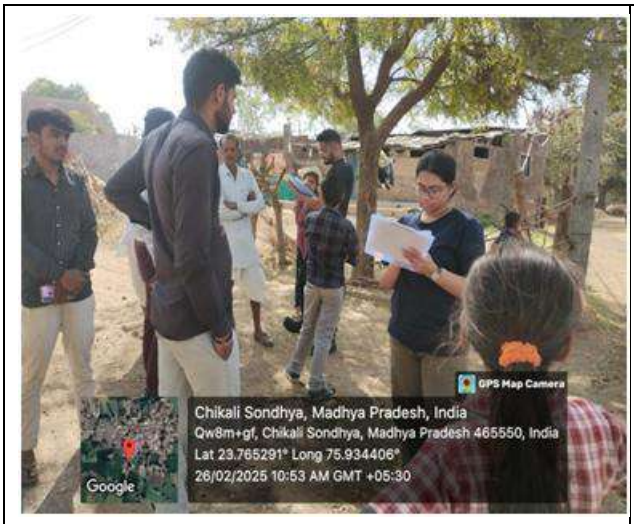
- The project team conducted 26 vehicle transects and 12 line transects across the revenue areas of Shajapur and Agar Malwa districts during February 2025.
- A total of 62 line transects were surveyed three times between January 21 and January 24, 2025, following the All India Tiger Estimation protocol.
- Data collection was completed in Shajapur& Agar Malwa district and a report was submitted to DFO Shajapur and PCCF Wildlife.
- Perception Survey conducted to know community perceptions of Human-Wildlife Interactions in Shajapur Division in which covered 110 respondents of Shajapur& Agar Malwa districts.

Cost of the project:- 45.35 lakhs

Expected outcome of Research:-

i. Quality database of prey shall be generated.
ii. A division wise and entire state wise comprehensive report on prey population can be prepared.
iii. Division wise prey population shall be compared with previous (2018 and 2022) estimates to study their growth rate and dynamics.
iv. Abundance of herbivores outside forest area shall be estimated and probable conflict zones can be identified based on prey

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



Glimpses of field activities under Prey base estimation project

3. 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.

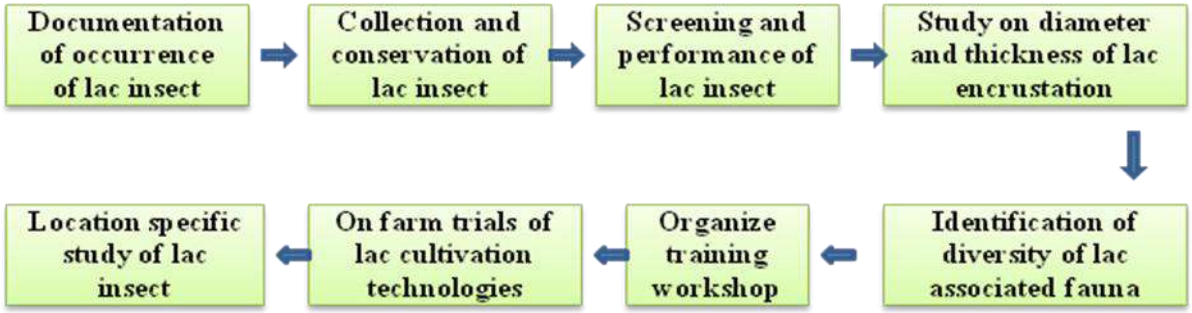
To overcome the situation the project was started to documentation the occurrence of lac insect/host plant, conserving the biodiversity of local lac insect species/races and breed which is decline due to anthropogenic activities and climate change. In this way, lac insect/host plants are needed for in-situ 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 (cm^2), initial mortality (%), density after 21 days of settlement ($/cm^2$), 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 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:-

- Completed survey of lac insect/host plants in 126 blocks of 29 districts of Chhattisgarh state in which lac insect occurrence were identified in 168 sites in 64 blocks of 26 districts of Chhattisgarh on 9 different host plants Viz., on palas, kusum, ber, pipal, rain tree, Galwang, safedsiris, semialata, akashmoni (*Acacia auriculiformis*)
- More than 500 plants of *Flemingia macrophyla* & *Flemingia semialata* and 160 plants/trees of 16 different host plant species are maintained in Regional Field Gene bank.
- Delivered lecture on lac insect conservation and scientific techniques of lac cultivation to 581 B.Sc. & M.Sc. Students, IFS (Probationers), trainee RFOs, Forest Guards and Forest officials of Madhya Pradesh, Uttar Pradesh, Maharashtra, and Odisha.
- On the occasion of "3rd National Lac Insect Day", a workshop cum orientation programme was organized at State Forest Research Institute, Jabalpur on 16/5/2024 in which faculty and post-graduate students of Zoology Department, Government Model Science College were invited to this programme to be aware of lac cultivation and biology of lac insects and importance of lac insect day and beneficiary insect week.
- On the occasion of the 101st Foundation day of ICAR-NISA on 20th September 2024, organized a day-long Rangeeni lac cultivation training workshop in village Sagona of Katni district, in which 55 farmers and samiti members participated in the training.
- A one-day training cum orientation workshop was organized on 18 October 2024 for the members of Eco Development Committee members Kheoni Wildlife Sanctuary, Dewas, to improve their livelihood through Rangeeni lac production. A total of 27 samiti members of Eco Development Committee members and farmers participated in the training.
- Socio-economic status of 22 lac growing farmers of Kanker, Charama, Durgkondal and Bhanupratappur blocks of Kanker district of Chhattisgarh in which average farmers produced 381.36 kg lac and earned Rs 2,43,215.91 per annum from lac collection and income from lac cultivation contributed 29.27% of their total annual income.
- Socio-economic status of 19 lac growing farmers of Mohla blocks of Manpur-Mohla-Ambagarh Chwoki district of Chhattisgarh, in which average farmers cultivated 52.47 kg of lac and earned Rs 20594.74 per annum from lac production. Income from lac contributed only 8.01 % of their total annual income.
- Participated in 1st Mahakoshal Vigyan Mela & Arogya Expo 2024 dated 15th to 18th November 2025 organized by was jointly organized by MPCoST, District Administration, Jabalpur, IIITDM, Jabalpur and Mahakoshal Vigyan Parishad in Jabalpur in which more than 1000 visitors including Mr. Ashish Dubey, Honorable Member of Parliament, Jabalpur, visited our stall and learned about possible employment opportunities through lac cultivation and processing.
- Participated in 10th International Herbal Fair 2024 from 17th to 23rd December, 2024 jointly organized by Madhya Pradesh Govt. and Forest Department in Bhopal, in which more than eight hundred students, organized youth, entrepreneurs, academicians, scientists, ministers and other public representatives, policymakers visited our stall and learned about possible employment opportunities through lac cultivation and processing.
- Participated in Kisan Mela on 18 February 2025 in ICAR-Directorate of Weed Research Jabalpur in which more than 800 visitors, including Hon'ble Loksabha MP Mr. Ashish Dubey, Hon'ble Rajyasabha MP, Smt Sumitra Balmiki & Honble Mayor Jabalpur Shree Jagat Bahadur Singh Annu Jabalpur, visited our stall and learned about possible employment opportunities through lac cultivation and processing.
- Submitted Mid Term Review Report of NPCLIGR for the period 2014-2024 on dated 30 December 2024.
- Made presentation of Annual progress of the project in-front of funding agency on dated 11 February 2025.

Cost of the Project:- Rs. 60.00 lakhs

Expected Outcome of Research (for ongoing and newly initiated project)-:-

- 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

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

Why this Project:-

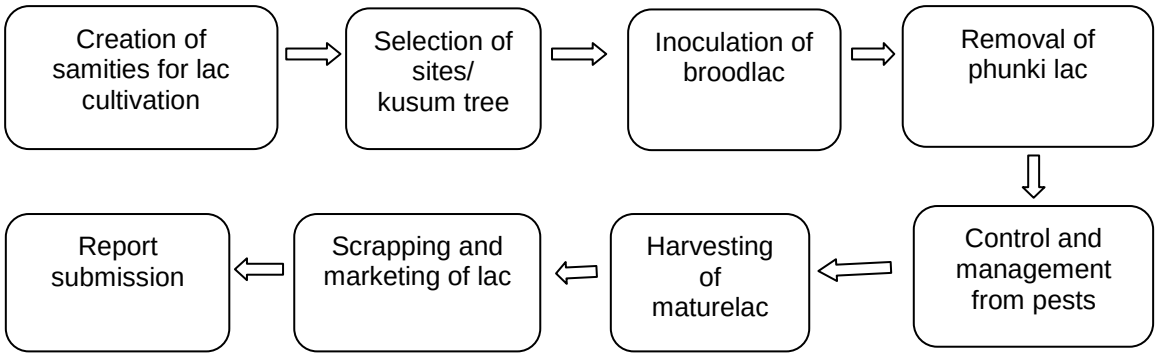
- The forest areas of Nowrozabad range of Umaria forest division of Madhya Pradesh are suitable for kusmi lac cultivation, particularly on Kusum which are quite abundant now. However lack of knowledge on cultivation techniques is found to be the main obstacle. Through lac production in the area, the 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:-

- To conduct hand-holding exercise on lac cultivation by scientific tools and technologies in Bichhiya village of Umaria Forest Division of Madhya Pradesh. SFRI Jabalpur and Umaria Forest Division have jointly adopted village Bichhiya under Umaria district for hand-holding experiment on Kusmi lac cultivation.
- In total, 45 village Forest Committee members were trained and selection & marking of 80 kusum trees was done for kusmi lac cultivation in the cropping season.
- Initially, 80 kg Kusmibroodlac were inoculated on 80 kusum trees (1 kg each kusum) in the month of February 2024.
- Van samiti members were trained in hand-holding exercises of lac cultivation, viz., selection of host, pruning operation, making broodlac bundle, binding lac bundles on suitable shoot & harvesting techniques of mature lac.

To monitor the implementation of hand holding exercise.

- During field observation in the month of 1-3rd May 2024, settlement of lac insects was observed in 60 kusum trees (High settlement-5, Medium-30, low-21 and very low 4).
- In the month of July 2024 van samiti members produced approx 1.8 quintal broodlac from 50 kusum trees which were released for self-inoculation on other branches of host plants.
- During field observation in the month of September 2024 settlement of lac insect was observed in 50 kusum trees (High settlement-5, Medium-23, low- 19 and very low 3).
- Field demonstrations of harvesting techniques were carried out in the month of January 2025 & harvesting of mature lac should be done after crawler emergence.

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*

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.

Other work:

- Submitted Phase IV report 2023: Tiger, co-predator and prey in Satpuda Tiger Reserve (2024)
- Submitted Phase IV report 2023: Tiger, co-predator and prey in Bandhavgarh Tiger Reserve (2024)
- Submitted Phase IV report 2023: Tiger, co-predator and prey in Panna Tiger Reserve (2024)
- Tiger, co-predator and prey in Bandhavgarh Tiger Reserve-tiger identification work done
- Tiger, co-predator and prey Sanjay Dubri Tiger Reserve- tiger identification done
- Participated as Committee Member & submitted Report on Unusual deaths of elephant in Bandhavgarh Tiger Reserve
- Participated as Committee Member & submitted Report of construction of 3rd Railway line in Midghat to Barkheda section in Ratapani Wildlife Sanctuary
- Participated as Committee Member regarding impact of Sant Kabeera Mela on Wildlife and Biodiversity of Bandhavgarh Tiger Reserve on 6th January 2025
- Assisted Kanha Tiger Reserve to put radio collar to re-wild a male tiger at Ghorela Enclosure, Mukki Range on 23/01/2025

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.

List of project titles with names of funding agency

Completed 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

Ongoing project - Nil

Newly Initiated Project – Nil

Regular Activitiy:- 01

1. Maintenance of Monitoring and Evaluation Facilities and Database of Predators Prey in M.P.

Funding Agency **:** Internal (Initially funds received from PCCF (Wildlife) & Chief Wildlife Warden, M.P. Bhopal)

Project Summary

Completed 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 km^2, pipeline distribution area 336.11 km^2 and area of buffer zone 430 km^2. 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:-

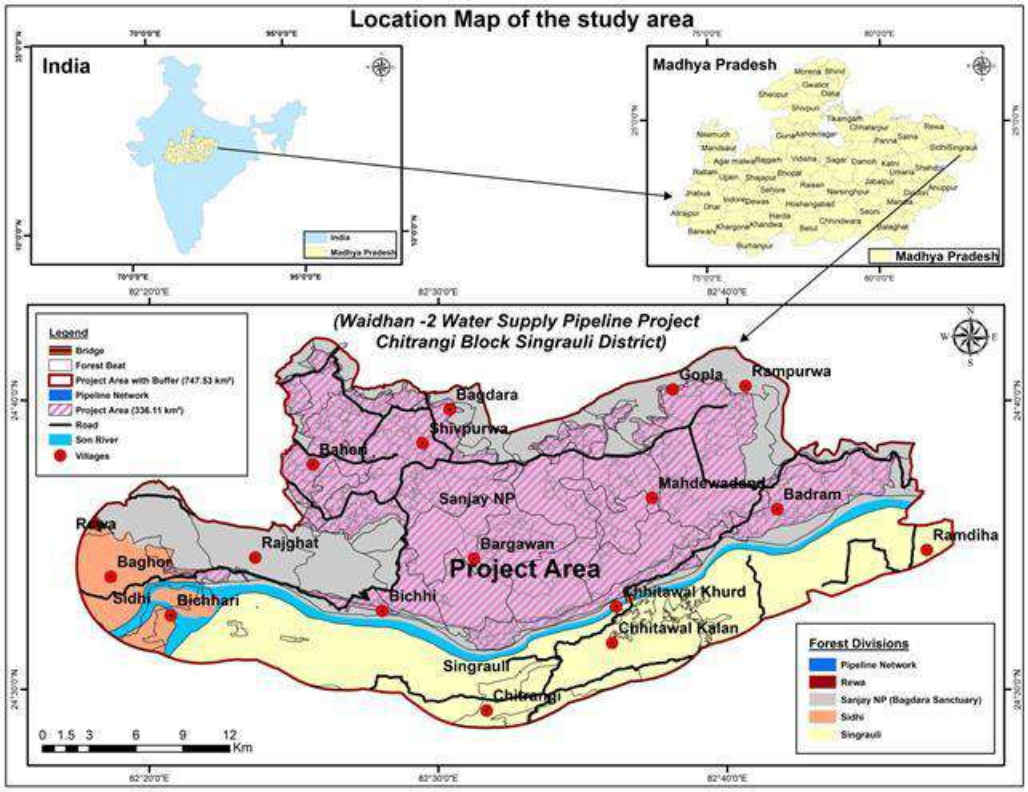
The study was performed by adopting standard methodology according to National Tiger Conservation Authority for field surveys in the study area on following points.

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 km^2 including 10 km buffer area. The pipeline network area is 336.12 km^2 and the buffer area is about 429.94 $km^{2.}$ Field observation will be carried out as per the points mentioned in methodology.



Location of study area of Waidhan-2, Water Supply Pipeline Project

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:-

- Explored the vegetation wildlife encluding Birds, available water sources, physico-chemical status of soil and drinking water problems in the study area.
- Predict the expected impacts of the project -
    - The removal of trees of laying out the pipelines.
    - 89.669 ha area is to be used for the pipeline construction.
    - During operational phase machine and vehicles may cause disturbance to wild animals.
    - There is no direct threat neither to terrestrial nor aquatic animals species be causes adjoining forest area and water bodies provide good shelter to this placed wildlife.
- There are following suggested measured –

- Compensatory afforestation to compensate the loss of forest cover.
- Added the grass plots and fodder plantation.
- Proper management of dominant invasive species i.e. *Lantana camara, Partheniumhysterophorus, Hyptissuaveolens*, *Ageratum conyzoides, Argemone Mexicana*.
- Grassland development for habitat improvement in the study area


Meeting with GM and Team (Jal Nigam)


Site View


Trail and Transect line survey


Sign survey and data collection for Carnivore on trail


Water pipeline construction sites


Social Survey


Nilgai **Blackbuck**

Regular activity:

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.

Interim Finding/Activities:

- 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 2024 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 -
    - Sehore Forest Division, Raisen Forest Division, Obedullahganj Forest Division by preparation of Tiger conservation Plant for proposed Ratapani Tiger Reserve.

Cost of the Project:- Rs. 68.20 Lakhs

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

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**

    Measures regarding wildlife management plan has been suggested for exacting area.

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

List of project titles with names of funding agency

Completed Project :- 01

1. Study on Tiger Presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhyan Range
   Funding agency : PCCF (Wildlife) Madhya Pradesh, Bhopal

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,

Newly initiated Project: 01

1. A scientific study on ecological impacts and sustainability of aerial firefighting in forests of South Panna Division.
   Funding agency : CEO, FDA, South Panna Division

Project Summary

Completed Project

1. Title of the Project:- Study on tiger presence and dispersal movements in Ratapani-Kheoni landscape of Vindhya Range

Why this Project:-

The Ratapani-Kheoni landscape, situated on the peri-urban fringes of Bhopal, represents a critical but understudied interface between expanding human settlements and remnant tiger habitats. Despite frequent tiger sightings, breeding records, and conflict incidents, this region lacked a data-driven conservation framework. This study addresses that gap through an integrated approach combining occupancy modeling, habitat suitability analysis, genetic monitoring, and corridor mapping to assess tiger presence, dispersal, and habitat connectivity outside traditional Protected Areas. Its findings provide compelling evidence for formal conservation action, including the designation of a new Tiger Reserve, and offer a replicable model for managing large carnivores in human-dominated landscapes.

Study methodology and design

- Occupancy analysis:The present study was initiated with the aim of conducting occupancy modeling and ensuring the long-term conservation of tigers in the landscape. We utilized the single-species, single-season model in the PRESENCE 2.13.6 program (Hines, 2006) to analyze tiger occupancy and establish the framework for tiger presence in the landscape. The total study area encompassed approximately 4620.84 sq. km.
- MaxEnt analysis: MaxEnt analysis was conducted using tiger presence data from 234 surveyed beats in the Ratapani-Kheoni landscape, overlaid on 10 km² grid units. Environmental variable layers were standardized in ArcMap and converted to ASCII format, along with a bias layer for background correction. Species data were formatted in CSV with X-Y coordinates. MaxEnt was configured with 25% random test data, 15 replicates (subsample), and 5000 iterations. The model output included habitat suitability maps and statistical summaries stored in the designated path.
- BMLR Analysis: From Dec 2018 to June 2019, 357 tiger presence points were recorded in 3.17 km grids across Ratapani-Kheoni. Binomial Multiple Logistic Regression linked tiger presence to habitat variables after testing multicollinearity and model fit.

$$P = \frac{exp^{(\Sigma BX)}}{1 + exp^{(\Sigma BX)}} \ldots.$$

Habitat suitability across Ratapani-Kheoni was mapped using logistic regression in ArcGIS, classifying areas from most to non-suitable. A beta coefficient table supported the BMLR-based Habitat Suitability Index analysis.

- Corridor designing in ArcGIS 10.3.1 by using Linkage mapper tools:

To prepare the resistance raster for the Linkage Mapper, we employed Gnarly landscape utility tools. These tools were utilized to generate a cumulative raster, incorporating the resistance values of features on the ground. We assigned resistance values to each feature within individual layers. An Excel spreadsheet was created to define the number of classes, provide class descriptions, and most importantly, specify resistance values. These resistance values were determined based on the negative impact of each feature with respect to suitable focal patches.

Resistance habitat calculator: The Resistance and Habitat Calculator tool generated a resistance map using values from column F of the Excel sheet. For focal species analysis, maximum resistance across input layers was calculated to assess landscape integrity.

Linkage Mapper tool: We utilized the Linkage Mapper GIS tools to enhance the analysis of regional wildlife habitat connectivity. This toolset comprises multiple Python scripts, bundled into an ArcGIS 10.1 toolbox, which automate the mapping of wildlife habitat corridors.

- **Population genetics through DNA analysis:**

Sampling: From December 2017 to June 2019, we collected samples in the Ratapani-Kheoni landscape and the Satpura Tiger Reserve in central India. A total of 359 scat samples were gathered from the Ratapani-Kheoni landscape, and 267 scat samples were collected from locations within the Satpura Tiger Reserve, all presumed to be from tigers (Panthera tigristigris).

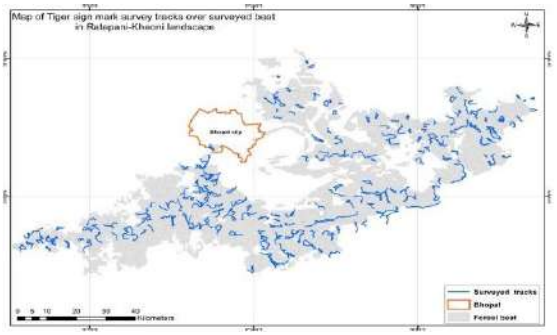
The objective of collecting these scat samples was to estimate the minimum number of tigers present in the forests, assess their relative genetic diversity, and determine whether there is a population genetic structure among these forest fragments in central India. This was achieved by comparing the genetic data from these samples with those from other locations, including the Kanha and Bandhavgarh tiger reserves.

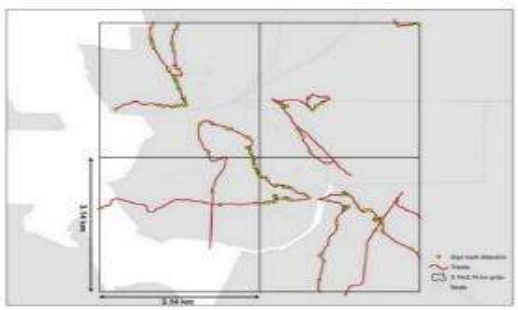
The DNA analysis for population genetics was carried out in the lab of Professor Uma Ramakrishnan at NCBS, Bengaluru, following these steps:

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

Study Design:

- From Dec 2018 to Apr 2019, a tiger sign survey was conducted over 5,312 km² in Ratapani-Kheoni using 8×8 km grids based on tiger home range estimates. Occupancy modelling assessed tiger distribution at 64 km² scale, accounting for imperfect detection. Prey presence was recorded, and spatial correlation was addressed using Hines et al. (2010).
- Field protocol: A tiger sign survey was conducted from Dec 2018 to Apr 2019 in Ratapani-Kheoni, recording tracks and scat along forest trails. Signs of key prey species were also noted. Trail segments were scored as “1” or “0” for detection and aggregated into 1 km spatial replicates. Occupancy was modeled using PRESENCE software, and overall tiger occupancy (Ψ) was estimated using AIC-based model comparison.





Activities Undertaken: Data sorting, Geo-tagging and GIS mapping, Occupancy in Presence, Analysis of habitat suitability modelling including MaxEnt, Binomial multiple logistic regression (BMLR)etc. were performed. Linkage mapper was performed for corridor designing. Habitat suitability prediction was performed of different models viz. Generalized linear model (glm), Random Forest (RF), Support Vector Machine(SVM), MaxEnt(SDM), Boosted Regression Trees (brt) in R language

Objectives of Research

Monitoring of tigers through non-invasive DNA sampling; non-invasive genetic analysis to establish tiger presence, minimum tiger numbers, sex, and their distribution.

