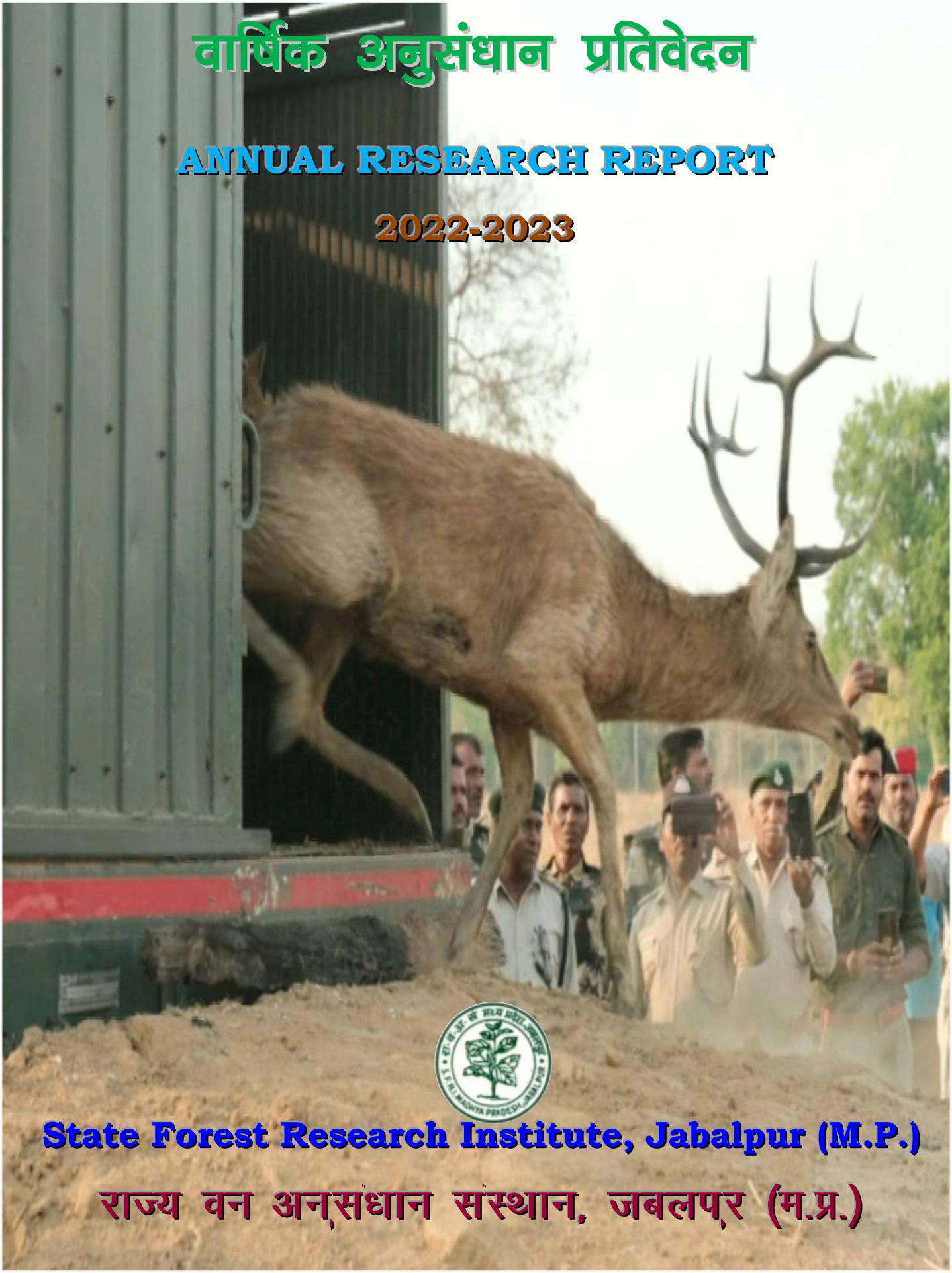
वार्षिक अनुसंधान प्रतिवेदन

ANNUAL RESEARCH REPORT

2022-2023



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

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

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With best compliments from :

Director
SFRI, Jabalpur

State Forest Research Institute, Jabalpur (M.P)

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

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Cover photo

Front cover: Release of Barasingha in the Bandhavgarh Tiger Reserve after PHVA studies then by SFRI, M.P.
(Photo courtesy: Dr. Aniruddha Mazumdar)

Barasingha after release in the open in Bandhavgarh Tiger Reserve
(Photo courtesy: Dr. Aniruddha Mazumdar)

Back cover

Experimentation of growing plants in root trainers
(Photo courtesy: Dr. Archana Sharma)

Glimpses of various training and extension activities in SFRI, Jabalpur
(Photo courtesy: Anirudhwa Sarkar)

FROM THE DIRECTOR'S DESK

Forest and bio-resources are renewable resources, which needs to be sustainably managed with a scientific approach. The need of the hour is to address the emerging new forest management issues and challenges by adopting research based solution. Adaptive and applied research with proper transfer of technical knowledge, evolved by research will be certainly effective in mitigation and providing solutions to the problematic issues.

State Forest Research Institute since its inception in 1963 have catered to the forest department by focusing its efforts on conducting research programmes to enhance the productivity, conservation and protection of forest resources of the state.

The year 2022-2023 was marked by events of various types like organization of need based training programmes, workshop, conference and delivering of quality planting material, capacity building of frontline staff for All India Tiger Estimation (AITE).

Consultancy assignments like Environmental Impact Assessment (EIA) & preparation of Environmental Management Plan (EMP), monitoring habitat suitability study of terrestrial and aquatic fauna. Population management of Wildlife and human wildlife conflict mitigation have raised the credibility and reputation of the institute as a premier institute of forestry research.

The institute achieved the objectives as envisaged in its Annual Action Plan of 2022-2023. 32 research projects were undertaken during this period. 14 research projects were completed 16 research projects were continued 02 new research projects were initiated and 10 regular activities were carried out. During this year 09 research papers/articles were published in various journals and 08 papers were presented in souvenirs. 05 technical bulletins and brochures were published for extension of the research findings to the beneficiaries at the grassroot level. The institute also prepared the Annual Research Report 2021-2022 and hosted it on the website. Publication of the quarterly journals "Vaniki Sandesh" and Journal of Tropical Forestry, Marketing information newsletter "Vandhan Vyapar" were published as per schedule.

The institute organized a workshop on “Rehabilitation of Degraded Forest Ecosystems in Madhya Pradesh: Emerging Scenario & Way Forward”, residential training programmes on "Logging and timber grading skill up-gradation”, for the field foresters of production division of forest department, training programmes on "Preparation of plants by root trainer method and planting" for the field foresters of 63 territorial divisions and 11 Social Forestry divisions, organizing educational tour and exposure visit of trainee forest rangers and forest guards from 07 forest training academies all over the country and students from 10 colleges and universities from across the country, organization of awareness campaign on forest environment on the Foundation Day of the Institute, World Tiger Day, Foundation Day of State of M.P. and plantation of bamboo saplings in the campus on the World Environment Day and participation in the 9th International Herbal Fair, Bhopal. A notable feature of the activities of the institute was "Monitoring and evaluation of tree plantations done in the year 2015-2016" by the M.P. Forest Department.

The guidance and support by the enlightened members of the Board of Governors and Research Advisory Committee has inspired us to achieve our objectives and optimum standards of accomplishment is gratefully acknowledged.

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

I thankfully acknowledge the support commitment and cooperation of the administrative colleagues, staff and the entire scientific fraternity of the institute for the overall progress and development of the institute.

It was a privilege in having the responsibility to steer this premier institute towards developing it as a self sustaining centre of excellence in its various research and outreach programmes and consider it as a great honour in presenting this Annual Research Report 2022-2023, which highlights the salient achievements of institute from April, 2022 to March, 2023. I hope that this report will provide an insight of our activities and look forward to your valuable suggestions and advice that can improve our future endeavors.

(Amitabh Agnihotri)
Director

1. THE INSTITUTE

1.1 INTRODUCTION

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

The institute is located at Jabalpur in a lush green campus spread over a sprawling area of about 102 ha. The region of Jabalpur has close proximity to two major forest types, namely; sal and teak forests of Madhya Pradesh and four protected areas (PA's) namely; Kanha, Bandhavgarh, Pench and Satpuda. This unique location rendered it suitable for the setting this institute here. It houses a rich infrastructure of various research and experimental plots, research nursery, ornamental nursery, clonal nursery, medicinal and aromatic plants nursery, rose garden, seasonal garden, lac, gene-bank, glass-house, mist-chambers, shade-net houses, poly houses, botanical garden, bambusetum, tissue culture, The administrative block, houses fully renovated state of art EIA, soil and seed testing laboratories a mobile soil testing laboratory. conference halls, lecture room, museum, herbarium, auditorium, library and documentation centre and the laboratproes. 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. Multilocational cum provenance trials of important forestry and bamboo species in different forest divisions of Madhya Pradesh
2. वन विभाग म.प्र. द्वारा विभिन्न योजनाओं के अंतर्गत किये गये वृक्षारोपणों का अनुश्रवण एवं मूल्यांकन
3. Genetic diversity assessment using molecular markers for elite identification of existing candidate plus trees of Teak (*Tectoan grandis*) M.P.
4. Use of excavated soil for enhancing natural regeneration and plantation activities of Greenka Energy Pvt. Ltd. Rampura Forest Range, Neemuch District of M.P.
5. Dissemination of Knowledge Through Training Programme for Sustainable Management and Quality Fruit Collection of Chironji to Stakeholders.
6. Investigations into problems related to natural regeneration of various miscellaneous species and development of suitable silivicultural management techniques
7. Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important species viz. *Anogeissus latifolia* & *Commiphora wightii*.
8. **अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यों की अद्यतन स्थिति का आंकलन।**
9. Development of quality planting material of medicinal plants.
10. Development of suitable package of practices for sustained rehabilitation of degraded forests.
11. Development of suitable nursery and planting practices for RET species.
12. Development of suitable agroforestry and farm forestry models for various agro-climatic zones of the state and studies on forest based livelihoods
13. Estimation of carbon sequestration potential in forests of different compositions and densities.
14. Establishment of a network of sample plots representing different forest types, including coppice forests and plantations
15. Preparation of species-specific growth tables for volume, biomass and sequestered carbon and development of region-specific allometric equations for estimation of these parameters
16. Establishment of a network of preservation plots in different forest types and studies in ecological succession.
17. Assessment of region-specific potential of NTFP production in forests.
18. Development of suitable tools and techniques for sustainable and non-destructive harvesting of NTFPs and Germplasm collection, evaluation and preservation.

19. Development of suitable post-harvesting techniques for different NTFPs
20. Conversion of eligible existing 'candidate plus' trees into 'plus' trees after their genetic evaluation and also selection of new 'candidate plus' trees of economically important species having desired genetic traits
21. Conversion of existing seed stands into seed production areas and establishment of new quality seed stands.
22. Seed certification
23. Environmental impact assessment and preparation of environmental management plans
24. Upgradation and modernization of institute laboratories and Dissemination of evolved technologies from lab to land

B. Wildlife

1. AITE 2022 Evaluation of wild animals population and habitat in M.P.
2. AITE : Data Scrutiny & Submission
3. 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
4. International Conference on "Wildlife Conservation: Emerging Scenario and Way Forward" Kanha Tiger Reserve, Mandla (M.P.)
5. Population Habitat Viability Analysis (PHVA) of Head ground Barashingha *(Cervus duvauceli branderi)* for introduction in Bandhavgarh Tiger Researve, M.P.
6. Study on lepopard (*Panthera oardus L.*) presence, identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of Jabalpur nad Indore, M.P.
7. Estimation of wildlife populations.
8. Monitoring and evaluation of wildlife habitats
9. Re-introduction of species
10. Estimation of carrying capacity of PAs for ecotourism
11. Impact assessment of eco-tourism
12. Potential exploration of ecotourism in areas outside protected areas (PAs)
13. Determination of carrying capacity of visitors in tiger reserves and PAs.
14. Man-animal interactions
15. Habitat management
16. Landscape level planning and management
17. Corridor linkages and functionality assessment
18. Protected areas (PAs) management effectiveness evaluation.

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. Use of excavated soil for enhancing natural regeneration and plantation activities of Greenko Energy Pvt.Ltd., Rampura forest range, Neemuch district of M.P.
2. Selection of species specific root trainer sizes and potting mixes to be adopted by the Forest Department nurseries of Madhya Pradesh for ten selected tree species.
3. Capacity Building of Frontline Forest Staff of Madhya Pradesh for 5th cycle of All India Tiger Estimation Programme-2021-22
4. Study on leopard *(Panthera pardus L.)* presence, identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of Jabalpur and Indore, Madhya Pradesh
5. Population Habitat Viability Analysis (PHVA) of Hard ground Barashingha *(Cervus duvauceli branderi*) for introduction in Bandhavgarh Tiger Reserve, M.P.

6. Impact Assessment of Proposed Sheopur Kalan & Badoda Towns A Group Water Supply Scheme- Parbati River Sub-project under MPUSIP on Aquatic Fauna, River Hydrology & Ecology and its Mitigation.
7. Assessment of impact of Doubling of Katni Singrauli Railline Project on flora, fauna and habitats of Sanjay-Dubri Tiger Reserve
8. Environmental Impact Assessment on Flora, Fauna & Socio economic status of local communities and action to be taken to mitigate impact of Kopra Medium Project at Nauradehi Wildlife Sanctuary, Sagar District (M.P)
9. Development of high-tech nursery and preparation of quality planting material of RET species for their restoration in natural forest and rural/urban areas through plantations.
10. Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected areas/ Territorial divisions of Madhya Pradesh.
11. Monitoring of re-introduced tigers (*Panthera tigris L*.) in Nauradehi Wildlife Sanctuary.
12. Study of the impact of proposed Morena Water supply sub project under MPUDP on Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial wildlife Sanctuary, Morena (MP).
13. Study on tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vindhyan Range.
14. Identification of potential pockets and selection of candidate plus trees of Bija and standardization of its clonal propagation technique.
15. Conservation of lac insects genetic resources.
16. Production of quality planting stock of important RET and wild medicinal tree species through application of advanced technology.
17. Study based on growth of sample plots of Teak, Sal and other species laid out in different forest areas of Madhya Pradesh.
18. मध्यप्रदेश में प्रमुख गोंदों के संग्रहण के ऑकड़ों का संकलन एवं प्राथमिक संग्राहकों पर सामाजिक आर्थिक प्रभाव।
19. पश्चिमी मध्यप्रदेश के मालवा का पठार कृषि–जलवायु प्रक्षेत्र (क्षेत्रीय वन वृत्त, उज्जैन) के अंतर्गत कृषक समृद्धि योजना द्वारा कृषि वानिकी के तहत निजी भूमि के रोपण एवं वर्तमान कृषि वानिकी मॉडल का अध्ययन।
20. मध्यप्रदेश में महुआ फूल एवं अचार गुठली के उत्पादन एवं संग्रहण मात्रा का ऑकलन।
21. देवास जिले में लोकवानिकी प्रबन्ध योजना क्रियान्वयन का अनुश्रवण एवं मूल्यांकन।
22. उच्च गुणवत्ता वाले पौध तैयार करने हेतु बीज तथा नर्सरी तकनीकों का मानकीकरण।
23. क्षेत्रीय सह सुविधा केन्द्र, जबलपुर द्वारा मध्यप्रदेश एवं छत्तीसगढ़ में औषधीय पौधों के लिए डेटाबेस प्रबंधन प्रणाली की स्थापना एवं औषधीय पौधों की खेती का प्रचार–प्रसार।
24. संस्थान के बैम्बूसिट्म में (बांस का पौधशाला) देश के विभिन्न क्षेत्रों से विभिन्न प्रजातियों के बांस का रोपण तथा उनका रखरखाव।
25. Digitization of old maps of MP Forest Department

1.5 TRANSFER OF TECHNOLOGY

1. प्रदेश के समस्त क्षेत्रीय वनमण्डलों में रूट ट्रेनर पद्वति से पौधों की तैयारी कर रोपण बाबत प्रशिक्षण कार्यक्रम।
2. Skill upgradation training on Logging and Grading Timber.
3. Training and demonstration programme on establishment and best management of Seed Production Areas, Seed Technology and Nursery Management for Field Foresters.
4. Workshop on "Degraded Forest Ecosystems in Madhya Pradesh : Emerging Scenario & Way Forward" .
5. Capacity building of frontline forest staff of M.P. for 5th cycle of All India Tiger Estimation Programme- 2021-22

6. Scientific method of Lac cultivation.
7. Training on establishment, maintenance and periodic measurement of sample plots
8. Orientation programme on wildlife population monitoring tools and technologies
9. Training cum demonstration of cultivation techniques, processing and marketing of medicinal and aromatic plants.
10. Training cum awareness and orientation programmes regarding forestry research for the newly recruited trainee forest rangers and forest guards and students from universities.
11. रोपणी में रूट ट्रेनर में पौध तैयारी, पौधों में होने वाली बीमारियों का निदान एवं रोपणी प्रबंधन पर प्रशिक्षण एवं प्रदर्शन।
12. Participation in exhibitions and fairs.

1.6 Environmental Impact Studies

1. EIA on flora fauna & socio economic status of local communities and action to be taken to mitigation impact of Kopra Medium project at Nauradehi wildlife sanctuary, Sagar, M.P.
2. Assessment of impact of doubling of Katni-Singrauli railline project on flora, fauna and habitates of Sanjay-Dubri Tiger Researve, 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	1
5	Forest Ranger	3	1
6	Dy. Ranger	1	0
7	Forester	1	7
8	Forest Guard	15	11
	Total	**26**	**23**
	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

S.No	Forestry Professionals	Sanctioned	Working
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	0
	Technical Assistant (Contingency)		2
3	Technical Assistant (Forestry Research), (Sr. Research Officer)	9	7
	Technical Assistant		2
4	Technical Assistant (Consultancy/Extension), (Sr. Research Officer)	1	1
5	Technical Assistant (Library), (Sr. Research Officer)	1	1
6	Technical Assistant (Documention) (Sr. Research Officer)	1	1
7	Technical Assistant (Computer) (Sr.Research Officer)	1	1
8	Lab Technician, (Sr. Research Officer)	6	1
	Lab Technician		2
9	Lab Incharge, (Sr. Research Officer)	3	0
10	Ledger Assistant (Research Officer)	3	1
	Ledger Assistant		0
11	Herbarium Assistant (Contingency)	1	1
12	Lab Assistant	3	1
13	Field Assistant	3	1
	Total	**36**	**23**
	Non-Technical		
1	Head Clerk	1	1
2	Accountant	2	1
3	Steno – II	2	0
4	Steno – III	2	0
5	Assistant Grade – II	2	1
6	Assistant Grade – III	4	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 six broad divisions 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

5. Animal Ecology
1. Conservation Biology
2. PHVA studies
3. 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

2022-2023

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	2	-	3	7
2	Conservation	1	1	-	2	4
3	Forest Management	1	-	-	2	3
4	Forest Utilization	1	1	-	-	2
5	Productivity	2	3	-	1	6
6	Social Economics	1	2	1	-	4
	Wildlife Department					
1	Animal Ecology	2	3	1	1	7
2	Habitat Ecology	1	2	-	1	4
3	Wildlife Management	1	1	-	-	2
4	Ecotourism and Conservation Education	-	-	-	-	-
	Facilitation Cells					
1	Environmental Impact Assessment (EIA)	1	1	-	-	2
2	Climate Change, Climate Justice, REDD+	-	-	-	-	-
3	Extension,Training & Consultancies	-	-	-	-	
4	Monitoring & Evaluation	1	-	-	-	1
5	GIS & Remote Sensing	-	-	-	-	-
6	Computer & IT	-	-	-	-	-
7	Library	-	-	-	-	-
8	Documentation	-	-	-	-	-
9	Procurement	-	-	-	-	-
10	Common Research Facility	-	-	-	-	-
	TOTAL	**14**	**16**	**2**	**10**	**42**

2.1 FORESTRY DEPARTMENT

2.1.1 BIOTECHNOLOGY RESEARCH DIVISION

Mandate

1. Investigations on genetic variation, inheritance pattern and reproductive biology.
2. Exploring correlation between intra-specific variability and habitat characteristics.
3. Selection, testing and development of clones/varieties of commercially important tree species for desired traits.
4. Allele mining for traits related to biotic and abiotic stresses.
5. Developing breeding and production populations through provenance, progeny and clonal trials.
6. Field verification of already identified 'candidate plus trees' and conservation of eligible ones to 'plus trees' after their genetic evaluation.
7. 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.
8. Development of microsatellite markers for important tree species.
9. Molecular maker based genetic diversity analysis of populations of important forestry species.
10. Full genome sequencing of native tree species.
11. Development of improved varieties with desired quantitative (growth) and qualitative (disease, insect, pest and drought resistance) traits through genetic engineering.
12. Wood forensic studies.
13. Development of bio-informatic tools and data base for priority species.
14. Germplasm evaluation of medicinal plants for active ingredients.
15. Study of seasonal variations in the content of secondary metabolites.
16. Determination of differences, if any, in the percentages of secondary metabolites present in medicinal plant produces of wild and cultivated origin.
17. Phytochemical analysis of forest foods-edible fruits, tubers, etc. for their nutritional values.
18. Phytochemical analysis of forestry plants for their potential utilization in preparation of bio-pesticides and bio-fertilizers.
19. Bio-prospecting for useful organic compounds in micro-organisms, plants and fungi that grow in extreme environments.
20. 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.
21. Field testing of the performance of tissue culture raised planting material.

Completed Projects :- Two

1. Use of excavated soil for enhancing natural regeneration and plantation activities of Greenko Energy Pvt.Ltd., Rampura Forest Range, Neemuch district of M.P

   Funding Agency: PCCF (Land Management), M.P. Bhopal

2. Identification of potential pockets and selection of candidate plus trees of Achar, Beeja, Tinsa, Haldu, Dhaman and Shisham and standardization of their clonal propagation technique

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

On-going Projects :- Two

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 :- Three

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

Project Summary:-

Completed Projects

1. Title of the Project : Use of excavated soil for enhancing natural regeneration and plantation activities of Greenko Energy Pvt.Ltd., Rampura Forest Range, Neemuch district of M.P

Why this Project :-

As per the letter no./F-4/2021/10-11/3375 Bhopal, dated 07/10/2021 from Principal Chief Conservator of Forest (Land Management), Satpura Bhawan Bhopal in which it is mentioned that Greenko Energy Pvt.Ltd. is establishing pump storage in 301.96 hectare for which Govt. of India given in-principle approval for setting up pump storage in the proposed forest land. This proposed area is about 4 km away from Gandhi Sagar Sanctuary with 8 to 10 inch soil depth as per the above said letter. After in-principle approval from Govt. of India the pump storage project was proposed by Greenko Energy Pvt.Ltd. Govt. of India has imposed candition and suggested to take up a study regarding enhancement of natural regeneration and afforestation on excavated soil by a recognised institute.

Keeping the above consideration and with the consent of office letter no./Gen./3128 dated 01/11/2021 the project proposal was formulated in compliance for the above proposed activities. Hence, this project was formulated for providing necessary suggestion to the concerned agency.

Research Methodology :-

a. Survey of the project area – It covered the following activities.

- Collection of meterological data - climate, topography, rainfall, number of rainy days, temperature etc.
- Soil samples will be collected for analysis of their physico-chemical properties viz pH, Electrical Conductivity, NPK, organic carbon, moisture content, water holding capacity etc.
- Vegetational survey – includes present status of naturally occurring species and their regeneration status.

b. Site improvement activity - It covered the following suggestions/activities.

- Suitable species for afforestation scheme.
- Spacing and different pit size for various suitable species.
- Appropriate soil mixture in pits for better growth.
- Enhancing natural regeneration through protection and various conservation practices.

Study Design :- For ecological studies, three main activities was carried out in Greenko Energy Pvt.Ltd. site and adjoining area.

a. Crop composition - As per the guidelines of working plan, 5 plots of 0.1 ha was laid out randomly to study crop composition in the area.

b. Regeneration status - In each plot of 0.1 ha, three sub plots of size10m × 10m was laid out for observing the natural regeneration of various species in the site.

c. Ground flora study - Similarly, 5 sub plots of size 1 sqm will be laid in each 0.1 ha plot to study ground flora of the area.

For edaphic soil study, three-three soil samples was collected randomly along the road side and from the excavated dump. This will helped to understand the physio-chemical properties of the soil as well as to help the suggestion for afforestation through suitable species.

Objectives of Research:-

- To improve impacted site through natural regeneration and plantation activities.