Short-term objectives:-

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

Long term objectives:-

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

Cost of the project : Rs. 43.07 lakhs

Outcome of the project :

Objective-Based Research Findings:

1. Spatial Distribution of Tigers

- Recent ecological modeling across the 7,210 km² Ratapani–Kheoni landscape in central India provides a multi-scale understanding of tiger distribution.
- Occupancy Modeling using PRESENCE software indicates tiger presence across 3,762.48 km² of the 5,312 km² surveyed (True Occupancy: 70.83%).
- Habitat Suitability Index (HSI) via BMLR modeling identified 2,691 km² of suitable habitat.
- MaxEnt Species Distribution Modeling predicts high tiger occurrence probability in 1,409.08 km².

2. Minimum Tiger Population

Non-invasive DNA analysis (NGS sequencing) confirmed a minimum of 19 individual tigers in 2018–19, indicating a small but viable population.

3. Priority Conservation Areas (TCPUs)

Using MaxEnt and GIS, five Tiger Conservation and Protection Units (TCPUs) were delineated:

TCPU	Area (km²)	Notable Feature
1	50.99	Confirmed breeding site
2	724.20	Core source population& Interface with urban expansion
3	104.43	Dispersal corridor node
4	301.48	Transitional habitat
5	227.98	Interface with urban expansion

Together, these TCPUs cover the 1,409.08 km² core habitat area and serve as conservation focal points.

4. Corridor Connectivity and Resistance

- Eight key linkages connect TCPUs and stepping stones (n=10).
- Linkage_1 (26.27 km) between TCPU_1 and TCPU_2 has lowest resistance (0.06 CWD), offering the best dispersal corridor.
- Linkage_6 shows the highest resistance (18.97 CWD), reflecting anthropogenic fragmentation.

- Village intersections are notable in Linkages 6–8 (0–3 km buffer), highlighting potential conflict zones.

5. Pinch Points and Stepping Stones

- Ten stepping stones were identified as critical microhabitats supporting tiger dispersal.
- Pinch points in Linkages 6, 7, and 8 are vulnerable to bottlenecks due to village proximity (e.g., Gondra, Silpuri).
- Strategic habitat restoration in these zones is essential to sustain movement pathways.

6. Conflict Mitigation and Urban Interface

- TCPU_2 and TCPU_5 lie adjacent to Bhopal city and are human-wildlife conflict hotspots.
- Urban expansion (projected +381.45 km² in 30 years) threatens habitat continuity.
- A 2 km eco-sensitive buffer zone, greenbelt planning, and 32 km protective fencing around the proposed 1,744.7 ha Tiger Safari can mitigate conflict and promote coexistence.

7. Sustainable Habitat Management and Livelihood Integration

- The safari zone includes 20 forest beats across Bhopal, Sehore, and Obedullaganj divisions.
- These areas are ideal for community-based ecotourism, research, and biodiversity education.
- Proposed development includes a Forest Interpretation Centre and Butterfly Park in moist creek zones of TCPU_5, enhancing both ecological value and local livelihoods.

8. Population Viability and Genetic Connectivity

- Genetic analysis shows the Ratapani tiger population is stable but isolated.
- STRUCTURE analysis reveals limited shared ancestry with Satpura, Kanha, and Bandhavgarh (Fst = 0.20–0.25), emphasizing the need for landscape-level genetic connectivity interventions.

9. Resident vs. Transient Use

- The 1,409.08 km² core area (TCPUs) can sustain resident tigers.
- Linkages and stepping stones serve as transient routes, underscoring the importance of maintaining functional corridors.

10. Geospatial Occupancy Trends

- Naïve occupancy = 0.5904 (49/83 grids).
- Best-fit model: ψ(Cattle + Ruggedness), pt(Nilgai + Water), AIC = 1144.59.

11. Key findings:

- Tigers are using rugged terrains with cattle and Nilgai presence.
- Photo evidence supports tiger predation on Nilgai.
- Tigers aid forest protection in inaccessible terrains.

12. Recommendations

- Enhance protection in TCPU_1 and TCPU_2 as source populations.
- Implement targeted habitat restoration in corridor pinch points.
- Promote community engagement through ecotourism-based livelihoods.
- Monitor urban expansion near TCPU_5 with a dedicated greenbelt and conflict mitigation framework.
- Integrate Ratapani into broader Central Indian Tiger Landscape Conservation Planning through genetic corridor design.

Key Facts of the Report - The principal facts on which project report is based are as follows:

Population genetics:

- The minimal unique tiger population is 19 in 2018-19 based on DNA genotyping (NGS)
- Ratapani individuals form their own cluster (STRUCTURE analysis)
- Ratapani has very little shared ancestry with Satpura, Kanha –Pench and Bandhavgarh populations, Not closely related or connected to any within the landscape
- Analysis of the four focal populations using structure indicates K=4 best explains the genetic clustering of these populations.
- Ratapani individuals form their cluster and do not show this pattern of shared variation.
- Analysis of clustering of these populations and assignment based on STRUCTURE indicate that there is some clustering of Kanha and Satpura populations, and these have the lowest Fst estimate.
- There is some shared ancestry between Satpura, Kanha, and Bandhavgarh, with some individuals sharing high proportions of ancestry based on the STRUCTURE plot.
- In addition, estimates of Fst between Bandhavgarh and Kanha and Satpura are relatively low. This suggests that there may be some movement of individuals among these populations.
- Ratapani has moderate Fst with all of the three other populations in the landscape (0.2-0.25). Based on STRUCTURE analysis, Ratapani has very little shared ancestry with any of the populations.

- Overall it does not appear that Ratapani is more closely related or connected to any of these three populations within the landscape.
- Further landscape-level analysis that assesses the impact of landscape features and distance across the landscape could help in explaining the apparent isolation or low connectivity of Ratapani with other populations within this landscape.

Relative movement pattern in different Geo-spatial scales:

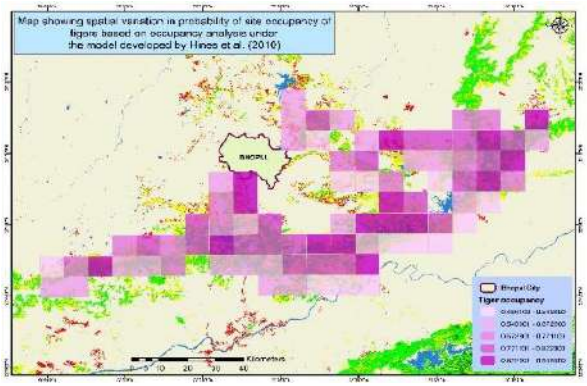
The relative temporal dispersal movements of all individually identified Unique Strip Pattern (IUSP) tigers were derived from opportunistic camera trap data spanning Bhopal, Sehore, Dewas, Obedullaganj, and Raisen divisions. These IUSPs were correlated with camera trap data from all mentioned divisions to integrate the movement patterns of tigers.

In the study area, tiger dispersal movements often overlap across the territorial forests of three divisions: Bhopal, Obedullaganj, and Sehore. The tigress exhibiting remarkably long-range behavior demonstrates unique behavior within the thin and fragmented suitable habitat of the Ratapani landscape.

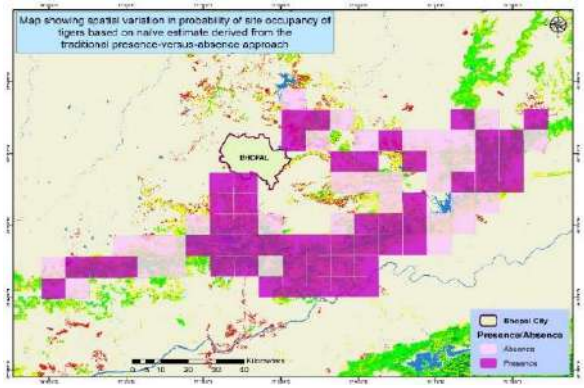
Occupancy estimates:

- The occupancy survey covered a total study area of 5312 sq. km, segmented into 83 grid cells of 64 sq. km each.
- Tiger signs were confirmed in 49 out of the 83 grid cells surveyed, resulting in a naïve occupancy rate of 0.5904.

(A) The estimated tiger-occupied habitat covers approximately 70.83% of the total study area, equating to an area of 3762.48 sq. km (SE=482.34) out of 5312 sq. km.



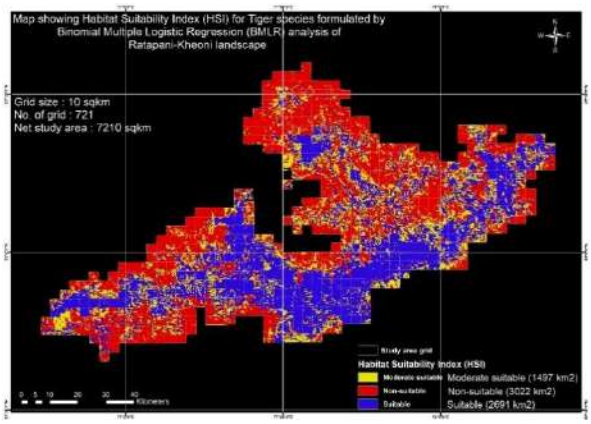
(B) In contrast, the traditional 'presence-versus-absence' approach covers only 3136.20 sq. km, underestimating true occupancy by 59.04%.



The best-fitted model identified through occupancy analysis is the Hines model, where the ψ(Cattle+Ruggedness), θ(.), θ'(.), pt(Nilgai+Water) configuration exhibited the lowest AIC value of 1144.59 among 44 models. The model-specific β(beta) coefficient estimate for covariates influencing tiger occupancy in the Ratapani-Kheoni landscape (RKL) is β0(SE[β0]) - 0.52(0.61).

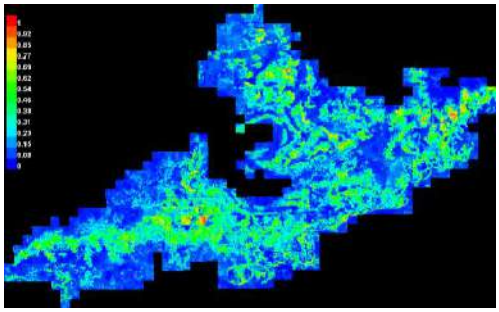
The historical tiger population persists near the city in the Vindhyan landscape due to rugged terrain, abundant water availability, and the presence of prey, primarily Bluebull/Cattle.

BMLR Output: Based on BMLR-based Habitat Suitability Index (HSI), the suitable area for tigers is estimated to be 2691 sq. km out of the total 7210 sq. km study area.



❖ **MaxEnt Output:** The total 7210 km^2 area was mapped on the GIS platform ArcGIS 10.1 by MaxEnt SDM analysis to find out the tiger conservation prioritization areas (TCPUs). TCPU_1, TCPU_2, TCPU_3, TCPU_4 and TCPU_5 were identified using MaxEnt software within a studied landscape area.

The predicted probability of occurrence covered an area of 1409.08 sq. km within the study landscape. The identified TCPUs were spatially distributed across five conservation units: TCPU_1 (50.99 sq. km), TCPU_2 (724.20 sq. km), TCPU_3 (104.43 sq. km), TCPU_4 (301.48 sq. km), and TCPU_5 (227.98 sq. km).



Percent Contribution for each variable of the model: The table below illustrates the percentage contribution of each variable in the model.

S. No.	Variable	Variable code	Percent contribution
1	B. tragocamelus probability of occurance	Nilgai_avg	28.1
2	Rusa unicolor probability of occurance	Sambar_avg	8.8
3	Topographic ruggedness Index	Ruggedness TRI	7.2
4	Village density	Village_Density	5.9
5	Annual mean temperature	AM_Temp	5
6	Minimum temperature of coldest month	Min_Temp_CM	4
7	Muntiacus muntjak probability of occurance	Barking_Deer_avg	3.6
8	Maximum temperature of warmest month	Max_Temp_WM	3.5
9	Melursus urcinus	Sloth_bear_presence	3.3
10	Slope	slope	3.2
11	Bamboo regeneration	Bamboo_Regeneration	3.2
12	DEM elevation	Elevation	3
13	Axis axis probability of occurance	Chital_avg	3
14	Bamboo forest	Bamboo_forest	2.9
15	Water availability upto March	Water_Availability_Upto_March	2.8

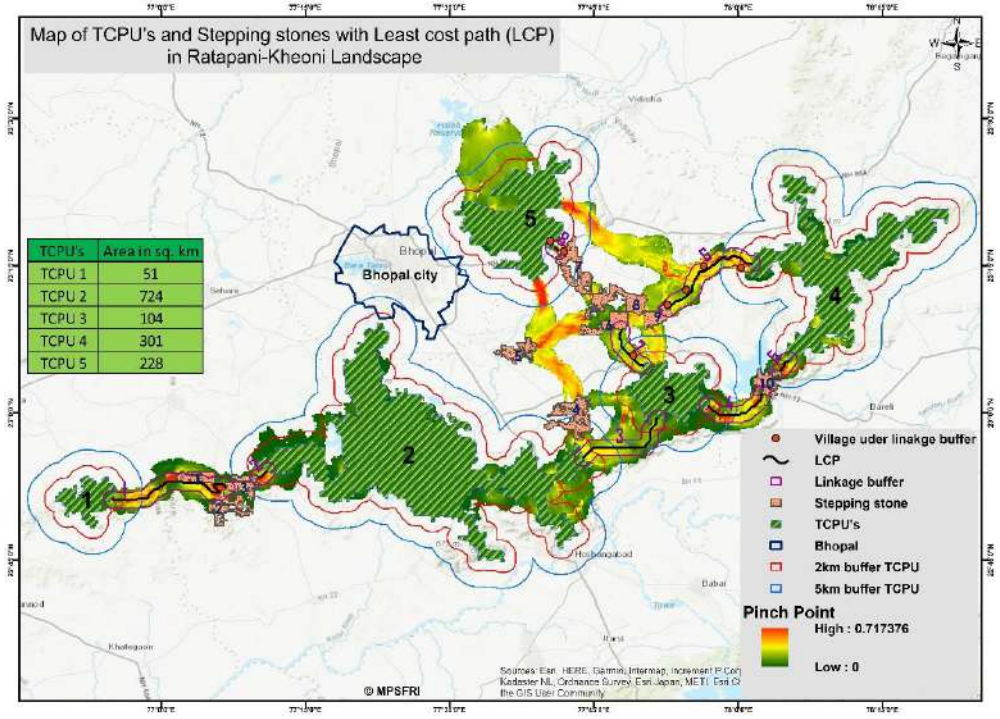
16	Human footprint	Human_footprint	2.7
17	Forest cover	Forest cover	2.4
18	Distance of village from forest compt.	DST_From_Village	2.3
19	Annual precipitation	Ann_Precipitation	1.9
20	Cattle count	Cattle_Presence	1.7
21	Human population density	Population_Density	0.8
22	Precipitation of Driest month	Precipitation_DM	0.7

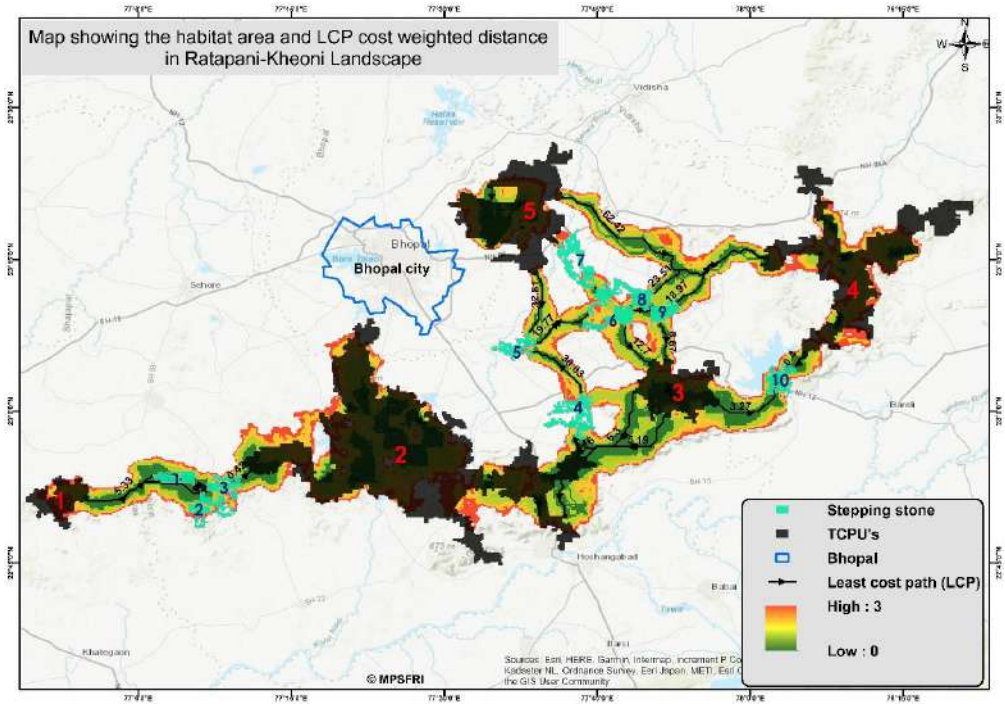
Our species distribution models effectively map tiger habitat needs across breeding seasons, accurately identifying core TCPUs and smaller stepping stone habitats. These stepping stones enhance connectivity by reducing travel distances between major TCPUs, serving as seasonal stopovers for dispersing tigers. While not supporting permanent breeding, they play a vital role in linking the habitat network. In total, ten stepping stones have been identified in the study area, with details summarized in the accompanying table.

Table showing Numbers of stepping stone, their area and the villages falling under the stepping stones

S.No.	Stepping Stone	Stepping stone area (in ha.)	Numbers of villages	Village area (in ha.)	Village population
1.	**1**	1173	0	-	-
2.	**2**	1959	1	712	869
3.	**3**	1411	1	1094.63	1109
4.	**4**	3033	6	1087.82	1083
5.	**5**	1504	3	957.18	1586
6.	**6**	1701	2	2093.08	1044
7.	**7**	2672	5	1606.02	2623
8.	**8**	2728	5	1766.35	4808
9.	**9**	1250	0	-	-
10.	**10**	1583	1	277.14	370

The map below illustrates the Tiger Conservation Priority Units (TCPUs), Stepping Stones, and Cost-Weighted Distance.





Linkage	Cost Weighted Distance (CWD)	Linkage length (in km.)	Village falling under 0-3 km swath	Village falling under 3-5 km swath	Total Villages
1	0.06	26.278	0	5	5
2	0.42	2.137	0	1	1
3	5.19	18.406	0	3	3
4	3.27	12.669	0	2	2
5	0.40	2.847	0	0	0
6	18.97	21.263	4	4	8
7	12.70	9.149	1	3	4
8	3.74	1.066	2	2	4

Result of SDM analysis in R:

Performances of Species Distribution Modelling

The results show that machine learning models (RF, BRT, MAXENT, SVM) outperformed the regression model (GLM) across all evaluation techniques. Random Forest (RF) had the highest accuracy, followed by SVM, MAXENT, BRT, and GLM. RF also led in AUC, TSS, and COR, while GLM performed well in Deviance after RF.

Methods	:	AUC	COR	TSS	Deviance
glm	:	0.89	0.62	0.67	0.7
rf	:	0.93	0.71	0.72	0.61
svm	:	0.91	0.67	0.72	0.67
maxent	:	0.91	0.66	0.68	0.68
brt	:	0.91	0.67	0.70	0.81

Tiger distribution in different models

Tiger occupancy based on max(se+sp) thresholds for GLM, RF, SVM, MAXENT, BRT, and Ensemble models were 34%, 43%, 21%, 36%, 29%, and 30.6%, respectively. RF performed best, indicating 3,103 km² occupied out of 7,216.58 km². The ensemble model mapped occupancy levels,

classifying 58.75% of the area as unsuitable. Of the remaining 41.24%, tiger presence was categorized as low (22.08%), medium (11.92%), and high (7.2%).

Model	AUC	Correlation	TSS	Threshold	Threshold Max (Spe+Sen)	persent of distribution	Suitable area in sq. km
glm	0.89	0.62	0.67	0.34	0.34	34	2453.64
RF	0.93	0.71	0.72	0.43	0.43	43	3103.13
SVM	0.91	0.67	0.72	0.21	0.21	21	1515.48
MaxEnt	0.91	0.66	0.68	0.36	0.36	36	2597.97
brt	0.91	0.67	0.7	0.29	0.29	29	2092.81
Ensemble	0.908	0.66	0.70	0.3060	0.32	32	2352.60

The relative contribution of predictor variables:

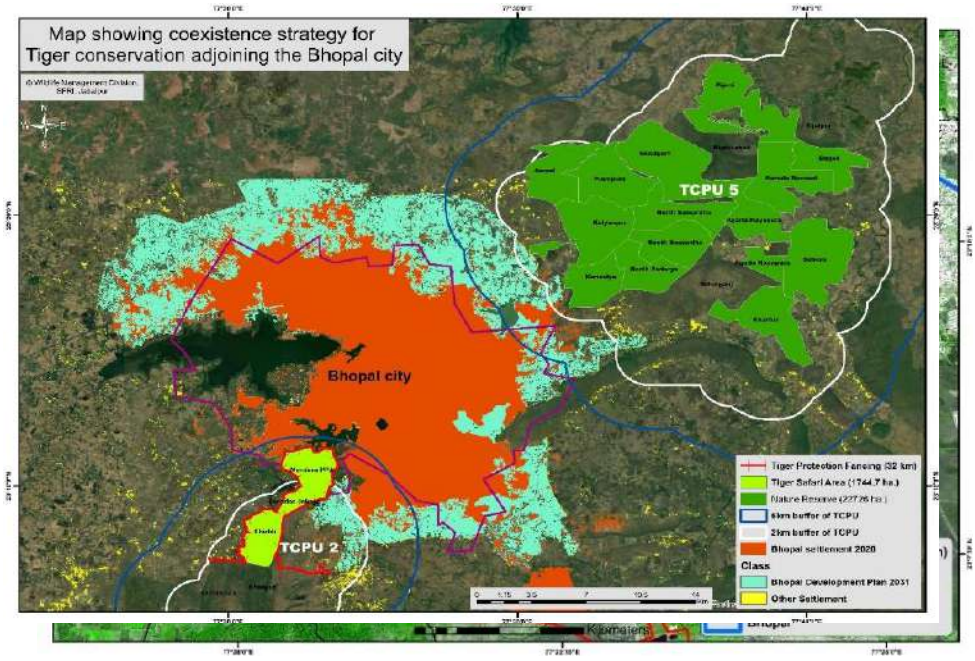
The relative influence of predictors is shown in Table 35. Some variables had a very high relative influence, while others were insignificant. The top three individual variables (Population_density, Barking_deer_HSI, Nilgai_HSI, Sambar_HSI, Cattle_Presence, Slothbear_Presence, Water_Upto_March) had relative influences for GLM, RF, SVM, MAXENT, and BRT of 37.8%, 16.7%, 20.2%, 21.5%, and 35.6%, respectively.