Activities Undertaken:-

Field tour was conducted for site survey, vegetation survey and soil samples collections for their physico-chemical analysis

Cost of the Project :- Rs. 8.45 Lakhs

Outcome of Research :-

1. The soil of project site is moderately suitable for plantation activities.
2. The pH of the soils of study area varied between 6.53 to 6.83 which is suitable for plantation of tree species.
3. The Organic Carbon of the soil of project site are varied from 0.68% to 0.81%.
4. The bulk density of different soil samples is medium and it may be due to the presence of clay content.
5. It was observed that the Nitrogen and Phosphorus level were less. Therefore, the supplements of these macro nutrient will essential for soil fertility. As far as Potassium is concern in given samples is normal.
6. In the project site it was recorded that the copper found 0.208 to 0.390 ppm, Fe. 4.197 to 5.690 ppm, Mn. 2.315 to 3.392 ppm, Zn. 0.604 to 0.760 ppm respectively.
7. Mixed vegetation was found in the area and the average girth & height of the trees were recorded between 12 cm to 34 cm and 1.42 m to 4.92 m respectively.
8. Regeneration was found very poor in all studied points. Palash was recorded as a dominant species in one plot while mixed status of existing species was recorded in remaining other plots.
9. *Cassia tora* was recorded as dominant species.

Study site, natural vegetation and land pattern

2. Title of the Project:- Identification of potential pockets and selection of candidate plus trees of Achar, Beeja, Tinsa, Haldu, Dhaman and Shisham and standardization of their clonal propagation technique.

Why this Project: -

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

Research Methodology:-

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

Study Design:-

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

Objectives of Research :-

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

Activities Undertaken:-

Field tour was conducted in different Forest Divisions. Stem branches was collected and clonal propagation technique was standardized. Preparation of publication.

Cost of the Project :- Rs. 25.97 lakhs

Outcome of Research:-

In this project 6 commercially important tree species of different categories (critically endangered, endangered and rare) have been selected. The broader objectives of this project were identification of their potential pockets from different agroclimatic zones of Madhya Pradesh, Identification and selection of morphologically and phenotypically superior genetoypes as a Candidate Plus Trees (CPTs) and standardization of their clonal propagation technique. For achieving these objectives, reconnaissance survey were made in different agroclimatic zones and in different forest divisions of Madhya Pradesh.

Under this project for *Buchanania lanzan* 102 trees were surveyed from 9 forest divisions covering 12 ranges and 20 compartments from 9 agroclimatic zones. Out of 102 trees total 36 phenotypically and morphologically healthy trees were selected and marked alongwith their geotagging. Potentially rich areas were found from West Chhindwara, South Panna, South Seoni, Chhatarpur, Sehore, Anoopur, Ashok Nagar, Dewas and Sidhi forest divisions. As far as clonal propagation was concerned was found very difficult due to its recalcitrant nature. During the study it was also observed that the wild genetic resource of this species is declining rapidly due to unsustainable harvesting practices of their fruits before riping. 6 agroclimatic zones were found potentially rich for Bija covering 9 divisions and 9 ranges. It was observed that Dindori, South Balaghat, North Balaghat and North Betul areas are richly endowed with *Pterocarpus marsupium* however South Seoni, Shepur, Mandla, Sehore and Raisen are also potentially rich areas of this species. The out standing trees phenotypically candidate plus trees were identified from these areas. The clonal propagation was also found very difficult for Bija however NAA 200 ppm concentration induced 5% rooting response from juvenile

cuttings. During the study it was observed that the natural population of this species is declining day by day due to huge biotic pressure and poor natural regeneration.

During reconnaissance survey it was observed that *Ougeinia oojeinensis* (Tinsa) was limited only in 7 agroclimatic zones of Madhya Pradesh which were resticricted only in 8 Forest Divisions covering 8 ranges. The potentially rich areas were found from North Balaghat, South Seoni and Anuppoor forest divisions. The 32 healthy phenotypically superior candidate plus trees have been identified from these areas alongwith their geotagging. From the study hence is clearly indicated that this species comes under critically endangered category. Therefore, today it is an urgent need to protect and conserve this valuable timber tree species by increasing its population in the forests. An attempt has also been made for standardizing its clonal propagation protocol but due to its recalcitrant nature. Root promoting hormone IBA at 500 ppm concentration showed only 3% rooting response. *Adina cordifolia* was reported from 9 forest divisions representing 9 agroclimatic zones. Total 14 ranges and 18 compartments were surveyed during the study. From these areas 150 trees of this species were surveyed for the identification of CPTs. Total 43 genetically superior and sound healthy candidate plus have been identified so far from these areas. It was also noticed that Anuppoor, West Chhindwara, Sidhi, North Balaghat are richly endowed with this species. Due to huge biotic pressure on forests the natural population of this valuable timber tree species is declining rapidly. The other reason noticed was poor natural regeneration due to very poor seed germination. An attempt has also been made for standardizing its clonal propagation technique. Root promoting hormone NAA at 500 ppm concentration showed > 5% rooting response when the juvenile cuttings were treated for 30 minutes.

During reconnaissance survey it was observed that *Grewia tiliifolia* (Dhaman) is found only in 5 forest divisions covering 5 ranges which represents 4 agroclimatic zones. More than 32 trees of Dhaman were visited from these forest areas but most of the trees of selected for CPTs only 5 phenotypically superior candidate plus trees were identified from Obedullaganj, Raisen, Anuppoor, West Chindwara and South Seoni forest divisions. From the study its concluded that Dhaman is comes under critically endangered tree species. The reasons observed for declining the natural population of this species was irregular flowering habit. Clonal propagation of this species was found very difficult due to its recalcitrant nature and both the root promoting hormones NAA and IBA were failed to induced from roots from juvenile cuttings. *Dalbergia latifolia* (Shisham) was also found only in 3 agrocliamtic zones of Madhya Pradesh including 4 forest divisions having 6 ranges with 3 compartments. During the survey 38 trees of this species were visited so far out of which only 10 healthy and morphological superior candidate plus trees have been identified from South Seoni, W.Chhindwara, S.Chhindwara and Sehore forest divisions. So these areas are potentially rich areas of this species. The declining of natural population of this species may be due to very slow growth and very poor natural regeneration. The vegetative propagation of this species was found very difficult hence difficult to propagate it by clonal propagation. Only new and healthy green shoot were developed from the cuttings.

Achar

Bija

Tinsa

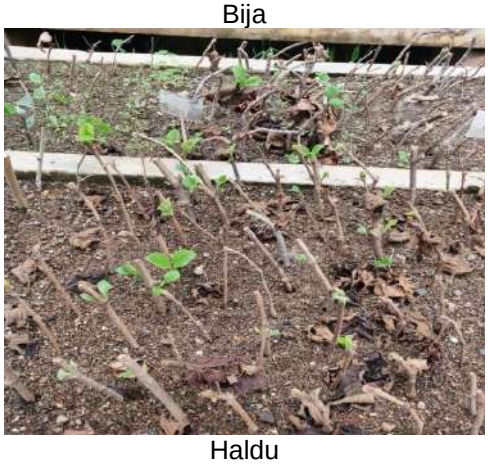
Haldu

Dhaman

Shisham

Bija

Tinsa



Haldu

Dhaman

On-going Projects

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

Why this Project:-

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

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

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

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

(iii) Molecular analysis 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:

a. The number (and percentage) of polymorphic genes in the population.
b. The number of alleles for each polymorphic gene.
c. The proportion of heterozygous loci per individual.

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

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

Research Methodology: -

1. **Collection of leaf samples-**The leave samples of 305 candidate plus trees will be collected from identified candidate plus trees of teak situated in different forest divisions of Madhya Pradesh along with their GPS location.

2. **Methods of DNA extraction using CTAB (Cetyl tri-methyl ammonium bromide) protocol:**

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

3. **Microsatellite amplification for genetic diversity study**

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

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

4. **Scoring of DNA banding pattern for assessing genetic diversity**

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

5. **Selection of elite group of candidate plus trees-**

After collection of data the genetic diversity will be assessed among the selected candidate plus trees. After analysis, highly genetically diversified CPTs will be marked as elite group. After this analysis, their morphological traits will be compared to justify their genetic and phenotypic relationship.

Objective of Research:-

- Collection of leaf samples from selected Candidate plus trees.
- To isolate DNA from leaves.
- To amplify the genomic DNA.
- To assess the Genetic diversity between the CPTs.
- To identify genetically distinct group of CPTs as elite material.
- To compare phenotypic and genotypic characters.

Activities Undertaken:-

Recruitment of project staff. The list of previously selected candidate plus trees of Teak have been compiled and renovation of Biotechnology laboratory have been done. The diluted Teak primers have been tested for their amplification using RTPCR but poor amplification have been observed and the gel image bands are not clear.

Cost of the Project: - Rs. 27.60 Lakhs

Expected Outcome of Research:-

1. 305 CPTs 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 are 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 305 candidate plus trees of teak genetically distinct CPT or group of CPTs will be identified as a source of elite group on the basis of their genetic makeup.
5. After this analysis, their morphological/phenotypical traits will be compared to justify their genetic and phenotypic relationship because DNA is non manipulable material and environment does not effect on it.
6. This study will help to identify elite germplasm of this valuable timber species for further genetic improvement programme and the DNA of CPTs will be stored in the form of DNA library for further studies.

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

Why this Project:-

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

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

Research Methodology: -

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

Cost of the Project: - Rs. 31.83 Lakhs

Expected Outcome of Research:-

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

Regular activity

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

Why this Project:-

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

Research Methodology:-

A provenance trial of *Litsea glutinosa* has been taken up in SFRI campus in the year 2010-11 with 8 provenances viz Jagdalpur-15, Pachmarhi-15, Baihar – 15, Lalbarra (Balaghat)-15, Patalkot – 15, Rewa – 15, Betul – 15, Langhi (Balaghat)-15, Samnapur-7 alongwith 126 plants. The plants were

raised through stem branch cuttings under mist chamber. The best performing provenance will be evaluated on the basis flowering and fruiting pattern, height and girth.

Study Design:-

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

1. Jagdalpur Total plants = 15 (3 lines of 5 plants each)	2. Jagdalpur Total plants = 15 (3 lines of 5 plants each)	3. Lanji Balaghat Total plants = 15 (3 lines of 5 plants each)	4. Lalbarra Balaghat Total plants = 10 (2 lines of 5 plants each)
5. Patalkot Total plants = 15 (3 lines of 5 plants each)	6. Rewa Total plants = 15 (3 lines of 5 plants each)	7. Betul Total plants = 15 (3 lines of 5 plants each)	4. Lalbarra Balaghat Total plants = 10 (2 lines of 5 plants each)
8. Baihar Balaghat Total plants = 16 (2 rows of 8 plants each)			

Objective of Research:-

- Maintenance and collection of growth data.

Activities Undertaken:-

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

Cost of the Project - Rs. 0.50 Lakhs

Expected Outcome of Research:-

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

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

Why this Project:-

Mahua is a versatile fruit bearing tree species which occurs in different forest divisions 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 observed.

Research Methodology:-

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

Study Design:-

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

Objective of Research:-

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

Activities Undertaken:-

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

Cost of the Project - Rs.0.50 Lakhs

Expected Outcome of Research:-

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

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

Why this Project:-

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

Research Methodology:-

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

Study Design:-

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

Objective of Research:-

To maintain and enrich Bamboosetum of SFRI.

Activities Undertaken:-

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

Cost of the Project - Rs.1.00 Lakhs

Expected Outcome of Research:-

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

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

Other significant achievements :

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

2.1.2 CONSERVATION RESEARCH DIVISION

Mandate

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

Completed Project : One

1. Development of quality planting material of medicinal plants. RCFC-CR.
   Funding Agency: RCFC, Jabalpur

Ongoing Project: One

1. Preparation of quality planting material of RET and other important species.
   Funding Agency: SFRI, Jabalpur

Regular Activities : Two

1. Maintenance and development of Medicinal and aromatic plants gene bank.
   Funding agency : SFRI, Jabalpur
2. Maintenance of Forest Herbarium, SFRI Jabalpur
   Funding agency : SFRI, Jabalpur

Project Summary:-

Completed Project

1. Title of the Project:- Development of quality planting material of medicinal plants. RCFC-CR.

Why this Project:-

This institute is engaged in medicinal plant conservation since last few decades. Preparation of quality planting material of medicinal plants is one of the mandates of RCFC project. This year under this mandate 50, 000 plants will be prepared in SFRI nursery.

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

A. Preparation of QPM of the selected medicinal plant species. Species are selected with the discussion with regional Director and Co-ordinator of RCFC-CR. 19 species selected for multiplication. QPM for all the mentioned species will be prepared through seeds, stem. Cuttings or root cuttings.

B. Maintenance of the existing earlier indisposed stock of medicinal plant species.

Planting materials which were not disposed during last season will also maintained under this project.

Objectives of Research:-

1. Preparation of QPM of the selected medicinal plant species.
2. Maintenance of the existing earlier indisposed stock of medicinal plant species.

3. Selling of plants in nominal rates or free distribution to cultivators and other individual households/ institutions for establishment of home/institutional herbal gardens and extension purpose.

Activities Undertaken:-

- Procurement of material
- Filling of poly-bags
- Plant preparation through seeds and cuttings

Cost of the project: Rs.5.00 Lakhs

Outcome of the project:-

- 51 542 plants of 48 species were prepared
- List of plants prepared and verified by RCFC on October 2022. Task completed.

Insulin
(*Costus igneus*)

Satawar
(*Asparagus racemosus)*

Sarpgandha
(*Rauvolfia serpentine*)

Aonla
(*Phyllanthus emblica)*

Bach
(*Acorus calamus***)**

Ledipeepar
(*Piper longum*)

Ongoing Project

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 was not properly maintained.

The balance amount 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 selling of plants. This amount was 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 the 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 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 commercial/environmental 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 sustaining nursery.

Activities Carried out: -

- Procurement of material
- Filling of poly-bags
- Plant preparation through seeds and cuttings

Cost of the Project:- 9.04 Lakhs

Expected Outcome of the Project : -

- Plantlets of 81 RET and other important species are prepared.
- This work will be helpful to provide plantlets of RET and other important species to user groups.
- Rs. 1 lakh earned through selling of plantlets will help in enrich of revolving fund which will help in running of the nursery in coming years.

Guggal (*Commiphora wightii*)

Jamun (*Syzygium cumini*)

Kalla (*Dillania indica*)

Mahua (*Madhuca indica)*

Sita Ashok (*Saraca asoca*)

Medicinal plant Nursary

Regular Activities :

1. Title of the Project:- Maintenance and development of Medicinal and aromatic plants gene bank.

Why this Project:-

Medicinal plant conservation is one of the mandate of Biodiversity and Medicinal plant branch. This project will help us to enrich the existing medicinal plant gene bank of SFRI, Jabalpur.

Research Methodology:-

Following works will be carried out under the project.

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 gene bank.
   Maintenance of gene bank of medicinal plant and infrastructure:
b. **Plant utility display:** For each species labels will be prepared depicting information regarding its local name, scientific name, uses etc.
c. **Maintenance of gene bank of medicinal plant and infrastructure:** All infrastructure including live plants will be maintained under the project.

Study Design:-

Based on availability of medicinal plants, survey will be conducted to collect the planting material. Plants will also be procured from other institutions to enrich the gene bank.

Objectives of Research:-

1. Collection and conservation of medicinal and aromatic plants in the Gene Bank of SFRI, Jabalpur.
2. Maintenance of gene bank of Medicinal plants.

Activities Carried out-

Manpower, poly-pots, potting media, Mother plants, Irrigation and plant nutrients, Survey for collection of medicinal plants and conservation and maintenance of collected plants in the gene-bank

Expected Outcome of the Project : -

- Medicinal plants will be conserved inside the institute's premises. .

Views of nursery visit by field staff and students

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

Activities undertaken:-

- Cleaning and protection of herbarium sheets
- Maintenance of Herbarium software

Cost of the Project:- 0.20 Lakhs

Expected 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. Nursery and plantation techniques of root trainers (Training given to the staff of social forestry and territorial divisions).

Projects executed in collaboration with other divisions of the institute

a. Completed projects with other divisions

S. No.	Projects	Target	Achievement	Division
1	Assessment of impact on Doubling of Katni Singrauli Rail line Project on flora, fauna and habitats of Sanjay-Dubri Tiger Reserve	Biodiversity assessment of different impact zones.	Target achieved and report submitted.	EIA cell
2	Assessment of impact of Kopra mini irrigation project.	Biodiversity assessment of different impact zones.	Target achieved and report submitted.	EIA cell
3	Nursery evaluation and grading work.	Evaluation of social forestry nurseries.	Field work of Ratlam, Jhabua and Rewa done, report submitted to PI.	Forest Productvitiy
4	Techniques of preparation of plants in root trainers and its plantation.	Classroom and hands-on trainings on plants preparation and plantation techniques provided to all selected field staff of Social forestry and territorial divisions.	Trainings provided	Forest Productvitiy

b. On-going projects with other divisions

S. No.	Projects	Achievement	Division
1	Provenance trial work (Plant preparation work)	Plants of six species to be prepared as per seeds provided by Dr. S.K. Tiwari. Work in progress.	Biotechnolgy Division
2	Monitoring and evaluation of plantations.	Basic report of Biodiversity assessment prepared, training provided to all team members. All 20 plantations monitored. Reports under preparation.	Monitoring and valuation cell.

2.1.3 FOREST MANAGEMENT RESEARCH DIVISION

Mandate:

1. Contribution to the knowledge of silviculture of forestry species.
2. Development and standardization of nursery and planting techniques of different forestry species.
3. Evaluation of plantations raised by the state forest department and forest development corporation.
4. Evaluation of the quality and impact of various development activities of the state forest department.
5. Determination of sustainable harvesting practices of timber and bamboo species.
6. Provision of soil testing services to the SFD, FDC and other users.
7. Finding the growth development of crop stands for different species in different site quality classes and in different agro climatic zones.
8. Designing the experiments and analysis of data for preparing the conclusion from the projects for all te research branches of the institute.
9. Training on 'Establishment, maintenance and periodic measurement of sample plots to departmental personnel and students.'

Ongoing Project : One

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

Regular Activities : Two

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

Project Summary:-

Ongoing Projects :

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

Why this Project:-

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

Research Methodology:-

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

Study Design:-

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

Objectives of Research:-

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

Activities Undertaken:-

- Appointment of one project staff and procurement of stationary.

Expected Outcomes of Research:-

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

Cost of the project : Rs. 2.40 Lakhs

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

Creation initial database for forecasting of all crop parameters and volume of felled trees for forest professionals, field foresters.

Regular activity :

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

Why this Project :-

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

Research Methodology:-

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

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

Objective of Research:- मृदा परीक्षण कार्य

Activities Undertaken:-

- मृदा नमूनों की तैयारी
- मृदा नमूनों का भौतिक एवं रासायनिक परीक्षण
- मृदा स्वास्थ्य कार्ड तैयार करना

Cost of the Project :- Rs. 5.00 Lakhs

Expected Outcome of Research : -

- विभिन्न वनमंडलों, वन विकास निगम एवं संस्थान के विभिन्न विभागों से प्राप्त लगभग 558 मृदा नमूनों का परीक्षण कर संबंधितों को रिपोर्ट प्रदाय करना।
- रिपोर्ट के आधार वृक्षारोपणों को अधिक से अधिक संख्या में सफल बनाना।

Estimation of organic carbon from the soil samples

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

Why this Project :-

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

Research Methodology:-

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

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

Objective of Research:-

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

Activities Undertaken:-

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

  Cost of the Project :- Rs. 7.77 Lakhs

Expected Outcome of Research : -

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

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

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

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

Other Activities

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

2.1.4 FOREST UTILIZATION RESEARCH DIVISION

Mandate

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

Completed Projects : One

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

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

Ongoing Projects : One

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

   Funding Agency: NMPB, New Delhi

Project Summary:-

Completed Project

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

Why this Project:-

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

Research Methodology :-

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

Study Design :

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

Objective of Research:-

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

Activities Undertaken:-

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

Cost of the project: Rs.10.00 Lakhs

Outcome of the project:- During both the years of the project (2020 to 2022), following activities has been undertaken:-

- Total 40 markets of 23 districts were surveyed. During the survey, districts namely, Katni, Panna, Satna, Sidhi, Umaria, Dindori, Shahdol, Anuppur, Tikamgarh in Katni centre, Chhindwara, Betul, Seoni, Hoshangabad in Chhindwara centre, Shivpuri, Sheopur, Gwalior

districts in Shivpuri centre, Jhabua, Alirajpur, Indore and Neemuch districts in Indore centre and Mandla, Balaghat, Raisen districts in Jabalpur centres were covered.

- Market information of commercially and economically important medicinal and Non Timber Forest Produce traded and marketed during the different seasons were recorded and collected.
- These informations were collected through personal interviews and telephonic communication.
- The market rates of total 99 important Non Timber Forest Produce was recorded and collected viz. 99 MFP species from Neemuch mandi, 58 species from Shivpuri Mandi, 56 from Indore, 41 from Lamta district Balaghat, 40 from Katni Mandi, 38 from Karahal district Sheopur, 36 from Barghat District Seoni, 34 from Betul (Betul Padhar and Chicholi), 32 from Mandla (Mandla, Anjania and Mawai), 29 from Umaria, 24 from Alirajpur, 22 from Tikamgarh, 22 from Dindori, 20 from Satna, 19 from Chhindwara (Chhindwara, Tamia, Delakhari and Damua), 18 from Gwalior (Gwalior and Mohna), 9 from Anuppur and 7 species from Pawai district Panna.
- For the monitoring of Minimum Support Price (MSP) of the notified 32 important MFPs of Madhya Pradesh, quarterly surveys were undertaken in the months of February-March 2021, May-June 2021, August-September 2021, November-December 2021, February-March 2022, May-June 2022, August-September 2022, November-December 2022 and prices of purchase of MFPs at village, block and district level traders were collected.
- During the month of February-March 2021 to November-December 2021, it was observed that the prices of Satawar root, Charota seed (*Cassia tora)*, Baibirang seed (*Embelia tsjeriam cottam*), Gudmar (*Gymnema sylvestre*), Mahua flower (*Madhuca latifolia*), Konch seed (*Mucuna pruriens*), dry Aonla (*Phyllanthus emblica*), Bhilawa (*Semecarpus anacardium*), Anantmool (*Hemindesmus indicus*), Amaltash phalli (*Cassia fistula*) and Kusum lac (*Shellac*) were found on the higher side of MSP.
- The prices of Bael guda (*Aegle marmelos*), Kalmegh panchang (*Andrographis paniculata*), Achar guthli (*Buchanania lanzan*), Nagarmotha root (*Cyperus scariosus*), Honey, Mahua gulli (*Madhuca latifolia*), Palas lac (*Shellac*), Harra (*Terminalia chebula*), Dhawai flower (*Woodfordia fruticosa*) and Kutaj bark (*Holarrhena antidysentrica*) according to grading, were found on higher side in some markets in the months of February-March 2021 to November-December 2021.
- The prices of Arjun bark (*Terminalia arjuna)*, Jamun guthli (*Syzigium cuminii)*, Imli with seed (*Tamarindus indica)*, Bahera (*Terminalia bellirica*), Giloy (*Tinospora cordifolia*), Apamarg (*Achyranthes aspera)*, Karanj seed (*Millettia pinnata*), Neem seed (*Azadirachta indica*) and Sal seed (*Shorea robusta*) were found to be on the lower side of MSP in the surveyed markets, in months of February-March 2021 to November-December 2021.
- During the month of February-March 2022 to August-September 2022, it was observed that the prices of Satawar root (*Asparagus racemosus*), Baibirang seed (*Embelia tsjeriam cottam)*, Gudmar (*Gymnema sylvestre)*, Konch seed (*Mucuna pruriens)*, dry Aonla (*Phyllanthus emblica)*, Bhilawa (*Semecarpus anacardium)*, Amaltash phalli (*Cassia fistula)*, Mahua gulli (*Madhuca latifolia)*, Nagarmotha root (*Cyperus scariosus)*, Palas lac (*Shellac*) and Kusum lac (*Shellac)* were found to be on the higher side of MSP.
- The prices of Bael guda (*Aegle marmelos)*, Achar guthli (*Buchanania lanzan)*, Honey, Charota seed (*Cassia tora)*, Kutaj bark (*Holarrhena antidysentrica)*, Karanj seed (*Millettia pinnata)*, Kalmegh panchang (*Andrographis paniculata)*, Bahera (*Terminalia bellirica)*, Dhawai flower (*Woodfordia fruticosa)*, Mahua flower (*Madhuca latifolia)*, Arjun bark (*Terminalia arjuna)* according to grading, has been found on higher range, in some of the markets, in the months of February-March 2022 to August-September 2022.
- The prices of Jamun guthli (*Syzigium cuminii)*, Imli with seed (*Tamarindus indica)*, Giloy (*Tinospora cordifolia)*, Apamarg (*Achyranthes aspera)*, Harra (*Terminalia chebula)*, Neem seed (*Azadirachta indica)*, Anantmool (*Hemindesmus indicus)*, Makoi dana panchang (*Solanum nigrum)*, were found on lower side of MSP, in surveyed markets in the months of February-March 2022 to August-September 2022.
- The collected data was processed and scrutinized
- Final data was computerized and analyzed

- The Volumes of Van Dhan Vyapaar Patrika viz. Vol. 20 (1, 2, 3 and 4), Vol. 21 (1, 2, 3 and 4) and Vol. 22 (1, 2, 3 and 4) were prepared and 4000 copies were published.
- The above published issues were distributed free of cost, through post, to Hon'ble Forest Minister, Secretary of Forest, Principal Chief Conservator of Forest, Head of Forest, all PCCF, APCCF, CCF and CF of other sections, DFOs of all the Forest Division, Wild life institutes, Organizations, Farmers, Traders, Manager of Van Dhan Kendra, JFMCs members, etc.