The relative variable importance (RVI) for population density was as follows: 22.4% (GLM), 7.5% (RF), 4.4% (SVM), 10.2% (MaxEnt), and 20.9% (BRT). The next most important factor was prey combinations: Barking deer + Nilgai (15.4% for GLM), Sambar + Nilgai (9.2% for RF), Cattle + Sambar (11.3% for SVM), Barking deer (5.5% for MaxEnt), and Cattle + Sambar (14.7% for BRT). The water variable ranked among the top three most important variables only in the MaxEnt model, where it was second with an RVI of 5.8%.

Financial output:-intangible climate change resistance benefits, contribution in carbon sink and effective ecotourism-based monitoring.

Application of research findings

Mendora PPA in Samardha Range has served as a tiger breeding area for a decade. To strengthen conservation, it is proposed to link it with Chichli beat via adjoining revenue land and develop the Raja Bhoj Tiger Safari. Enclosing Mendora PPA, the linkage, and Chichli beat with a chain-link fence (totaling 1,744.7 ha) will create a functional safari area. This initiative will support long-term tiger conservation while generating livelihoods and enabling social monitoring.

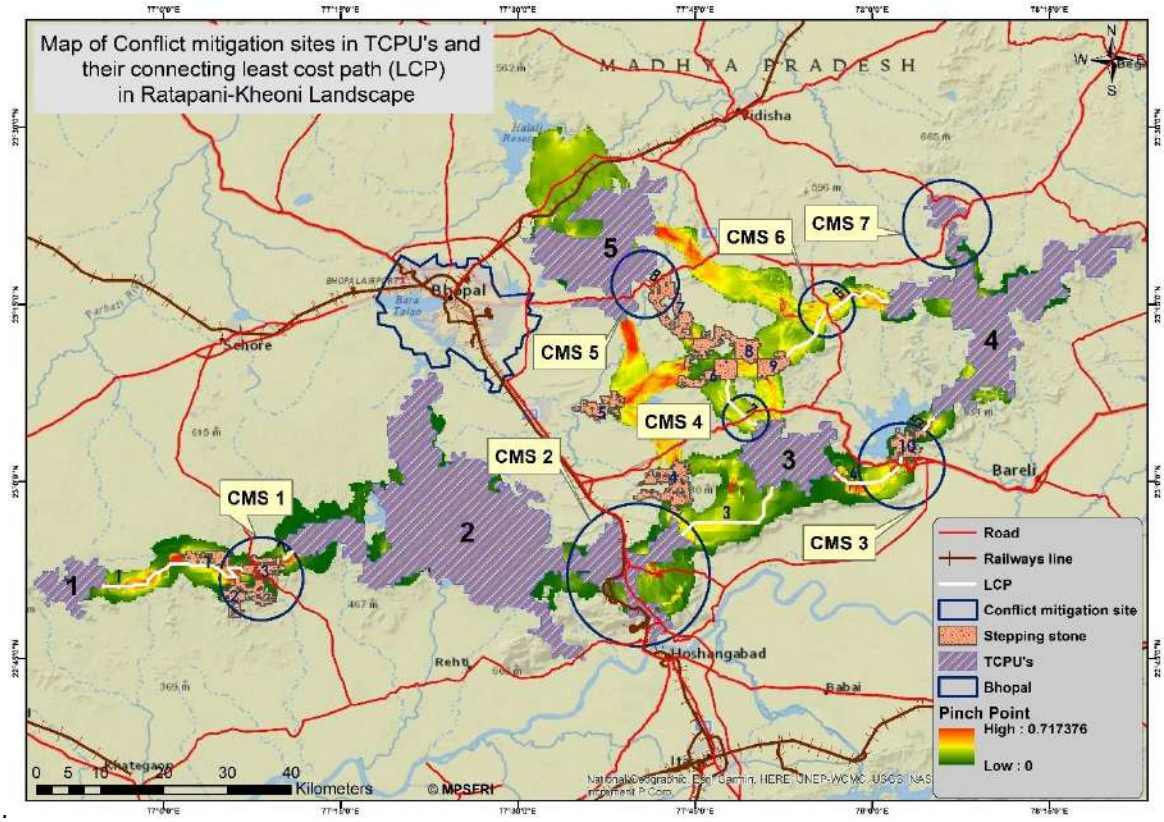


The proposed strategy aims to prevent tiger dispersal into Bhopal city by enclosing a 1,744.7-hectare area with a 32 km, 12-feet high fence as part of the Raja Bhoj Tiger Safari. This will reduce crop damage, loss of life, and poaching incidents. The safari will create ecotourism-based jobs for local villagers and promote wildlife conservation through community involvement. Located in a scenic forest near Bhopal, the area hosts rich biodiversity, including tigers, leopards, wolves, sloth bears, and various herbivores.

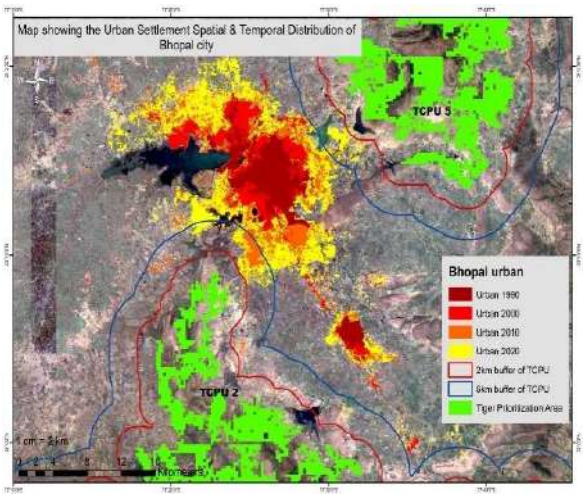
TCPU_2 and TCPU_5 near Bhopal offer high ecotourism potential. TCPU_2, adjacent to key water bodies like Kerwa and Kaliyasot dams, supports bird-watching and diverse wildlife. A 1,744.7-hectare Tiger Safari including Chichli and Mandora PPA, with a 32 km boundary, will enhance ecotourism and reduce conflict. Jungle Safari routes through 20 beats in Bhopal, Sehore, and Obedullaganj divisions will further expand opportunities. TCPU_5, rich in biodiversity and scenic grasslands, supports transient tigers and is ideal for reintroduction. It also offers scope for a Nature Interpretation Center and eco-education, creating livelihoods and supporting tiger conservation.
Enhanced conservation and surveillance will boost biodiversity and ensure safety near Bhopal's outskirts. This strategy offers a model for balancing wildlife coexistence with urban growth.

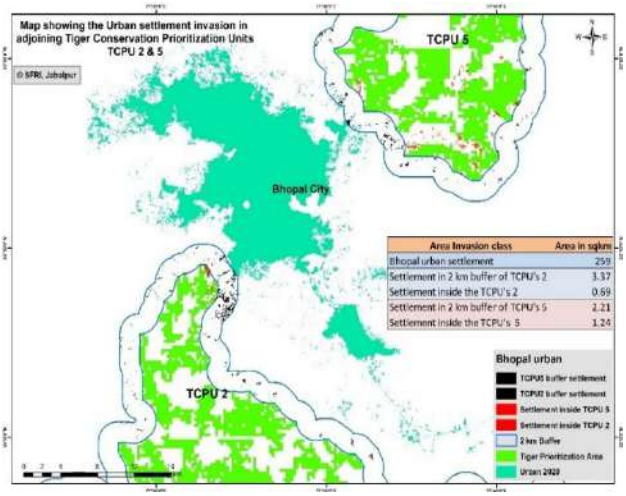
Deliverable technologies developed in each project for stakeholders, forest professionals, field foresters and other beneficiaries:

The selected methodology will serve as a critical decision-support tool for prioritizing key tiger conservation areas and will also provide essential baseline data for formulating a strategic human–wildlife conflict mitigation plan



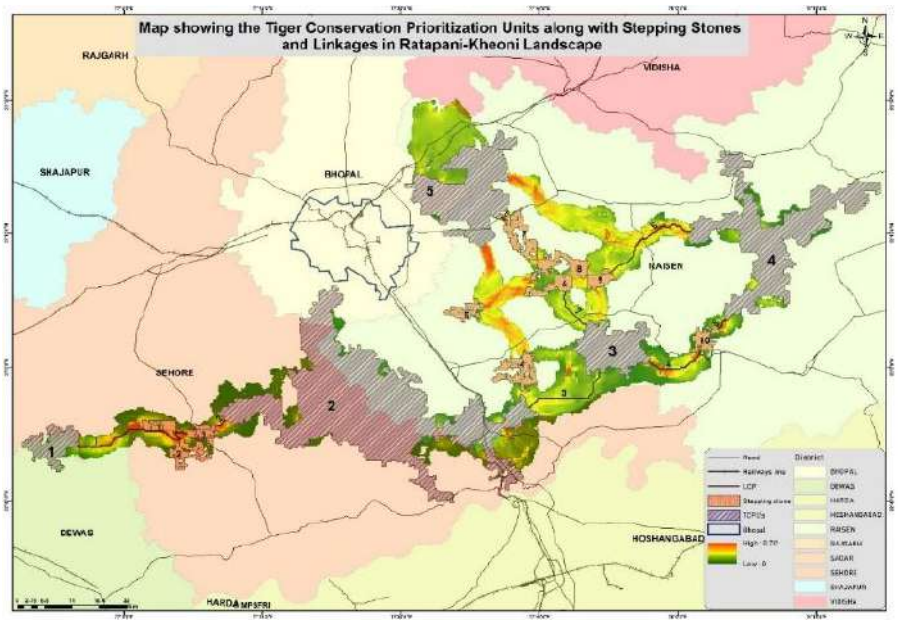
Urban expansion near Bhopal poses a growing threat to adjacent tiger habitats. To safeguard these ecosystems, it is essential to redirect human settlements away from forests through strategic green development. A 2 km green buffer around Tiger Conservation Prioritization Units (TCPUs) in the Bhopal Development Plan is recommended to reduce conflict and preserve habitat integrity. A detailed micro-plan for this buffer is critical for managing human–wildlife interactions and ensuring long-term conservation.





Tiger habitat suitability in the Vindhya range near Bhopal was assessed using the MaxEnt model, identifying 1,409 sq km of highly suitable habitat within a 5,312 sq km study area. This habitat spans the Bhopal, Sehore, Obedullaganj, and Raisen forest divisions. Next-Generation Sequencing (NGS) confirmed the presence of 19 unique tigers. Five Tiger Conservation Prioritization Units (TCPUs) have been delineated, connected by 8 linkages, including 10 stepping stones and pinch-point barriers.

Genetic analysis reveals limited relatedness between the Ratapani tiger population and other Central Indian populations like Kanha, Pench, and Satpura, with only some affinity to Bandhavgarh. Structure analysis indicates minimal shared ancestry. To enhance genetic exchange and population viability, strengthening corridor connectivity between Ratapani and areas like Nauradehi and Omkareshwar is recommended.



Conclusion:

The Vindhyan landscape study spanned approximately 5,312 sq. km. Historical records from the 1983–1998 Bhopal circle working plan reported 19 tigers based on the 1980 wildlife census. After a 35-year gap, the State Forest Research Institute (SFRI), Jabalpur confirmed the presence of 9 tigers via camera trapping in 2016. In our recent study (2018–19), Next-Generation Sequencing (NGS) of faecal DNA identified a minimum of 19 individual tigers, reaffirming the long-term persistence of a tiger population near Bhopal.

Genetic analyses revealed limited relatedness between the Ratapani tiger population and those of Satpura, Kanha, and Bandhavgarh Tiger Reserves. Structure analysis indicated minimal shared ancestry, suggesting that Ratapani tigers are genetically distinct within the Central Indian landscape.

From December 2018 to April 2019, a tiger occupancy survey was conducted using Presence software v13.6. The landscape was divided into 83 grid cells of 64 sq. km each. Tiger signs were detected in 49 grids, resulting in a naïve occupancy estimate of 0.5904. Advanced modeling estimated potential tiger habitat occupancy at 3,762.48 sq. km (70.83% of the total study area), with a standard error of 482.34.

Traditional presence–absence approaches significantly underestimated occupancy by 59.04%, identifying only 3,136.20 sq. km as occupied. Among 44 candidate models, the Hines model was the best fit (lowest AIC = 1144.59). It identified cattle presence and rugged terrain as the most influential covariates (ψ = Cattle + Ruggedness), while detection probability (pt) was best explained by the presence of Nilgai and water sources.

Key ecological factors contributing to tiger habitat suitability included elevated rugged terrain, perennial water availability, and the presence of prey species—particularly cattle and Nilgai. While Nilgai are not typically preferred prey due to their agility and nocturnal activity, opportunistic predation was confirmed via camera trap evidence. Cattle, by contrast, were frequently predated upon, with multiple forest division records supporting these incidents.

Rugged landscapes provided natural shelters such as cliffs, rock overhangs, and dens, supporting tiger habitation. The consistent availability of feral and domesticated cattle has created an anthropogenically supported prey base, reinforcing tiger presence in the Ratapani-Kheoni landscape.

In conclusion, this study highlights the ecological resilience of tigers near Bhopal, the importance of refined occupancy modeling, and the critical role of anthropogenic factors—especially cattle—in sustaining the population. Enhanced conservation efforts should focus on managing livestock-wildlife interactions and improving habitat connectivity to ensure long-term viability.Wildlife-friendly, science-based land-use planning is essential for managing long-term human–wildlife interactions in the Vindhyan landscape near Bhopal. Key strategies include establishing buffer zones, modifying land use to support wildlife, and using guard animals or barriers to protect livestock and crops. Such measures can foster coexistence while preserving habitat integrity and biodiversity.

Details of Tiger Conservation Prioritization Units (TCPUs) GIS mapping of Ratapani Kheoni landscape:

1. TCPU with compartment and Villages TCPU_1, TCPU_2, TCPU_3, TCPU_4 and TCPU_5.

	TCPU	Area in sqe.km	Number of village	Name of village TCPU	Range	Beat	Compt.
1	TCPU1	50.99 km2	4	Khini Bujurg Dai Guwadiyabazyaft Nandakheda	Kheoni	Chikalpat, Doulatpur, Kalibai, Kheoni (E), Kheoni W, Kolari, Lalyakhedi, Nandadai, Roopadarh	RF-203,199,212,201, 200,209,213,214 210,204A, 208,198 204,205,207,191 206,195,194,196, 197,211
2	TCPU2	724.20 km2	32	Bhoot Palasi Nasipur Bawadiya Gondi Jabra Malkhar Karmoda Imaliya Gondi Loha Pathar Borda JhalPipali Kumhariya Chikalpani Magarpat Dhabla	Barkhera	Bagajhiri Barkhera Barrusot-I Barrusot-Ii Bhootpalasi Choka Divatiya Kairi Karmoda Pipaliya Kala Piplani Ratapani Tajpura	PF-982,983,980,981 965,970,975,976 977,978,979,940 941,942,943,944 948,949,950,945 946,947,971,974 964,966,967,968 951, RF-300,298,530,531 532,299,533,534 535

	TCPU	Area in sqe.km	Number of village	Name of village TCPU	Range	Beat	Compt.
				Khajuri Saras Semri Katkua Bineka Barkheda Harrai Sewaniya Parihar Khanpura Borda Kherichouka Bhura Kheda Goutampur Surai Dhaba Lawa Khadi Bamnai Mathar (Vangram) Jam Piplani Kalan Semra	Budhni	Bansapur Bhimkothi Budhani Jarrapur Saidganj Taalpura Uchakheda Yarnagar	PF643,641,642,640 RF623,624, PF639 RF634,635, PF637, 636,638,651,652 RF630,631,601,600 PF605, RF621
					Chilwaha	Uradmau Khamariya	RF492,493
					Dahod	Bamnai Bithori Dhabla Imalya Jawra Jhiri Karmai Kolar Kumhariya Malkhar Nishankheda PatharKansia Setu Barkhera Tumdakhera	PF 938,939,917,918,906 907,908,909,910,915 913,914,924,922,923 921,925,900,901,936 934,935,937,928,930 931,932,933,929,919 920,926,927,916,911 912,903,904,905,902 895,897,896 RF 536,301,302,305,306 307
					Delawari	Aamdo Bardha Delawadi Jamuniya Khajuri Naharkola North Mathar South Mathar	PF562,563,564,565,567 570,566B, 517,524,525 526,527,528 RF 529dw,531dw,532dw 577dw,551dw,552dw 553dw,554dw,548dw 549dw,550dw,555dw 556dw, 538,539dw 540dw,541dw,542dw 543dw,544dw,545dw 533dw, 537,534dw 535dw,536dw,546dw 547dw
					Icchawar	Dhaikheda	RF 267,253,266
					Ladkui	Bhurakheda Dabari Mograkheda Moyajhir Sirali	PF 460,459,458,461464, 462,466,468,465 RF 254,258,255,265,260 259,264,263,262,261
					Rehti	Banya Chatarkota Dhaba Khajuri Khanpura Ratanpur Semari	PF 488,490,489,491,523,521 522,520,519,518,571,572 573,575,574,568,569,566 RF 591,594,593,595,560,559
					Samardha	Bhanpur Chichli Gol Samaspura	PF 220,221,222,223 RF 214,215,216,217,218,219 210,212,213
					Sehore	Khari	RF 69
					Veerpura	Amamay Borpani Charmandli Cheekalpani	PF 63,507,511,510,509,508 502,506,505,503,504,342 349,341,340,343,348,346 347,345,344

	TCPU	Area in sqe.km	Number of village	Name of village TCPU	Range	Beat	Compt.
						East Lohapathar Jhaleepali Kathotiya Lawakhadi Magarpath Saras Sevaniya Parihar Veerpura West Lohapathar	RF 513,512,514,79,78,80,75,76 516,501,494,495,496,515 77,70,74,73,72,71,330,326 327,339,336,334,335,333 83,82,85,86,81,84,500 499,498,497
3	TCPU3	104.43 km2	5	Dant Kho MagardhaPipaliya Borkhadi Borpani Jaitpur	Barkhera	Mokalwada	RF 566,567,568,569,572,573
					Bineka	Bagaspur Borkhari East Dantkho Jaitpur Lulka Magardha North Dantkho Rampura Silari South Sajoli West Dantkho	PF 728,723,724,725 RF 446,441,477,461,462,463,454 455,456,457,440,452,453,442 443,458,459,460,444,448,450 451,470,471,472,473,474,475
					Goharganj	Karakwani	RF 565
4	TCPU4	301.48 km2	18	Khobi Kesali Kota Khajari Simariya Kalan Bhajiya Ghonti Bahra Suneti Ramgarh Borpani Mahalpur Patha Dagdaga Suagard Salahpur Surbarri Jaitgarh Patna Bhiladiya Gunjai Rajghati	Bamhori	Bajani Bhajiya Jaitgadh Kartoli Kukwara Pondri Ramgara Viran	RF 254,261,234,235,236,237,238 239,248,255,231,232,233,251 240,241,242,243,249,250,252 253
					Bari	Araskhera Bhartipur Chora Ghana Pali Dungariya Panjhirpa	PF 748 RF 524,521,517,518,519,520,522 523,276,277,278,279 UC -UC2
					Chilwaha	Behra Umrai	PF 765 RF 496
					Garhi	Borpani Dehganv Garhi A Garhi B Haidari Jamuniakala Jamuniakhas Karmodi Lilngava Mahalpurpatha Mudiyakhera Rampura Rasidpur Sarra Sehora	PF 107,101,988,989,102 RF 11,12,13,14,21,24,23,31,32,36 35,34,105,114,100,99,10,9,8,3 4,5,7,33,25,26,107,111,112 113,22,104,108,109,110,106
					Sultanpur	Ghana(Berkhedi) GhotiBehra Santra	PF 743,744,755,756,757,751,752 754 RF 515,516

	TCPU	Area in sqe.km	Number of village	Name of village TCPU	Range	Beat	Compt.
					West Silwani	Gajanda Khamaria Ramgarh Samnapur Simaria Singhpuri	RF 166,172,173,120,119,163,165 177,168,169,167,179,178
5	TCPU5	227.98 km2	19	Prempura Gopisur Satkunda Agriya Nayapura Agriya Choupda Bilarkhoh Sihora Imaliya Katsari Mushkabad Badoda Khamkheda Salera Bagod Bilkhiriya Kalan Geedgarh Sehadganj Silpuri Kharbai Sukasen Bankhedi	Chiklod	Makodiya	PF 770,771,772 RF 539
					Raisen West	Agaria Nayapura Bagod Baroda Sevasni Bhartipur Geedgarh Kharbai Mushkabad Piprai Sehatganj Sehora Tijalpur	PF 20,24,21,17,16,19,18,15,87 992,990,30,13,10,12,11,14,9 31,22,23,25,26,27,86A,86C RF 336,337,338,339,538,333 334,335,537,346,348,349
					Samardha	Amoni Kalyanpur Kanasiya North Padarya North Samardha Prampura South Samardha South Padariya	PF 194,195,190,191,197,198 RF 182,173,174,175,176,183,188 189,184,185,186,187,169,170 171,177,168,178,179,180,181

2. Stepping stones along with Compartment

Stepping stones	Division	Range	Compartment No.	LGL_STATUS	Beat Name
1	Sehore	Icchawar	238	RF	Dundalawa
			239	RF	Dundalawa
			240	RF	Dundalawa
			241	RF	Dundalawa
			231	RF	Balupat (East)
			232	RF	Balupat (W.)
			230	RF	Balupat (East)
			242	RF	Balupat (East)
			243	RF	Balupat (East)
			244	RF	Balupat (East)
			229	RF	Balupat (East)
2	Sehore	Ladkui	384	RF	Nayapura
			387	RF	Siradi
			388	RF	Siradi
			411	RF	Sankota
			385	RF	Sankota
			389	RF	Nayapura
			410	RF	Sankota
			412	RF	Rafikganj
			386	RF	Sankota
			383	RF	Basantpur
			409	RF	Nayapura
			382	RF	Basantpur
			370	RF	Siradi
			372	RF	Ghutwani

Stepping stones	Division	Range	Compartment No.	LGL_STATUS	Beat Name
			417	RF	Kosmi
3	Sehore	Icchawar	247	RF	Nadan
			250	RF	Nadan
			249	RF	Nadan
			248	RF	Nadan
			280	PF	Nadan
			251	RF	Dhaikheda
			252	RF	Dhaikheda
		Ladkui	418	RF	Durganayak
			421	RF	Durganayak
			419	RF	Durganayak
			417	RF	Kosmi
			420	RF	Durganayak
			416	RF	Kosmi
4	Obedullahganj	Barkhera	310	RF	Munhasa
			311	RF	Munhasa
			312	RF	Munhasa
			961	PF	Munhasa
			969	PF	Ratapani
		Goharganj	313	RF	Ghana
			314	RF	Ghana
			315	RF	Beelkheri
			316	RF	Beelkheri
			317	RF	Beelkheri
			318	RF	Sehora
			319	RF	Dhamdhusar
			843	PF	Sehora
5	Obedullahganj	Chiklod	816	PF	North Amarthon
			817	PF	North Amarthon
			818	PF	Bhojpur
			819	PF	Bhojpur
			330	RF	Ashapuri
			331	RF	Ashapuri
6	Obedullahganj	Chiklod	552	RF	Sonthar
			553	RF	Sonthar
			554	RF	Sonthar
			555	RF	Barbatpur
			796	PF	Maholi
			548	RF	Barbatpur
			549	RF	Barbatpur
			550	RF	Barbatpur
			797	PF	Maholi
7	Obedullahganj	Chiklod	543	RF	Barrukhar
			544	RF	Barrukhar
			768	PF	Maharmanga
	Raisen	Raisen East	34	PF	Neemkhera
			35	PF	Neemkhera
			37	PF	Neemkhera
			39	PF	Banchhod
			40	PF	Banchhod
			360	RF	Neemkhera
			361	RF	Neemkhera
			362	RF	Neemkhera
			363	RF	Neemkhera
			364	RF	Neemkhera
8	Obedullahganj	Chiklod	546	RF	Barrukhar
			551	RF	Barbatpur