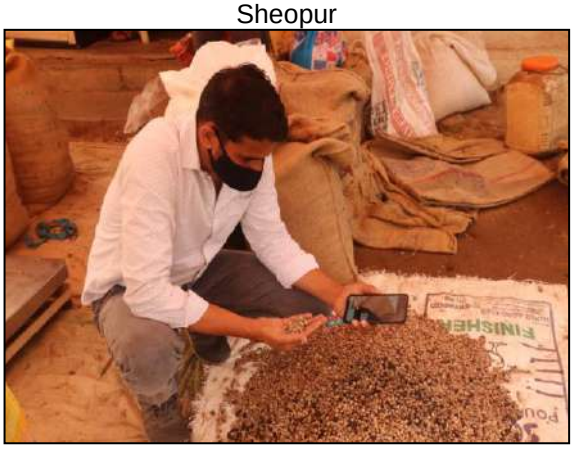
Collection of MFPs information from Prabandhak of Chareaon samiti district Balaghat

Collection of MFPs information from the trader of village Chicholi, district Betul

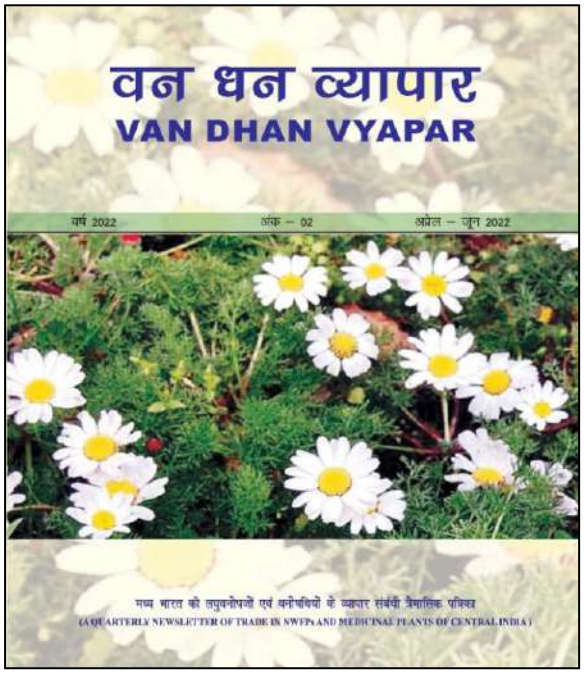
Collection of MFPs information from the trader of Pohri district, Shivpuri

Group discussion with traders of Karahal, district Sheopur

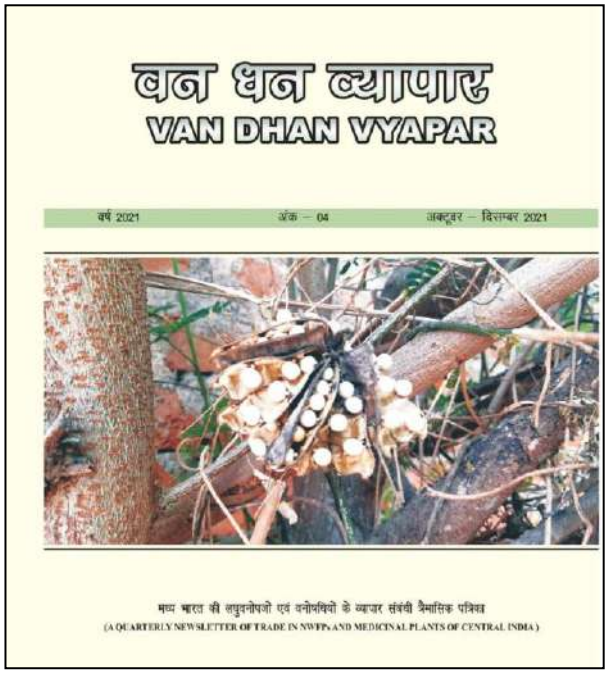
Collection of MFPs information from the trader of village Chiraidongri



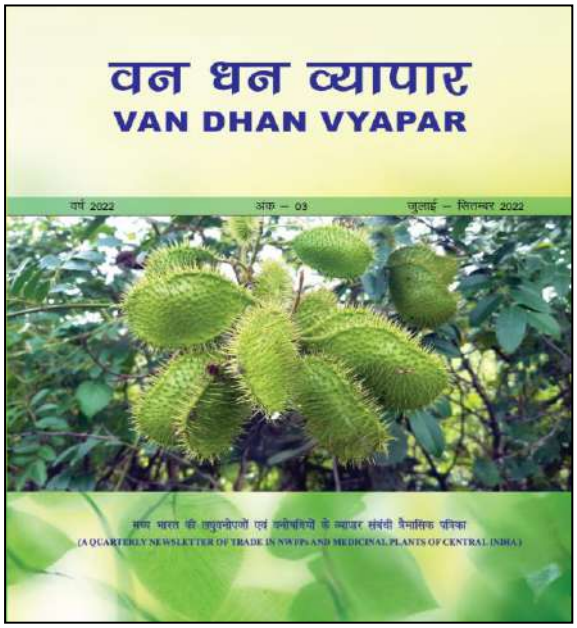
Visit to weekly market Damua, district Chindwara



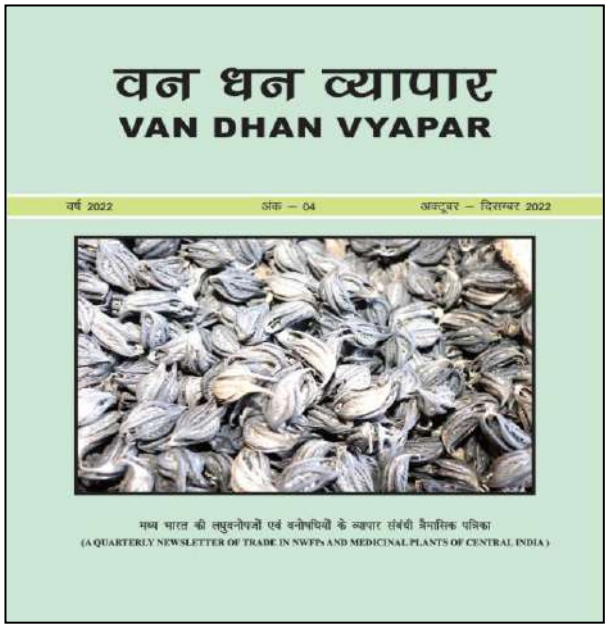
Vol. 1 (January – March) Year 202



Vol. 2 (April – June) Year 2022



Vol. 3 (July – September) Year 2022



Vol. 4 (October – December) Year 2022

Ongoing Projects

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

Why this Project:-

- Establishment of Regional Cum Facilitation Centre - Central Region - under the Central Sector Scheme of NMPB.
- To promote conservation, development and sustainable management of medicinal plants of NMPB.

Objectives of Research:-

- Disseminate the programmes and policies of NMPB
- Establishment of linkages between different stakeholders

Activities Carried out-

- Collection of data
- Market rate collection
- Training, stakeholder meet, seminar, workshop, webinars

- Publications
- Subject matter expert
- QPM Distribution

Cost of the Project:- Rs.158.3925 lakhs

Expected Outcome of the Project : -

- 405 beneficiaries were trained in 05 training programs
- 200 collectors were trained
- 04 webinars conducted
- 410550 Planting material raised for distribution
- 384031 plants were distributed under Ayush Aapke Dwar, Ayush Aapki Kheti, Herbal garden and Seva Pakhwada to the public and farmers for cultivation
- 05 success stories were documented
- 96 no. of fortnightly market rates were collected and sent to NMPB for e-charak portal
- 04 new brochures were published, 11 brochures reprinted
- M&E of 02 project- completed
- Area covered in cultivation – 31.425 ha
- 200 potential herbal products were reported
- Participation in Fairs/Meetings/Seminars/Workshop/ Trainings -09

Participation in Fairs/ Melas

Free plant Distribution under Ayush Aapke Dwaar & Ayush Aapka Cultivation

Trainings

2.1.5 FOREST PRODUCTIVITY RESEARCH DIVISION

Mandate

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

Completed Project : 02

1. Dissemination of knowledge through training programme for sustainable management and quality fruit collection of chironji to stakeholders.

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

2. Training and demonstration programme on establishment and best management of seed production areas, seed technology and nursery management for field foresters

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

Ongoing projects:- 03

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

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

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

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

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

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

Regular Activities:- One

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

   Funding Agency -SFRI, Jabalpur

Project Summary :-

Completed project

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

Why this Project:-

Unscientific harvesting practices, immature fruit/seed collection and overexploitation are commonly practiced by stakeholders and fruit collectors. Natural regeneration and distribution of this species in natural forest is also decreasing in past few years.

Training Methodology:-

- 20 trainings and demonstration programme were imparted to 20 Village level JFMCs committees members as per potentially rich of chironji areas in East, West and South Chhindwara and North & South Panna Forest Divisions.

Study Design:- Training

Objectives of Research:-

- To disseminate the knowledge of package of practices for quality fruit collection and sustainable management of the chironji.

Activities Undertaken:-

- 40-50 participants (JFMC's) were invited for each training programmme.
- During these training effect of collection period on fruit quality were disseminated through power point presentation and lecture in simple language/ poster/pamphlets.
- Fruits collection procedure demonstrated in the field.
- Loss of income was assessed through get-to-gether with fruits collectors.
- Causes of sudden drying of chironji tree were identified in the field.
- Training material with technical brouchers were distributed to the trainees for detailed information on collection of quality fruits and sustainable management practices.

Cost of the Project:- 14.10 lakhs

Outcome of Research:-

- 20 trainings were imparted to the members of selected JFMC's and forest dependent communities with subordinate staff of Chhindwara and Panna Forest Divisions.
- Total 1013 participants (fruit collectors) were trained in two divisions.
- Final Report submitted




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

Why this Project:-

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

Training Methodology:-

- Classroom lectures by PPT presentation and field demonstration

Study Design:- Training

Objectives of Research:- To provide basic knowledge for selection of Seeds stand, establishment and best management of seed production areas, Seed Technology and Nursery Management

Activities Undertaken:-

- 11 training programmes were organized.
- Total 300 Field foresters invited from 52 territorial and 11 Social Forestry Circle.
- Training period - 03 days.
- Venue - State Forest Research Institute, Jabalpur
- Final report submitted.

Cost of the Project:- 23.25 lakhs

Outcome of Research:-

- 281 field foresters were trained on establishment and management of seed production areas, seed technology and nursery management.




Ongoing projects

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

Why this Project:-

Natural regeneration and distribution of these species in natural forest has decreased in the 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 *Annogeissus latifolia* were collected from 10 seed zones from 30 sites.
- Analysis of seeds for various parameters were 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:-

- Identification potential pockets.
- Evaluation best germplasm.
- Standardization of seed techniques.
- Standardization of nursery techniques.
- Publication of technical brochures

Achievement

- Repeat study of vegetative propagation of *Commiphora wightii* and *Anogeissus latifolia* was done.
- Under physiological parameters various pre-treatments were applied for enhancing the germination of seeds.
- In *Commiphora wightii* the best treatment was found to be seed soaking with 0.5% KNO_3 for 10 minutes.
- In vegetative propagation the best treatment was found in 7mm dia of vegetative cutting with 500 ppm GA3 for overnight soaking.
- The highest 66% rooting response was found with above treatment.
- Best collection period were find out in the 1st week of February with respect to higher germination potential.
- 54% germination was recorded of seeds clooected in the month of February, against 26% in those collected in the month of November.
- Seeds were stored in various storage conditions to enhance the longevity of seeds.
- Seed longevity was recorded for only 07 days.
- In *Anogeissus latifolia,* preliminary observations of three seed zone, the highest germination 7% was found with seed soaking in 48 hrs. cold water followed by 5% with 200 ppm GA3 against 1% in control.

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

Why this Project:-

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

Research Methodology:-

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

Study Design:- रोपणी भ्रमण

Objectives of Research:-

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

Activities Undertaken:-

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

Cost of the Project:- 04.50 Lakhs

Expected Outcome of Research:-

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

Achievements:-

- समस्त 57 चार एवं पाँच स्टार रोपणियों की अधोसंरचना का मूल्यांकन, श्रेणीकरण एवं मान्यता कार्य किया गया।
- अंतिम प्रतिवेदन तैयार किया जा रहा है।

अनुसंधान विस्तार की रोपणियों का अवलोकन एवं प्रशिक्षण

3. Title of the Project:- Selection of species specific root trainer sizes and potting mixes to be adopted by the Forest Department nurseries of Madhya Pradesh for 10 selected tree species.

Why this Project:-

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

Research Methodology:-

Fresh seeds will be collected from identified superior trees by hand plucking and peak maturity of targeted species. After collection seeds will be dried in open air and will be 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 will be done on following lines:

1. Collection of seeds.
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. Preparation of various potting mixture.
5. Seed sowing in various root trainer cell size with various potting mixture.
6. Seed sowing in nursery bed and germination tray.
7. Experiment will be laid out in the greenhouse of the institute and Social Forestry Nursery, Jabalpur.
8. The experiment will be laid out in Complete Randomized Block Design (CRBD) with various treatments with three replicates in each treatment. 30 plants will be required for each treatment with three replicates in every experiment.
9. After experiments produce plant will be provided free of cost to the Social Forestry Nursery / Forest Department.

The potting mixtures will be composed with various fertilizers and chemicals. Three-month-old seedling will be used for experiments. Different size of root trainer will be used for standardization of root trainer cell size with potting mixture. The plants will be transplanted very carefully without disturbing the root ball and irrigated daily with fresh water. Fumigation with various insecticides and fungicides will also be done as per requirement of the disease in plants. Observation will be recorded on germination potential, seedling growth and survival percentage. Potting mixture will be analyzed for its physico-chemical properties prior applied into root trainer and after the completion of experiment. 05 experiments will be done to achieve the objectives.

Experiment no. 01:- 03 sowing condition will be tried to effect on seed germination behaviour.

Experiment no. 02:– 36 potting mixtures will be used to effect on growth and survival of seedlings of targeted species.

Experiment no. 03:– Effect of various cell size of root trainer on seedling growth and survival percentage.

Experiment no. 04:- Thinning of seedlings in root trainer trays in 03 month intervals of every potting mixes seedlings.

Experiment no. 05:- To standardize spacing of seedlings in root trainers for better growth and survival of plants.

Study Design:- Randomize Block Design RBD

Objectives of Research:-

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

Activities Undertaken:-

- Seed collection.
- Seed testing.
- Production of plants.
- Procurement of chemicals and fertilizers.
- Procurement of various sizes of root trainers.
- Seed collection of 10 targeted species for production of plants for experimental work.
- Preparation of potting media.
- Filling of root trainers with different potting mixture.
- Preparation of nursery bed.
- Seed sowing in nursery bed, germination tray and root trainers. Observation were recorded on germination potential.
- Testing of potting media before and after experiment.
- Shifting of seedlings from nursery bed to root trainer with various potting mixture.
- Watering and weeding.
- Fumigation with various insecticides and fungicides will also be done as per requirement of the disease in plants.
- Observation recorded on growth and survival of plants every two months interval.
- Measurement of seed ling growth.

Cost of the Project:- Rs.17.76 Lakhs

Expected Outcome of Research:-

- Evaluate potting mixture for raising quality seedlings of 10 targeted species.
- Species wise root trainer size with potting mixture will be standardized.
- Standardization 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

Achievement:-

- Procurement of chemicals, fertilizers and root trainers.
- Collection of seeds of 10 targeted species.
- Seed sowing in different sowing media.
- Observations were recorded on germination potential.
- Various potting mixture were prepared

- Seed sowing in different cell size of root trainer with various potting mixture.
- Observations were recorded in different cell size of root trainer with various potting mixture with respect to germination potential, growth and survival of seedlings.
- Various experiments were laid out for observation of growth and survival of seedlings.

Seed Germination and potting mixture standardization experiment of *A. latifolia*

Regular activity

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

Objectives of Research:

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

Activities Undertaken:

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

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

- Deliverable technologies of standardization of seed and nursery techniques of *Commiphora wightii* and *Anogessus latifolia* was developed.
- On the basis of previous research work, technology disseminated through training and demonstration programme on sustainable harvesting and management practices of chironji fruit to fruit collectors and stakeholders.

Other Significant achievement :

- 02 projects were completed and final report submitted to the funding agency.
- 312 field foresters of various forest divisions and R&E circles were trained for plant preparation in root trainers and their management in nurseries, seed technology for plant production in root trainer.
- Infrastructure developed for production of plants in root trainers.
- 04 new project proposals were formulated and submitted to the funding agency.7

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.

Completed Project:- 01

1. ''देवास जिले में लोकवानिकी प्रबन्ध योजना क्रियान्वयन का अनुश्रवण एवं मूल्यांकन''।

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

On-going 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 तहत निजी भूमि के रोपण एवं वर्तमान कृषि वानिकी मॉडल का अध्ययन''।

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

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

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

Newly Initiated Project : 01

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

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

Project Summary:-

Completed Project

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

Why this Project:-

निजी भू–स्वामियों तथा सामुदायिक भूमि में खड़े वनों का वैज्ञानिक प्रबन्धन करने, क्षेत्र में वनोंपज एवं वनोंषधियों का रोपण कर कृषकों को समृद्ध बनाने के लिए लोक वानिकी प्रबन्ध योजना का क्रियान्वयन मध्यप्रदेश शासन द्वारा किया गया। जिन कृषकों ने इस योजना को प्रारम्भ में अपनाया था, वे एक निश्चित समयावधि उपरांत भू–राजस्व संहिता की धारा 240–241 में शिफ्ट हो गये। अतः यह अध्ययन आवश्यक हो गया था कि लोक वानिकी प्रबन्ध योजना के क्रियान्वयन में क्या कमियाँ रही, इसको अपनाने वाले कृषकों को क्या लाभ एवं हानि हुई। लोक वानिकी प्रबंध योजना एवं धारा 240–241 के कारण पुनरुत्पादन एवं पर्यावरण पर क्या प्रभाव पड़ा आदि कारणों को ज्ञात करना ताकि कमियों को दूर कर अन्य जिलों में बेहतर तरीके से लागू किया जा सके। यह परियोजना फंडिंग एजेन्सी के निर्देशानुसार तैयार की गयी है।

Research Methodology & Study Design:-

कार्यालय प्रधान मुख्य वन संरक्षक अनुसंधान विस्तार एवं लोकवानिकी, मध्यप्रदेश, भोपाल के पत्र क्रमांक/अनु.वि./लो.वा./210 भोपाल, दिनांक 24/01/2019 के अनुसार दिये गये अनुसंधान बिन्दुओं को ध्यान में रखकर अध्ययन कार्य पूर्ण किया गया।

- द्वितीयक साहित्य का अध्ययन एवं आँकड़ों का संग्रहण तथा विश्लेषण कर परियोजना को मूर्त रूप देने का कार्य किया गया।
- योजना में सम्मिलित कृषकों का प्रारंम्भिक सर्वेक्षण एवं उनके प्राकृतिक वनों के स्थल का अवलोकन किया गया।
- प्रारंभिक सर्वेक्षण कर अनुसूची तैयार करने का कार्य किया गया।
- अध्ययन क्षेत्र में लोक वानिकी प्रबन्ध योजना एवं धारा 240–241 अपनाने वाले कृषकों के चयन का कार्य किया गया।
- कुल ग्रामों एवं कृषकों में से 10 प्रतिशत नमूनों (सेम्पल) का सविचार दैव निदर्शन पद्धति से चयन किया गया।
- सामाजिक–आर्थिक सर्वेक्षण द्वारा कृषकों का साक्षात्कार लेकर अनुसूची में जानकारी एकत्र की गई।
- आँकड़ों को कम्प्यूटर में फीडकर उनका वर्गीकरण, श्रेणीकरण एवं विश्लेषण कर परियोजना प्रतिवेदन तैयार किया गया।
- प्रबंध योजना में किसान संघ की भूमिका का अध्ययन किया गया।
- फोटोग्रॉफ तथा संरचित अनुसूची द्वारा आँकड़ों का संकलन किया गया।
- प्रबन्ध योजना के पालन में कमियाँ, समस्याएं एवं सुझाव से संबंधित आँकड़ों का संकलन किया गया।
- वित्त प्रदाता संस्था के दिये गये निर्देशानुसार आँकड़ों का विश्लेषण कर प्रतिवेदन प्रस्तुत किया गया।

Objective of Research:-

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

Activities Undertaken:-

देवास जिले की खातेगांव एवं बागलीके कृषक प्रतिनिधियों एवं क्षेत्रीय वन विभाग के अधिकारियों से साक्षात्कार एवं चर्चा द्वारा हितग्राहियों की समस्याएं, सुझाव, कृषक संघ तथा विभाग की भूमिका आदि से संबंधित जानकारी एकत्र करने का कार्य किया गया। इसके पश्चात् एकत्र किए गये ऑकड़ों को कम्प्यूटर में फीड, करने, विश्लेषण एवं प्रतिवेदन लेखन का कार्य किया गया।

Cost of the Project:- Rs. 10.60 Lakhs

Expected Outcome of Research:-

अनुश्रवण एवं मूल्यांकन से प्राप्त परिणामों का संक्षिप्त विवरण निम्नानुसार हैः–

1. देवास जिले के भूमि स्वामियों ने अपने प्राकृतिक वनों से वृक्षों के विदोहन हेतु लोक वानिकी प्रबन्ध योजना के तहत् सम्मिलित हुए, उसमें उनको कयी प्रकार की समस्याओं का सामना करना पड़ा, ऐसा कृषकों ने साक्षात्कार दल को जानकारी दिया।
2. अन्वेषण के समय साक्षात्कार में प्राप्त जानकारी के सम्बन्ध में कुछ तथ्य तो सत्य थे वही कुछ किसानों और वनमंण्डल की सम्मिलित कमियां दृष्टिगोचर हुई। किसानों की कमी यह थी कि वृक्षों के विदोहन उपरांत जिन पौधों को रोपित करना था वे पौधे अन्वेषण दल को नही मिले। किसानों द्वारा इस संबंध में बतलाया गया कि पौधे लगाए गये थे, लेकिन विभिन्न कारणों जैसे पानी की कमी एवं मवेसियों की चराई आदि से नष्ट हो गये। वन विभाग द्वारा किसानों के विदोहित काष्ठ का भुगतान कर दिया गया और दूसरी किस्त में पुनः पौधों के विदोहन की अनुमति भी दे दी गयी।
3. अन्वेषण से ज्ञात हुआ कि देवास जिले के किसान एकमत से उपजाऊ भूमि में खड़े प्राकृतिक वृक्षों का निवर्तन कर विभिन्न कारणों से खेती करने में भूमि का उपयोग करना चाहते हैं।
4. लोक वानिकी प्रबन्ध योजना के तहत् सम्मिलित भूमि स्वामी के प्राकृतिक वनों से विदोहन के लिए परिपक्व वृक्षों में से बहुत कम वृक्षों के विदोहन की अनुमति देने का प्रावधान था, जिससे किसानों की आवश्यकता पूर्ति में बाधा एवं एक मुश्त लाभ नही मिल पाता था।
5. विदोहन के लिए प्रस्तावित वृक्षों की कटाई हेतु अनुमति मिलने में बहुत बिलम्ब होता था एवं हितग्राही को बार–बार कार्यालय के चक्कर लगाने पड़ते थे।
6. पासिंग हैमर लगाने तथा काष्ठ को डिपो तक ले जाने में अनावश्यक विलम्ब होता था।
7. काष्ठ परिवहन में अनावश्यक देरी होती थी, जिससे हितग्राही को अतिरिक्त (वाहन का भाड़ा) भुगतान करना पड़ता था।
8. काष्ठ की कीमत के भुगतान में हितग्राही को बहुत लंबा इंतजार करना पड़ता था।
9. योजना क्षेत्र में मौजूद सागौन के अतिरिक्त अन्य प्रजातियों के वृक्षों जैसे साजा, सेजला एवं धावड़ा आदि की काष्ठ को डिपो में विक्रय की सुविधा नही मिलती थी, जिसके कारण हितग्राही काष्ठ को रोपण क्षेत्र से अन्य जिलों में अथवा सस्ते दामों में स्थानीय स्तर पर बेचने को मजबूर होना पड़ता था। इससे किसान को लागत अधिक लगने के कारण काफी नुकसान उठाना पड़ता।
10. धारा 240–241 के अंतर्गत वृक्षों के पातन की स्वीकृति एवं लम्बी कागजी कार्यवाही के कारण किसानों को खेती का कार्य छोड़कर कार्यालय के चक्कर लगाना पड़ता है, इससे एक तो कृषि कार्य पर विपरीत प्रभाव पड़ता है, दूसरी ओर परिवहन व्यय, शारीरिक, मानसिक कष्ट उठाने के बावजूद भी कटाई की अनुमति मिलने में देरी, पासिंग हैमर लगाने का इंतजार, काष्ठ को डिपो तक परिवहन करने और विक्रय के उपरांत भुगतान में देरी का सामना करना पड़ता था।
11. क्षेत्र में बिचौलियों की सक्रियता से भी किसानों को वांछित लाभ से वंचित होना पड़ा है।
12. भू–स्वामियों के परिवार की संख्या में वृद्धि, भूमि का विभाजन एवं विखंडन, क्षेत्र में बिजली, सिंचाई साधनों का विस्तार, भूमि की उर्वरता, कृषि की लागत में वृद्धि, श्रमिकों के पारिश्रमिक में वृद्धि आदि कारणों से भू–स्वामी लोक वानिकी प्रबन्ध योजना के स्थान पर भू राजस्व संहिता 1959 की धारा 240–241 के प्रावधानों के तहत अधिक से अधिक वृक्षों की एक मुश्त कटाई