Stepping stones	Division	Range	Compartment No.	LGL_STATUS	Beat Name
			552	RF	Sonthar
			547	RF	Barrukhar
	Raisen	Raisen East	41	PF	Banchhod
			42	PF	Banchhod
			43	PF	Veerpur
			44	PF	Veerpur
			46	PF	Veerpur
			47	PF	Veerpur
			48	PF	Veerpur
			365	RF	Nayapura
			366	RF	Nayapura
			368	RF	Nayapura
9	Obedullahganj	Chiklod	800	PF	Maholi
			801	PF	Maholi
		Chilwaha	426	RF	Karaghati
			427	RF	Arjani
			428	RF	Arjani
			429	RF	Arjani
			425	RF	Karaghati
	Raisen	Raisen East	50	PF	Gondra
			367	RF	Nayapura
10	Obedullahganj	Bari	286	RF	Bari
			287	RF	Bari
			288	RF	Bajeerganj
			289	RF	Bajeerganj
			290	RF	Bajeerganj
			527	RF	South Kandela

3. Linkage along with Compartment

Linkage	Division	Range		Compartment No.	LGL_STATUS	Beat Name
1	Sehore	Icchawar		214	RF	Bordikhurd
				235	RF	Bordikhurd
				213	RF	Bordikhurd
				236	RF	Bordikhurd
				237	RF	Dundalawa
				238	RF	Dundalawa
				212	RF	Bordikhurd
				239	RF	Dundalawa
				240	RF	Dundalawa
				241	RF	Dundalawa
				230	RF	Balupat (East)
				242	RF	Balupat (East)
				243	RF	Balupat (East)
				245	RF	Nadan
				244	RF	Balupat (East)
				247	RF	Nadan
				248	RF	Nadan
				246	RF	Nadan
	Dewas	Khategoan		233A	RF	Palasi
				225	RF	Ligapani
				224	RF	Machwas
				230	RF	Ligapani
				231	RF	Khatamau
				232	RF	Palasi
				223	RF	Machwas
		Kheoni		215	RF	Patrani
				220	RF	Roopadarh

Linkage	Division	Range		Compartment No.	LGL_STATUS	Beat Name
				222	RF	Roopadarh
				213	RF	Kheoni (E)
				221	RF	Roopadarh
				219	RF	Roopadarh
				214	RF	Kheoni (E)
				218	RF	Patrani
	Sehore	Ladkui		387	RF	Siradi
				366	RF	Pipilani
				368	RF	Pipilani
				369	RF	Pipilani
				370	RF	Siradi
				367	RF	Pipilani
				365	RF	Pipilani
2	Sehore	Icchawar		267	RF	Dhaikheda
				251	RF	Dhaikheda
				252	RF	Dhaikheda
				253	RF	Dhaikheda
				266	RF	Dhaikheda
		Ladkui		254	RF	Dabari
				255	RF	Dabari
				420	RF	Durganayak
				449	PF	Navalgaow
				450	PF	Navalgaow
3	Obedullahganj	Barkhera		573	RF	Mokalwada
				574	RF	Umariya
				575	RF	Umariya
				582	RF	Umariya
				583	RF	Umariya
				584	RF	Borpani
				585	RF	Borpani
				586	RF	Borpani
				588	RF	Pipaliyagoli
				589	RF	Amajhiri
				590	RF	Amajhiri
				591	RF	Amajhiri
				592	RF	Amajhiri
				594	RF	Amajhiri
				595	RF	Panjhir
				596	RF	Panjhir
				597	RF	Panjhir
				598	RF	Panjhir
				964	PF	Ratapani
				965	PF	Barrusot-I
				966	PF	Ratapani
				967	PF	Ratapani
				968	PF	Ratapani
				970	PF	Barrusot-I
				576	RF	Mokalwada
		Bineka		474	RF	West Dantkho
	Sehore	Budhni		666	RF	Dungariya (B)
				667	RF	Dungariya (B)
				664	RF	Dungariya (A)
4	Obedullahganj	Bari		289	RF	Bajeerganj
				290	RF	Bajeerganj
				291	RF	Patni
				292	RF	Patni
				293	RF	Kevlajhir

Linkage	Division	Range		Compartment No.	LGL_STATUS	Beat Name
		Bineka		463	RF	Jaitpur
				464	RF	North Neelgrah
				465	RF	North Neelgrah
				466	RF	North Neelgrah
				467	RF	South Neelgrah
				468	RF	South Neelgrah
				469	RF	South Neelgrah
				482	RF	South Dhunvani
				483	RF	South Dhunvani
				484	RF	South Dhunvani
				485	RF	North Dhunvani
				486	RF	North Dhunvani
				488	RF	Kamwali
				489	RF	Kamwali
				487	RF	North Neelgrah
5	Obedullahganj	Bari		285	RF	Bari
				286	RF	Bari
				287	RF	Bari
				524	RF	Araskhera
				525	RF	Araskhera
				526	RF	South Kandela
				528	RF	South Kandela
				284	RF	Bari
				527	RF	South Kandela
6	Obedullahganj	Chilwaha		496	RF	Behra
				400	RF	Umrai
				401	RF	Bharda
				402	RF	Bagwada
				403	RF	Bagwada
				404	RF	Bharda
				407	RF	Bhusimeta
				408	RF	Bhusimeta
				409	RF	Bhusimeta
				410	RF	Bhusimeta
				416	RF	Mahuakheda
				417	RF	Mahuakheda
				418	RF	Mahuakheda
				419	RF	Mahuakheda
				420	RF	Mahuakheda
				421	RF	Chandangora
				422	RF	Chandangora
				423	RF	Chandangora
				425	RF	Karaghati
				765	PF	Umrai
				766	PF	Bagwada
	Raisen	Garhi		4	RF	Mahalpurpatha
		Raisen East		50	PF	Gondra
				51	PF	Gondra
				398	RF	Tikoda
				399	RF	Tikoda
7	Obedullahganj	Bineka		434	RF	Borkhari
				435	RF	Bineka
				437	RF	Bineka
				438	RF	Bineka
		Chiklod		554	RF	Sonthar
				325	RF	Dungariya
				326	RF	Dungariya

Linkage	Division	Range		Compartment No.	LGL_STATUS	Beat Name
				796	PF	Maholi
				797	PF	Maholi
		Chilwaha		436	RF	Champaner
8	Raisen	Raisen East		35	PF	Neemkhera
				37	PF	Neemkhera
		Raisen West		27	PF	Sehora

Rani Kamlapati Fort is now a home of Delawadi tigers

Contiguous habitat of tiger around the Ginnor (Rani Kamlapati) Fort

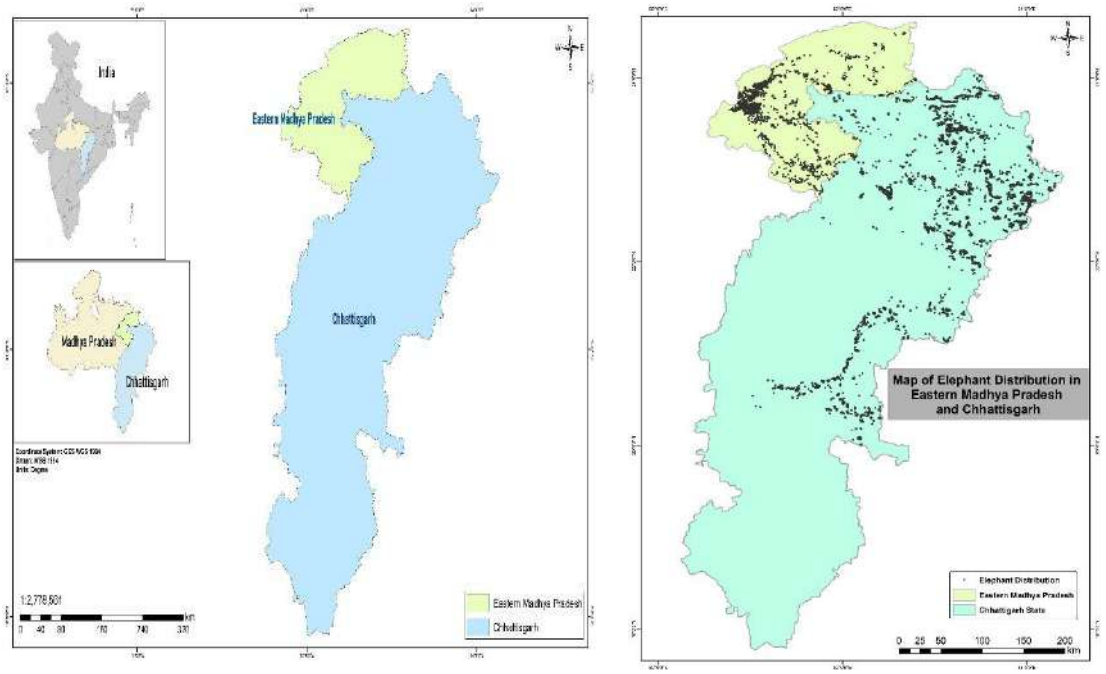
Ongoing Project

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:-

Over the past century, Madhya Pradesh has been devoid of resident Asian elephant (*Elephas maximus)* populations and the associated management frameworks. However, beginning in 2018, wild elephants began migrating westward from Chhattisgarh into Bandhavgarh Tiger Reserve (BTR), inaugurating a novel colonization front. This unexpected range expansion has precipitated a suite of conservation challenges, from unanticipated human–elephant conflict in local communities to gaps in reserve management capacity. Understanding the drivers, pathways, and implications of this westward movement is therefore essential for developing proactive strategies to accommodate elephant populations and mitigate emerging conflicts in a landscape unaccustomed to their presence.

This development has triggered escalating human–elephant conflict (HEC) in the region, where both forest managers and local communities are ill-prepared to respond. The project was thus conceived to address two major gaps: the lack of spatially explicit habitat modeling for elephants in the Central Indian landscape, and the absence of comprehensive documentation of the socio-ecological dynamics of conflict. The dual aim was to inform strategic corridor conservation and provide data-driven recommendations for mitigating conflict and fostering coexistence in a landscape that is new to elephant presence.



Research Methodology:-

To understand and predict elephant distribution and associated conflict patterns, we adopted a mixed-methods approach combining ecological modeling with socio-economic field surveys. For habitat suitability analysis, we used MaxEnt version 3.4.4, implementing two complementary modeling frameworks. The first was a split-sample model applied to the broader Eastern Madhya Pradesh–Chhattisgarh landscape, using 15 replicated runs with 75% of presence records for training and 25% for testing. This approach achieved a high mean test AUC of 0.803 with a low standard deviation of 0.007, indicating consistent and reliable model performance. The most influential environmental predictors were minimum temperature of the coldest month (Bio6), which contributed 22.8% to the model with 23.3% permutation importance, followed by forest cover (20.2% | 15.0%), maximum temperature of the warmest month (Bio5: 14.3% | 16.0%), and proximity to sandbeds (14.2% | 16.0%).

To complement this broad-scale model and quantify local-scale uncertainty, a second MaxEnt model was developed using a bootstrap framework in a subregion of Eastern MP. This model was based on 15 replicates using resampling with replacement and achieved a mean training AUC of 0.794 with a standard deviation of 0.005. In this framework, forest cover (32.3%) and human population density (31.2%) emerged as the top contributors, with significant permutation importance values of 9.4% and 25.0% respectively. Other notable variables included Bio5 (10.4% | 13.5%), Bio6 (7.9% | 17.1%), and bamboo presence (6.3% | 5.2%). Jackknife tests consistently identified Bio6 and human population density as strong independent predictors in both modeling strategies.

Parallel to the modeling, a detailed socio-ecological survey was conducted across 51 villages surrounding BTR. A total of 218 individuals were interviewed using a semi-structured questionnaire covering topics such as crop and property damage, human casualties, elephant foraging behavior, seasonal patterns of conflict, mitigation strategies, cultural attitudes, and experiences with compensation claims. These insights were essential in interpreting the human dimension of the elephant expansion and identifying factors driving local conflict intensity.

Study Design:-

Data Processing; Potential Vegetation MapLand Use and Land Cover Map (Currentscenario);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 helpin the use of HEC mitigation methods based on different hot spots 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 theSanjay-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.
- The habitat suitability modeling was performed in Eastern Madhya Pradesh (MP) and Chhattisgarh (CG) with socio-ecological surveys to inform targeted management in Eastern Madhya Pradesh (MP)
- Activities completed regarding “Understanding Human- elephant conflict in Bandhavgarh Tiger Reserve, Madhya Pradesh: Perception, crop raiding pattern and conflict dynamics”

Results and Discussion:

The study confirmed that elephants entered Bandhavgarh Tiger Reserve in 2018, marking the first official record of elephant presence in this landscape in modern times. This recent colonization has resulted in intense and widespread conflict within a short time span. Between 2018 and 2024, a total of 204 crop damage incidents, 96 property damage cases, and 8 human fatalities were recorded in 51 villages. Particularly alarming was the concentration of incidents in interstate entry-point and frequently used villages, where 24.6% of all house damage cases (n = 247) occurred and 9 human deaths were documented. These findings highlight the speed and severity with which conflict has escalated in newly occupied areas.

A detailed analysis of crop raiding revealed that elephants display a strong preference for the reproductive stage of crops, with 47.7% of incidents occurring during this phase. This behavior is likely linked to higher palatability and nutritional value. Conflict was seasonally skewed, with a marked peak in the post-monsoon period (September to November), coinciding with the harvest of staple crops such as paddy, wheat, maize, and banana. In the dry summer months, when fields lie fallow, elephants shifted their foraging behavior toward stored grain supplies, often breaking into traditional kaccha houses, of which 87% of surveyed households reported havingto access food. This resulted in extensive structural damage and heightened risk of human-elephant encounters.

Group dynamics also played a critical role in the intensity and nature of the conflict. Statistical tests showed that elephant herds caused significantly greater crop losses compared to solitary tuskers. A chi-square test revealed a significant association ($\chi^2 = 8.343$, $p = 0.015$), indicating that herds were more likely to be involved in events with over 25% crop loss. Conversely, logistic regression analysis showed that solitary tuskers were significantly more likely to cause structural damage to homes. The regression coefficient for tusker involvement was $B = 1.460$ ($p = 0.002$), with an odds ratio of 4.307, meaning tuskers were over four times more likely than herds to damage houses. Interestingly, neither the time of day ($p = 0.999$) nor season ($p = 0.686$) was a significant predictor of house damage, suggesting that these incidents were largely opportunistic and not seasonally driven.

The community’s response to conflict was diverse but largely ineffective. The majority of respondents attempted to protect their farms by guarding at night, using deterrents such as shouting and vehicle noises (84.4%), fire or firecrackers (84.4%), lights (24.3%), chilli smoke (10.5%), and in some rare cases, electric fencing (4.1%) or land abandonment (3.6%). Despite these efforts, 77% of

respondents reported continued crop raiding, and only 23% felt that guarding was even partially effective. This highlights the urgent need for more systematic and scientifically validated mitigation strategies.

Cultural attitudes toward elephants varied significantly across regions. Among the 218 respondents, 23.8% expressed tolerance toward elephants and viewed them as part of the natural landscape. In tribal-dominated areas such as Singrauli'sWaidhan and Mada regions, elephants were seen as divine beings, often associated with Lord Ganesh. In these areas, the belief that crops belonged to both humans and elephants promoted greater acceptance. However, in the Anuppur region, all respondents expressed unwillingness to coexist with elephants, regardless of income, education, or land ownership. This contradicts findings from other HEC studies that suggest socio-economic status significantly affects human attitudes. In the Central Indian context, cultural worldviews and local history appear to play a more influential role.

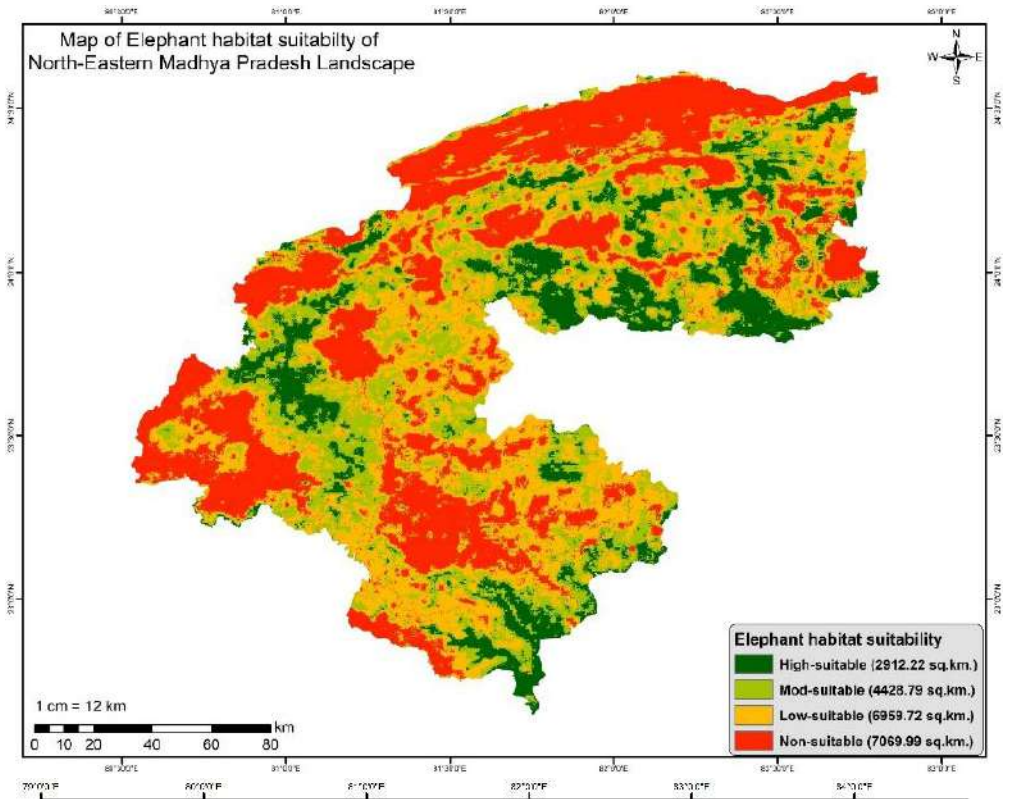
Compensation for damages was another critical theme in the study. Many affected individuals did not apply for compensation due to frustration with the lengthy and bureaucratic process. A statistically significant association was observed between failure to receive compensation and the type of procedural problem encountered ($\chi^2 = 43.000$, $p < 0.001$), with delays and cumbersome paperwork being the primary deterrents. This not only reduces trust in institutions but also increases the likelihood of retaliatory attitudes and negative perceptions toward elephants

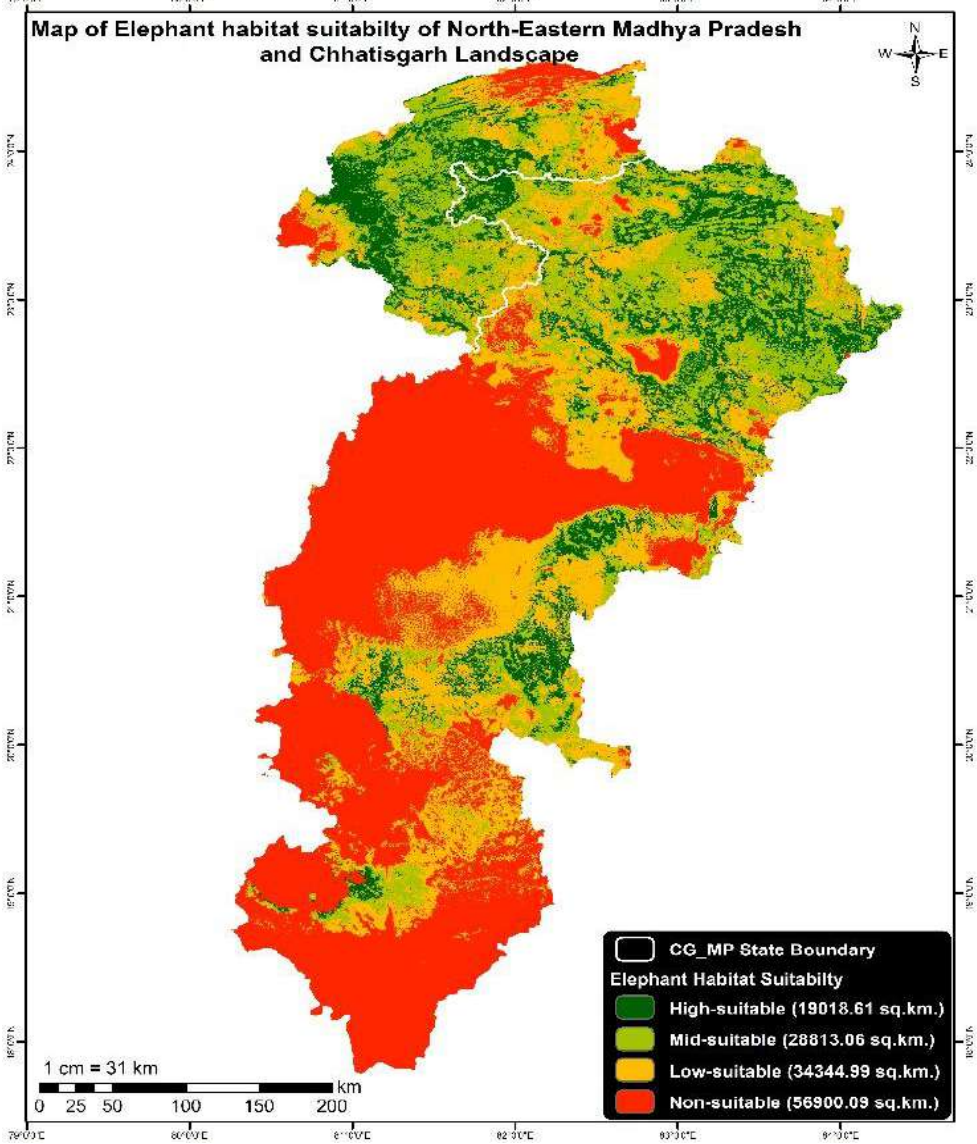
Cost of the Project: Rs. 50.00 lakhs

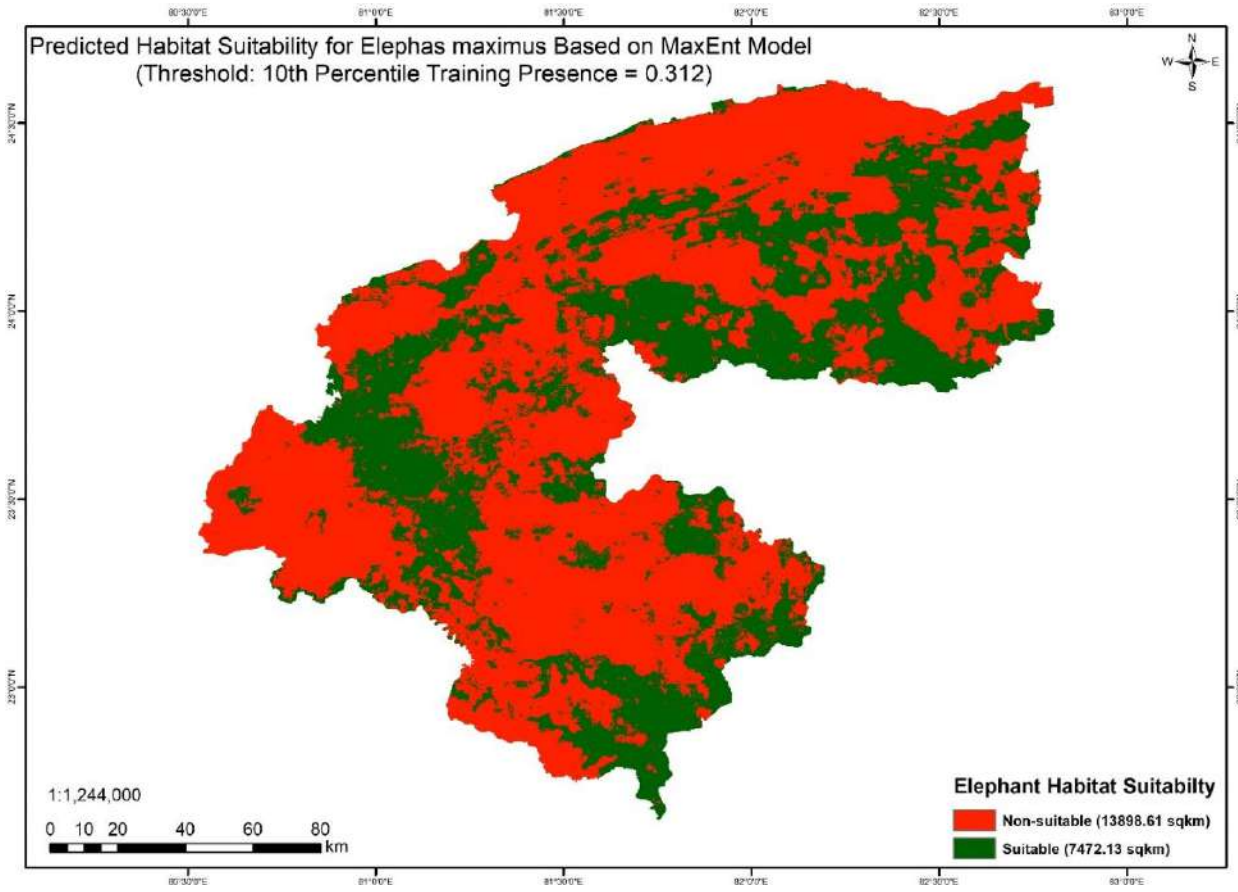
Expected Outcome of Research:

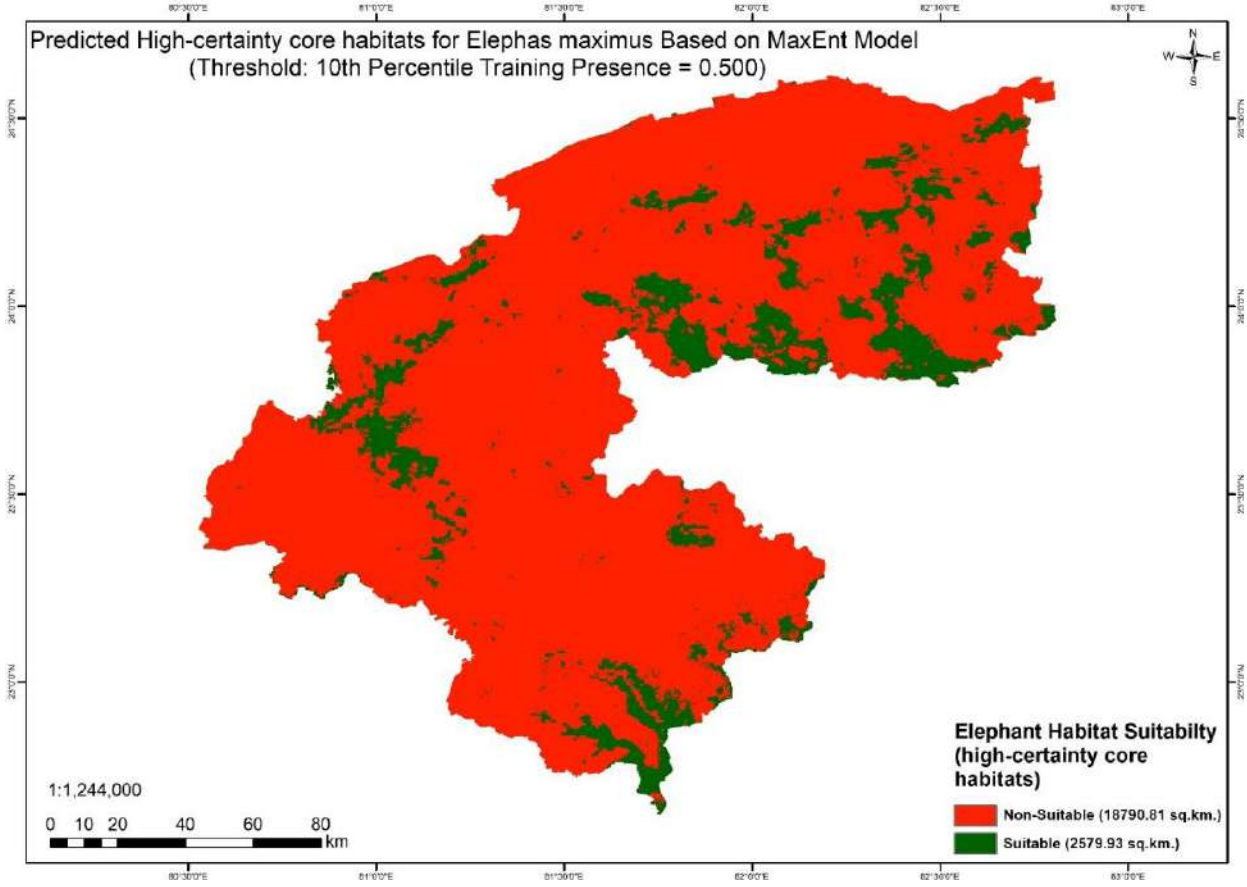
This integrated study produced several impactful outcomes. First, the habitat modeling generated high-resolution maps of suitable elephant habitat and movement corridors in the Eastern MP–CG landscape. These maps provide forest departments with robust spatial tools for conservation planning. Second, the village-level surveys identified high-risk zones of human–elephant conflict, especially around BTR's entry points. Third, the study shed light on nuanced behavioral patterns such as seasonal crop targeting and the differential impact of herds versus tuskers. Fourth, it revealed widespread dissatisfaction with existing mitigation and compensation systems, particularly in non-tribal areas where cultural tolerance was low. Finally, the interim findings underscore the complexity of conflict dynamics in newly colonized regions, suggesting that standardized HEC solutions may be insufficient without local adaptation.

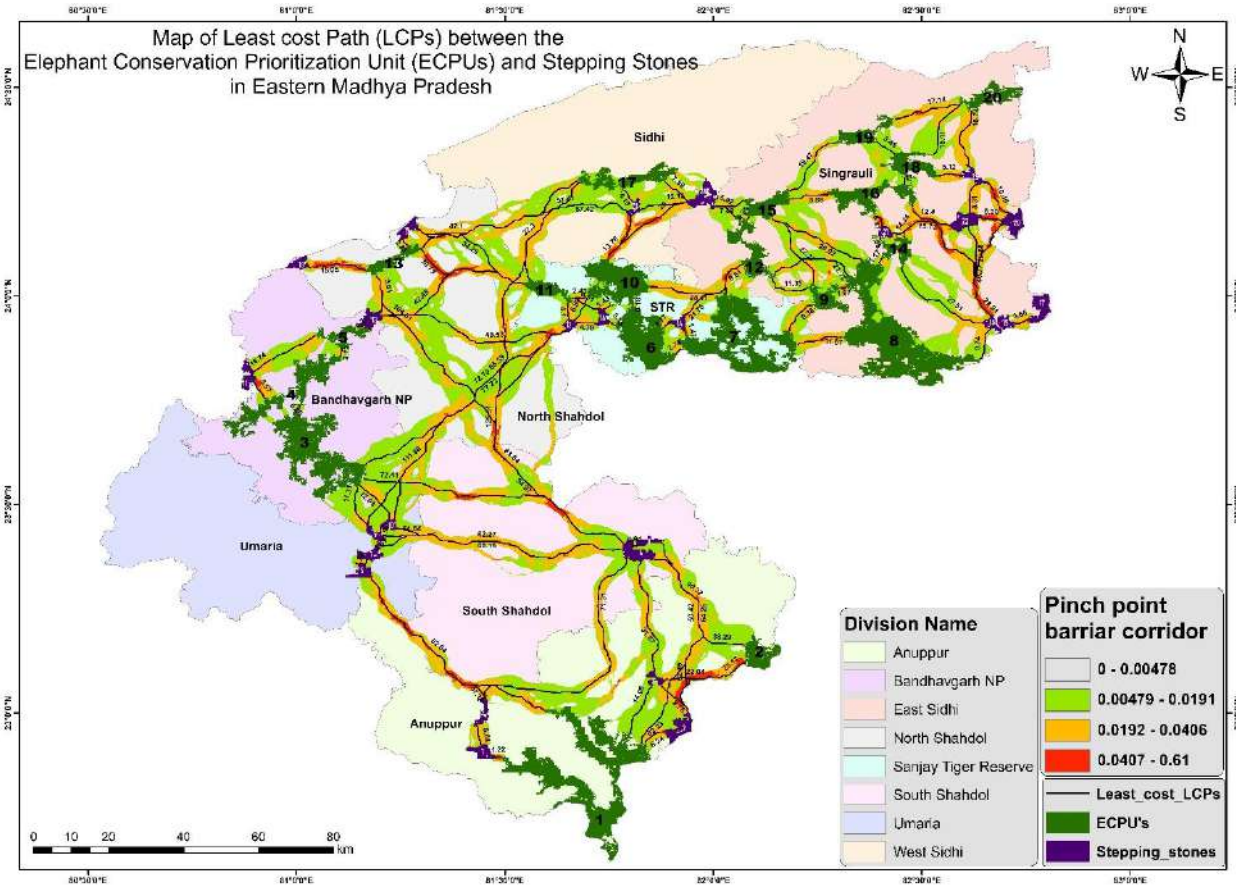
Recommendations : Based on interim findings these insights, several recommendations emerge. First, conservation planning should prioritize the protection and restoration of habitats and corridors identified as high suitability zones by the MaxEnt model, particularly those near riparian sandbeds and forest mosaics. Second, mitigation strategies should be tailored to seasonal patterns. For example, electric fencing should be deployed during peak crop seasons, while grain storage solutions—such as metal bins or raised granaries, should be introduced to reduce property damage in summer. Third, the state forest departments must urgently streamline the compensation process. Introducing a digital claim platform with pre-filled templates and tracking features could significantly increase uptake and satisfaction. Fourth, awareness and coexistence campaigns should leverage local cultural values, especially in tribal areas, by aligning elephant conservation with spiritual and community beliefs. In modernized or resistant zones such as villages located in Anuppur Forest Division and the buffer areas of Bandhavgarh Tiger Reserve (BTR), conservation messaging may need to emphasize economic security and personal safety. Finally, long-term monitoring and adaptive management are essential. This can be achieved through the creation of a real-time GIS dashboard that integrates habitat models, conflict data, and mitigation status, enabling rapid response teams to act swiftly and efficiently in emerging conflict zones.

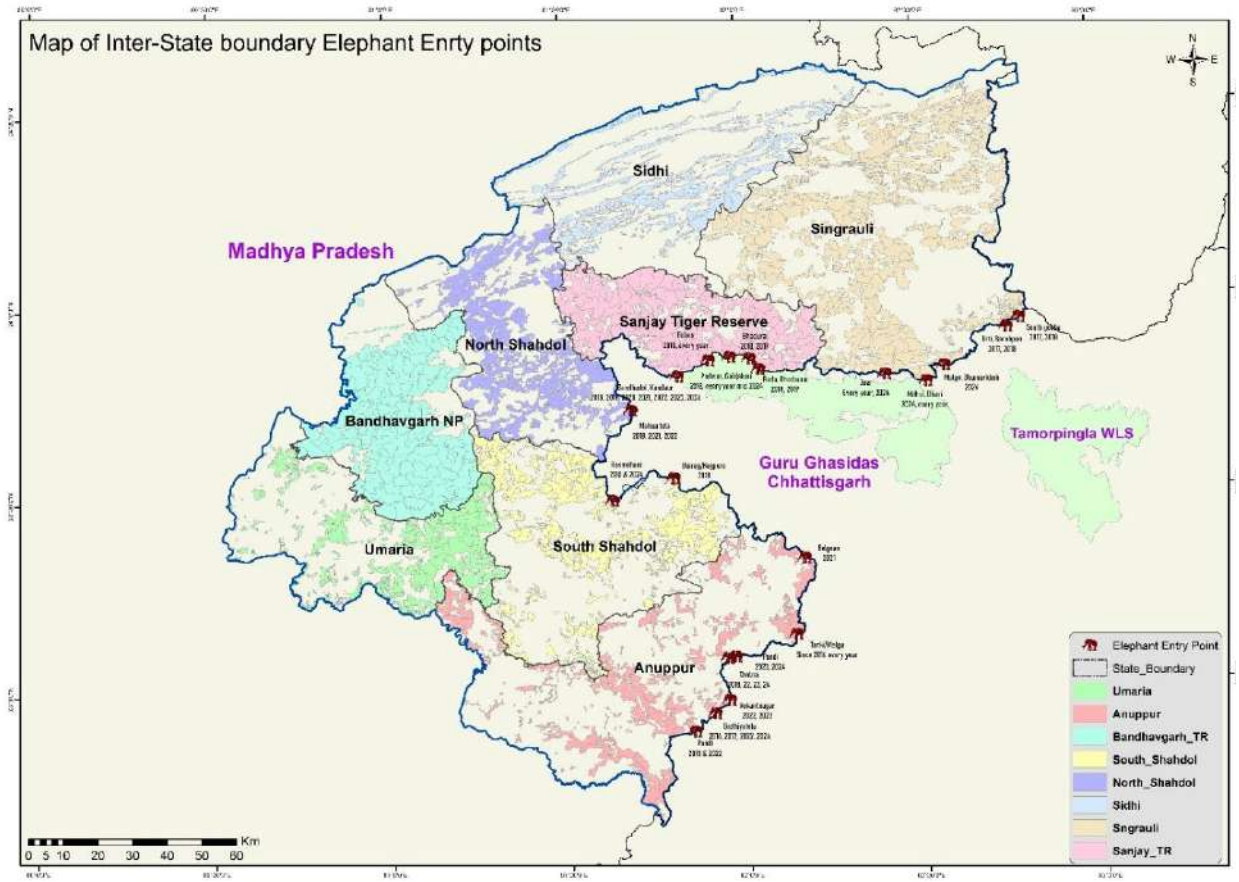

Map of Elephant habitat suitabilty of
North-Eastern Madhya Pradesh Landscape
N
W
E
S
Elephant habitat suitability
High-suitable (2912.22 sq.km.)
Mod-suitable (4428.79 sq.km.)
Low-suitable (6959.72 sq.km.)
Non-suitable (7069.99 sq.km.)
1 cm = 12 km
km
0 10 20 40 60 80

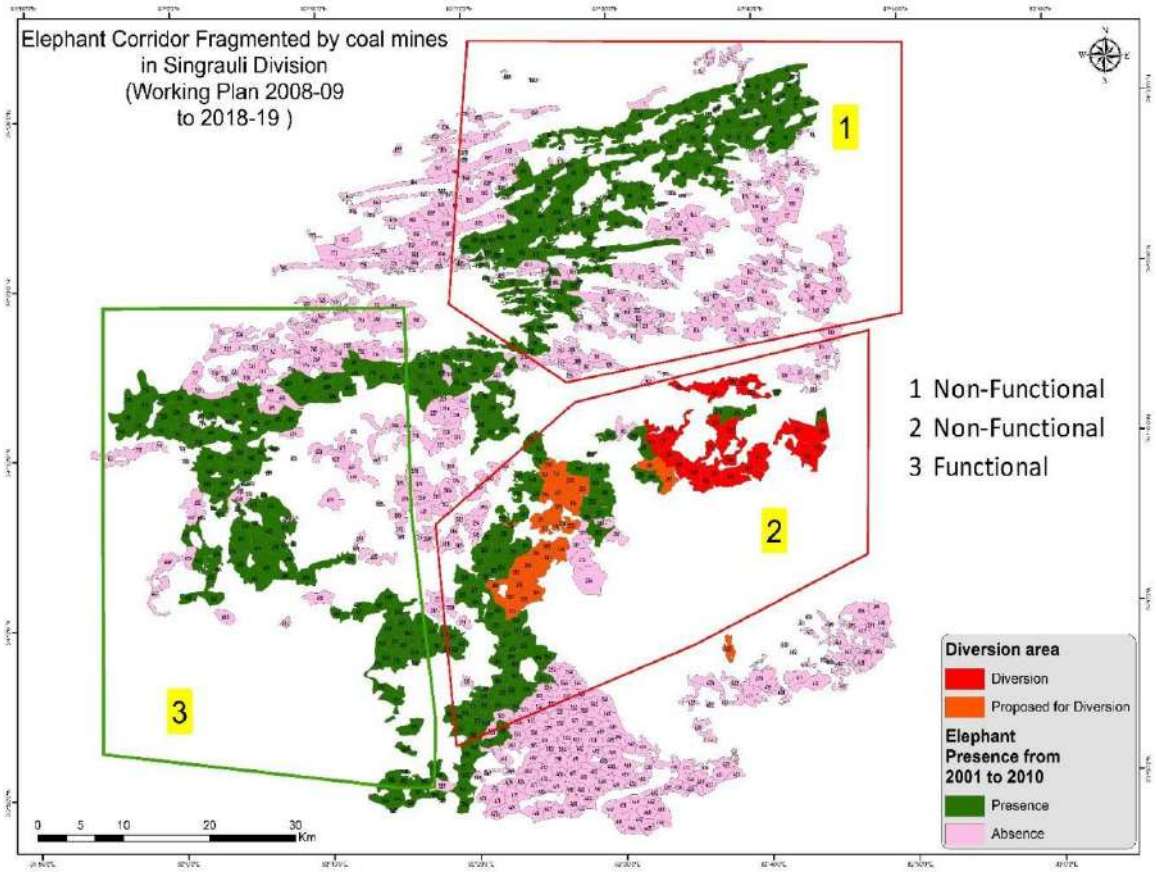

Map of Elephant habitat suitabilty of North-Eastern Madhya Pradesh
and Chhatisgarh Landscape
N
W
E
S
CG_MP State Boundary
Elephant Habitat Suitabilty
High-suitable (19018.61 sq.km.)
Mid-suitable (28813.06 sq.km.)
Low-suitable (34344.99 sq.km.)
Non-suitable (56900.09 sq.km.)
1 cm = 31 km
km
0 25 50 100 150 200


Predicted Habitat Suitability for Elephas maximus Based on MaxEnt Model
(Threshold: 10th Percentile Training Presence = 0.312)
N
W
E
S
1:1,244,000
0 10 20 40 60 80
km
Elephant Habitat Suitabilty
Non-suitable (13898.61 sqkm)
Suitable (7472.13 sqkm)

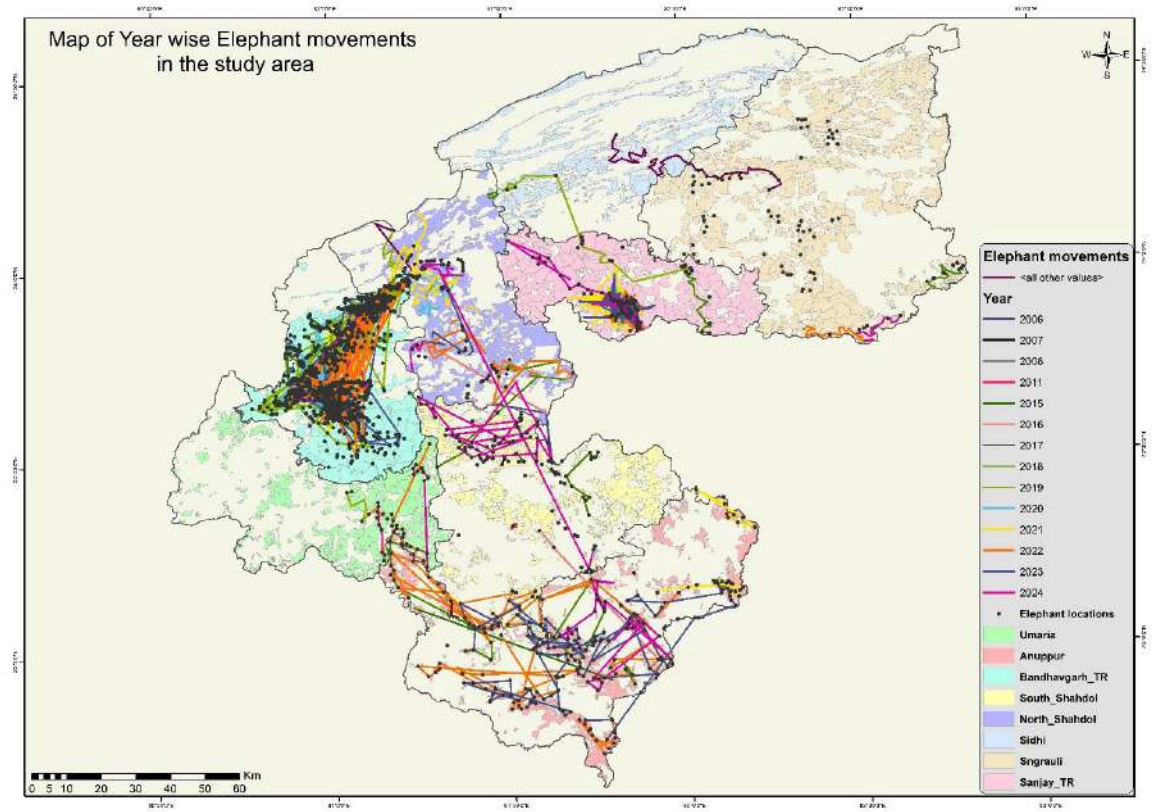

Predicted High-certainty core habitats for Elephas maximus Based on MaxEnt Model
(Threshold: 10th Percentile Training Presence = 0.500)
N
W
E
S
1:1,244,000
0 10 20 40 60 80
km
Elephant Habitat Suitabilty
(high-certainty core
habitats)
Non-Suitable (18790.81 sq.km.)
Suitable (2579.93 sq.km.)