करवा कर भूमि को कृषि कार्य में परिवर्तित करने की प्रवृत्ति जाग्रत हुई। इसमें बिचौलियों ने भरपूर लाभ उठाया।

13. किसानों की मंशा है कि शासन उनकी भूमि के वृक्षों के निवर्तन की प्रक्रिया को सरल और सहज बनाए तथा निश्चित समय–सीमा में उनके उपज की कीमत दिलाने संबंधी कानून में संशोधन करे।
14. वृक्षों के विदोहन की जटिलता दूर हो जाने पर, किसान खेती वाली भूमि के मेंड़ में वृक्ष लगाने को प्रोत्साहित होंगे।

Application of Research Findings:-

देवास जिले में लोक वानिकी प्रबन्ध योजना के क्रियान्वयन में आने वाली कमियों को दूर कर किसानों की समझमें आने वाले नियमों के साथ क्रियान्वयन एवं क्रियान्वयक की जवाबदेही सुनिश्चित कर दी जाय तो निश्चित ही किसानों में इस योजना की लोकप्रियता को बढ़ावा मिलेगा तथा किसान इस दिशा में अग्रसर होंगे। अनुश्रवण एवं मूल्यांकन से प्राप्त निष्कर्षों के अनुसार निम्न बिन्दुओं पर कार्यवाही कर स्थल में योजना को कार्य रूप में परिणत किया जा सकता है।

1. प्रबंध योजना के क्रियान्वयन हेतु लंबी एवं जटिल कागजी कार्यवाही को कम कर सरल व आसान बनाया जाय।
2. किसानों की लोकवानिकी प्रबंध योजना में स्वीकृत का समय कम किया जाय।
3. प्रबंध योजना में भूमि स्वामी के निजी क्षेत्र में खड़े सागौन एवं अन्य प्रजाति के वृक्षों में से 50 से.मी. छाती गोलाई या इससे ऊपर के वृक्षों का विदोहन कार्य भूमि स्वामी की आवश्यकतानुसार किए जाने बावत नियम सुनिष्चित करने पर विचार किया जाना चाहिए।
4. भूमि स्वामी के भूमि सेविदोहन उपरांत पासिंग हैमर लगाने,काष्ठ डिपो तक परिवहन किये जाने एवं कीमत भुगतान की न्यूनतम समय–सीमा सुनिश्चित करने की अवश्यकता है।
5. भू–स्वामी द्वारा विदोहित अपनी निजी क्षेत्र की काष्ठ को पासिंग हैमर अंकित होने के बाद कटिंग चालान द्वारा शासकीय वन डिपो में जमा करवाने वाला पूर्व का नियम लागू करने की किसानों की मांग पर उचित निर्णय करने की आवश्यकता है।

7.भू–स्वामी को निजी वन से विदोहित काष्ठ कोशासकीय वन विभाग के डिपो में स्वयं विक्रय करने की कुछ सीमा तक स्वतंत्रता दिए जाने पर विचार किया जा सकता है।

8. भू–स्वामी द्वारा विदोहित काष्ठ शासकीय डिपो में जमा करने के पश्चात् उसे पावती देने के उपरान्त भुगतान के लिए अधिकारियों द्वारा किसानों से किसी प्रमाण पत्र की मांग संबंधी प्रावधान को किसानों की मंशानुसार किया जाना उचित होगा।
9. राजस्व एवं वन विभाग की अधिकारिता पर कानून का सर्वग्राही बनाने की अवश्यकता है।
10. विदोहन उपरांत स्थल आधारित अभिवहन पास जारी करने कीसमय–सीमा तय होनी चाहिए।
11. संबंधित वनमंडल द्वारा यह सुनिश्चित किया जा सकता है कि लोकवानिकी प्रबन्ध योजना में सम्मिलित प्राकतिक वन से वृक्षों के विदोहन उपरांत कृषकों को संपूर्ण राशि का तत्काल भुगतान न किया जाये, अपितु एक निश्चित राशि एक निश्चित समय के लिए संबंधित किसान के नाम से बैक में एफ डी कर वनमंडल के नियन्त्रण में रखी जानी चाहिए, जिसका भुगतान एक या दो वर्ष जो भी उचित हो, तभी दी जावे जब किसान के प्राकृतिक वन में विदोहित वृक्ष के अनुपात में रोपित पौधे जीवित हों। इससे किसान पौधों को लगाने से लेकर संरक्षित करने की जिम्मेवारी पूरी कर सकेंगे। इसी आधार पर अगले क्रम में पौधों के विदोहन की भी अनुमति देना उचित होगा।
12. भू–राजस्व संहिता की धारा 240 हो या 241, कृषक द्वारा तहसील कार्यालय में वृक्ष विदोहन के लिये आवेदन देने पर पर संबंधित उपवनमंडल कार्यालय को अभिमत के लिये भेजा जाता है एवं उप वनमण्डलाधिकारी द्वारा परिक्षेत्राधिकारी से कई बिन्दुओं पर परीक्षण कराया जाता है, इस कारण अनावश्यक देरी हो जाती है। किसी कृषक की मृत्यु हो जाने पर खसरा नंबर का रकबा उसके वारिसान के नाम राजस्व रिकार्ड में दर्ज हो जाने के बाद भी अमान्य कर दिये जाने की जानकारी किसानों द्वारा दी गयी है। अतएव इस समस्या का उचित समाधान आवश्यक है।

13. भू–राजस्व संहिता की धारा 240 के तहत विदोहन हेतु कृषक द्वारा तहसील कार्यालय में आवेदन देने के पश्चात् विदोहन किये जाने वाले वृक्षों का स्वयं संज्ञान लेकर,राजस्व निरीक्षक एवं पटवारी के प्रतिवेदन पर वृक्ष विदोहन की स्वीकृति आदेश देना तय करने का प्रावधान किया जा सकता है।भू–राजस्व संहिता की धारा 241 में किसान की सीमा से लगने वाली वन विभाग की सीमा को परिक्षेत्राधिकारी से जांच करवाकर अभिमत दिया जाना उचित होगा।

14. किसानों के अनुसार वृक्षों में हित वर्ष 1999 के कारण आदिवासी कृषकों को जटिल समस्याओं का सामना करना पड़ता है। उन्हें कलेक्टर कार्यालय से वृक्ष विदोहन बावत् आदेश प्राप्त करने में बड़ी कठनाई का सामना करना पड़ता है। राजस्व मण्डल कार्यालय, ग्वालियर में अपील की कार्यवाही के लिए जाना पड़ता हैं और उसमें भी समय पर न्याय नही मिल पाता है। अतः इस संबंध में सामान्य वर्ग,अनुसूचित जाति के कृषकों के वृक्ष विदोहन की भांतिअनुसूचित जन–जाति के कृषकों के लिए भी प्रक्रिया अपनाई जा सकती है। इससेअनुसूचित जन–जाति वर्ग के कृषकों को फायदा हो सकेगा।

15. लोकवानिकी नियम हो या भू–राजस्व संहिताकी धारा 240–241, जिसमें भी कृषकों के वृक्षों विदोहन हो, उसमें भू–स्वामी को दो घनमीटर काष्ठ घर पर निजी उपयोग के लिये रखने का प्रावधान किए जाने की आवश्यकता है, जो पूर्व में प्रचलित था जिसे वर्तमान में प्रचलन से हटा दिया गया है। इसलिये उक्त नियम को पुनः लागू किया जाना उचित होगा। इससे कृषकों की निजी आवश्यकताओं की पूर्ति हो सकेगी।

16. इस योजना से जुड़कर ईमानदारी से कार्यरूप में परिणत करने वाले हितग्राही को प्रोत्साहित करं सम्मानित करना चाहिये, जिससे दूसरे कृषक भी इस योजना से प्रेरित होकर जुड़ सकें।

17. किसानों के सुझाव अनुसार, कुछ कृषकों के पास निजी क्षेत्र में जलाऊ जैसे सागौन एवं अन्य प्रजाति के वृक्ष (बिगड़े वन के रूप में) खड़े है, जिनका न तो कोई उपयोग है न ही उनका कोई भविष्य। उन क्षेत्रों के लिये ऐसा नियम होना चाहिए कि निश्शेष पातन (क्लियर फेलिंग) किया जाकर कपिस से प्राप्त पौधे, पुनरुत्पादन द्वारा प्राप्त पौधे एव गैप (खाली जगह) में पौधा रोपण से वापस वन क्षेत्र तैयार किया जा सके।

18. वन क्षेत्र एवं कृषक के अधिकार क्षेत्र वाले रोपण में पारदर्शिता पूर्ण निर्णय कर किसानों का सहयोग करने की आवश्यकता है।

19. लोक वानिकी प्रबन्ध योजना एवं भू राजस्व संहिता 1959 की धारा 240–241 में किसानों की निजी भूमि में स्थित प्राकृतिक वनों से किसानों, पर्यावरण, मृदा अपरदन, जल संरक्षण जैसे लाभों से जुड़े मुद्दों पर संवेदनशीलता, न्याय एवं वर्तमान आवश्यक मानवीय परिस्थितियों को ध्यान में रखते हुए नियमों में प्रावधान करने की आवश्यकता है, जिससे कि ऐसे नियम स्थानीय परिस्थितियों के अनुरूप सर्वग्राही हो।

20. मालवा प्रान्त की भू–संरचना एवं जलवायु के अनुसार निजी प्राकृतिक वनों से वृक्षों के पातन हेतु नियमों का निर्माण किया जाना उचित होगा। देवास जिले में अध्ययन के दौरान पाया गया कि वर्षों से कृषकों की उपजाऊ भूमि में खड़े प्राकृतिक वृक्ष, वर्तमान स्थिति के अनुसार लाभ नही दे रहे हैं। शासकीय नियमों में बाध्यता के कारण कृषक ऐसी भूमि से वृक्षों को अलग कर खेती के लिए प्रयुक्त करने को मजबूर हैं। ऐसा इसलिए कि परिवार की संख्या में वृद्धि, सिंचाई के साधनों का प्रसार, मंहगी कृषि प्रक्रिया द्वारा अन्न का उत्पादन प्रमुख है। अनुचित तरीके से नियमों से छिपकर खेत से प्राकृतिक वृक्षों के पातन से उनकी उपज का उचित लाभ संबंधित भू–स्वामी को न मिलकर मध्यस्थ लोगों की जेब में जा रहा है। इसी कारण कृषकों में वृक्षारोपण के प्रति नकारात्मक सोच को प्रोत्साहन मिल रहा है। अतः नियमों का सरलीकरण करते हुए ऐसे प्रावधान किया जाय कि भू–स्वामी उर्वर भूमि से क्रमानुसार वृक्षों को तभी अलग करें, जब वे उक्त भूमि के मेंड़ में एक निश्चित अंतराल में तथा निश्चित वृक्षों का रोपण कर ले तभी उसे उक्त खेत को कृषि कार्य के लिए प्रयुक्त कर सकेगा। इससे पर्यावरण को भी अनुकूल बनाए रखा जा सकेगा, फसल को नुकसान होने से बचाया जा सकेगा।

21. कृषकों द्वारा खेत के मेंड़ में वृक्षों को रोपित करने के उपरांत एक साधारण प्रक्रिया के तहत विदोहित करने एवं उसके निवर्तन का प्रावधान किया जाय, जिससे भू–स्वामी को कम से कम परेशानी का सामना करना पड़े तथा उसे दीर्घकाल में लाभ की प्रत्याशा बनी रहे।

22. धारा 240–241 में दिए गये वर्तमान प्रावधानों में प्राकृतिक वनों से एक साथ निर्धारित माप के सभी वृक्षों की कटाई की अनुमति देने के स्थान पर एक निश्चित प्रतिशत के वृक्षों को, निश्चित अंतराल में कटाई की अनुमति प्रदान करने संबंधी प्रावधान का समावेश करने की आवश्यकता है।

तहसील–कन्नौद, ग्राम–सुरानी में किसानों के प्राकृतिक निजी वन में धारा 240–241 के अंतर्गत काटी गई आबादी का स्थलीय निरीक्षण

तहसील–कन्नौद, ग्राम–सुरानी में धारा 240–241 के अंतर्गत काटे गए सागौन वृक्ष के ठूँठ का अवलोकन

तहसील–कन्नौद, ग्राम–सुरानी में धारा 240–241 के अंतर्गत काटे गए सागौन वृक्षों का मापन कार्य

तहसील–कन्नौद, ग्राम–बुरूट में धारा 240–241 के अंतर्गत काटे गए सागौन पेड़ों के ठूँठ, भूमि से निकालकर मेढ़ के किनारे पाए जाने का दृश्य

तहसील–कन्नौद, ग्राम–बुरूट में धारा 240–241 के अंतर्गत काटे गए पेड़ों के ठूँठ को निकालकर भूमि को कृषि कार्य में परिवर्तित करने का दृश्य

On-going Projects

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

Why this Project:-

कृषकों की खेती को लाभप्रद बनाने एवं आय में वृद्धि के उद्देश्य को ध्यान में रखकर कृषक समृद्धि योजना के अंतर्गत कृषि वानिकी के तहत् कृषकों की निजी भूमि में शासन स्तर पर पौधा रोपण

का जो अभियान प्रारम्भ किया गया था, उसके प्रति कृषकों का क्या रवैया है, क्या कमियां है, यह अभियान सफल रहा या असफल इसका कारण, कृषि वानिकी पद्धति अपनाकर खेती करने से कृषकों को होने वाली लाभ एवं हानि आदि तथ्यों को प्रकाश में लाने तथा भविष्य में ऐसी योजना के क्रियान्वयन से पूर्व गुण–दोष पर विचार कर उचित रणनीति तैयार करने हेतु अनुसंधान करने का दायित्व फंडिंग एजेन्सी ने सौंपा था।

Research Methodology & Study Design:-

- अध्ययन क्षेत्र का चयन
- योजना में सम्मिलित कृषकों का सविचार दैव निदर्शन(Stratified Random Sample)विधि से चयन।
- सामाजिक–आर्थिक सर्वेक्षण द्वारा अनुसूची में कृषकों से आँकड़ों का संकलन।
- सर्वेक्षण हेतु समान आनुपातिक प्रतिनिधित्व के आधार पर कृषकों का चयन कर साक्षात्कार।
- सामाजिक वानिकी वृत्त द्वारा कृषि वानिकी पद्धति के अंतर्गत कृषकों की निजी भूमि में स्थापित प्रदर्शन प्रक्षेत्रों से प्रदर्शन प्रक्षेत्र का चयन तथा रोपण स्थल के पौधों की वृद्धि संबंधी आँकड़ों का संकलन।
- समूह रोपण एवं खेत के मेड़ों में किए गए रोपण से कृषि उत्पादन पर पड़ने वाले प्रभाव से संबंधित आँकड़ों का संकलन एवं विश्लेषण।
- लागत–लाभ अनुपात(Cost Benefit Ratio) का विश्लेषण।
- चयनित जिलों के ग्रामीणों एवं किसानों से उनके मॉडल, कृषि वानिकी पद्धति के आँकड़ों का संकलन एवं विष्लेषण कर नवीन मॉडल की रूपरेखा प्रस्तुत करना।

Objectives of Research:-

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

Activities Undertaken:-

साजापुर एवं नीमच जिले के कृषकों का साक्षात्कार एवं चर्चा द्वारा ऑकड़े एकत्र करने का कार्य किया गया। इसके पश्चात् एकत्र किए गये ऑकड़ों को कम्प्यूटर में फीड करने, सारणीयन का कार्य किया गया।

परियोजना के अंतर्गत उज्जैन वनमंडल में स्थित प्रदर्शन प्लाट के ऑकड़े एकत्र करने का कार्य शेष है, इसके अतिरिक्त उज्जैन वृत्त के सभी वनमंडलों के स्थलीय सर्वेक्षण का कार्य पूर्ण किया जाकर ऑकड़ों को कम्प्यूटर में फीड कर विश्लषण का कार्य जारी है।

Cost of the Project:- Rs.16.40 Lakhs

Expected Outcome of Research:-

- कृषक समृद्धि जैसी योजनाओं के माध्यम से वृक्षारोपण के प्रगति की समीक्षा हो सकेगी तथा ऐसी योजनाओं के प्रति कृषकों के रुझान का पता चल सकेगा।
- कृषि–वानिकी के प्रयोग से कृषकों की लाभ–हानि का आँकलन प्राप्त होने से कृषकों को मार्गदर्शन एवं प्रेरणा प्राप्त होगी।
- मालवा का पठार कृषि जलवायु प्रक्षेत्र में सफल पाए गये कृषि वानिकी मॉडल के परिणामों से कृषकों को कृषि वानिकी एवं वृक्षारोपण के प्रति निर्णय लेना सरल होगा।
- परियोजना क्षेत्र में कृषि–वानिकी मॉडल के प्रचार–प्रसार की रणनीति तैयार करने में मदद मिलेगी।

कृषक समृद्धि योजना के अंतर्गत किए गये वृक्षारोपण

ग्राम अरन्या कला, जिला–साजापुर

ग्राम–बापचा, जिला–साजापुर

ग्राम–अभयपुर, जिला–शाजापुर

भारखेड़ी, जिला–नीमच

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

Why this Project:-

मध्यप्रदेश महुआ उत्पादन संग्रहण में एक महत्वपूर्ण स्थान रखता है। प्रदेश के गरीब एवं आदिवासी समुदाय के भोजन एवं आजीविका का प्रमुख स्त्रोत है। महुआ के व्यापार पर कई महत्वपूर्ण व्यापारिक उद्योग धंधे स्थापित हैं, जिनसे सरकार को आय प्राप्त होती है। इसी प्रकार चिरौंजी जो कि अचार के वृक्षों से निकलती है, जिसका देश विदेशों में निर्यात कर बहुमूल्य विदेशी मुद्रा प्राप्त की जाती है। प्रारम्भिक अध्ययन में पाया गया है कि महुआ के वृक्षों का नया रोपण नही हो रहा है, पुराने वृक्ष कमजोर होकर नष्ट हो रहें हैं, आदिवासियों की वनों में स्थित वृक्षों पर निर्भरता बढ़ती जा रही है। वनों से महुआ फूल संग्रहण के पूर्व संग्राहकों द्वारा संग्रहण स्थल में आग लगाकर सफाई की जाती है, इससे कई बार जंगल में भयानक आग लग जाती है, जिससे जैव विविधता एवं जंगली पेंड़ पौधों का नुकसान होता है। संग्राहक अचार गुठली संग्रहण करने के लिए अवसर पाकर अधिक आय की लालसा में वृक्ष काटकर गुठली का संग्रहण करते हैं, जिससे वृक्ष धीरे–धीरे कम होते जा रहे हैं। वर्तमान समय में औपचारिक रूप से महुआ फूल एवं अचार गुठली के संग्रहण मात्रा के आँकड़े उपलब्ध नही हैं। जंगल के

वृक्षों का आँकलन वन मंडलों की कार्य आयोजना से कर उत्पादन का आँकलन किया जा सकता है, लेकिन कृषकों की निजी एवं राजस्व भूमियों में महुआ एवं अचार के वृक्षों की संख्या अज्ञात होने के कारण ऐसा करना संभव नही था। इस अध्ययन से महुआ एवं अचार वृक्षों की संख्या का आँकलन प्राप्त होने पर उत्पादन मात्रा का आँकलन किया जाना संभव होगा। सरकार को प्राथमिक संग्राहकों की आय एवं रोजगार को बढ़ाने के लिए ठोस कदम उठाने में सहायक हो जाएगा।

Research Methodology & Study Design :-

- द्वितीयक आँकड़ों, साहित्य के द्वारा महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण क्षेत्रों की स्थिति, महत्वपूर्ण आँकड़े एकत्र करना।
- परियोजना स्टॉफ का चयन एवं सर्वेक्षण कार्य के लिए उन्हें प्रशिक्षण प्रदान करना।
- जिलेवार स्थानीय एवं थोक व्यापारियों से साक्षात्कार।
- मध्यप्रदेश राज्य लघु वनोपज सहकारी संघ, भोपाल एवं वनमंडल कार्यालय, स्थानीय फुटकर एवं थोक बाजार के व्यापारियों से महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण मात्रा की जानकारी एकत्र करना।
- महुआ फूल एवं अचार गुठली के उत्पादन/संग्रहण वाले जिलों का प्रारम्भिक सर्वेक्षण कर संग्रहण क्षेत्र वाले गाँवों का सामाजिक–आर्थिक सर्वेक्षण के लिए चयन, सर्वेक्षण की तैयारी, अनुसूची (प्राथमिक संग्राहक एवं व्यापारी के लिए) का निर्माण।
- परियोजना स्टॉफ का चयन एवं सर्वेक्षण कार्य के लिए उन्हें प्रशिक्षण प्रदान करना।
- मध्यप्रदेश के 52 जिलों में मौजूद 385 तहसीलों में कुल 54,903 गाँव विद्यमान है (मध्यप्रदेश शासन डायरी 2020)। अतः प्रत्येक तहसील से 02 गाँवों का सविचार निदर्शन पद्धति से चयन।
- प्रत्येक गाँव के 5 प्रतिशत (अधिकतम 15 न्यूनतम 5) अर्थात् अधिकतम 11,550 और न्यूनतम 3850 संग्राहक परिवारों के सामाजिक–आर्थिक सर्वेक्षण द्वारा साक्षात्कार लेकर संरचित अनुसूची के माध्यम से आँकड़े निर्धारित प्रपत्र में एकत्र किये जायेंगे।
- जिलेवार महुआ फूल एवं अचार गुठली का व्यापार करने वाले स्थानीय व्यापारी, साप्ताहिक बाजार एवं जिले के थोक व्यापारी से साक्षात्कार लेकर इन प्रजातियों के व्यापार, कीमत निर्धारण प्रक्रिया, मूल्य संवर्द्धन, भण्डारण विधि एवं उत्पादन/संग्रहण में होने वाली कमी व वृद्धि के बारे में आँकड़े एकत्र किया जाकर उनका अध्ययन एवं विश्लेषण किया जाएगा।
- एकत्र किए गये आँकड़ों के विश्लेषण द्वारा अनुकूल एवं प्रतिकूल दोनों परिस्थितियों की संग्रहण मात्रा को प्रतिबिम्बित कर सकेगें।
- वरिष्ठ अधिकारियों एवं विषय विशेषज्ञों से चर्चा एवं उनके द्वारा प्राप्त महत्वपूर्ण सुझावों के आधार पर आवश्यकतानुसार महुआ फूल एवं अचार गुठली के संग्रहण उपरांत मूल्य, गुणवत्ता, भण्डारण एवं मूल्य संवर्द्धन के संबंध में आवश्यक वैज्ञानिक विधि एवं उपाय सुझाए जायेंगे।
- एकत्र किए गये आँकड़ों का अध्ययन एवं विश्लेषण।

Objectives of Research:-

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

Activities Undertaken:-

भोपाल, जबलपुर, सतना, रीवा, मंडला जिले के संग्राहकों का साक्षात्कार एवं चर्चा द्वारा संबंधित जानकारी एकत्र करने का कार्य किया गया। इसके पश्चात् एकत्र किए गये ऑकड़ों को कम्प्यूटर में फीड करने, सारणीयन एवं विश्लेषण तथां प्रतिवेदन लेखन का कार्य किया गया।

मध्यप्रदेश के 50 जिलों में सामाजिक–आर्थिक सर्वेक्षण का कार्य पूर्ण किया जाकर ऑकड़ों को कम्प्यूटर में इन्ट्री कर विश्लेषण कर लिया गया है। अंतिम प्रतिवेदन लेखन का कार्य किया जा रहा है।

Cost of Project:- Rs.64.63 Lakhs

Expected Outcome Research:-

- जिलेवार महुआ एवं अचार गुठली की कुल उत्पादन/संग्रहण मात्रा का आँकलन।
- महुआ एवं अचार गुठली के उच्च, मध्यम एवं निम्न उत्पादन क्षेत्रों की पहचान।
- महुआ एवं अचार गुठली के उत्पादन/संग्रहण, प्रसंस्करण, मूल्य संवर्द्धन आदि में आने वाली समस्याओं की पहचान एवं निदान के उपाय।
- महुआ फूल एवं अचार गुठली की उत्पादन/संग्रहण मात्रा ज्ञात होने से माँग–पूर्ति के अनुसार कीमत निर्धारण द्वारा ग्रामीण आदिवासियों के हितों का संरक्षण संभव।
- वास्तविक उत्पादन/संग्रहण मात्रा के आँकलन द्वारा संबंधित उद्योग में निवेश की संभावना।
- महुआ एवं अचार गुठली की उत्पादन/संग्रहण मात्रा को बढ़ाने के लिए प्रभावी कदम उठाना आसान होगा।

Newly Initiated Project :

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

Why this Project:-

प्रदेश में समय–समय पर विभिन्न कृषि वानिकी मॉडल्स का अध्ययन कर खेती से औसत आय बढ़ाने के लिए कृषकों को सलाह देकर अपनाने पर बल दिया गया है। इन समस्त प्रयासों को अपेक्षाकृत सफलता नही प्राप्त हो सकी है, जिसका उत्तरदायित्व समय–समय पर बदलती प्राकृतिक, मानवीय एवं सामाजिक घटनाओं को जाता है। इन समस्त घटनाओं का अध्ययन कर प्रदेश के विभिन्न कृषि जलवायु क्षेत्रों में अपनाए जाने वाले कृषि वानिकी मॉडलों का अध्ययन कर उनकी सफलता एवं असफलता के कारकों को प्रकाश में लाने की आवश्यकता है, जिस पर गहन विचार विमर्श कर असफलता के कारकों को दूर कर सर्वग्राही तकनीक प्रस्तुत करना तथा सफल कृषि वानिकी मॉडल्स के अवधारणाओं को लागू करने के लिए कृषकों को मार्गदर्शन की आवश्यकता है।

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

Research Methodology & Study Design:-

- वर्ष 2000, 2010 एवं 2014 में राज्य वन अनुसंधान संस्थान, जबलपुर द्वारा प्रदेश के विभिन्न कृषि जलवायु क्षेत्रों में कृषि वानिकी मॉडल्स का अध्ययन किया था। प्रस्तुत परियोजना के माध्यम से पूर्व में कृषि वानिकी मॉडल्स का अध्ययन किया जाकर वर्तमान स्थिति में लाभ–हानि का आँकलन करते हुए, लाभप्रद मॉडल्स के बारे में प्रतिवेदन प्रस्तुत किया जाएगा। साथ ही उपयुक्त कृषि वानिकी पद्धति का सुझाव प्रस्तुत किया जायेगा।
- अध्ययन क्षेत्र का चयन।
- चयनित जिलों के प्रत्येक कृषि वानिकी मॉडल्स के कृषकों का साक्षात्कार एवं स्थल अवलोकन द्वारा संरचित अनुसूची में साक्षात्कार (structured interview) लेकर निम्न बिंदुओं पर जानकारी एकत्र की जाएगी।
- परियोजना से संबधित पूर्व में स्थापित अन्य कृषि वानिकी पद्धति अपनाने वाले कृषकों का पता चलने पर मौके पर उनको भी अध्ययन में सम्मिलित किया जाना प्रस्तावित है।

- लागत–लाभ अनुपात (Cost Benefit Ratio) हेतु विभिन्न गतिविधियों में कृषकों द्वारा किए गए सभी व्ययों एवं उसके स्वयं के श्रम दिवसों तथा समस्त प्राप्तियों एवं उनके बाजार मूल्यों का पूरा लेखा जोखा परियोजना दल द्वारा रखा जायेगा। जिसे प्रतिवेदन लेखन में उपयोग किया जाएगा।
- प्राप्त आँकड़ों का विश्लेषण कर अन्तिम परियोजना प्रतिवेदन तैयार कर वित्त पोषक विभाग को प्रस्तुत किया जायेगा।
- आँकड़ों को कम्प्यूटर में फीडकर उनका वर्गीकरण, श्रेणीकरण एवं विश्लेषण।

Objective of Research:-

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

Activities Undertaken:-

फंडिंग एजेन्सी से रु. 05 लाख प्राप्त हो चुके हैं। लेकिन वर्ष 2015–16 के वृक्षारोपण मूल्यांकन कार्य में संलग्नता के कारण कार्य प्रारम्भ नहीं किया जा सका। साथ ही On-going 02 परियोजनाओं के ऑकड़ों का विश्लेषण एवं अंतिम प्रतिवेदन प्रस्तुत करने का कार्य किया जा रहा है। प्रभाग में इस कार्य के लिए एक मात्र सदस्य होने के कारण प्रस्तुत परियोजना का कार्य प्रारम्भ नही किया जा सकता। जैसे ही कम से कम 01 परियोजना का अंतिम प्रतिवेदन प्रस्तुत कर दिया जाएगा, उसके तत्काल बाद ही इस परियोजना का कार्य प्रारम्भ कर दिया जाएगा।

Cost of the Project:- Rs. 39-964Lakhs

Expected Outcome of Research:-

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

Scientific and technical achievements during the year

- अनुसंधान, विस्तार वृत्त, जबलपुर में आयोजित कार्यशाला (दिनांक 2–03–2023) में कृषक एवं स्टाफ को **कृषि वानिकी मॉडल्स** के बारे में प्रशिक्षण दिया।
- चालू वित्तीय वर्ष में कुल 07 प्रशिक्षु वन क्षेत्रपाल को सामाजिक–आर्थिक प्रभाग की गतिविधियों एवं उपलब्धियों से अवगत कराया गया।
- ''वन विभाग मध्यप्रदेश द्वारा विभिन्न योजनाओं के अंतर्गत वर्ष 2015–16 किए गये वृक्षारोपणों का अनुश्रवण मूल्यांकन''
- दल (क्र. 06) प्रभारी के रूप में दल का नेतृत्व करते हुए 04 सामान्य वनमंडलों उमरिया, अनूपपुर, सिंगरौली एवं रीवा के वर्ष 2015–16 के कुल 20 प्लांटेशनों में अनुश्रवण एवं मूल्यांकन का कार्य।
- सामान्य वनमंडलों उमरिया, अनूपपुर, सिंगरौली एवं रीवा के वर्ष 2015–16 में किए गये रोपणों के कुल 20 प्लांटेशनों में अनुश्रवण एवं मूल्यांकन का कार्य पूर्ण किया जा जाकर ऑकड़ों का विश्लेषण कर ड्राफ्ट रिपोर्ट फंडिंग एजेन्सी को प्रेषित कर दी गयी है।

2.2 WILDLIFE DEPARTMENT

2.2.1 ANIMAL ECOLOGY RESEARCH DIVISION

Mandate

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

Completed Project: - 02

1. Identification of best performing bamboo species for enhancement of income of farmers in Madhya Pradesh

   Funding Agency : State Bamboo Mission, Bhopal
2. Population Habitat Viability Analysis (PHVA) of Hard ground Barashingha (*Cervus duvauceli branderi*) for introduction in Bandhavgarh Tiger Reserve, M.P.

   Funding agency : PCCF (Wildlife) M.P. Bhopal through Bandhavgarh Tiger Reserve, M.P.

Ongoing Projects:- 03

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

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

   Funding agency-ICAR Indian Institute of Natural Resins and Gums, Ranchi, Jharkhand
3. AITE: Evaluation of Wild Animals Populations and Habitat in MP, Part I &II

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

Newly initiated Project:- 01

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

Regular Activities:- 01

1. Maintenance of Circular rose garden and Regional Lac field gene bank

   Funding agency : SFRI, Jabalpur

Project Summary

Completed Project

1. Title of the Project:- Identification of best performing bamboo species for enhancement of income of farmers in Madhya Pradesh

Why this Project:-

Degradation and depletion of bamboo forests has manifested in diminishing bamboo production and greater proportion of industrial bamboos as against commercial bamboos in bamboo production, resulting in declining financial returns.

In order to mitigate this serious problem, not only bamboo forests are to be managed strictly in accordance with scientific principles of management, but also, greater emphasis needs to be given to promote planting of bamboos on farm lands in a larger way. That is why; extension of bamboo covers over non-forest lands (farm lands and community lands) is one of the focus areas of National Bamboo Mission and MP State Bamboo Mission. However, capacity building of farmers by organizing training programmes is essential for the success of this programme.

Bamboo is an important source of income. According to an estimate, 20,000 NT (Notional tonnes; 1 N.T. is equivalent to 2400 m length of bamboo culms) of bamboo is being obtained from farmers. For many farmers, bamboo is the main source of income. In some states like Tamilnadu, many farmers have switched over from traditional agriculture to bamboo farming. There are 22 districts in the state of M.P. which have abundance of bamboo. To enhance income of farmers and bamboo dependant population from bamboo cultivation and to identify species which are more profitable to farmers, the present study is proposed to be carried in the state. Bamboo setums, demo plots have been established in different agro-climatic zones of the state

Research methodology: -

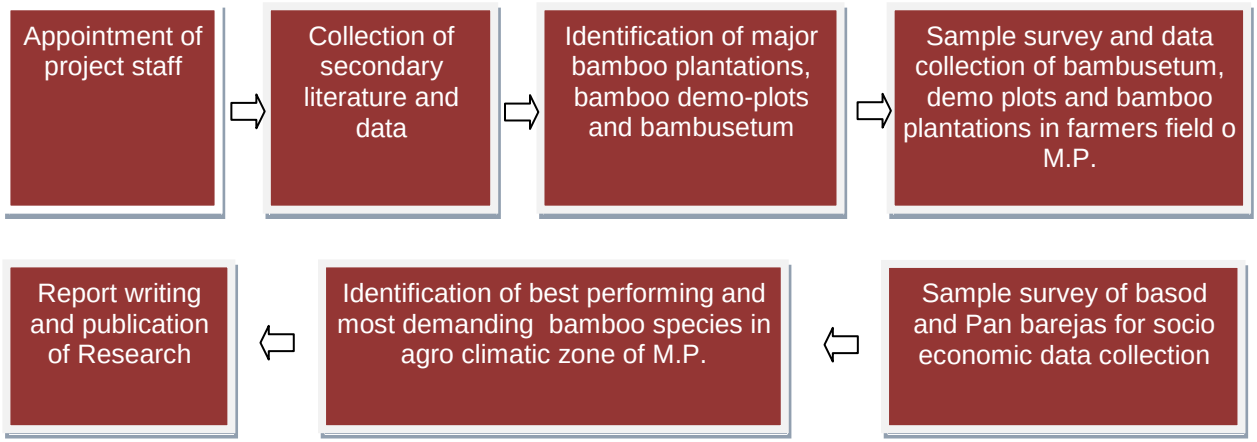
To Identify best performing bamboo species

- Bamboo plantations, bamboo setums and demo-plots of various species in different agro-climatic zones were surveyed and sample plantations of each bamboo species were assessed to compare their performancein terms of survival, yield and profitability for plantations.
- Three growth study measurements were taken from all clumps and the average measurement was used for calculations. The number of culms in these clumps was counted and all observations were made for the GBH, height and number of culm per clump for all the species.

Socio –economic survey of basod and pan barejas

- Random sampling technique was followed to select basod and pan barejas households. All the relevant information was collected from the basods through a structural questionnaire by personal interview
- Tabular analysis was done to calculate different parameters of socio-economic condition, *viz*, family size, education status, land holing capacity, animal husbandry status, major occupations, bamboo species utilized and resource availability, high demand bamboo species, bamboo requirement, bamboo purchasing sites, income from various sources and and interest of rural people/farmers in planting high yielding bamboo species, other than the traditional *D. strictus* species etc

Study Design :-



Objectives of Research:-

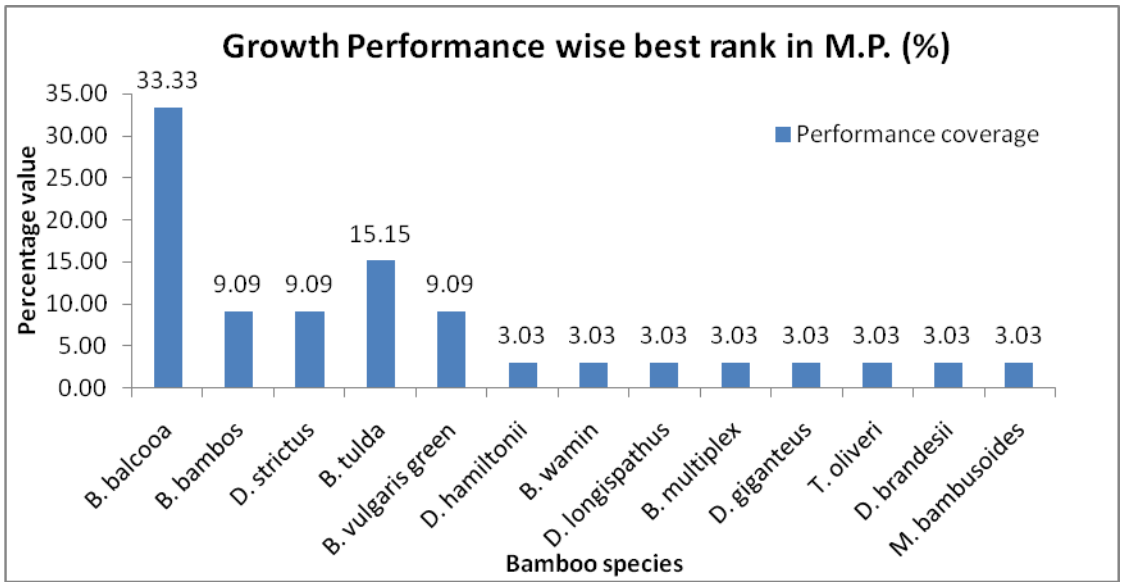
1. To identify best performing bamboo species in all the agro-climatic zones of the state based on the study of bamboo setums demo-plots and other bamboo plantations.
2. To identify species suitable for strengthening the socio-economic conditions of farmers and other dependent communities – basods and pan barejas.

Activities Undertaken:–

Cost of the Project:- 10.17 lakhs

Outcome of Research:-

- Under the project, 11 bambusetums, 40 bamboo demo plots, 264 bamboo plantations of farmers of 12 Forest Divisions of 11 agro climatic zones were surveyed to evaluate the growth performance of different bamboo species.
- Under the project, observed in total 39 different bamboo species in different bamboo setum, demo plots and farmer plantation of 11 agroclimatic zones of Madhya Pradesh.
- Overall growth performance wise rank, *Bambusa balcooa* found to be the best performing followed by *Bambusa tulda* whereas *Dendrocalamus strictus* was found to be most popular (high demanding) species amongst the bamboo dependent communities.



- Socio –economic study has been conducted in all 13 Forest Divisions of 11 agro-climatic zones of Madhya Pradesh in which 1374 basod household and 59 pan barejas of 04 Forest Divisions of 02 agro climatic zones of Madhya Pradesh were surveyed.

Income share from traditional business of basod household in Forest Divisions of Madhya Pradesh

S.No	Name of Forest Division	Surveyed Household	Annual income from traditional business (Rs.)	% of income from traditional business
1	South Seoni	248	45819.28	46.48
2	Anuppur	103	39809.71	45.49
3	Satna	249	38795.31	41.25
4	Jabalpur	100	37470.12	47.25
5	Raisen	113	37663.72	47.14
6	Bhopal	11	81818.18	79.03
7	Tikamgarh	81	48071.10	31.79
8	N. Betul	154	39551.53	58.80
9	Indore	15	60400.00	100
10	Ujjain	10	57840	42.21
11	Khandwa	177	35945.65	44.15
12	Badwani	64	37936.50	35.90
13	Alirajpur	49	42340.90	41.59

- Under the project demand and consumption of bamboo in bamboo dependent communities were also studied in which maximum gap found in Satpura plateau followed by Nimad plains.
- During our field survey, it was observed that most of the areas, basod has facing problems of bamboo at their desired cost. The bamboo they used purchase from the market sometimes move beyond their purchasing capacity. The similar situations have been observed for Pan bareja communities. This high cost of procurement of bamboo for market is affecting their production cost.
- So they have demanded to provide their required bamboo through forest depot with a minimum supporting price.
- Final report and utilization certificate has been submitted to funding agency.

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

Why this Project:-

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

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

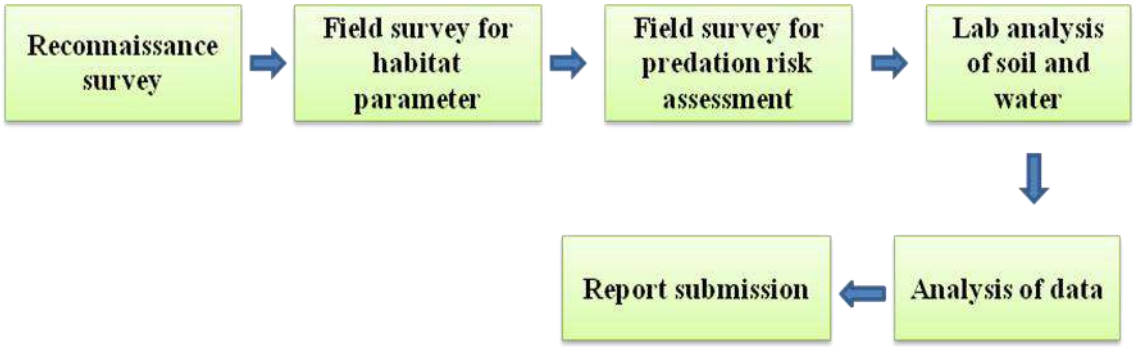
A detail population Habitat Viability Assessment is the need of the hour before carring the introduction programme

Research methodology: -

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

Study Design :-

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



Objectives of Research:-

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

Activities Undertaken:–

- Draft report has been submitted to funding agency

Cost of the Project:- 3.91 lakhs

Outcome of Research:-

- Viable habitat for barasingha in Bandhavgarh identified which can be used for long term conservation of this species
- Our present study identified suitable habitat of barasingha in Bandhavgarh and endorsed the proposed enclosure site at Magdhi range as one of the most suitable habitats of barasingha.
- Our study also predicted that 60 animals from surpluses with a sex ratio of 1:1 animals with supplementation of 10 individuals (from the surpluses) with a sex ratio of 1:3 for five years to free ranging condition shall be best suited as founder stock.
- Present study also revealed that, though release site has high predation risk, but buffer prey species is present which reduces probability of predation of introduced Barasingha population.
- For long term survival of Barasingha at Bandhavgarh, more suitable habitat needs to be created and inter connection of grassland is need of the hour.

On-going project

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

Why this Project:-

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

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

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

Initially this proposal was submitted for the urban area of Jabalpur only. The urban area of Indore is also included in the proposed study based on the recommendations made by Research project evaluation Committee members of Office of Principal Chief Conservator of Forest (Wildlife), Madhya Pradesh Forest Department vide letter no मा. चि.- II/2469, भोपाल dated 15-03-2021. It was observed that, leopards are entering inside the housing complexes, residential colonies, university complexes of both Jabalpur and Indore in regular interval. The sudden venturing of leopards inside the human habitation has created tremendous pressure on the forest department of both Jabalpur and Indore. To address this complex conservation issue and also to augment domain knowledge on source sites of straying leopard in the urban areas, the present study has been proposed.

Research Methodology:-

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

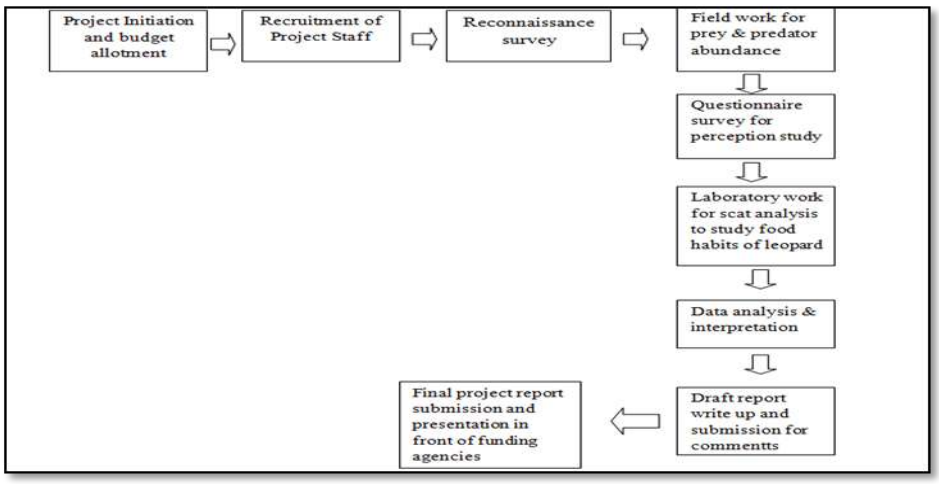
- Reconnaissance surveys and sign surveys for occupancy estimation
- Camera trapping for leopard abundance estimation
- Kill monitoring and Scat Analysis for food habits study

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

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

Study Design:-

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

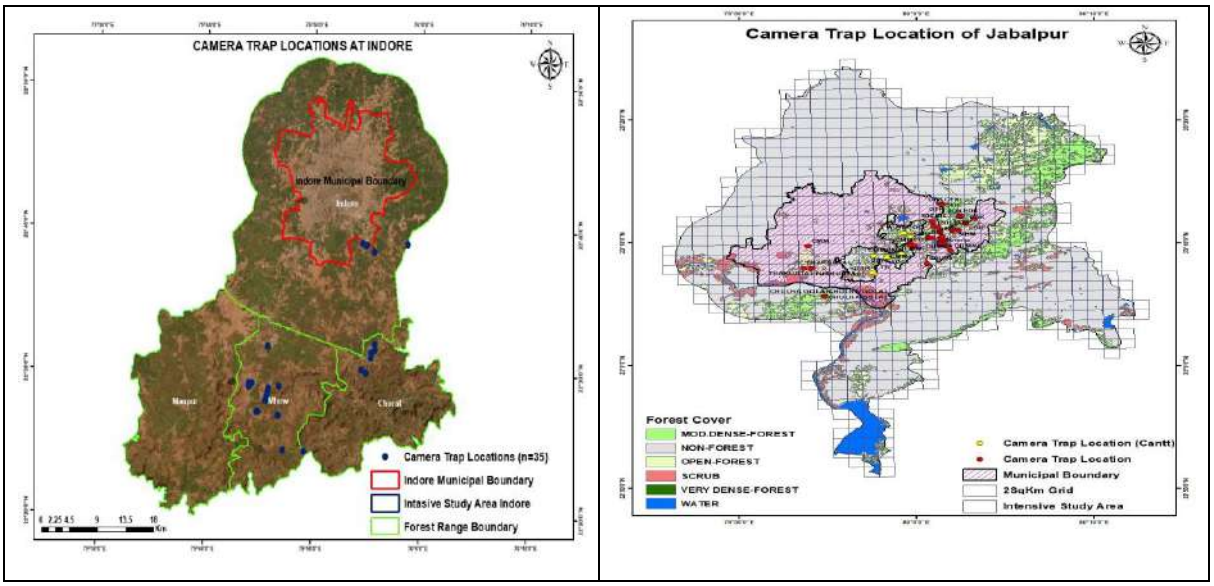


Objectives of Research:-

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

Activities Undertaken:-

- Perception study data collection has been completed in both Jabalpur and Indore. In total2255 households in Indore and 2593 householdsin Jabalpur have been surveyed.
- Analysis of the collected perception data is under process.
- Camera trapping exercise has been completed in both Jabalpur and Indore.
- Leopard kill data obtained through media reports and Forest Department has been analyzed which revealed that there were total 929 incidences of cattle depredation by leopard from 2014 to 2021. Out of which maximum, attacks were on Cows i.e., 83.53%, followed by 10.55% on Goat and rest 5.92% on Buffaloes
- 11 scat samples from Indore and 16 scat samples from Jabalpur have been collected during field surveys.Scat analysis is under process.
- Leopard presence data collection is completed in both Jabalpur and Indore.
- Collected data is under analysis for map preparation.