Map of Least cost Path (LCPs) between the
Elephant Conservation Prioritization Unit (ECPUs) and Stepping Stones
in Eastern Madhya Pradesh
N
W
E
S
Sidhi
Singrauli
STR
Bandhavgarh NP
North Shahdol
Umaria
South Shahdol
Anuppur
0 10 20 40 60 80
km
Division Name
Anuppur
Bandhavgarh NP
East Sidhi
North Shahdol
Sanjay Tiger Reserve
South Shahdol
Umaria
West Sidhi
Pinch point
barriar corridor
0 - 0.00478
0.00479 - 0.0191
0.0192 - 0.0406
0.0407 - 0.61
Least_cost_LCPs
ECPU's
Stepping_stones


Map of Inter-State boundary Elephant Enrty points
N
W
E
S
Sidhi
Singrauli
Madhya Pradesh
Sanjay Tiger Reserve
North Shahdol
Bandhavgarh NP
Tamorpingla WLS
Guru Ghasidas
Chhattisgarh
Umaria
South Shahdol
Anuppur
0 5 10 20 30 40 50 60
Km
Elephant Entry Point
State_Boundary
Umaria
Anuppur
Bandhavgarh_TR
South_Shahdol
North_Shahdol
Sidhi
Singrauli
Sanjay_TR



"The elephant corridor was previously identified by Shri Amitabh Agnihotri, the then Working Plan Officer of the Singrauli Division, during the 2008–2009 to 2018–2019 planning period.
Block 1 and Block 2 Non-functional corridors of elephants.
Block 3- Functional Corridor of elephants



Wild tusker spotted in Jaithari range, Anuppur Division

Elephant presence in agricultural field.

Elephant roaming in Tala range, BTR.

Drone surveillance of wild elephants in Sanjay-Dubri Tiger Reserve.

Crop damage caused by wild elephants in Beohari Range, North Shahdol.

Community perceptions on potential solutions assessed through village survey

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Night-time patrols in high-risk villages prone to elephant activity</td><td>Frequent tusker activity near Anuppur interstate border.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Perception study on human-elephant interactions</td><td>Surveying human tolerance to animal nuisance</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Subadult tusker recorded in Bandhavgarh: A sign of expanding elephant range.</td><td>Interviews to develop localized HEC solutions</td></tr>
</table>

Other significant achievements :

- Monitoring and evaluation of plantation raised under the Green India Mission scheme by MPFD: In 2015-16, we evaluated and monitored 15 plantation sites established by the Madhya Pradesh Forest Department, located in the South Balaghat and Satna Forest Division of the Rewa circle.
- Monitoring and evaluation of plantation raised under the Green India Mission scheme by MPFD: In 2015-16, we evaluated and monitored 20 plantation sites established by the Madhya Pradesh Forest Department, located in the South Balaghat, Rewa and Satna Forest Divisions of the Rewa circle.
- Refresher Activities provided to DFO, SDO, Range Officers, Range assistants, forest Guard and students.

2.3 FACILITATION CELL

2.3.1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) CELL

Mandate

1. Environmental impact assessment and preparation of environmental management plans

List of project titles with names of funding agency

Completed Projects :- 02

1. Preparation of Phytosociological study of main species in and around upto 5km. the Manganese bearing area at Balaghat , M.P.
   Funding Agency: MOIL Limited Balaghar, M.P.
2. Baseline data generation work of Flora Fauna studies for preparation of EIA EMP Report for the three opencast coal mining projects of M/S Northern Coalfields Limited, Singrauli, M.P.
   Funding Agency: CMPDIL, Singrauli

Project summary
Completed Projects

1. Title of the Project:- Preparation of Phytosociological study of main species in and around upto 5km. the Manganese bearing area at Balaghat , M.P.

Why this project :-

The main purpose of the phytosociological analysis is to understand floristic vegetation characteristics, to estimate the species richness and diversity which is existing in the study area.

Research Methodology:

All studies will be carried out in 05 km surrounding areas of the proposed site. The proposed study site is located at the Manganese bearing area at Balaghat, Madhya Pradesh. Experimental plots shall be laid to assess priority sites for conservation one would ideally obtain biodiversity measures assessing the species richness, species diversity of the Floral species found at the site. The main purpose of the phytosociological analysis is to understand floristic vegetation characteristics, to estimate the species richness and diversity which is existing in the study area.

Study Design:

Systematic approach for assessment of the status of Phytosociological study of main species in and around upto 5 km. the Manganese bearing area at Balaghat will be adopted. The whole area of 05 km distance from the mine of the proposed will be investigated for preparation of inventory of flora. Qualitative and quantitative assessment of vegetation will be done by adopting standard ecological methods of working plan code 2014.

Qualitative and quantitative assessment of floral components consisting of tree, shrubs and regenerating tree species and ground vegetation will be undertaken. Standard plot size of 0.1 ha and other plots will be adopted.

Objectives of Research :-

- To assess the Phytosociological structure of main species in and 5 km surrounding areas of the proposed site.
- To analyze the density, frequency and abundance of tree diversity in the study area.

Activities Undertaken:-

- Collection of baseline data on existing flora of the area

Cost of the project:- Rs. 9,98,188 /-

Outcome of Research:–

- The whole study area was explored for inventorisation of forest flora.
- Qualitative and quantitative assessment of forest vegetation was done by adopting standard ecological methods.

- Assessment of vegetation has been conducted and diversity indices of natural vegetational cover in forestland were determined to understand the status of existing plant communities in the Bharweli mine.
- Final report submitted to Funding Agency

Plate1 - Field survey work for Sampling of vegetation

2. Title of the project:- Baseline data generation work of Flora Fauna studies for preparation of EIA EMP Report for the three opencast coal mining projects of M/S Northern Coalfields Limited, Singrauli, M.P.

Why this project:-

The present project work provides baseline data on flora and fauna studies conducted as part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for three open-cast coal mining projects of Northern Coalfields Limited (NCL) in Khadia Block of Singrauli, Madhya Pradesh. The State Forest Research Institute (SFRI), Jabalpur, conducted the study to assess the area's ecological status and biodiversity before further mining expansion.

Research Methodology:-

Data collection involved both primary and secondary methods. Vegetation surveys used standard ecological techniques, including plot-based sampling for trees, shrubs, and ground vegetation, while faunal surveys used line transects, point counts, opportunistic sampling and systematic sampling method integrating All India Tiger Estimation (AITE) data for mammal populations. The focus was on identifying species diversity, population densities, and any species of conservation concern.

Study Design:

Floral Diversity Assessment-

- Collection of primary & secondary data
- Assessment of tree, Shrub and Climbers and regeneration status.
- Assessment of ground vegetation

Faunal Diversity Assessment-

- Opportunistic-Sampling, Systematic-Sampling, Line-Transect-Method, Avian-Surveys, Analysis of AITE-2022-Data

Objectives of Research-

- To collect the baseline data generation work of flora fauna studies for preparation of EIA-EMP report for the three opencast coal mining projects.

Activities Undertaken-

- Collection of baseline data on existing flora of the area

Cost of the project- Rs. 8,44,880/-

Outcome of Research:

- Collection of baseline data on existing flora and fauna of the area
  Following 03 final reports submitted to funding agency

1. Baseline Data Generation work of Flora, and Fauna Studies for Preparation of EIA-EMP Report for the Three Open Cast Coal Mining Projects of M/S Northern Coalfields Limited, **Block-B** Singrauli.
2. Base line Data Generation work of Flora, and Fauna Studies for Preparation of EIA-EMP Report for the Three Open Cast Coal Mining Projects of M/S Northern Coalfields Limited, **Bina Block,** Singrauli

3. Baseline Data Generation work of Flora, and Fauna Studies for Preparation of EIA-EMP Report for the Three Open Cast Coal Mining Projects of M/S Northern Coalfields Limited, **Khadia Singraul.**

Plate1.- Inception meeting & Field survey work for Sampling of Flora and Fauna

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 :

- Samples were collected for estimation of carbon pool of 14 plantations under FDA project

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.

List of project titles with names of funding agency

Ongoing Projects : 02

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.
2. ग्रीन इंडिया मिशन, म.प्र. द्वारा विभिन्न वन विकास अभिकरणों में वर्ष 2019, 2020, 2021, 2022 में कॉम्पोनेन्ट A के विभिन्न सब मिशन अंतर्गत वृक्षारोपण कार्यों एवं कॉम्पोनेन्ट B सपोर्ट एक्टिविटी के कार्यों का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पैक्ट असेसमेंट (पी.आई.ए.) किये जाने के संबंध में।

   Funding Agency - अपर प्रधान मुख्य वन संरक्षक (ग्रीन इंडिया मिशन/वन विकास अधिकरण) म.प्र. भोपाल

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 एवं द्वितीय चरण के 360 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 360 वृक्षारोपणों का मूल्यांकन कार्य वर्ष 2022–23 एवं 2023–24 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–

No.	Evaluation Team	Circles and total No of plantations	Division and No of plantations
1	**1. Dr. Awadhesh Sharma, SRO** **2. Sh. Rakesh Jain, SRO** 3. Sh. Shobhakant Mishra,FG 4. Sh.Nitesh Soni,FG	20 Gwalior-09 Shivpuri-09 PTR-01 STR-01	1.Morena-02 2.Sheopur-07 3.Ashoknagar-02 4.Guna-03 5.Shivpuri-04 6.PTR-01 7.STR-01

2	**1.Dr Aniruddh Majumdar, ScientistB** **2.Sh. KLVerma,SRO** 3.Sh.Rajesh Dixit,FG 4.Sh.Basant Rajak, FG	20 Balaghat-03 Chhatarpur-10 Rewa-07	1.North Balaghat-01 2.South Balaghat-02 3.Chhatarpur-05 4.Tikamgarh-02 5.North Panna-02 6.South Panna-01 7.Rewa-07
3	**1. Dr. Sachin Dixit, SRO,** **2. Sh.Dharmendra Singh, Forester** 3. Sh. Anand Agarwal,FA 4. Sh. Pravindra Gwalvansh,FG	20 Betul-05 Sagar-15	1.North Betul-01 2.South Betul-03 3.West Betul-01 4.Damoh-07 5.North Sagar-03 6.South Sagar-05
4	**1.Sh. GS Mishra,SRO** **2.Smt Richa Seth,SRO** 3.Sh.Rakesh Uike,FG 4.Sh.Vijay Bahadur, TA	20 Rewa-16 Seoni-04	1.Sidhi-16 2.South Seoni-04
5	**1.Dr.Pratiksha Chaturvedi,SRO** **2.Sh.SS Raghuvanshi ,SRO** 3.Sh.Vijay Haldkar,Dy Ranger 4.Sh.Vinay Kori,FG	20 Bhopal-11 Ujjain-09	1.Bhopal-01 2.Raisen-02 3.Obedullaganj-01 4.Sehore-02 5.Rajgarh-03 6.Vidisha-02 7.Dewas-02 8.Neemuch-01 9.Ratlam-01 10.Shajapur-02 11.Ujjain-03
6	**1.Dr. Anjana Rajput, SRO** **2.Dr.Mayank MakrandVerma,SRA** 3.Sh.C.P.Mishra, FG 4.Sh.Deendayal, FG	20 Rewa-20	1.Satna-10 2.Singrauli-10
7	**1.Smt.Abhishweta Rawat,RRO** **2.Smt.Madhuri Shrivastav, RA** 3.Sh.Sajid Ali, Dy Ranger 4. Sh.SantLal Kudape, Forester	20 Indore-05 Khandwa-12 Hosangabad-03	1.Dhar-02 2.Indore-02 3.Jhabua-01 4.Barwah-01 5.Barwani-01 6.Burhanpur-04 7.Khandwa-02 8.Khargoun-02 9.Sedhwa-02 10.Harda-02 11.Hosangabad-01
8	**1.Dr.Uday Homkar, SRO** **2.Sh.Amit Pandey,SRO** 3. Sh.Sunil Rajak,Dy Ranger 4. Sh.Sushil Thakur, FG	20 Chhindwara-11 Seoni-09	1.East Chhindwara-06 2.West Chhindwara-03 3.South Chhindwara-02 4.Narsinghpur-02 5.North Seoni-07
9	**1.Dr.Jyoti Singh,SRO** **2.Sh. Girish Shukla, RO** 3. Sh.S.S. Mehta, Dy Ranger 4. Sh.Alok Raikwar,TA	20 Jabalpur-12 Shahdol-08	1.Dindori-03 2.East Mandla-03 3.Jabalpur-01 4.Katni-01 5.West Mandla-04 6.Anuppur-01 7.North Shahdol-03 8. South Shahdol-01 9.Umaria-03

तृतीय चरण के चयनित 180 वृक्षारोपणों का क्षेत्रीय मूल्यांकन कार्य प्रगति पर है एवं वृक्षारोपण स्थलों का डाटा फीडिंग, डाटा एनालिसिस, प्रतिवेदन तैयार करने 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।

Deliverable technologies developed in each project for stakehaolders, forest professionals, field foresters and other beneficiaries - वन विभाग के क्षेत्रीय अमले के लिए।

Monitoring & Evaluation work of GIM Plantation at South Sagar division Inspection by Director SFRI, Jabalpur

Monitoring & Evaluation work of GIM Plantation at Hoshangabad division Inspection by Dy. Director SFRI, Jabalpur

Plantation Evaluation Workplace South Sagar Division

Plantation Evaluation Workplace South Sagar Division

Plantation Evaluation Workplace Hoshangabad Division (GIM)

2. Title of the Project:- ग्रीन इंडिया मिशन, म.प्र. द्वारा विभिन्न वन विकास अभिकरणों में वर्ष 2019, 2020, 2021, 2022 में कॉम्पोनेन्ट A के विभिन्न सब मिशन अंतर्गत वृक्षारोपण कार्यों एवं कॉम्पोनेन्ट B सपोर्ट एक्टिविटी के कार्यों का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पैक्ट असेसमेंट (पी.आई.ए.) किये जाने के संबंध में।

Why this Project:-

- ग्रीन इंडिया मिशन के अंतर्गत कराये गये वृक्षारोपण जो लगभग 6 वर्ष के हो गये हैं उन वृक्षारोपणों का मूल्यांकन किया जाना अत्यन्त आवश्यक है क्योंकि मूल्यांकन के परिणामों के आधार पर भविष्य में किए जाने वाले वृक्षारोपण की रणनीति निर्धारण में सहायक होगा।
- वृक्षारोपण परियोजनाओं के सफल क्रियान्वयन के लिए एवं बेंच मार्किंग के लिए।

Research Methodology:-

PCCF GIM, मध्य प्रदेश, भोपाल के द्वारा दिए गए निर्देशानुसार मध्यप्रदेश के प्रत्येक संभाग के लिए वृक्षारोपण का चयन स्तरीकृत यादृच्छिक नमूनाकरण (Stratified random sampling) के आधार पर किया गया। इस परियोजना के अंतर्गत वर्ष 2019 से 2021 तक ग्रीन इंडिया मिशन के तहत कुल 323 वृक्षारोपण स्थलों का चयन किया गया जिसमें से 105 वृक्षारोपण में कुल 6037.33 हेक्टेयर क्षेत्र को शामिल किया गया। जिसमें मध्यप्रदेश के 18 वनमण्डल का चयन किया, जो कुल क्षेत्रफल का लगभग 30% है। ग्रीन इंडिया मिशन के अंतर्गत 11 सबमिशन को शामिल किया गया हैं। जो निम्नानुसार है–

Submission
Submission 1(a) Moderately dense forest cover , but showing degradation
Submission 1 (b) Type A Ecorestoration of degraded open forest with plenty of root stocks
Submission 1 (b) Type B Ecorestoration of degraded open forest with limited root stocks and blanks
Submission 1(b) Type C Ecorestoration of degraded open forest of largely open areas with sparse undergrowth
Submission 1 (c) Restoration of grasslands
Submission 2 (f) Restoration of abandoned mining areas
Submission 3 (a) Plantation in urban and peri urban areas
Submission 4 (a) Agroforestry and social forestry in farmers land including current fallows
Submission 4 (b) Agroforestry and social forestry in Shelterbelt plantation
Submission 4 (c) Agroforestry and social forestry in Highway/ Rural roads/ canals/ Tank Bunds
Submission 5 Restoration of wetlands

संपूर्ण डिज़ाइन सांख्यिकीय रूप से सुदृढ़ है, ताकि कम से कम मानव–पक्षपात हो। सबमिशन के उद्देश्यों के अनुरूप मूल्यांकन कार्य किया गया। ग्रीन इंडिया मिशन वित्तपोषी संस्था के द्वारा दिये गये निर्धारित प्रपत्रानुसार वनमण्डल स्तर एवं परिक्षेत्र स्तर पर जानकारी एकत्र कर मूल्यांकन कार्य किया गया। इसमे प्रदेश के 18 वन मंडलों लिये गये है। इनमें दक्षिण सिवनी, शिवपुरी, श्योपुर, धार, झाबुआ, बडवानी, सेंधवा, उत्तर बैतूल, दक्षिण पन्ना, उमरिया, औबेदुल्लागंज, रायसेन, दक्षिण सागर, नर्मदापुरम, सतना, दक्षिण बालाघाट, सीहोर, पश्चिम बैतूल शामिल हैं।

मूल्यांकन कार्य के अंतर्गत पौधों की वृद्धि एवं जीवितता प्रतिशत का अध्ययन किया गया और आसपास के परिवेश में बदलाव का भी अध्ययन शामिल किया गया। ग्रीन इंडिया मिशन का उद्देश्य केवल पर्यावरणीय उत्थान नहीं, बल्कि सामाजिक लाभ भी है। इस परियोजना के अंतर्गत वैज्ञानिक इस बात का भी मूल्यांकन कर रहे है कि मिशन के तहत पौधारोपण से ग्रामीणों की जीवनशैली में कितना सुधार हुआ और स्थानीय समुदायों के रोजगार और जीवन स्तर पर कितना प्रभाव डाला है।

Study Design:- ग्रीन इंडिया मिशन के अंतर्गत वर्ष 2019 से 2021 तक के कुल 323 वृक्षारोपण स्थल का चयन किया गया जिसमें से 105 वृक्षारोपण में कुल 6037.33 हेक्टेयर क्षेत्र को शामिल किया गया। जिसमें मध्यप्रदेश के 18 संभागों का चयन किया, जो कुल क्षेत्रफल का लगभग 30% है।

Objectives of project:-

- 5 मिलियन हेक्टेयर (MHA) की सीमा तक वन/वृक्ष आवरण में वृद्धि और अन्य 5 मिलियन हेक्टेयर वन/गैर–वन भूमि के वन/वृक्ष आवरण की गुणवत्ता में सुधार।
- कार्बन पृथक्करण और भंडारण (जंगलों और अन्य पारिस्थितिक तंत्रों में), जल विज्ञान सेवाएं और जैव विविधता जैसी बेहतर/संवर्धित पारिस्थितिकी तंत्र सेवाएं; ईंधन, चारा, और लकड़ी और गैर–लकड़ी वन उत्पाद (एनटीएफपी) जैसी प्रावधान सेवाओं के साथ।
- लगभग 30 लाख परिवारों की वन आधारित आजीविका आय में वृद्धि।
- आने वाले भविष्य में वार्षिक CO_2 पृथक्करण को 50 से 60 मिलियन टन तक बढ़ाया जाएगा।

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।

Cost of the project : 81,40,500/–

Expected Impact of the Project:- यह मूल्यांकन भविष्य में की जाने वाली परियोजनाओं की सफल क्रियान्वयन में सहायक सिद्ध होगा।

Deliverable technologies developed in each project for stakehaolders, forest professionals, field foresters and other beneficiaries - वन विभाग एवं स्थानीय लोगो के लिए।

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.

Other activities:-

- Performed various activities as a Co-PI in the research project" Prepatation of phytosociological study of main species in and around upto 5 km the manganese bearing area at Balaghat, M.P".
- Performed various activities as a Team Member, project “Evalution and monitoring of 20 plantations of different forest divisons.
- Evalution and Monitoring of 10 plantations of Sidhi forest divison alongwith field work, data analysis, computerization and report writing
- Perform tasks in GIM project i.e. data analysis, computerization and help in report writing of 11 plantations of Sheopur Forest division
- 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.”
- Provided One day “Educational tour and training on using GIS and RS technology in vector surveillance” for M.Sc. Public Health Entomology students of ICMR-NIRTH, Jabalpur, dated 02/08/2024 at SFRI

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

Dissemination of information

a. Annual Research Report

The Annual Research Report for 2023-24 was prepared, published and hosted on website of the institute.

b. Training on concept of Soil Moisture Conservation and its Importance in forestry

Two training programs have been organized in three days each from 24/06/2024 to 26/06/2024 and from 27/06/2024 to 29/06/2024 by the Forest Management Division of State Forest Research Institute, Jabalpur. In which a total of 55 trainees from West Chhindwara, Vidisha, South Sagar, Kanha Tiger Reserve (Buffer/Core), Dindori, West Mandla, South Seoni, South Balaghat, Damoh, Khandwa, Burhanpur, Dhar, Ashoknagar, Shivpuri, Gwalior, Tikamgarh, Raisen, North Panna and Jabalpur Forest Divisions participated in the trainings.

Classroom session and field demonstration programme

c. Organization of training programme on "Logging and Timber Grading Skill Upgradation"

The training program was sponsored by the Principal Chief Conservator of Forests (Production). The training program was organized by conservation division of SFRI in two phases on 10-11 September 2024 and 18-19 September 2024 at the State Forest Research Institute. In the first phase of this training program, 52 forest rangers, deputy forest rangers, foresters and forest guard level officers and employees from 17 forest divisions participated, and in the second phase, 58 forest rangers, deputy forest rangers, foresters and forest guard level officers and employees from 20 forest divisions participated

Classroom session and field demonstration programme

d. Organizing a two-day training cum workshop on tree planting techniques

The first phase of the two-day training cum workshop on the technique of tree plantation was organized by conservation division on 12.09.2024 and 13.09.2024 at the State Forest Research Institute, Jabalpur with the financial support of Principal Chief Conservator of Forests (Development), Van Bhawan Bhopal Madhya Pradesh, in which 102 range officers from 45 forest divisions participated.