Cost of the Project:- Rs. 43.07 Lakhs

Expected Outcome of Research:-

- Source sites and causal factors of straying of leopard in and around Jabalpur and Indore.
- Leopard-human interaction zone and available suitable habitat areas for leopard in Jabalpur and Indore.
- Perception of local people towards human-leopard interaction amicably in the urban areas of Jabalpur and Indore

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

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

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

Why this Project:-

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

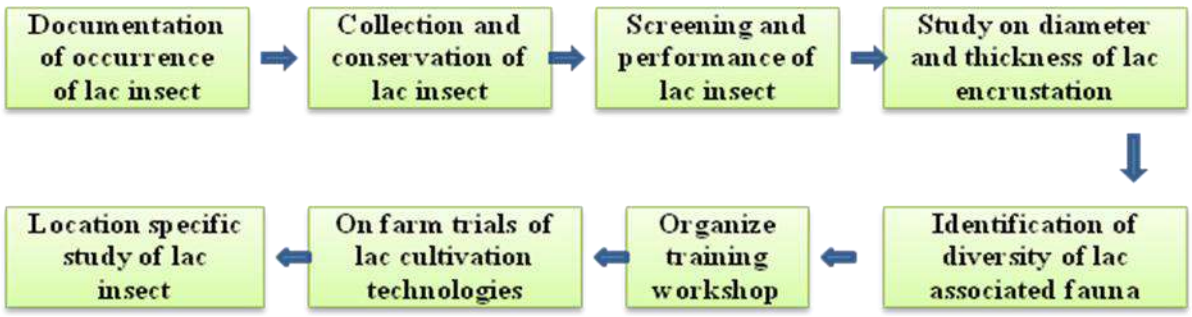
To overcome the situation the project was started to documentation the occurrence of lac insect/host plant, conserving the biodiversity of local lac insect species/races and breed which is decline due to anthropogenic activities and climate change. In this way, lac insect/host plants are needed for in-situ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

In this project, there were 8 network Co-operating centers and 3 voluntary center throughout in India with one lead centre IINRG, Ranchi, under network project on conservation of lac insect genetic resources. There are three states; Madhya Pradesh, Maharashtra 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.
- **On farm trials of lac cultivation technologies-** On farm trials of lac cultivation were made in selected sites of Madhya Pradesh. Farmers will be select randomly on the basis availability of host plants.
- **Training of farmers / resource persons:** cultivation training workshops were organize 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 of lac associated fauna-**Fauna that emerged from lac insect were collected and separated based on their identification under the microscope based on morphological characters of predators, parasitoids and hyper parasitoids of lac insect.
- **Study on diameter and thickness of lac encrustation-**Measurement was taken at the middle of the lac encrustation length and for shoot diameter at the ends of the encrustation, where lac was not present using vernier calipers. The formula-encrustation thickness= (encrustation diameter covering shoot-shoot diameter) for each shoot was used and averaged (Langlentombi et al. 2021).

Study Design:-



Objectives of Research:-

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

Activities Undertaken:-

- Collected insect samples from **10 sites of 7 districts** districts of Madhya Pradesh and **13 sites of 9 districts** of Maharashtraand multiplied on 255 plants/ tree of 12 different host in Regional Field Gene Bank.
- 226 plants of *Flemingia macrophylla* and 356 plants of *Flemingia semialata* are maintained in lac host bed in potted condition and hundred fourty eight plants/tree of 15 host plants species are maintained in Regional Field Gene bank.
- *Ghont* tree potential sites were surveyed in Rethi and Bahoriband ranges of Katni Forest Division of Madhya Pradesh. During the survey *ghont* tree was abundantly found in 10 beats of Rethi range and 2 beats of Bahoriband range, in which 6 Forest beats of Rethi range and two forest beats of Bahoriband can be highly suitable for lac cultivation trials on *ghont* tree through van samiti members.
- Capacity building cum hand holding training workshop has been conducted on lac cultivation by scientific method at village Chargaon, Rehti block of Katni district of Madhya Pradesh during 18 May, 2022. The workshop comprised of 66 progressive farmers, Van samiti members and local forest staff of Katni Forest Division to commemorate Productive insect conservation week & first National Lac insect day.
- The Study on variation of crawler emergence period of lac insect were carried out to documented crawler emergence period of lac insect in 14 sites of 9 districts of Maharashtra on *palas, pipal, bargad* and *rain tree* host plants. Study revealed that Rangeeni lac insect crawler emergence period varied from third week of October to mid-week of November in different districts of Maharashtra. The earliest crawler emergence was observed on *bargad* at Sindhkhede Raja (Buldana) in third week of October, whereas posterior crawler emergence period was observed on *pipal* at Sindhkhede Raja (Buldana) in the last week of October.
- The studies on thickness, diameter growth, of lac encrustation were carried out in 6 sites of 5 districts of Madhya Pradesh and 15 sites of 9 districts of Maharashtra. The study revealed that in Madhya Pradesh maximum diameter thickness of lac insect occurred in Sarra Pipariya, Mandla in *palas* (12.2 mm), followed by Begarwani, Seoni in *palas* (10.9 mm) whereas lowest diameter thickness occurred in Sarekh, Seoni in *palas* (7.5 mm) of Madhya Pradesh. In case of Maharashtra maximum diameter thickness of lac insect occurred in Kalmnuri, Hingoli in *pipal* (14.3 mm), followed by, Surkuda, Gondia in *palas* (13.1 mm), whereas lowest diameter of lac encrustation occurred in Ambad, Jalna in *pipal* (5.8 mm).
- To document the lac associated fauna of lac insect, stick lac samples were collected from two lac growing districts and six non lac growing districts of Maharashtra state. Study revealed that predator *E. amabilis* Moore (20.73%) was the most abundant predator, and *Tachardiaephagus tachardiae* (64.48%) was the most prevalent parasitoid and *Brocon greeni* (2.28%) was the most abundant hyper parasitoides in Maharashtra
- Studies on income contribution of lac production to the livelihood of lac farmers of Dindori (36 farmers) district of Madhya Pradesh and Gondia (140 farmers) and Bhandara (50 farmers) districts of Maharashtra were carried during the year 2022. Study revealed that in Dindori district lac income contributes 27.21% of their total income and on average farmers earned Rs. 14405per annum from lac cultivation. In case of Gondia district lac income contributes 20.81% and average farmers earned Rs 29545 per annum whereas in Bhandara district lac income contributes 39.72%and average farmers earned Rs 19226.6 per annum from lac cultivation.
- Delivered lecture on scientific cultivation techniques of lac cultivation to 652 trainees' forest guards, Rangers, students and professors from different Division, college, universities during the field visits of Regional Lac Insect Field Gene Bank (2022 to 2023).

Cost of the Project:-8.35 Lakhs



Expected Outcome of Research:-

- *In-situ* and *Ex-situ* conservation of lac insect genetic resources
- Identification of best performing lac insect -host plants combination for sustainable yield in diverse conditions.
- Best performing lac insect samples shall be multiplied in gene bank to distribute local farmers.
- Identification ofdistrict wise diversity of lac associated fauna .
- Identification of variation of crawler emergence period in different agro climatic zones of Maharashtra.
- 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.

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

Why this Project:-

- The major aim is of the Project to know Population and abundance of tiger, co-predator and prey of all 83 Forest division of Madhya Pradesh under All India tiger Estimation (AITE) 2022 Program.
- The data collected During AITE Program
- Various Forest Division Of M.P. required Prey and Predator Population estimation for their working plan chapter
- In addition to that all tiger reserve of MP time to time Requested for range wise prey density and predator abundance data

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

Research Methodology:-

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

Data Analysis

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

Study Design:-

Summarising, the entire project shall be based on data collection from field data entry by computer operators from each 83 division, data scrutiny, verification and rectification at SFRI, data submission to NTCA-WII, literature review for data analysis process, in-house capacity building on updated data analysis techniques, report writing and submission of report to PCCF (Wildlife) and creation of data base for any further study.

Objectives of Research:-

- Data analysis on prey and predator status and abundance
- Generation of Reports

Activities Undertaken:-

- Prey density data analyzed for all 83 Forest Divisions with help of software using Distance 7.5(version) in 16 circle along with 9 protected Areas(6 tiger reserve 2 National parks and 1 wildlife sanctuary) and 11 Forest Development Corporation.
- Circle wise map of line transect all 16 circles.
- Circle wise density table of all 16 forest circles.
- Table of all territorial forest division/ unit total no transect & Effort sq.km
- Final report writing.
- **Cost of the Project:-** Rs.47.73 lakhs

Expected Outcome of Research:-

- Quality database of prey and predator shall be generated.
- A division wise and entire state wise comprehensive report on tiger and prey population can be prepared.
- Division wise tiger and prey population shall be compared with previous (2018) estimates to study their growth rate.
- New corridor map can be developed from dispersal pattern of tigers.
- Carrying capacity of tigers and leopards shall be obtained from each protected areas of Madhya Pradesh.
- Executive summary shall be written in Hindi and soft copy shall be circulated to forest units.

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

- Both macro (Division) and micro (Range) level prey and predator data shall be analyzed and report shall be submitted to DFOs and FDs for proper management intervention.

Newly initiated project

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

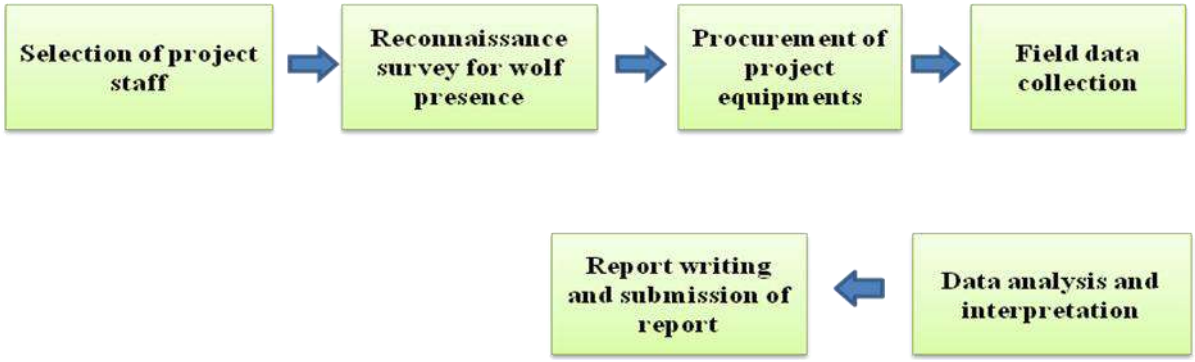
Why this Project:-

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

Research Methodology:-

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

Study Design:-



Objectives of Research:-

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

Activities Undertaken:-

Cost of the Project:- Rs. 45.35 Lakhs

Expected Outcome of Research:-

- Distribution pattern of wolf in Nauradehi Landscape
- Breeding habitats (den sites)
- Foraging pattern of wolf and their niche speration with other large carnivores
- Perception of local communities on wolf conservation

- Suitable Conservation strategy for long term survival of wolf in Nauradehi and adjacent area

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

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

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-introducedTigers in new habitats of Madhya Pradesh
8. Serve as nodal agency to compliment management authorities for scientific inputs.

Completed Projects: - 01

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

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

Ongoing Projects:- 02

1. Impact Assessment of Proposed Sheopur Kalan & Badoda Towns A Group Water Supply Scheme- Parbati River Sub-project under MPUSIP on Aquatic Fauna, River Hydrology & Ecology and its Mitigation.

   Funding agency **:** Madhya Pradesh Urban Services Improvement Project, Bhopal (M.P.)

2. AITE-2022 Evaluation of wild Animals Population and Habitat in Madhya Pradesh (for analysis of sign survey for carnivore species and beat status of Tiger & Leopard in Madhya Pradesh)

   Funding agency: Principal Chief Conservator of Forest (Wildlife) Madhya Pradesh

Regular Activitiy:- 01

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

   Funding Agency **:** SFRI & PCCF (Wildlife) M.P., Bhopal,

Project Summary

Completed Projects:

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

Why this Project:-

The tiger (*Panthera tigris*) is the top-order predator in the Indian subcontinent, with high flagship and conservation value. The latest tiger census conducted in India during the year 2014 shows that it harbours 57% of the global tiger population in 7% of their historic global range. Given that the tiger populations have undergone drastic declines and the recovery efforts including reintroduction are being promoted across the range countries. Nevertheless, such recovery efforts are limited by inadequate

understanding of the behavior of reintroduced animals. Translocation, reintroduction, restocking and rehabilitation are recognized as the central challenges for conservationist to re-establish wild population. Subsequently, the characteristics of home range, movement patterns and inter-specific interaction of released animals are indicative of the post-release response of each animal and the overall success of the release efforts.

Research Methodology:-

- **Studying ranging pattern of reintroduced tigers-** As per IUCN guidelines, all founder population has been radio-collared before hard release. All the collared animals need to be monitored intensively on 24 × 7 basis. Data has been analysed using Arc GIS 10.3.1. Minimum Convex Polygon (MCP) method and Kernal method were used to study the ranging pattern of reintroduced tigers.
- **Food habits and prey choice study-** Food habits and prey choice of reintroduced tigers have been studied from scat and kill data.
- **Studying prey availability for reintroduced tigers-** Line transects have been laid in the overall MCP areas of tigers to assess available prey base for re-introduced tigers. Distance software used for data analysis. Data of All India Tiger estimation 2018 also consider for prey availability.
- **Recruitment pattern and population dynamics study -** Reproductive success is a key to the survival of a species, and understanding the reproductive parameters of free ranging large carnivores is crucial for assessing the reproductive output. Continuous monitoring of first litter (three cubs) of reintroduced tigress N1 was done.
- **Collection of vegetation data:-** Study on vegetation composition, forest density and cover in each grid of the area has been carried out as per the working plan norms of Madhya Pradesh.
- Survey of habitat components including waterholes, unique habitats, special habitats, sensitive sites etc. done at the time of field survey.
- Human disturbances indices alike Number of tree cutting, no of human/livestock trail, people seen, livestock seen, grass/bamboo cutting has been recorded in each 10 m X 10 m plot.
- Topography of the area and forest types have been recorded
- Studying habitat selection of reintroduced tigers-Based on the habitat characteristic of the area and movement pattern of reintroduce tigers,season-wise tiger locations have been analysed.

Study Design:-

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

Objectives of Research :

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

Activities Undertaken :-

- Tiger Radio collaring - Radio collaring of male and female tigers.
- Continuous monitoring throughVHF radio collar tracking
- Monitoring of tiger trough camera trap - Camera trap installation based on direct and indirect evidences.
- Preparation of tiger profiles and their individual identification through stripe patterns.
- Pugmark monitoring - Regular PIP checking
- Analysis of tiger movement area - Based on tiger locations point in a certain duration (monthly and seasonal)
- Observation on animal behavior through direct sighting - Through vehicle and elephant back. Based on focal sampling method of each individual tigers
- Recording of kill data through approachable vehicle and elephant back.
- Collection of scat sample for microscopic analysis of hairs of prey species.
- Data Analysis and report preparation

Cost of the project- Sanctioned Budget 69,58 (Rs in Lakhs) Received Budget – 53.81

Outcome of research:-

- Receiving VHF signals and locations.
- Captured individual images of tigers in different locations of camera trap.
- POP and PIP formation.
- Preparation of MCP in Arc-GIS software.
- Location of tiger found in different vegetation types in different seasons.
- Tiger with radio collar
- Preparation of MCP and home range map.
- Camera trap images of each session
- Measurement of tiger's pugmark size and differentiation.
- Estimated home range area and prepared map.
- Observation on animal behaviors and activities
- Quadrat data of vegetation

Findings will be very useful for tiger population revival in the area and will support Park Managers for proper monitoring and protection of the introduced tiger and their litters.

Preparing POP of Pugmark

Tracing the pugmark – N112 for its size

Observing scratch marks on tree

Tracking N1 through Antenna

N111-Female : First Litter of N1 Tigress

N112-Female : First Litter of N1 Tigress

N113-Male : First Litter of N1 Tigress

Lactating mother : N1 Tigress
(When its second litter was five months old)

Ongoing Projects

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

Why this Project:-

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

Research Methodology:-

The study will be performed by adopting nationally and internationally accepted scientific methods for field surveys in all three seasons i.e. rainy, winter and summer, round the year as under:

1. **Selection of reference site-**Reference sitewas considered the stream site with values of hydrological stress = 0.
2. **Collection of secondary data-**Pre-existing data was collected through various secondary sources. Review of previous studies of this area.
3. **Collection of primary data from study area-**
    - Data collection from reference site and 7 sampling sites of the upstream and downstream
    - Inventory of aquatic and terrestrial flora-fauna and their critical habitats.
    - Identification of breeding/nesting sites and their mapping.
    - Movement pattern of major critical endangered species
    - Observation on various hydrological & ecological (rate of discharge, water velocity, river depth) parameters affecting the major faunal species in the river system.
    - Observation on physico-chemical properties of river water.
    - Assessment the water availability after water abstraction from the intake well in Parvati river for 50% dependable year, 75% dependable Year and Average Year and its impact.
    - Environmental flow (Rate of discharge, Velocity and Depth) and ambient water flow requirements for various species observed in Parvati river with special reference endangered fauna.
    - Study the anthropogenic activities within study area.
    - Recommendation and mitigation measures for the identified impacts.

Study Design:-

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

Objectives of Research:-

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

Activities Undertaken:-

- Reconnaissance survey and selection of reference site.
- Meeting with MPUDCL team and officials of Municipal Corporation Office, Sheopur Kalan and Badoda
- Study design and preparation of formats
- Selection of project staff as per requirements.
- Procurement of material / tools/ instruments/ accessories required for study.
- Preparation of Initial Environment Examination (IEE) report
- Collection of primary data on existing biological resources – Faunal – Floral species distribution, migratory bird species, and their habitat conditions, breeding/spawning grounds.
- Collection of primary and secondary data on river hydrology, morphology and its seasonal variations
- Water quality analysis for pH, DO, EC, COD, BOD etc.
- Study human activities like riparian agriculture, fishing, sand mining, raw water abstraction, cattle trampling and other human activity of the water supply project to Parvati River.
- Review of water supply project DPR for year wise water requirement.
- Procurement of last 10 years classified hydrological data from CWC, New Delhi of study site falling in river Parvati.
- Predict the minimum environmental flow required for the survival of the major aquatic fauna
- Mitigation measures to minimize the adverse impacts of water extraction

Cost of the Project:- Rs. 67.57 Lakhs

Expected Outcome of Research:-

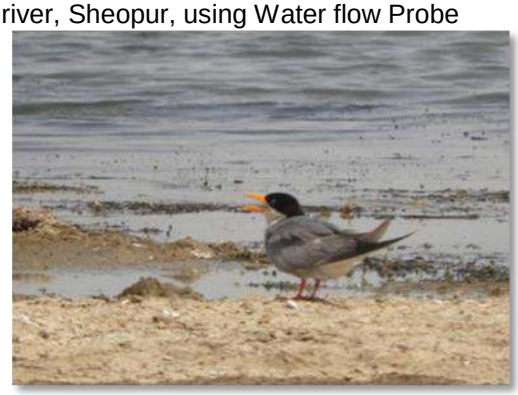
- Impact prediction of for Sheopur Kalan & Badoda group water supply scheme from Parvati river and construction of weir and intake well on survival of the major aquatic fauna and the estimation of minimum required environmental flow for endangered fauna
- Output data and project findings will be useful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


Water quality analysis using portable instuments


Sample collection of macro-invertebrates and macro-phytes.


Data collection for river velocityfrom Parvati river, Sheopur, using Water flow Probe

Mugger (*Crocodylus palustris*)



Riverturn (*Sterna aurantia*)

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

Why this Project:-

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

Research Methodology:-

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

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

Study Design:-

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

Objective of Research:-

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

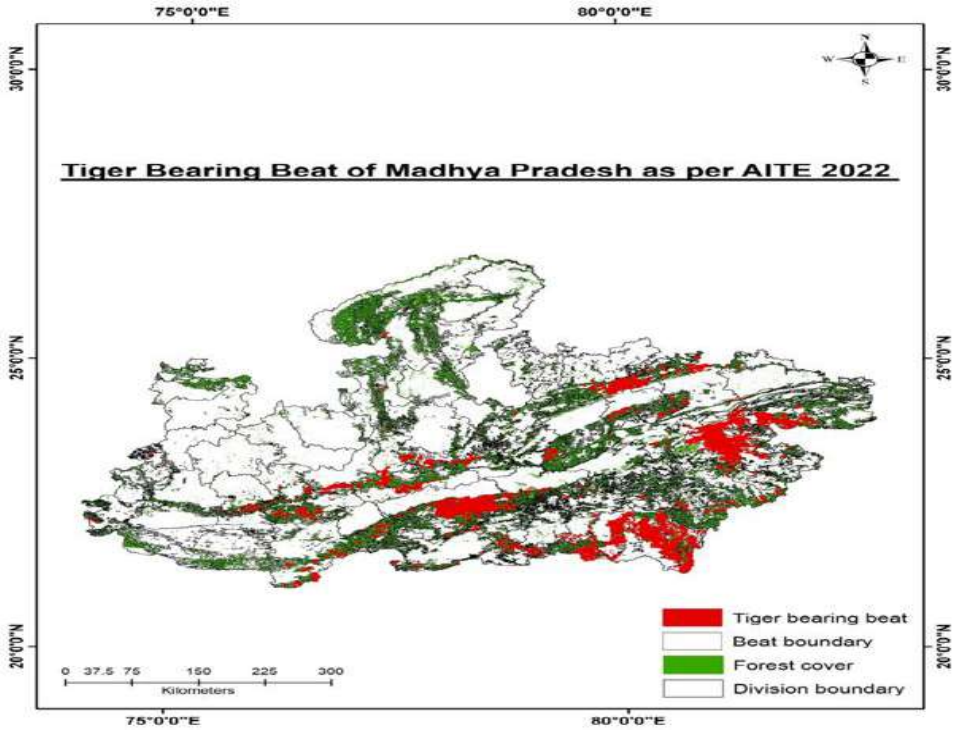
Activities Undertaken:-

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

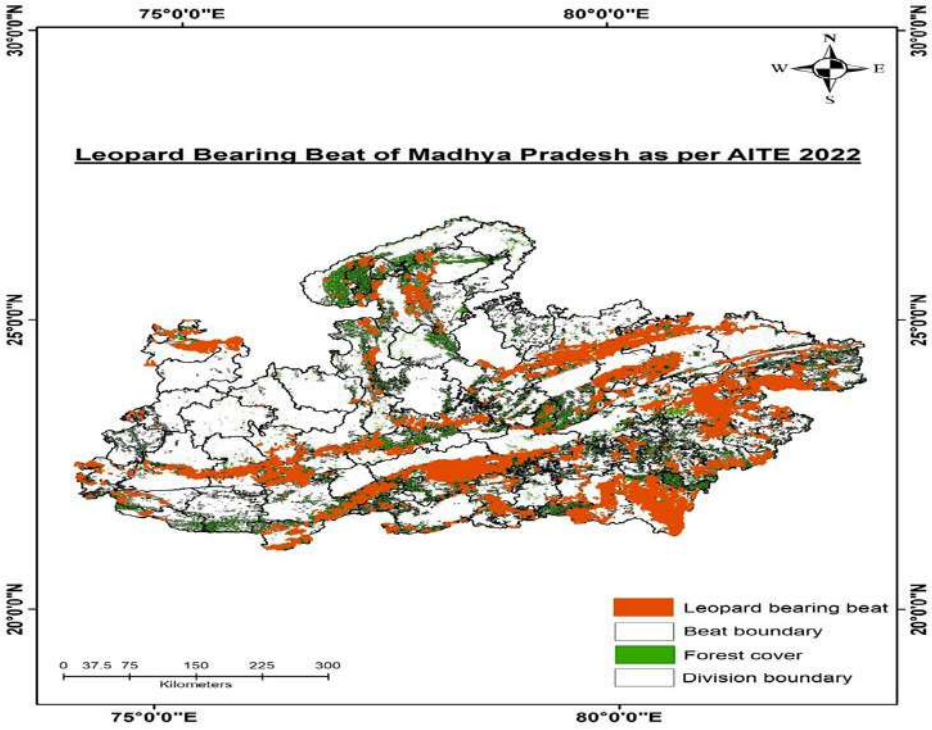
Cost of the Project:- Rs. 21.35 Lakhs

Expected Outcome of Research:-

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



Tiger bearing beat of Madhya Pradesh as per AITE 2022



Leopard bearing beat of Madhya Pradesh as per AITE 2022

Regular activities:

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

Objectives of Research:-

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

Activities Undertaken:-

- Maintenance of Tiger database, herbivore and carnivore database of the year 2016, 2017, 2018, 2019 2020-21.
- Maintenance of iridium data of radio collars and their charges.
- Renewal of Radio Collar Licence 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 -
- Divisional Forests Office, South Sagar, Working Plan Office, Shivpuri, Divisional Forests Office, Rajgarh, Chief Conservator of Forests, Ujjain, Chief Conservator of Forests, Betul, Chief Conservator of Forests, Rewa, Divisional Forests Office, Sheopur, Chief Conservator of Forests, Chhatarpur, Chief Conservator of Forests, Sehore, Chief Conservator of Forests, South Betul, Divisional Forests Office, Obedullahganj, Divisional Forests Office, South Panna, Working Plan Office, Balaghat, Working Plan Office, Indore. Divisional Forests Office, Dhar.

Cost of the Project:- Rs. 68.20 Lakhs

Other Assignment and Other Projects

This division has shouldered the responsibility for forthcoming International Wildlife Conference on "Wildlife Conservation: Emerging Scenario and Way Forward" which is going to be held at Kanha Tiger Reserve, Mandla (M.P.) 27-29 April, 2023. It's a big event and there are different four themes on Wildlife Conservation aspects.