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 Rajiv Gandhi Sahbhagi Vaniki Training Institute, Lakhnadaun, Forest Guards Training School, Govindgarh, Telangana Forest Academy, Dulaplly, Hydrabad, Chandrapur Forest Academy, Chandrapur, IIFM Bhopal, Uttrakhand Forest Training Academy, Haldwani, IGNFA, Dehradoon and students from PPN (PG) College, Kanpur (U.P.), JNKVV, Jabalpur, St. Aloysius Institute of Technology, Jabalpur, Guru Ramdas Khalsa Institue of Sceince & Technology, Jabalpur, Govt. College, Majholi, Govt. Model 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

f. Training on Forest Genetics, Biotechnology and Plant Tissue Culture

The Biotechnology Division of the Institute provided 7-days training to 14 students of B.Sc. Biotechnology 3rd year and 10-days training to 28 students of B.Sc. Biotechnology 4th year of the Government Science College, Jabalpur.

g. MoU between State Forest Research Institute, Jabalpur and Gyan Ganga Institute of Technology and Sciences, Jabalpur

A Memorandum of Understanding (MoU) has been signed between State Forest Research Institute, Jabalpur and Gyan Ganga Institute of Technology and Sciences, Jabalpur on 16/01/2025 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.

h. State Forest Research Institute Jabalpur participated in the First Mahakoshal Science Fair 2024

The first Mahakoshal Science Fair was organized by Madhya Pradesh Council of Science and Technology, IIITDM, Jabalpur and Mahakoshal Science Council from 15-18 November 2024 at Veterinary University Ground, Jabalpur, in which more than 100 state level institutions participated. The State Forest Research Institute (SFRI), Jabalpur displayed various prevalent activities and implemented achievements of the institute such as lac production and research work, cultivation techniques and use of medicinal plants, practical forestry and wildlife research field work through a stall in the science fair. .

i. Participation of the Institute in International Herbal Fair, Bhopal

State Forest Research Institute, Jabalpur participated in the International Herbal Forest Fair, Lal Parade Ground, Bhopal organized from 17/12/2024 to 23/12/2024. The visitors coming to the stall were provided with information related to the research activities of the institute and the information sought by them and publicity was done by providing brochures and magazines related to the research activities of the institute among the visitors.

Participation of the Institute in International Herbal Fair, Bhopal

j. Participation of the Institute in Kisan Mela cum Exhibition

Weed Research Institute, Jabalpur (Indian Council of Agricultural Research) organized a one-day Kisan Mela cum Exhibition on 18/02/2025, in which State Forest Research Institute, Jabalpur participated. The institute gave a live demonstration of medicinal plants, important species and conservation and promotion of lac insect in the one day farmer cum exhibition fair. Information was provided about the research work done by the institute in the last 100 years, conservation of medicinal and aromatic plants, and advanced farming.

Organization of Meetings

S. N.	Meeting	Organised by	Place	Date of organization	Participants
1.	39th Board of Governor (BOG)	SFRI Jabalpur	Van Bhawan, Bhopal	19.09.2024	Chairman and Members of the BOG
2.	Meeting on reorganization of editorial board of JTF	JTF Committee	SFRI Jabalpur	05.02.2025	JTF members
3.	Organization of 48th meeting of Research Advisory Committee of the Institute	Extenstion and Training Cell, SFRI, Jabalpur	Van Bhawan, Bhopal	26/03/2025	Chairman and Members of the RAC
4.	MoU with Gyan Ganga Institute of Technolgy and Sciences, Jabalpur	SFRI, Jabalpur	Meeting hall SFRI, Jabalpur	16/01/2025	SFRI and GGITS members

Participation in Fairs :

S.No.	Event	Date	Place
1.	MahakoshaVigyan Mela Jabalpur.	15 to 18 Sept. 2024	Jabalpur
2.	International herbal fare, Bhopal	17 to 23 Oct.2024	Bhopal
3.	Kisan Mela Jabalpur	18.02.2025	Jabalpur

Organization of trainings

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	Training on project formulation	Forest Productivity Division, SFRI	SFRI Jabalpur	03.07.2024	Field foresters and Samiti members.	-
2.	Meeting on preparation of training module for Training and demonstration programme on sustainable harvesting	Forest Productivity Division, SFRI	SFRI Jabalpur	04.07.2024	Field foresters and samiti members of Panna,	-

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
	and management practices for collection of quality flowers and fruits of *Emblicaofficinalis, Buchnanialanzan, and Madhucalatifolia*.				Chhindwara and Shehdol Division	
3.	Nursery plant protection from insects.	MPRVVN, Seoni	Hirri Sangam, Seoni	6.3.25	Forest staff of MPRVVN	50
4.	Identification, conservation and marketing of Medicinal plant.	Govt. PG College Panagar	Govt. PG College Panagar	28.2.25	Students of B.Sc. & teachers	80
5.	Logging and Timber Grading Skill Upgradation	Conservation division SFRI	SFRI Jabalpur	10-11.09 2024 and 18-19.09.2024	Forest staff of M.P.	111
6.	वृक्षारोपण करने की तकनीक पर दो दिवसीय प्रशिक्षण सह–कार्यशाला	Conservation division SFRI	SFRI Jabalpur	05-06.09 2024 and 12-13.09 2024	Forest staff of M.P	200
7.	visit organized of B.Sc. (Forestry) students from JNKVV, Jabalpur	SFRI Jabalpur	SFRI Jabalpur	23-09-2024	B.Sc. (Forestry) students	15
8.	visit organized of students from Guru Ram Das Khalsa College, Jabalpur	SFRI Jabalpur	SFRI Jabalpur	03-12-2024	Under Graduate Students	59
9.	Biotechnology Training Provided to students of Govt. Science College, Jabalpur	Biotechnology Division	SFRI Jabalpur	One Week (06/01/2025)	Under Graduate Students	14
10.	Biotechnology Training Provided to students of Govt. Science College, Jabalpur	Biotechnology Division SFRI	SFRI Jabalpur	10 Days (10/01/2025)	B.Sc.IV year	28
11.	visit organized of students from Govt. College Manjoli Jabalpur	SFRI Jabalpur	SFRI Jabalpur	30-01-2025	B.Sc. students	21
12.	Lecture delivered to students PPN (PG) College, CSJM University, Kanpur (UP) on research activities, quality seed collection, certification & testing and nursery management.	SFRI, Jabalpur	SFRI, Jabalpur	08.04.2024	M.Sc./ MA Students	16
13.	Lecture delivered to trainee Forest Guards from Forest Training School, Govindgarh, Rewa on research activities, quality seed collection, certification & testing and nursery management.	Extension and Training Cell, SFRI, Jabalpur	SFRI, Jabalpur	26-05-2024	Trainee FG	41
14.	Lecture delivered to trainee Rajiv Gandhi Sahbhagi Vaniki Training Institute, Lakhnadun, Seoni on research activities, quality seed collection, certification & testing and nursery management.	Extension and Training Cell, SFRI, Jabalpur	SFRI, Jabalpur	26-05-2024	Trainee FG	34
15.	Lecture delivered to trainee IFS from Training School, Dehradun on research activities, quality	Extension and Training Cell, SFRI,	SFRI, Jabalpur	30.05.2024	Trainee IFS	15

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
	seed collection, certification & testing and nursery management.	Jabalpur				
16.	Lecture delivered to trainee FRO Telangana Forest Academy from Hyderabad on research activities, quality seed collection, certification & testing and nursery management.	Extension and Training Cell, SFRI, Jabalpur	SFRI, Jabalpur	18.07.2024	FRO's	34
17.	Lecture delivered to trainee FRO Chandrapur Forest Academy from Maharashtra on research activities, quality seed collection, certification & testing and nursery management.	Extension and Training Cell, SFRI, Jabalpur	SFRI, Jabalpur	21.08.2024	FRO's	30
18.	Lecture delivered to trainee FRO UK Forestry training academy, Haldwani, Naineetal (UK) on research activities, quality seed collection, certification & testing and nursery management.	Extension and Training Cell, SFRI, Jabalpur	SFRI, Jabalpur	19.12.2024	FRO	38
19.	Lecture delivered to IFS MP Cadre on research activities, quality seed collection, certification & testing and nursery management.	Extension and Training Cell, SFRI, Jabalpur	SFRI, Jabalpur	22.01.2025	Trainee IFS	16
20.	Lecture delivered to IFS from IGNFA, Dehradun (Mid Carrier Training) on research activities, quality seed collection, certification & testing and nursery management.	Extension and Training Cell, SFRI, Jabalpur	SFRI, Jabalpur	02-02-2025	IFS	35
21.	Lecture delivered to Tamil Nadu Forest Officers from IIFM, Bhopal on research activities, quality seed collection, certification & testing and nursery management.	Extension and Training Cell, SFRI, Jabalpur	SFRI, Jabalpur	21.09.2024	IFS	16
22.	Training on concept of Soil Moisture Conservation and its Importance in forestry	Forest Management division SFRI	SFRI, Jabalpur	24 June - 26 June 2024 & 27 June - 29 June 2024	Field Staff	29 26
23.	Orientation programme on Wildlife population monitoring tools and technologies, Tiger reintroduction & habitat improvement	Wildlife division SFRI Jabalpur	SFRI, Jabalpur	08-10-2024	St. Aloysius Institute of Tech., Jabalpur	35 Students

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.	कार्यशालाः रोपणी प्रबंधन एवं तकनीक।	R&E Jabalpur	R&E Jabalpur	04.10.2024	30
2.	State-level Multi-stakeholder Consultation		Courtyard by Marriott,	15.04.2024	01

S.N.	Name of the programme	Organized by	Venue	Date	Participants
	Workshop under the Project strengthening Landscape Management		Bhopal		
3.	Attended executive council meeting of the Society of Tropical Forestry.	Director SFRI, Jabalpur	SFRI Jabalpur	13.05.2024	Scientific staff, JTF Editorial Staff
4.	Attended executive council meeting of the Society of Tropical Forestry.	Director SFRI Jabalpur	SFRI Jabalpur	13.01.2025	Scientific staff, JTF Editorial Staff
5.	Attended executive council meeting of the Society of Tropical Forestry.	Director SFRI, Jabalpur	SFRI Jabalpur	13.02.2025	Scientific staff, JTF Editorial Staff
6.	Attended 48th RAC meeting.	SFRI, Jabalpur	Van Bhawan, Bhopal	26.03.2025	Scientists & SROs with RAC members
7.	Attended presentation on Third National Lak Insect Day	SFRI, Jabalpur	SFRI, Jabalpur	16/05/2024	01
8.	Attended celebration of International Biodiversity Day Theme “Be part of the plan” for biodiversity conservation	Madhya Pradesh Biodiversity Board ,Van Bhawan, Bhopal	SFRI, Jabalpur	22/05/2024	SFRI Staff
9.	Attended meeting for Journal of Tropical Forestry	SFRI, Jabalpur	SFRI, Jabalpur	13/02/2025	JTF Staff
10.	Annual Review Meeting on Project "Restoration Ecology and Monitoring of Grasslands in Kanha Tiger Reserve, Madhya Pradesh"	Field Director, Kanha Tiger Reserve, Mandla (M.P.)	Kanha Eco-Centre, Kanha Tiger Reserve, Mandla (M.P.)	25 to 26 Oct. 2024	01
11.	Presentation of New Project proposal in-front of Technical Committee	Principal Chief Conservator of Forest (Wildlife), Bhopal	Online Meeting	29/01/2025	02

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. Sale of SFRI Publication
6. Maintenance of Forest archive

Activities

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

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

Technical Bulletins

S N.	Bulletin No.	Title	Year	Price (INR)
1	2	Volume Table of Terminalia tomentosa for M.P.	1963	70.00
2	4	Yield Table of Sal for M.P.	1966	70.00
3	5	Seed Directory vol. I	1967	30.00
4	9	Standard Volume Table of Teak for S.Chhindwara in M.P.	1971	70.00
5	10	Family Ranunculaceae to Polygonaceae in M.P. (Monograph of 13 family)	1971	25.00

S N.	Bulletin No.	Title	Year	Price (INR)
6	11	Teak growth tables of different ecological forest types in M.P.	1971	70.00
7	12	Standard volume tables of *Boswellia serrata* for Nimar tract in M.P.	1971	70.00
8	15	Bark Table for *Boswellia serrata*	1971	25.00
9	16	Family Linanceae to Berseraceae	1974	25.00
10	18	Species for plantation in M.P. (Reprint 1996)	1977	100.00
11		मध्यप्रदेश में वृक्षारोपण के लिये उपयुक्त प्रजातियां	1977	100.00
12	22	Bamboo Plantation	1986	50.00
13	23	Fuel wood removal by headloads-A case study of Jabalpur	1987	20.00
14	24	Eucalyptus cultivation in M.P. – JTF	1987	25.00
15	26	Socio-economic Potential of Minor Forest Produce in M.P.	1991	75.00
16	28	Material for forest flora of Madhya Pradesh	1996	150.00
17	29	Tissue culture protocols for Teak, Neem & Khamer	1997	150.00
18	30	Growth statistics of forest plantations	1997	75.00
19	31	Medicinal plant of M.P. distribution, cultivation & trade	1998	200.00
20	32	Local Volume Table for Teak, Sal and other species	1997	60.00
21	33	Price Trends of some medicinal plants	1998	80.00
22	34	Biological Diversity of SFRI premises	1998	50.00
23	35	Seed production in Teak Seed Orchards in M.P.	1998	100.00
24	36	Seed certification protocol of forest tree species	1998	75.00
25	37	Tissue culture protocols for important medicinal plants of M.P.	1998	30.00
26	38	Macro-propagation protocol of some tree and medicinal plants species.	1998	40.00
27	39	Yield and stand tables of teak in Madhya Pradesh	1998	200.00
28	40	An Annotated Bibliography of Bamboo	1999	50.00
29	41	Status survey of Non Timber Forest Produce in primary Tribal Markets: A case study in Amarkantak Plateau.	1999	100.00
30	42	Application of laboratory seed testing results in nursery practices.	2000	50.00
31	43	म0प्र0 में भिलवा का सामाजिक आर्थिक विश्लेषणात्मक अध्ययन।	2000	100.00
32	44	Silviculture research in M.P.	2000	150.00
33	45	Handbook of Bamboos with particular reference to M.P.	2002	80.00
34	46	औषधीय पौधों की खेती की प्रचार प्रसार पत्रिका।	2003	150.00
35	47	Medicinal herbs in trade: a study of safed musli (*chlorophytum* species) in Madhya Pradesh	2003	20.00
36	48	Collection, processing and marketing of *Buchanania lanzan* in Madhya Pradesh	2005	20.00
37	49	मध्यप्रदेश के महत्वपूर्ण आयुर्वेदिक पादप	2005	70.00
38	50	आंवला वृक्षारोपण एवं आर्थिक महत्व	2008	50.00
39	51	उच्च गुणवत्ता के बीज एकत्रीकरण, भण्डारण, उपचारण, प्रमाणीकरण तथा बीजोत्पादन क्षेत्रों के चयन एवं प्रबंधन पर दिग्दर्शिका।	2008	50.00
40	52	Floral Diversity of Kanha Tiger Reserve	2009	900.00
41	53	Nursery and Planting technique of Tree Species	2010	100.00
42	54	Forest Glossary for All (English – Hindi)	2010	50.00
43	55	वृक्षारोपण मार्गदर्शिका	2011	150.00

S N.	Bulletin No.	Title	Year	Price (INR)
44	56	संग्रहित लाख में समय के साथ वनोपजों में होने वाली कमी का अध्ययन।	2014	TM
45	57	Status of natural gum and gum oleo-resin of M.P.	2014	TM
46	58	बीज प्रक्षेत्र का चयन, बीज उत्पादन क्षेत्र की स्थापना, प्रबंधन, बीज संग्रहण, भण्डारण, उपचारण, परीक्षण एवं रोपणी प्रबंधन	2014	TM
47	59	वानिकी में मेक्रोक्लोनल प्रोपेगेशन तकनीक द्वारा वृक्ष एवं औषधीय प्रजातियों के क्लोनल पौधे तैयार करने की विधियॉ।	2014	TM
48	60	सामुदायिक भागीदारी द्वारा अकाष्ठीय वनोपजों के मानचित्रण एवं आंकलन विधि मार्गदर्शिका।	2015	55.00
49	61	अकाष्ठीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2015	190.00
50	62	कैमरा ट्रैप मार्गदर्शिका	2016	TM
51	63	अकाष्ठीय वनोपज प्रजातियों का अंतःस्थलीय, बाह्य स्थलीय संरक्षण, नवप्रवर्तन – वनवर्धन एवं विकास।	2016	1120.00
52	64	अकाष्ठीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2016	800.00
53	65	Volume table of Teak for various divisions of Madhya Pradesh	2016	TM
54	66	Volume table *of Shorea robusta* (Sal) for various forest divisions of Madhya Pradesh	2016	TM
55	67	रोपणी मार्गदर्शिका	2016	100.00
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	370
58	70	कट रूट स्टाक विधि : लेन्टाना उन्मूलन की नई तकनीक	2017	TM
59	71	बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण हेतु मार्गदर्शिका	2017	TM
60	72	प्रशिक्षण मार्गदर्शिका – आधुनिक जीपीएस, रेंज फाईडर एवं कम्पास हेतु	2017	TM
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	TM
67	78	बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण- 2018 हेतु मार्गदर्शिका	2018	TM
68	79	Volume table of miscellaneous species for various divisions of Madhya Pradesh.	2018	TM
69	80	हमारी कंद संपदा : मध्यप्रदेश में पायी जाने वाली कंद प्रजातियों की पहचान एवं विवरण	2018	TM
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	TM
72	83	बांधवगढ़ टाईगर रिजर्व के घास मैदानों का पारिस्थितिकीय अध्ययन : वन्य प्राणी प्रबंधन के संदर्भ में	2018	TM

S N.	Bulletin No.	Title	Year	Price (INR)
73	84	कुसुम के वृक्षो में लाख की कृषि प्रक्रिया	2019	TM
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	TM
76	87	कार्बन का महत्व, पर्यावरणीय घटनाओं से इसका संबंध एवं वनों में कार्बन संचयन का आंकलन ।	2019	TM
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	TM
78	89	दुर्लभ एवं संकटग्रस्त प्रजातियों की रोपणी तकनीक का प्रचार प्रसार	2019	TM
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	TM
80	91	Species specific cage designs to rescue & transport the wildlife & nest boxes for birds. (***only soft copy***)	2020	TM
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	--

(TM : Training Material)

Extension Series

Ext. Series	Title	Year	Price (INR)
1.	Teak Seed collection and uses	1981	10.00
2.	वृक्षारोपण में बीजों का महत्व	1981	15.00
3.	म.प्र. में साल रोपण की तकनीक	1991	15.00
4.	पड़त भूमि विकास हेतु उपयुक्त प्रजाति लेडिंया	1991	10.00
5.	ईसबगोल	1994	5.00
6.	सर्पगन्धा	1994	5.00
7.	रोसा घास	1995	5.00
8.	A mechanical device for pre sowing treatment of teak seeds	1995	5.00
9.	वृक्षारोपण कैसे करें	1996	25.00
10.	S.F.R.I Publications	1999	40.00
11.	माइकोराइजा (वैम)	1999	TM
12.	राइजोबियम	1999	TM
13.	एजेटोबेक्टर	2000	TM
14.	पी.एस.बी. (फास्फोरस विलायक)	2000	TM
15.	आँवला : वनो से किसानों तक	2000	40.00
16.	बाँस : वनो से किसानों तक	2000	40.00
17.	सागौन : वनो से किसानों तक	2000	60.00
18.	खमेर : वनो से किसानों तक	2000	60.00
19.	यूकेलिप्टस : वनो से किसानों तक	2000	50.00
20.	बच (एकोरस केलेमस)	2001	5.00
21.	सतावर (एस्पेरेगस रेसीमोसस)	2001	5.00
22.	सफेद मूसली (क्लोरोफाइटम बोरिविलियानम)	2001	5.00
23.	कलिहारी (ग्लोरिओसा सुपरबा)	2001	5.00
24.	सनाय (केसिया आगस्टफोलिया)	2001	5.00

Ext. Series	Title	Year	Price (INR)
25.	सर्पगंधा (रावोल्फिया सर्पेन्टिना)	2001	5.00
26.	अश्वगंधा (विथानिया सोमनीफेरा)	2001	5.00
27.	मुश्कदाना (एबलेमासकस मास्केटस)	2001	5.00
28.	लेमनग्रास (सिंबोपोगन फ्लेक्सिपोसस)	2001	5.00
29.	मेन्था या पोदीना (मेन्था आर्वेसिस)	2001	5.00
30.	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 1)	2003	20.00
31	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 2)	2007	20.00
32	Directory of Medicinal Plants Trades and ISM Industries of Central India	2009	100.00
33	Monograph on *Alectra chitrakutensis*	2011	60.00
34	Monograph on *Ceropegia bulbosa and Ceropegia macrantha*	2011	60.00
35	Monograph on *Crateva magna* and *ficus cupulata*	2011	60.00
36	Monograph on *Dioscorea tomentosa, D. wallichia* and *d. alata*	2011	60.00
37	Monograph on *Flemingia stricta* and *F. paniculata*	2011	60.00
38	Monograph on *Guggal (Commiphora wightii)*	2011	60.00
39	Monograph on Maida tree (*Litsea glutinosa)*	2011	60.00
40	Monograph on Padri tree (*Radermachera xylocarpa)*	2011	60.00
41	Monograph on Shyonaka (*Oroxylum indicum)*	2011	60.00
42	Some ethnic plants in cure of various human diseases	2011	250.00
43	कमरकस (पलाश) गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं भण्डारण तकनीकों का प्रदर्शन	2012	TM
44	साल बोरर से साल वनो की सुरक्षा	2014	TM
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	TM
46	Education material on Herbarium preparation and its management	2015	TM
47	मध्यप्रदेश के वनों में पायी जाने वाली महत्वपूर्ण दुर्लभ प्रजातियों की उपयुक्त रोपणी तकनीकी का विकास।	2015	TM
48	खमेर शीर्ष सूखन रोग एवं प्रबंधन तकनीकी मार्गदर्शिका	2015	TM
49	खनन क्षेत्रों में वनीकरण एवं पारिस्थितिकीय पुर्नस्थापना हेतु तकनीकी मार्गदर्शिका	2015	TM
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	TM
52	मार्गदर्शिका–आर्थिक महत्व की प्रजातियों बीजा, धावड़ा एवं अचार मे होने वाले रोगों का समेकित प्रबंधन एवं तकनीक	2017	TM
53	महुआ प्रशिक्षण एवं प्रदर्शन मार्गदर्शिका	2018	TM
54	सलई वृक्ष में वैज्ञानिक विधि से टैपिंग तकनीक, सतत् विनाश विहीन विदोहन, प्राथमिक प्रसंस्करण एवं भंडारण विधि – मार्गदर्शिका	2018	TM
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

S.N.	Title	Year
5	बीजा (टेरोकार्पस मारसूपियम)	2007
6	सागौन (टेक्टोना ग्रेंडिस)	2007
7	बबूल (अकेशिया निलोटिका)	2007
8	खैर (अकेशिया कटेचू)	2007
9	खमैर (मेलाइना आरबोरिया)	2007
10	ऑवला पौधों का विनाश विहीन विदोहन एवं संरक्षण मार्गदर्शिका	2007
11	महुआ रासायनिक उर्वरको के प्रयोग से महुआ फूल एवं फल की उत्पादकता में वृद्धि	2011
12	जन भागीदारी द्वारा अकाष्ठीय वनोपजों का प्राकृतिक वन क्षेत्रों में सतत् विदोहन एवं प्रबन्धन तकनीकी का विकास	2012
13	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

S.N.	Title	Year
43	चनाहुर *(Marsdenia tenacissima)*	2019
44	सफेद मुसली *(Chlorophytum borivilianum)*	2019
45	कुचला *(Strychnos nux-vomica)*	2019
46	बायविडंग *(Embelia ribes)*	2019
47	गिलोय *(Tinospora cordifolia)*	2019
48	हर्रा – बीज एवं रोपणी तकनीक	2020
49	बहेड़ा – बीज एवं रोपणी तकनीक	2020
50	रीठा – बीज एवं रोपणी तकनीक	2020
51	हल्दू – बीज एवं रोपणी तकनीक	2020
52	खुरासानी इमली – बीज एवं रोपणी तकनीक	2020
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	श्योनाक *(Oroxylum indicum)*	2021
80	सिस्सू, रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (डलवर्जिया सिरसू)	2024
81	बहेड़ा, रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (टरमेनेलिया बेलेरिका)	2024
82	सफेद सिरस,रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (अल्बीजिया प्रोसेरा)	2024
83	सगौन, रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (टेक्टोना ग्रेन्डिस)	2024
84	हर्रा, रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (टरमेनेलिया चिबुला)	2024
86	आँवला, रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (एम्बिलिका ऑफीसिनेलिस)	2024
87	शीशम, रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (डलवर्जिया लेटीफोलिया)	2024
88	काला सिरस, रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (अल्बीजिया लेबेक)	2024
89	करंज, रूट ट्रेनर में उच्च गुणवत्ता के पौध तैयारी (पोंगेमिया पिन्नेटा)	2024

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.