- Dr. Anjana Rajput,Division In-charge, Habitat Ecology has been assigned as Theme Associate for Theme-2 i.e. "Wildlife Habitat Ecology and Management".following activities has been conducted as the preparation of forthcoming conference –
    - Correspondence with participants regarding paper submission, paper editing, their travel plan etc.
    - Assisted theme coordinator for paper review.
    - Prepared book of Abstract for Theme-2.
    - Prepared the conference event schedule.
- Executed the project "Monitoring and Evaluation of Plantations (Plantations Year 2015-16) for 20 plantation sites of Madhya Pradesh", as team leader
    - Under this project; field survey and data collection of 20 plantation sites were completed. It's data analysis& report writing is under progress. Details of 20 plantation sites are given below :-
    - **श्योपुर वनमण्डल** –1, बीट–हनुमानखेड़ा–RF 123, परिक्षेत्र–बड़ौदा, 2, बीट–जागदा–RF 55, 3, बीट–बागलदा–RF 42, 4, बीट–बुखारी–RF 59, 5, बीट–बगदिया–PF 532 परिक्षेत्र–बुड़ेरा, 6, बीट–श्यामपुर–RF 636 परिक्षेत्र–खाडी, 7, बीट–गोपालपुर–स्कूल केम्पस परिक्षेत्र–पश्चिम विजयपुर
    - **अशोकनगरवनमण्डल**–1, बीट–मामोन–RF 28 परिक्षेत्र–अशोकनगर, 2, बीट–चिमला–RF 58 परिक्षेत्र–अशोकनगर,
    - **औबेदुल्लागंजवनमण्डल**–1, बीट–डुगंरिया–RF 325, परिक्षेत्र–चिकलोद
    - **संजय टाइगर रिजर्ववनमण्डल**–1, बीट–गड्डाहा–RF 1334, परिक्षेत्र–ब्यौहारी बफर
    - **गुनावनमण्डल**–1, बीट–झाझौन बी–PF 723, परिक्षेत्र–अरोन, 2, बीट–हमीरपुर–PF 646, परिक्षेत्र–फतेहगढ़
    - **शिवपुरीवनमण्डल**–1, बीट–कोटेरी–RF 176, परिक्षेत्र–बदरवास, 2, बीट–मधा –PF 1233, परिक्षेत्र–बदरवास, 3, बीट –चिरान–RF 448,परिक्षेत्र –करेरा, 4, बीट –बेदमउ–RF 230,परिक्षेत्र –बदरबास
    - **भिंडवनमण्डल**–1, बीट–गुमारा ए–RF 79,परिक्षेत्र –भिंड, **मुरैनावनमण्डल**–1, बीट–नूराबाद–PF 21,परिक्षेत्र –मुरैना ।

View of field visit of various plantation sites during their evaluation

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

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

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

Developed suitable management strategies will be applicable for long term sustenance and growth of tigers in Nauradehi and its adjoining forest patches.

2. To Study the impact of proposed Morena Water Supply under sub project MPUDP on the Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial Wildlife Sanctuary, Morena (M.P.).

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

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

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

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

Completed Project:- 01

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

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

Completed Project

Project Summary

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

Why this Project:-

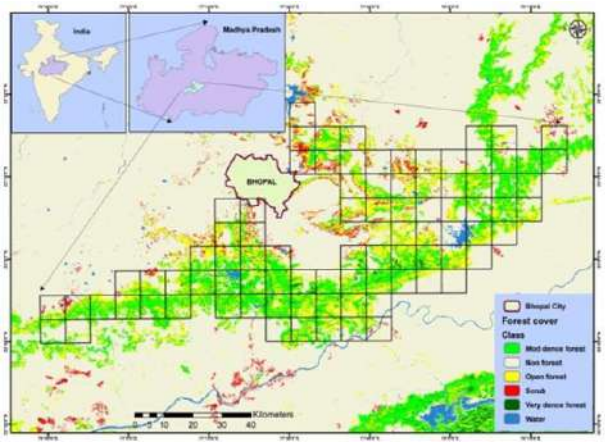
This project emerged due to the presence of dispersal tigers near Bhopal city, necessitating a scientific investigation to determine the reasons behind their proximity. The study aimed to identify the root causes and develop a strategic plan for sustainable wildlife management. The findings would support a decision-support system for demarcating critical tiger habitats using functional attributes and GIS mapping. Additionally, the project assessed landscape-level functionality through genetic analysis to manage human-animal interaction in urban areas. The study's results would aid the strategic green development of Bhopal and tiger conservation in the Ratapani-Kheoni landscape. By utilizing non-invasive genetics and camera traps, the project demonstrated cost-effective methods for long-term monitoring. It aimed to address the inadequate knowledge of tigers outside protected areas and improve the management of alternative tiger habitats in Madhya Pradesh

Research Methodology:-

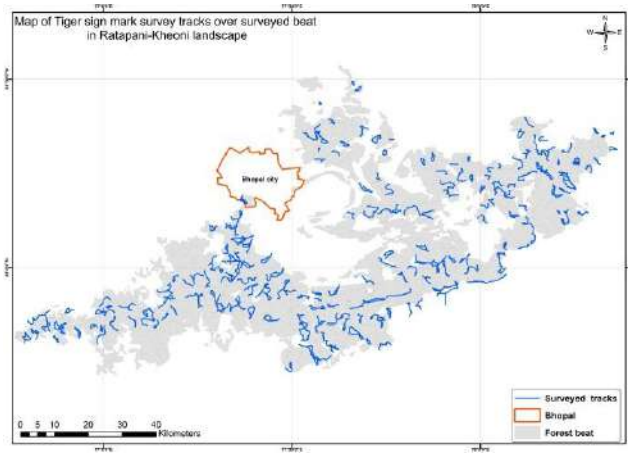
The study employed various methodologies for analyzing tiger occupancy, habitat suitability, and population genetics. Occupancy analysis was conducted using the PRESENCE program, while MaxEnt analysis was used to assess habitat suitability based on presence data collected from 234 survey beats. BMLR (Binomial Multiple Logistic Regression) analysis was employed to examine the relationship between tiger presence and habitat variables. Corridor designing in ArcGIS was performed using Linkage Mapper tools to support wildlife habitat connectivity analysis. Lastly, DNA analysis was carried out to determine the genetic diversity and population structure of tigers in the Ratapani-Kheoni landscape. The study design involved grid-based surveys for tiger sign marks and prey presence, and data collection was conducted through field surveys and DNA sampling.

Study Design:-

The tiger sign mark survey was conducted for tigers in the Ratapani-Kheoni landscape to determine the tiger-bearing area in the landscape from December 2018 to April 2019. Sampling unit large geographic grid cells at a scale appropriate to the study organism, depending on the biology of the species. For the sake of example, for the tiger in south-western India, the cell size was set based on the expected maximum home range size of ~200 (Karanth and Sunquist, 2000) and tiger in Panna tiger reserve in central India, the home range of male and female tigers were 132.7 and 73.6 (Sarkar et al., 2016). Initially, 8*8 grids were superimposed on the landscape geo-referenced map of the study area. A total of 5312 was initially surveyed which consisted of 337 forest beats within the 83 grids. Occupancy modeling framework, which accounts for imperfect detection, to identify the factors that affect the tiger distribution at the approximate scale of a female tiger's home range (Duangchatrasiri et al., 2019) 64 km2 -sized grid. We also surveyed the area for prey presence species. We used an occupancy survey method that explicitly accounted for spatial correlation recently designed to assess large-scale occupancy of tigers (Hines et al., 2010).



Georeferenced map of study site



Map showing GPS track evidence of survey

Objectives of Research:-

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

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

Cost of the Project:- 43.07 lakhs

Outcome of Research

The objective based research question answers were find out below:

➢ **Where is the spatial distribution of tigers in the Ratapani-Kheoni landscape?**

- The analysis of tiger occupancy using presence software indicates that tigers are present in an area of 3762.48 km2 out of the total study area of 5312 km2.
- Based on the BMLR-based Habitat suitability index (HSI) for tigers, a suitable area of 2691 km2 is derived out of the 7225 km2 study area.
- The MaxEnt analysis predicts the probability of tiger occurrence in an area of 1409.08 km2 out of the total 7210 km2 study area.

➢ **What is the minimum tiger population?**

- The minimum number of tigers in the study area was determined to be nineteen based on NGS sequencing (DNA Test).

➢ **Which areas are priority areas for tiger conservation?**

- In the present study, five Tiger Conservation Priority Units (TCPUs) were identified using GIS mapping. These TCPUs are currently functioning as important habitats for tiger presence. Camera trap photographs of tigresses with their cubs were captured in TCPU_1 and TCPU_2, indicating their role as breeding source populations. The linkages between these TCPUs were demarcated using Linkage Mapper analysis in ArcGIS 10.1 software and depicted on a Geo-Referenced Map. The longest linkage is observed between TCPU_1 and TCPU_2, with a length of 26.53 km.
- The study area of 7210 km2 was mapped on a GIS platform using ArcGIS 10.1 software to identify tiger conservation prioritization areas (TCPUs). TCPU_1, TCPU_2, TCPU_3, TCPU_4, and TCPU_5 were identified using MaxEnt software within the landscape. The predicted probability of tiger occurrence was found to be 1409.08 km2 in the study area. The identified TCPUs were spatially distributed among five conservation units: TCPU_1 (50.99 km2), TCPU_2 (724.20 km2), TCPU_3 (104.43 km2), TCPU_4 (301.48 km2), and TCPU_5 (227.98 km2).

➢ **Which habitat is linked to priority areas with minimal resistance?**

- The analysis of linkage connectivity among all the tiger habitats is based on the measurement of resistance. The pinch point analysis was conducted to assess resistance within the linkage swath. The selected linkages have resistance values ranging from 18.98 to 0.06 CWD. Linkage_6 shows the highest Cost Weighted Distance (CWD) of 18.97 between TCPU_4 and Stepping Stone_9, while linkage_1 has the lowest CWD of 0.06, indicating a viable connecting linkage between TCPU_1 and TCPU_2.
- The Linkage Mapper analysis identified eight linkages within the study area, which are crucial for connecting the five TCPUs. The lengths of these linkages are as follows (in descending order): L_1 (26.27 km), L_6 (21.26 km), L_3 (18.40 km), L_4 (12.66 km), L_7 (9.14 km), L_5 (2.84 km), L_2 (2.13 km), and L_8 (1.06 km). The cost-weighted distances (CWD) of these linkages range from L-6_CWD_18.97 to L-1_CWD_0.06, indicating varying levels of resistance.

➢ **Where are the pinch point barriers located within the connecting linkages that create bottlenecks for tiger dispersal?**

- A total of 8 linkages were identified in the study area, with the shortest one being between TCPU_5 and the nearest stepping stone, SS_7. Although the stepping stones are positioned within the middle of the linkages, they play a crucial role in supporting tiger movement. A total of 10 stepping stones were found, providing safe passage for tigers between TCPU areas.
- Within a 3 km swath along the least cost path, seven villages fall under linkages 6, 7, and 8, while 20 villages fall under linkages 1, 2, 3, 4, 6, 7, and 8 within a 3-5 km swath. Among these villages, four (Gondra, Mahuakheda, Bhusibenta, and Umrai Bahara) are located within the 0-3 km swath of Linkage_6, two (Silpuri and Neemkheda) within Linkage_8, and one (Damdongri) within Linkage_7. Linkages 1-5 do not have any villages within their 0-3 km least-cost path.

➢ **How can we ensure the conservation of wildlife and its continued existence?**

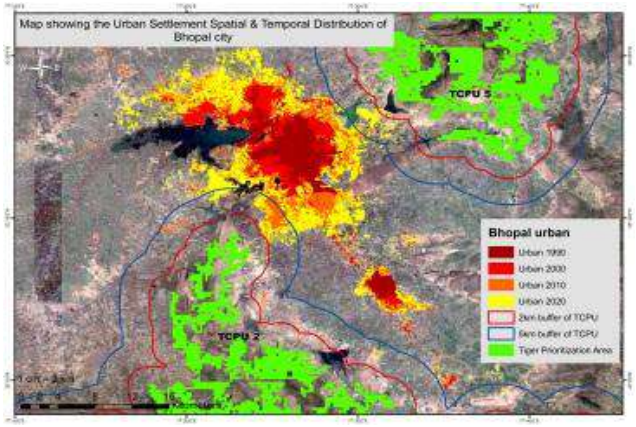
- The Mendora PPA, located in Kerwa Chowki in the Samardha Range, has been serving as a consistent breeding source area for tigers over the past decade. Therefore, it is crucial to establish a connection between Mendora PPA and Chichli beat by utilizing the revenue land in between. This land transfer is necessary because it functions as a valuable tiger habitat.
- To facilitate the establishment of a tiger safari, it is recommended to chain link fence the forest areas of Mendora PPA, revenue connecting linkage, and Chichli beat along their outer periphery. This enclosure will cover an area of 1744.7 hectares, ensuring the efficient utilization of land for the tiger safari. The establishment of a tiger safari can bring economic benefits through livelihood generation, social monitoring, and promoting long-term conservation programs. Ultimately, this strategy aims to prevent tigers from dispersing into the Bhopal Municipal Corporation areas from the Vindhya landscape.

➢**How can the habitat of fragmented forest areas be improved to ensure a conducive habitat for wildlife?**

- The Jungle Safari has a range of potential beats including Bhanpura, Samaspura, Gol, Kathotiya, Charmandali, SewaniyaParihar, Jhiri, Tumdakheda, Veerpura, Chikalpani, Borpani, Khajuri, Jawra, Karmai, Mathar, Delawadi, Naharkola, Bhootpalasi, Diwatiya, and Bhiyanpur. These 20 beats, located in Bhopal, Sehore, and Obedullaganj divisions, offer significant opportunities for local people to engage in ecotourism practices and contribute to nature conservation efforts. They provide an ideal setting for exploring the wild natural habitat and promoting sustainable tourism practices.

➢**Which areas of the landscape experience human-animal conflict, and what measures can be taken to mitigate it?**

- TCPU_2 and TCPU_5, located near the Bhopal capital region, have consistently shown evidence of tiger presence for seven years, making it a favorable area for tiger roaming and thriving wildlife.
- Bhopal's population has grown at an average rate of 31.47% over the past three decades, reaching an estimated 3,702,100 in the next three decades.
- The urban area of Bhopal has expanded by 46.76% in the last four decades, posing a disturbance to wildlife presence in TCPU_2 and TCPU_5. To address this, it is recommended to create a 2 km eco-sensitive buffer zone around the TCPUs and establish a green belt zone to foster co-existence.



Spatial and temporal distribution of Bhopal city

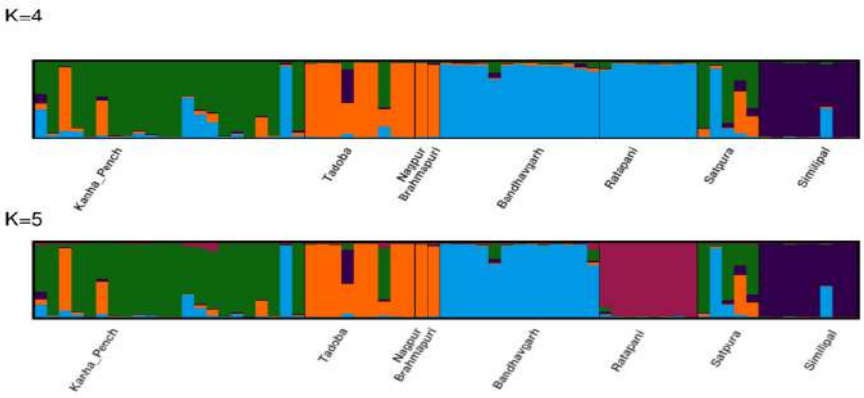
- Erecting a strong 32 km long and 12 feet high fence for the tiger safari is essential to enclose the 1744.7-hectare safari area. This will eliminate incidents of crop loss and potential harm to human life. Additionally, it will provide employment opportunities in ecotourism for nearby unemployed villagers. Eco-tourism-based monitoring will effectively combat wildlife hunting, create additional livelihoods, and promote harmony with wildlife conservation.
- The area surrounding TCPU_5 is rich in scenic natural beauty, featuring accessible grasslands at Prempura Beat for herbivore wildlife. However, there is a need to increase water sources' number and density. The presence of tigers, leopards, sloth bears, and wolves contributes to the thriving wildlife. The fertile soil, good site quality, and retained moisture further enhance the area's biodiversity, with great potential for butterfly parks in moist creek areas.
- The forest area connected to the capital of Madhya Pradesh offers a suitable location for forestry, wildlife research, and education. Educational activities can be conducted here for nature enthusiasts.
- Developing this area as a Forest Interpretation Center will strengthen tiger conservation efforts and provide livelihood opportunities for the forest-based community through ecotourism. By promoting eco-tourism-based monitoring, the vision of social fencing can be realized.
- Based on the present study, creating a nature reserve in TCPU_5 is necessary to conserve tigers and achieve the goal of co-existence.

➢ **Is the small tiger population in the sanctuary stable?**

- Yes, the small population in Ratapani is stable and experiencing continuous sustainable growth. However, it is important to note that the Ratapani population is distinct and isolated, with an adjacent tiger reserve.

➢**What is the degree of genetic relatedness observed between the intra and inter-adjoining sub-metapopulations in the landscape?**

- Analysis of clustering of Ratapani, Satpura, Kanha-Pench and Bandhavgarh 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.

➢**Which areas within the landscape have the capacity to support a resident tiger population, and which areas primarily facilitate the movement of transient tigers through connecting linkages?**

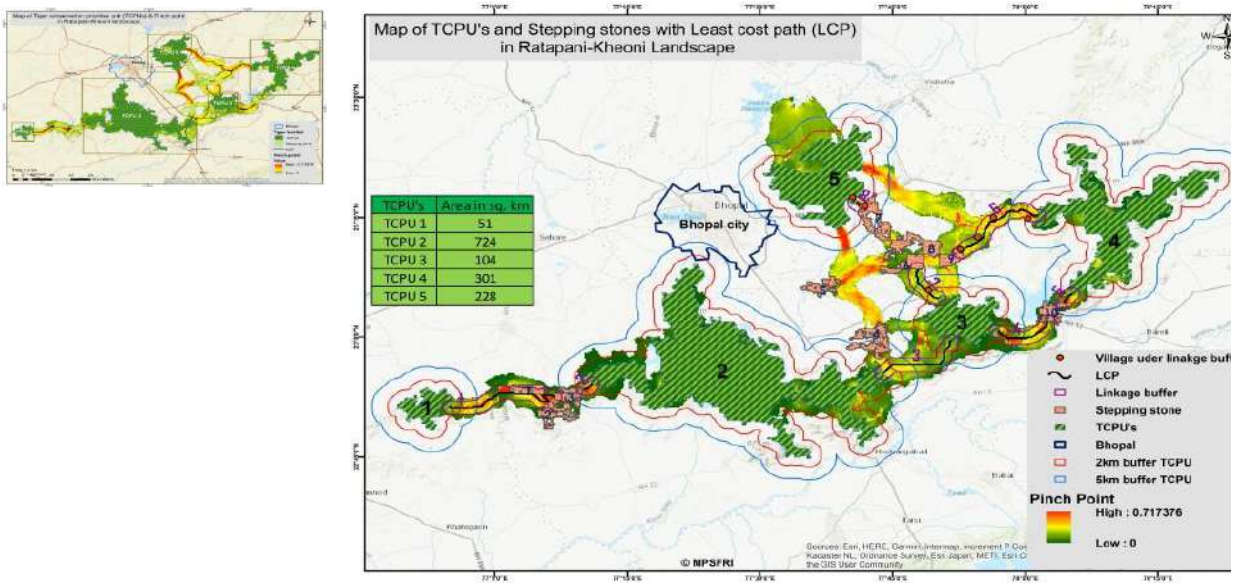


Figure: The five demarcated Tiger Conservation Prioritization Units (TCPUs)

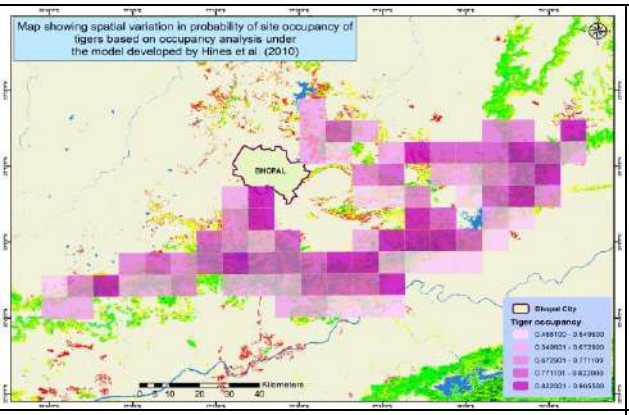
- Using ArcGIS 10.1 software, the entire 7210 km2 landscape was mapped to identify tiger conservation prioritization areas (TCPUs). Based on MaxEnt software analysis, five TCPUs were identified within the study area: TCPU_1, TCPU_2, TCPU_3, TCPU_4, and TCPU_5, with a predicted occurrence probability of 1409.08 km2.
- The total area of TCPUs is 1409.08 km^2, recognized as high-value conservation areas after GIS mapping. These areas require complete protection to ensure optimal ecological restoration and future wildlife coexistence. DNA Next-Generation Sequencing data from 2018-2019 identified a minimum of 19 tigers in the TCPUs. These findings are valuable for decision support systems (DSS) in demarcating critical tiger habitats based on functional attributes and their connecting linkages.
- • Eight linkages have been identified in the study area, with stepping stones located within these linkages. While the stepping stones are positioned in the middle of the linkages, their functionality and efficiency in supporting tiger movement surpass the linkages themselves. A total of 10 suitable tiger habitats, acting as stepping stones, provide safe passage for tigers moving between TCPUs, facilitating transient movement rather than supporting resident tiger populations.

➢What is the current status of geospatial tiger occupancy within the landscape?

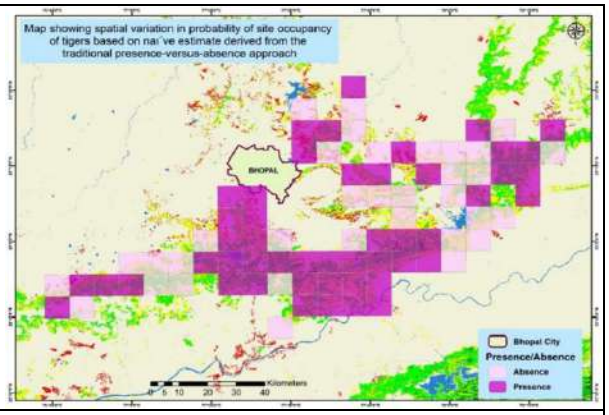
- Tiger occupancy survey was performed from Dec 2018 to Apr 2019 to estimate the overall occupancy rate Ψ on presence software version 13.6. In the occupancy survey across the study area of a total of 5312 (sq. km), segment distribution was 83 grid cells (size 64 sq. km). The detected tiger sign in 49 of 83 grid cells was confirmed, which yielded a naïve occupancy of 0.5904. The tiger-occupied estimated potential tiger habitat is 70.83% of the total study area, or an area of 3762.48 (SE=482.34) out of 5312(sq. km) Ratapani-Kheoni Landscape. In contrast, a naïve estimate derived from the traditional 'presence-versus-absence' approach is only 3136.20 sq. km and underestimated true occupancy by 59.04%.
- • The best-fitted model is the Hines model under which ψ (Cattle+Ruggedness),θ(.),θ'(.), pt(Nilgai+Water) model has shown the lowest AIC (value-1144.59) among 44 models. The model-specific β(beta) Coefficient estimate for covariates determining the Tiger occupancy in the Ratapani-Kheoni landscape is tiger β0(SE[β0])- 0.52(0.61).
- The rugged terrain, abundant perennial water availability, and Nilgai/Cattle presence were influencing the historical tiger population in the proximity of Bhopal by occupancy modelling . The Nilgai and Cattle presence was the main principal variable supporting the studied landscape's tiger population. Cattle and Nilgai share the habitat of tiger-occupied grids verified by our current study. However, a tiger was believed to not prefer large ungulate Nilgai as prey due to its night vision ability and highly nimble behaviour. However, some opportunistic

photographic evidence unambiguously supported that in the Ratapani-Kheoni landscape Nilgai population encountered predation.