Following activities were undertaken during the year.

S. No.	Works
1.	Circulation of books, working plans, reports and other reading materials
2.	Correspondence with users for return of books
3.	Provide CAS to users
4.	Classification of books and arrangement of classified books
5.	Preparation of book card slips and pasting of book pockets on books

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 2024 to March 2025)

Papers published in Journals (National and International)

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.
1.	International Journal of Science and Research (IJSR)	"Selection of Suitable Biofertilizers for Production of Quality Planting Stock of *Adansonia digitata*"	Dr. Archana Sharma Pradeep Vasudeva	Vol 13, Issue 9, Sept. 2024.
2.	International Journal of Science and Research (IJSR)	"Effect of Root Trainer Size and Potting Mixes on Growth and Survival of Seedlings of Dalbergia latifolia"	Dr. Archana Sharma, Dr. Sachin Dixit, Shailendra Kumar Nema	Vol 13, Issue 7, July 2024.
3.	Journal of Tropical Forest	"Studies on Terminalia Chebula for enhancing germination potential through presowing treatments under storage"	Dr. Archana Sharma, Pradeep Vasudeva, Shailendra Kumar Nema and Dr. Sachin Dixit	Vol. 40 January - June. 2024 No. 1&2.
4.	Journal of Tropical Forestry	Assessment of Floral Diversity in Bagdara Wildlife Sanctuary, Madhya Pradesh, India	Anjana Rajput, Shalini Jaiswal and Ruchira Dakhore	Vol. 40 (3 & 4) in press
5.	Journal of Tropical Forestry	Diversity of Birds of Bagdara Wildlife Sanctuary, Singrauli, Madhya Pradesh, India	Anjana Rajput, Ruchira Dakhore, Shalini Jaiswal	submitted for publication
6.	Journal of Tropical Forestry	"The need for a sustainable developmentgoal- based strategic approach to tiger conservation in proximity capital Bhopal"	Mayank Makrand Verma, Ravindra Mani Tripathi, Amitabh Agnihotri and Dharmendra Verma	Vol. 40 (3 & 4) in press
7.	वन–धन व्यापार	वन–धन व्यापार निर्मली (Strychnospotatorum) समीक्षा लेख	राजेश बर्मन आलोक रैकवार	Vol. 24 No. 2
8.	वन–धन व्यापार	वन–धन व्यापार पुनर्नवा (Boerhaviadiffusa L.): महत्व, औषधीय उपयोग एवं विपणन	डॉ. जी.एस. मिश्रा, राजेश बर्मन आलोक रैकवार	Vol. 24 No. 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.	The 6th Central Indian Landscape Symposium CILS 6	Key Drivers of Elephant Presence in Sanjay Dubri TigerReserve, Madhya Pradesh	Dr. Mayank Makrand Verma, Varun R, Satyadeep Nag	Sixth Central Indian Land-scape Symposium (CILS6) Olive Resorts, Sillari Pench, Maharashtra 7-10 January, 2025

Paper published in books/souvenirs

S. No.	Name of the edited books/ souvenirs	Title of the paper	Author(s)	Vol. Page No.
1.	"Smarika" International herbal fare, Bhopal. Dec.2024	महत्वपूर्ण औषधीय प्रजातियों की रोपणी एवं कृषिः आज की आवश्यकता	Uday Homkar	22-28
2.	"Smarika" International herbal fare, Bhopal. Dec.2024	सलई (*Boswellia serrata)* के अंकुरण की सरलतम तकनीक	Uday Homkar	83-84

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 2024-25

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)	-	8,80,00,000	8,80,00,000	8,29,74,392
Deposit Works (Sponsored projects)	5,57,82,241	3,45,78,109	9,03,60,350	4,02,31,687
Total Rs.	**5,57,82,241**	**12,25,78,109**	**17,83,60,350**	**12,32,06,079**

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 2024-25 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 (1.4.24 to 31.3.25) Rs.
On-Going Projects						
1	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	37,60,354	-	37,60,354	6,42,832
2	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	19,32,724	-	19,32,724	14,48,942
3	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	20,90,357	8,84,000	29,74,357	2,38,739
4	Standardization of propagation technology production of quality seedling of *Boswellia serrata*, *Buchanania lanzan* and *Shorea robusta*. **FD/FP/P/E/24-25/06**	APCCF R&E Lokvaniki M.P Bhopal	-	17,25,000	17,25,000	1,63,515
5	विभिन्न परियोजनाओं अंतर्गत किये गये वृक्षारोपण का अनुश्रवण एवं मूल्यांकन। **M&E/P/E/22-23/01**	PCCF, (Development) M.P. Bhopal	4,82,088	62,75,000	67,57,088	34,32,512
6	Comparative Study of MP Teak Timber and Imported Teak Timber. **FD/FP/P/E/24-25/07**	PCCF, (Development) M.P. Bhopal	-	9.73,000	9,73,000	7,04,521

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 (1.4.24 to 31.3.25) Rs.
7	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	34,41,436	-	34,41,436	15,79,901
8	"Training on concept of soil moisture conservation and its Importance in Forestry" पर तीन दिवसीय प्रशिक्षण कार्यक्रम के आयोजन बावत् |**FD/FM/P/E/24-25/01**	PCCF (CAMPA) Bhopal	-	25,35,000	25,35,000	4,11,729
9	Estimation of Prey Population, abundance and dynamics in M.P. .**WD/AED/P/E/24-25/08**	PCCF (CAMPA) Bhopal	-	21,74,000	21,74,000	3,20,776
10	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	4,48,955	-	4,48,955	4,31,430
11	"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	7,67,310	-	7,67,310	3,96,720
12	"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	6,80,000	-	6,80,000	4,15,256
13	"Ecology of Indian Wolf (Canis lumpus pallipes) and its conservation implication in Nauradehi Wildlife Division Madhya Pradesh". **WD/AED/P/E/23-24/01**	PCCF, Wildlife, M.P, Bhopal	10,08,750	13,75,500	23,84,250	11,82,874
14	Network project on conservation of Lac insect genetic resource has tentatvely been shoduled on **SEM/P/E/14-15-05**	IINRG Ranchi (ICAR)	361	13,24,000	13,24,361	13,24,361
15	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.	1,57,499	-	1,57,499	69,217
16	ग्रीन इंडिया मिशन द्वारा विभिनन वन विकास अभिकरणों में वर्ष 2019, 2020, 2021, 2022 एवं 2023 में कॉपोनेन्ट A के विभिन्न सब मिशन अंतर्गत वृक्षारोपण कार्यो एवं कॉम्पोनेन्ट B सपोर्ट एक्टिविटी के कार्यो का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पेक्ट असेसमेंट (पी.आई.ए.) किये जाने के संबंध में। **FD/M&E/P/E/24-25/10**	PCCF, Green India Mission, Bhopal	-	81,40,500	81,40,500	22,83,595

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 (1.4.24 to 31.3.25) Rs.
17	Molecular characterization, Biochemical profiling and in-vitro multiplication of elite genotypes of *Boswellia serrata* (Traina & Planch) - with special reference to Madhya Pradesh **FD/CON/P/E/24-25/09**	DBT, Ministry of Science and Technolgy Govt of India New delhi	-	2,10,000	2,10,000	2,10,000
18	सूक्ष्म प्रबंध योजना निर्माण हेतु वन कर्मचारियों एवं समिति सदस्यों के प्रशिक्षण हेतु	APCCF (JFM) Bhopal M.P.	-	51,75,000	51,75,000	-
19	Restroration of Botanical Garden of S.F.R.I. Jabalpur **FC/P/I/23-24/03**	State Forest Research Institute Jabalpur	7,84,222	-	7,84,222	93,485
	Total Rs.		**1,55,54,056**	**3,07,91,000**	**4,63,45,056**	**1,53,50,405**
1	Maintenance of monitoring and evaluation facilities and data base of predators prey in Madhya Pradesh" **WL/RA/32**	State Forest Research Institute Jabalpur	68,20,664	-	68,20,664	56,062
2	Preparation of quality planting material of RET and other important species. **BD/P/I/21-22/07**		5,30,520	-	5,30,520	2,100
3	Periodic observations in preservation plots established in different forest types of Madhya Pradesh **FC/P/I/23-24/04**		3,70,000	-	3,70,000	-
4	Maintenance of Forest Herbarium, SFRI Jabalpur **Pr. I.D. RA/I/P/06**		-	-	-	9,250
5	Maintenance and enrichment of SFRI Bamboosetum		-	-	-	-
6	Provenance trial of Litsea glutinosa. **TI/RA/I/30**		-	-	-	-
7	Maintenance of clonal germplasm of Mahua (Madhuca latifolia) **TI/RA/I/28**		-	-	-	-
8	Periodic measurement of sample plots laid out in different forest areas of Madhya Pradesh. **MEN/RA/01/08**		-	-	-	9,000
9	Seed testing and Certification, Collection and disposal of quality seeds & Carbon estimation works of the institute		-	-	-	-
10	मृदा नमूनो का परीक्षण करना **SIL/RA/I/23**		-	4,40,430	4,40,430	-
11	Maintanance of Ornamental nursery and circular rose garden using the fund of Lac research Project.		-	-	-	-
	Total Rs.		**77,21,184**	**4,40,430**	**81,61,614**	**76,412**
	Completed Projects duration in 2024-25					
1	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	4,86,478	-	4,86,478	4,83,446

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 (1.4.24 to 31.3.25) Rs.
2	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	6,74,836	-	6,74,836	3,15,236
3	"International Biodiversity Day Date 22-05-2024". **FD/CON/P/E/24-25/13**	Madhya Pradesh State Biodiversity Board	-	1,00,000	1,00,000	41,116
4	Training on Logging and timber grading skill upgradation. **FD/CON/P/E/24-25/04**	PCCF (Production) M.P. Bhopal	-	5,49,129	5,49,129	5,41,583
5	वृक्षारोपण करने की तकनीक पर दो दिवसीय प्रशिक्षण–सह– कार्यशाला **FD/CON/P/E/24-25/05**	PCCF, (Development) M.P. Bhopal	-	8,01,313	8,01,313	5,49,751
6	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**	38,89,676	-	38,89,676	28,17,924
7	Preparation of phytosociology study of main species in and around the manganese beraing project area around Bharweli 0.789 ha mine at balaghat by SFRI Jabalpur M.P.. **FD/EIA/P/E/24-25/02**	Mine Manager, Moil Limited, Balaghat Mine	-	9,98,187	9,98,187	4,75,839
8	Baseline data generation work of flora, fauna studies for prepration of EIA, EMP report for the three opencast coal mining projects of MIS Northern Coalfields Limited Singrauli. **FD/EIA/P/E/24-25/03**	NCL, Singrauli	-	8,44,880	8,44,880	4,66,949
	Total Rs.		**50,50,990**	**32,93,509**	**83,44,499**	**56,91,844**
	Completed Project Balance 2023-24		**2,74,56,011**	**53,170**	**2,75,09,181**	**1,91,13,026**
	Gross Total Rs.		**5,57,82,241**	**3,45,78,109**	**9,03,60,350**	**4,02,31,687**

INCOME (Revolving Funds for the year 2024-2025)		
S.No.	**HEAD**	**Income (In Lakh)**
1	Gate Entry Fee	10,96,658
2	Guest House Charges	3,16,280
3	House Rent & Water Charges	4,66,050
4	Misc Receipts	32,801
5	Plant Supply	4,98,079
6	Sale of tender Form	7,000
7	Training Fee	1,01,125
8	Institutional Charge	20,21,777
9	Soil Testing charges from Project Head	4,40,430

INCOME (Revolving Funds for the year 2024-2025)		
S.No.	**HEAD**	**Income (In Lakh)**
10	Completed Project Balance Received	1,84,05,417
11	Vehicle Auction Receipt	1,27,670
	Interest Received :-	
11	Interest on FDR	1,55,19,890
12	Saving Intrest	6,51149
	Grand Total	**3,96,84,326**

EXPENDITURE (Revolving Funds) for the year 2024-2025)		
S.No.	**HEAD**	**Expenditure**
1	Daily Wages	15,45,912
2	Repair & Maintenanc	17,15,214
3	Travelling Expenditure	47,590
4	Electricity	2,42,812
5	Office Expenses	6,81,317
6	POL Expenses	6,295
7	Stationary Expenses	25,912
8	GST Expenses	1,88,000
9	Audit & Leagal Fee	5,000
10	Computer Purchasing	45,755
11	Digitel Harberium AMC charges	9,250
11	Misc. Expenses	12,410
13	Meeting Expenses	3,225
	Gross Total	**45,28,692**

Income (Reserve Funds) for the year 2024-25		
	Details	**Income**
1	Soil Testing Charges	1,09,370
2	Plant Sale	27,648
3	Institutional Charges	19,48,473
4	Saving Interest	94,367
5	Misc Reciept	62
	Total Rs.	**21,79,920**

Expenditure (Reserve Fund) for the year 2024-25		
1	Misc. Expenditure	9000.00
2	Bank Charge	0.00
	Total Rs.	**9000.00**

Details of Accounts Financial Status as on 31st March, 2025				
S.No.	**Details**	**Cash in Bank**	**F.D.R.**	**Total**
1	Revolving Fund (Indian Bank)	2,61,46,066	1,50,00,000	**4,11,46,066**
2	Grant-In-aid	54,31,621	-	**54,31,621**
3	Deposit Work (Project Funds)	2,25,68,636	3,08,00,000	**5,33,68,636**
4	Sanchit Nidhi	35,79,835	5,50,000,00	**5,85,79,835**
	Total Rs.	**5,77,26,158**	**10,08,00,000**	**15,85,26,158**

5. ESTABLISHMENT

Postings, Transfers and Retirement (2024-2025)

Postings :

S.No.	Name	Designation	Date of Joining
1.	Shri Satyanand (IFS)	PCCF & Director	03-06-2024
2.	Shri Pradeep Kumar Vasudeva (IFS)	PCCF & Director	05-08-2023
3.	Shri Sandeep Fellows (IFS)	DCF & Dy. Director	01-04-2024

Transfers :

S.No.	Name	Designation	Date of Transfer
1.	Shri Satyanand (IFS)	PCCF & Director	05-08-2024
2.	Shri Ravindra Mani Tripathi (IFS)	CF & Dy. Director	08-01-2025
3.	Smt. Abhishweta Rawat	Forest Ranger	04-10-2024

Retirement :

S.No.	Name	Designation	Date of Retirement
1.	Shri Kamal Singh Masram (IFS)	DCF	30-06-2024
2.	Shri Sajid Ali	Dy. Ranger	31-12-2024

Temporary project staff engaged during the year (April 2024 to March 2025)

S. No	Name	Designation	Project under which appointed	Period	
				From	To
1.	Balram Lodhi	SRF	Network Project on conservation of Lac insect genetic resources	Jan. 2023	Mar. 2025
2.	Bharat Singh Armo	Field Asstt.		Jan. 2023	Mar. 2025
3.	Vikas Jain	JRF	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	Nov. 2024
4.	Pratap Rao Vagh	Admin. Asstt.		Nov. 2023	Mar. 2025
5.	Shalini Jaiswal	JRF		Nov. 2023	Nov. 2024
6.	Ruchira Dakhore	Project Asstt./ Office Asstt.		Nov. 2023	Nov. 2024
7.	Syed Tanveer Abbas Rizvi	JRF		Nov. 2023	Nov. 2024
8.	Ashad Hussain	Project Asstt./ Office Asstt.		Nov. 2023	Nov. 2024
9.	Abhilasha Barman	Comp. Opt.	Estimate of Prey Population, abundance and dynamics in M.P.	Dec. 2024	Nov. 2025
10.	Maulik Pandy	JRF		Dec. 2024	Nov. 2025
11.	Shreya Bose	JRF		Dec. 2024	Nov. 2025
12.	Sant Kumar	Project Asstt.		Dec. 2024	Nov. 2025
13.	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. 2025
14.	Bhaskar Panwar	JRF		Feb. 2024	Dec. 2024
15.	Noyan Uppadhai	JRF		Fen. 2024	Aug. 2024
16.	Deepti Sonawane	JRF		Sep. 2024	Nov. 2025
17.	Shubhendra Mishra	JRF		Sep. 2024	Nov. 2025

S. No	Name	Designation	Project under which appointed	Period	
				From	To
18.	Anuradha Haldkar	Project Asstt.	Baseline data genration work of flora fauna studies for preparation of EIA/EMP report for the three open cast coal mining projects of M/s Northern Coalfields Limited Singrauli M.P.	Sep. 2024	Mar. 2025
19.	Hariom Barmaiya	JRF		Oct. 2024	Feb. 2025
20.	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	Oct. 2024
			Standardization of propoagation technology for production of quality seedling of *Boswellia sarata, Buchania lanzan* and *Shorea robusta*	Nov. 2024	Oct. 2025
21.	Akash Shukla	JRF		Feb. 2025	Jan. 2026
22.	Shailendra Nema	JRF	Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important species viz. *Anogeissus latifolia & Commiphora wightii*	Apr. 2023	Jun. 2024
			Conservation of Bobab tree (*Adansonia digitata*) through development and extension of its nursery plantation and conservation techniques in Dhar district of M.P.	Sep. 2024	Aug. 2025
23.	Suryakant Choubey	FA	Study project on wild elephant habitat use and mitigation measures to minimize man-elephant conflict with special reference to Sanjay-Bhandhavgarh habitat linkage of central highland landscape	Apr. 2023	May 2025
24.	Satyadeep Nag	SRF		Nov. 2023	Apr. 2025
25.	Gauravkumar Valand	JRF		Nov. 2023	Oct. 2024
26.	Harshita Prajapati	JRF		Sep. 2024	May. 2025
27.	Shailendra Yadav	RA-III	Genetic diversity assessment using molecular markers for elite identification of existing candidate plus trees of Teak (*Tectoan grandis*) M.P.	Jun. 2023	Apr. 2024
28.	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
29.	Sonal Chaturvedi	JRF	वन विभाग द्वारा विभिन्न योजनाओं के अंतर्गत किये गये वृक्षारोपण का अनुश्रवण एवं मूल्यांकन।	Dec. 2023	Oct. 2025
30.	Priyanka Verma	JRF		Dec. 2023	Oct. 2025
31.	Aparna R. Sukla	JRF		Nov. 2024	Oct. 2025
32.	Ajay Lavishkar	JRF		Dec. 2023	Oct. 2025
33.	Deepa Pradhan	JRF		Dec. 2023	Oct. 2025
34.	Satyam Saxena	Comp. Opt.		Dec. 2023	Oct. 2025
35.	Ramdeen Bhalavi	JRF		Dec. 2023	Oct. 2025

S. No	Name	Designation	Project under which appointed	Period	
				From	To
36.	Ajay Ku. Bijewar	JRF		Jan. 2024	Dec. 2024
37.	Pradeep Ku. Kori	JRF		Dec. 2023	Sep. 2024
38.	Vineet Ku. Mehra	JRF		Nov. 2024	Oct. 2025
39.	Jay Prakash George	JRF		Nov. 2024	Dec. 2024
40.	Pankaj Saini	JRF		Jan. 2025	Feb. 2025
41.	Suneel Ku. Payasi	JRF	मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल्स की सफलता एवं असफलता के कारकों का विश्लेषण"	Jan. 2024	Jun. 2025
42.	Shubham Tiwari	Project Asstt.		Dec. 2023	May 2025
43.	Rishab Tiwari	JRF	Prepatation of phytosociological study of main species in and around upto 5 km the manganese bearing area at Balaghat, M.P.	Oct. 2024	Mar. 2025
44.	Rajesh Barman	FA	Strengthening of Market Information System (MIS) for Dissemination of Market Analysis of Minor Forest Produce in different Agro-Climatic Zones of Madhya Pradesh.	Feb. 2024	Jan. 2025
45.	Durgesh Raj Vishwakarma	Comp. Asstt.	Comprative study of M.P. teak timber and imported teak timer	Nov. 2024	Dec. 2025
46.	Himanshi	JRF	ग्रीन इंडिया मिशन म.प्र. द्वारा विभिन्न वन विकास अभिकरणों में वर्ष 2019, 2020, 2021, 2022 एवं 2023 में कम्पोनेन्ट A के विभिन्न सब मिशन अंतर्गत वृक्षारोपण कार्यों एवं कम्पोनेन्ट B सपोर्ट एक्टिविटी के कार्यो का अनुश्रवण मूल्यांकन एवं प्रोजेक्ट इम्पेक्ट असेसमेंट (पी. आई.ए.) किये जाने के संबंध में	Nov. 2024	Apr. 2025
47.	Pooja Yuvnati	JRF		Nov. 2024	Apr. 2025
48.	Dr. Anil Ku. Kori	JRF		Nov. 2024	Apr. 2025
49.	Dinesh Ku. Kuldeep	JRF		Nov. 2024	Apr. 2025
50.	Loukesh Ku. Ahirwar	JRF		Nov. 2024	Apr. 2025
51.	Anmol Lucky Ekka	JRF		Nov. 2024	Apr. 2025
52.	Farhat Jahan	JRF		Nov. 2024	Apr. 2025
53.	Dr. Satyendra Thakur	JRF		Dec. 2024	Apr. 2025
54.	Nikita Jain	Comp. Opt.		Nov. 2024	Apr. 2025
55.	Sharmishtha Gangopadhyay	JRF		Nov. 2024	Apr. 2025

Participation of the Institute in Kisan Mela cum Exhibition

Training on concept of Soil Moisture Conservation and its Importance in forestry

Participated in the First Mahakoshal Science Fair 2024

Training programme on Logging and Timber Grading Skill Upgradation

Educational tour & exposure visit of the trainee forest officers

MoU between SFRI and GGITS Jabalpur

Published by
Extension, Training & Consultancy Cell
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(An Autonomous Institute of Department of Forests, Government of Madhya Pradesh)
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