- The findings of present occupancy modelling also support this fact as best fitted Hines model ψ(Cattle+Ruggedness), θ(.), θ'(.), pt(Nilgai+Water) is found. The detection probability of the Nilgai and water model gained the lowest AIC value. Cattle presence also influences the occupancy with high significance along with Nilgai, the feral cattle presence elsewhere in the elevated rugged terrain and providing easy prey for predation.
- The concerned forest divisions regularly reported and documented the cattle kill evidence by the tigers. The physical factor of rugged terrain also supports the tiger population by providing shelter, i.e. den, cliffs, and overhangs. So, we can say safely that the Ratapani-Kheoni landscape population is artificially supported by the presence of cattle due to anthropogenic reasons. The tiger presence also plays a critical role in habitat protection because rugged terrain is unsuitable for the sudden escape of forest dwellers during accidental encounters with carnivores. Patterns of spatial variation in probability of site occupancy of tigers in the Ratapani-Kheoni Landscape of Madhya Pradesh (RKL) were sown in Figure, page no. 25, (a) based on occupancy analysis under the model developed by Hines et al. (2010) (b) based on naïve estimate derived from the traditional presence-versus-absence approach.



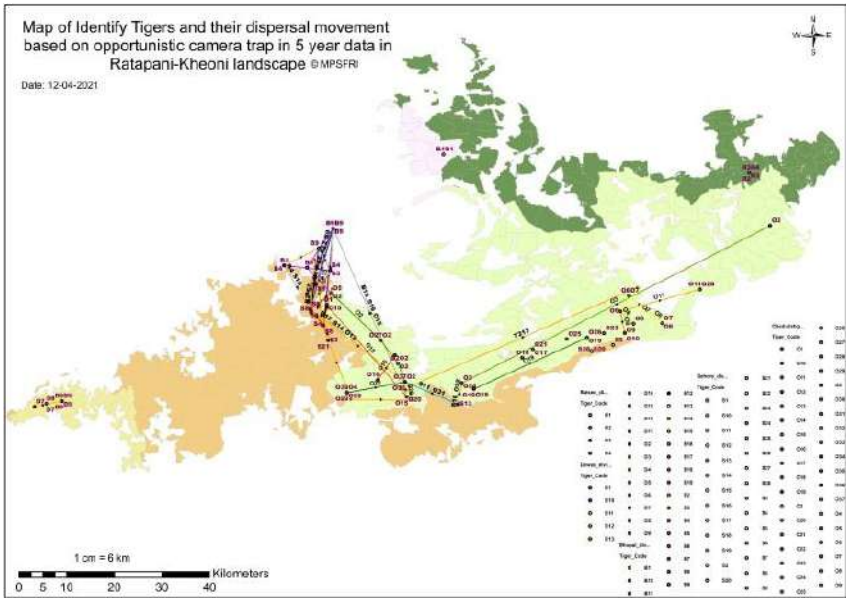
(A)The tiger occupied estimated potential tiger habitat is 70.83%, or an area of 3762.48 (SE=482.34) out of 5312(km2)



(B) In contrast, the traditional 'presence-versus-absence' approach is only 3136.20 km2 and underestimated true occupancy by 59.04%

➢ What is the pattern of movement during dispersal in a landscape?

In most cases, the Tiger dispersal movement overlaps the territorial forest of three divisions: Bhopal, Obbadlahganj and Sehore. Tigress T213 showing remarkably long-range behaviour is unique behaviour in thin and fragmented suitable habitat in Ratapani landscape.



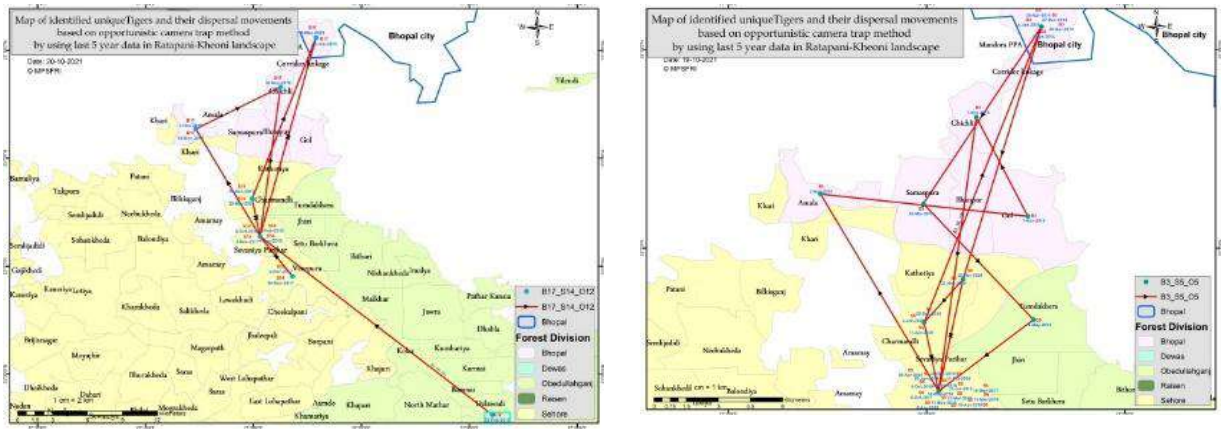
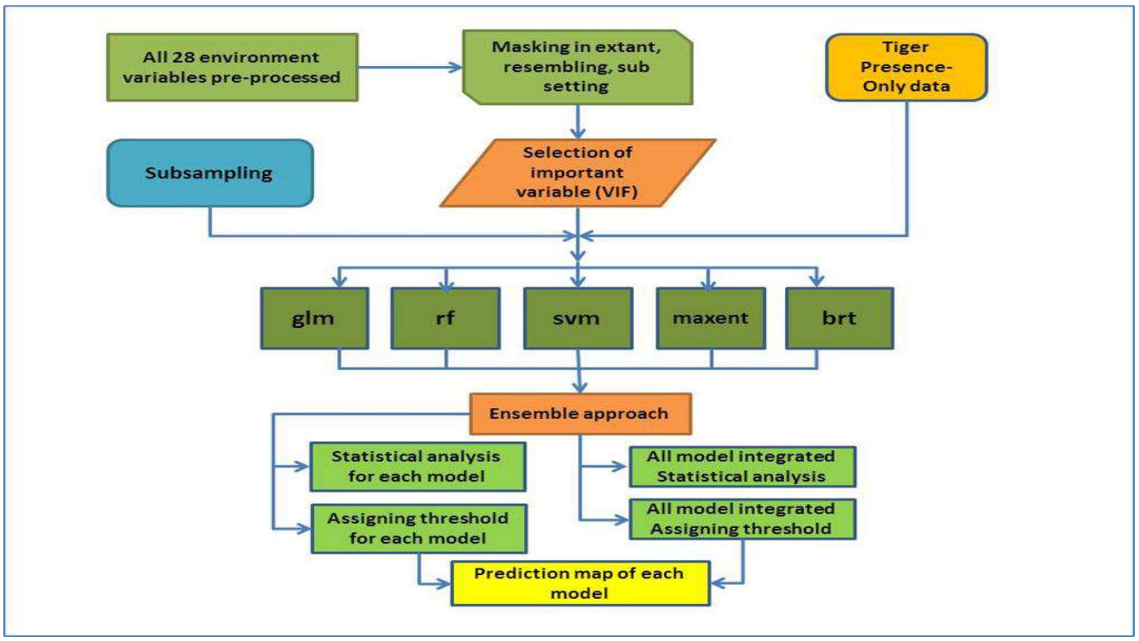


Figure shows the identified tigers & their dispersal movements, tiger movement has been showed equally overlapping in the areas of Bhopal, Obedullaganj and Sehore forest divisions.

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

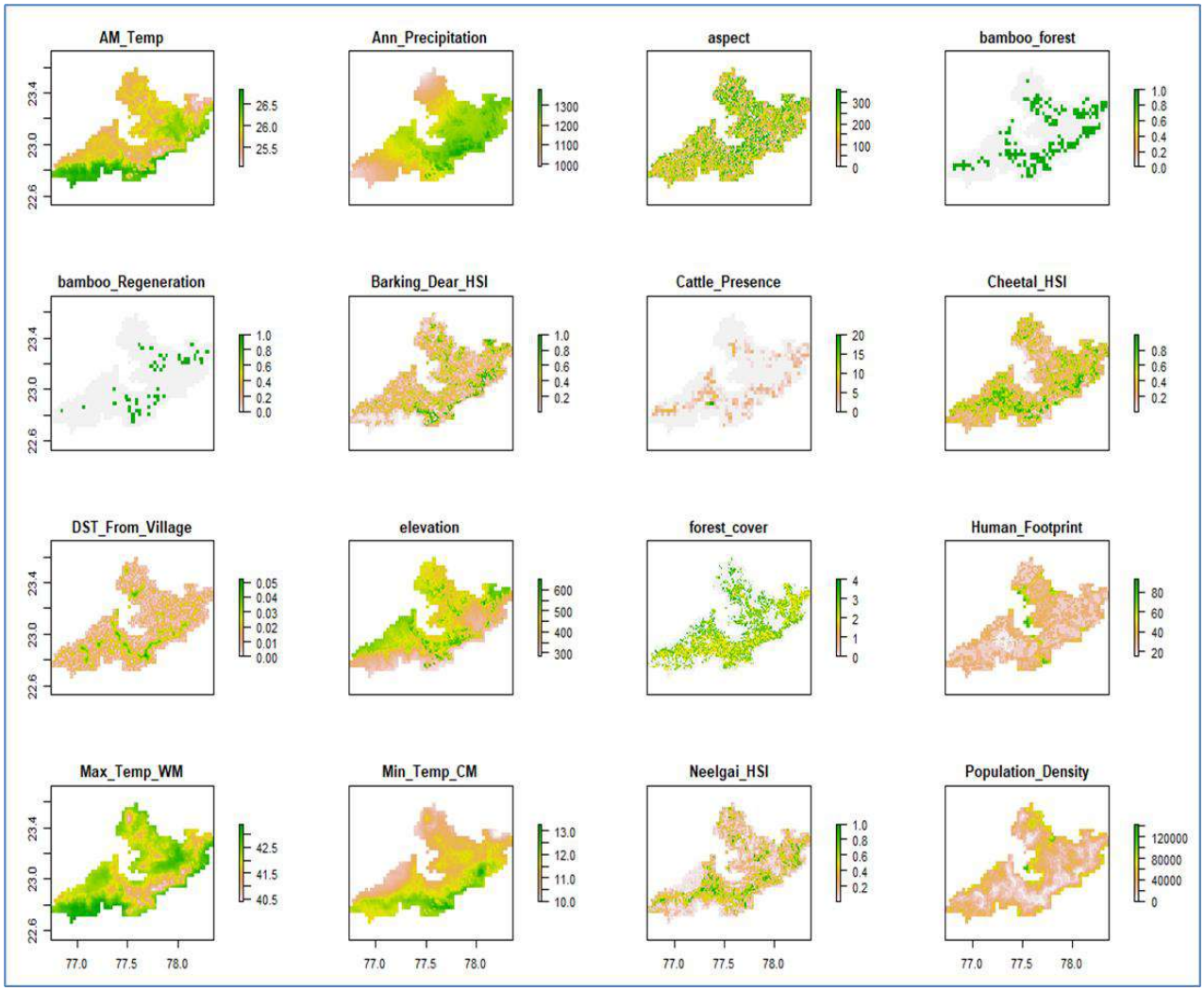
The methodology will be helpful for decision support in the prioritization of tiger conservation patches and also provide baseline information for a strategic conflict mitigation plan.

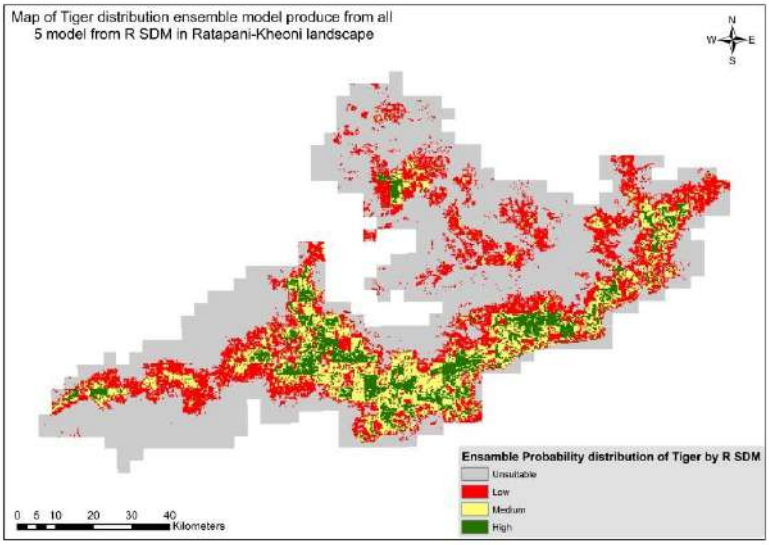
Species Distribution Modeling in R



SDM method overview flow diagram

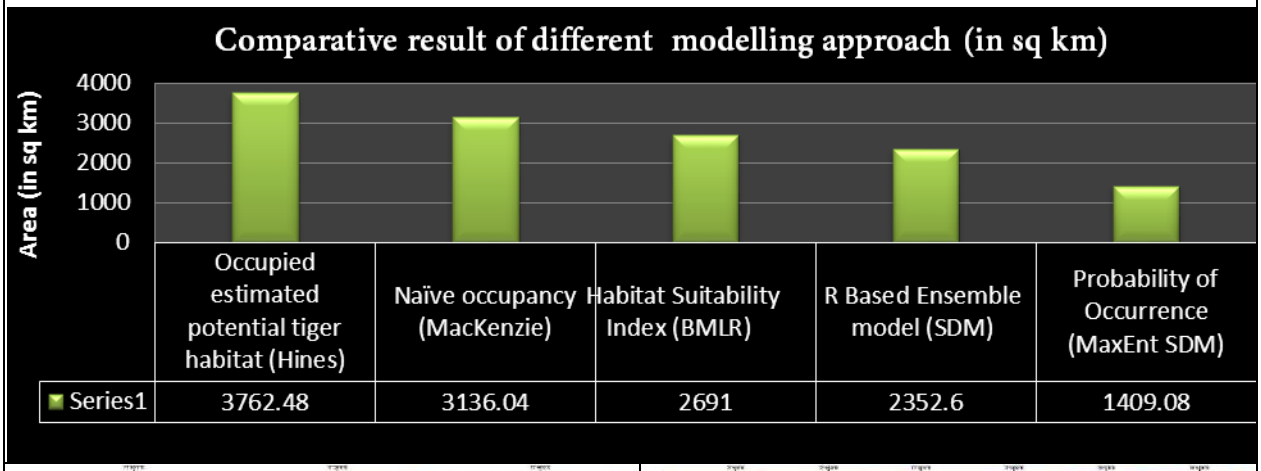
All Environment Variables used in R SDM model

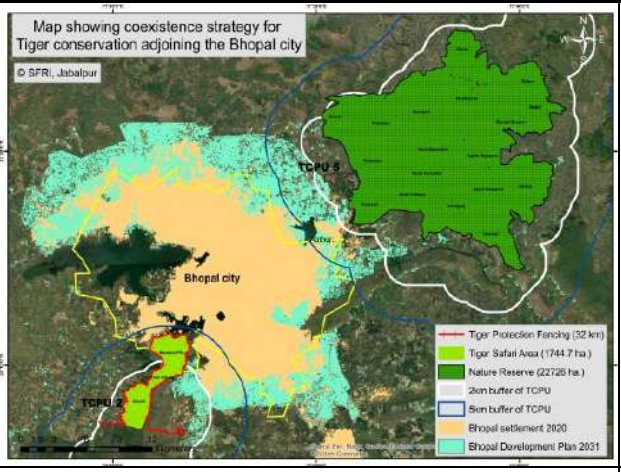




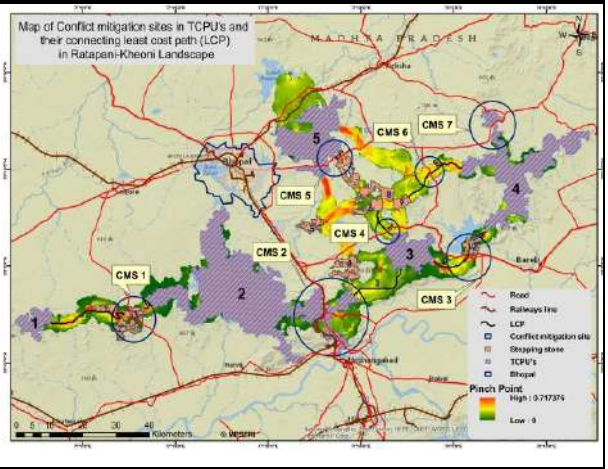
Methods	:	AUC	COR	TSS	Deviance
GLM	:	0.89	0.62	0.67	0.7
RF	:	0.93	0.71	0.72	0.61
SVM	:	0.91	0.67	0.72	0.67
MaxEnt	:	0.91	0.66	0.68	0.68
BRT	:	0.91	0.67	0.7	0.81

Figure: Ensemble model produced from GLM, RF, SVM, MAXENT and BRT, for modelling and mapping of Tiger habitat suitability distribution. The gray, red, yellow, and green colors describe "uninvaded," "low," "medium," and "high", respectively





Strategy to minimize conflict



Identification of mitigation sites

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:-

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

Research Methodology:-

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

Study Design:-

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

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

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

GIS based proactive management strategy formulation

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

Objectives of Research:-

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

Activities Undertaken:- Pilot survey completed

Cost of the Project:- 50.00 lakhs

Expected Outcome of Research

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

Other significant achievements.

- **International wildlife conference:** Actively participated in preparation, liaisoning and logistic arrangement of the International Wildlife Conference on "Wildlife Conservation: Emerging Scenario and Way Forward" at Kanha Tiger Reserve, Madhya Pradesh, India, from April 27-29, 2023. Dr. Mayank Makrand Verma served as a theme associate for theme 4: Human-Wildlife Conflicts and Mitigation Measures and also prepared five posters in different themes.
- **Monitoring and evaluation of plantation raised by MPFD:** We evaluated and monitored 20 plantation sites established by the Madhya Pradesh Forest Department in 2015-16, located in Bhopal, Rewa, Gwalior, and Shivpuri circles.
- **AITE 2022:** As a Co-PI in the project "AITE 2022 Evaluation of Wild Animal Population and Habitat in Madhya Pradesh," DR. Mayank Makrand Verma supervised encounter rate calculations and performed occupancy analysis using field data.Participated and provided technical assistant in training programme on "AITE-2022 MSTrIPES Desktop software" dated 04-14 April, 2022 at SFRI Jabalpur.

Elephant Dung as presence sign mark

Elephant pugmark at BTR

Makhna Elephant encounter at Tala gate BTR

Elephant Critical Habitat Sanjay-Dubri Tiger Researve

Elephant destruction

Feeding Bamboo to the elephants

Elephant bull pushed down a massive tree

Villagers house destructed at Haiki Village Pondi-Range, Sanjay- Dubri TR

UAV (Drone) based elephant monitoring in Pondi Range of Sanjay- Dubri TR

2.3 FACILITATION CELL

2.3.1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) CELL

Mandate

1. Environmental Impact Assessment Study

Completed Project :- 01

1. Assessment of impact of Doubling of Katni Singrauli Railline Project on flora, fauna and habitats of Sanjay-Dubri Tiger Reserve

   Funding Agency: IRCON Pvt. Ltd.,

On-going Project :- 01

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

   Funding Agency: Water Resource Department, M.P.

Project summary

1. Title of the Project:- Assessment of impact of Doubling of Katni Singrauli Railline Project on flora, fauna and habitats of Sanjay-Dubri Tiger Reserve.

Why this project :-

Ministry of Railway has sent a letter to State Forest Research Institute, Jabalpur through Project Director, Katni-Singrauli Rail Doubling Project, Ircon International Limited, Madhya Pradesh, vide letter no. Ircon/2065/K.S. doubling/18/6/977, dated22.09.2021 to the compliance of the following issues:

- Biodiversity Impact Assessment Report (since the proposal involves the use of more than 50 ha NP/WLS)
- Details of the Animal Passage plan prepared on the basis of the guidance department. Eco-friendly measures to mitigate impacts of line a infrastructure on wildlife along with the locations of details and dimensions of the mitigation structure and ot hermitigation measures.
- Trees fallin within the definition of wildlife as per the Wildlife (Protection) Act, 1972.Therefore, please provide specific comments with reference to 29/35 (6)of the Wildlife (Protection) Act, 1972.

Research Methodology: Environmental Impact Assessment (EIA) study is supposed to provide adequate baseline information, which is likely to have implication on project activities on various environmental components and their projections towards the improvement on existing and localized flora and fauna/wild life. Consequently, the study on EIA ultimately provides a set of recommendations to the policy planners and decision makers for safe operation of the projects. As per the guidelines of MoEF Govt. of India for EIA, the area covering 10 km radius from the project site is the study area for the project. The impact assessment will be conducted in the forest area within 10 km radius from the centre of the project site. The whole impact area (10 km radius) is divided into 5 sub-impact zones from the centre point :-

- 0-1 km- sub-impact zone
- 1-3 km-sub-impact zone
- 3-5 km-sub-impact zone
- 5-7 km-sub-impact zone
- 7-10 km-sub-impact zone

Study Design:

Experimental plots shall be laid to assess priority sites for conservation one would ideally obtain biodiversity measures assessing the species richness (total number of species), species diversity (type

of species) of the Floral and Faunal species found at the site. To attain this information we would require the adoption of variety of methods and assessment of the site at multiple time points.

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

Field survey by SFRI team, Railway Authority, and Officials from Sanjay-Dubri Tiger Reserve

Existing overpasses at Impact Zone of Sanjay-Dubri Tiger Reserve

Reconnaissance survey by SFRI team, Railway authority and Sanjay-Dubriofficials

View of measuring the sound and air quality at study sites

Views of quadra testudy and data collection

Existing underpasses at Impact Zone of Sanjay-Dubri Tiger Reserve

Objectives of Research :-

- To collect the baseline data on existing flora and fauna and the socio-economicstatusof theareaforthebiodiversity report.
- To assess the probable impacts of the proposed activities on flora and fauna of thearea andtheirhabitat within the10km impact zone.
- To assess the impact of noise, air and water quality due to proposed activities,
- To suggest mitigation measures and animal passage plan for conservation /protection and improvement of flora, fauna, habitats and social status of localcommunities.

Activities Undertaken:-

- Collection of baseline data on existing flora of the area.
- Collection of air, noise and water samples.

- Scanning 28.65 km foot patrolling of Beohari Buffer, Bastua Core and Dubari Core with the help of forest rangers and beat guards.
- Monitored all sensitive under and overpasses and recorded newly proposed under and overpasses and fencing locations at animal sensitive areas of Katni- Singrauli railway line.

Cost of the project:- Rs 40,07,750/**-**

Outcome of Research:-

- Collection of baseline data on existing flora and fauna of the area
- Environmental pollution impact on water, air and noise pollution have been studied with the help of standard method prescribed by CPCB.
- Collection of air, noise and water samples and analyzed.
- Scanning 28.65 km foot patrolling of Beohari Buffer, Bastua Core and Dubari Core with the help of forest rangers and beat guards.
- Monitored all sensitive under and overpasses and recorded newly proposed under and overpasses and fencing locations at animal sensitive areas of Katni- Singrauli railway line.
- Final report submitted to Funding Agency

On-going Project:

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

Why this Project:-

- The Kopra river is the tributary of the Sonar river (a tributary of Ken river, Yamuna basin).
- Kopra Medium Project would help in maximum utilization of water in Sagar District, Madhya Pradesh.
- The proposed Dam and its submergence area falls under Nauradehi WLS, this is why it is important to study the impact of dam on the wildlife habitat and local communities.
- The proposed study would create a base line information on flora, fauna and socio economic status of local communities. This study may help to develop long term suitable strategy by Nauradehi WLS and also by Water Resource Dept., M.P.

Research Methodology:-

Environmental Impact Assessment (EIA) study is supposed to provide adequate baseline information, which is likely to have implication on project activities on various environmental components and their projections towards the improvement on existing and localized flora and fauna/wild life. Consequently, the study on EIA ultimately provides a set of recommendations to the policy planners and decision makers for safe operation of the projects. As per the guidelines of MoEF Govt. of India for EIA, the area covering 10 km radius from the project site is the study area for the project. The impact assessment will be conducted in the forest area within 10 km radius from the centre of the project site. The whole impact area (10 km radius) is divided into 5 sub-impact zones from the centre point :–

- 0-1 km- sub-impact zone
- 1-3 km-sub-impact zone
- 3-5 km-sub-impact zone
- 5-7 km-sub-impact zone
- 7-10 km-sub-impact zone


Views of study sites during pilot survey


Views of study sites during data collection on environment assessment


Views of quadrate study during vegetational data collection

Study Design :-

- Experimental plots shall be laid to study tree cover, shrub and ground vegetation, regeneration study of forest, status of Rare, Endangered and Threatened (RET) species, Diversity Index
- Wildlife abundance shall be assessed using occupancy method and camera trap method
- Environmental pollution shall be assessed.
- Socio-Economic status of local communities shall be studied through questionnaire survey
- Suitable mitigation measures shall be developed and report shall be generated

Objectives of Research :-

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

Activities Undertaken:-

- Recruitment of project staff
- Collection of baseline data on existing flora is in progress
- Collection of Air, noise and water samples is in progress
- Sign survey-Surveyed 4 grids out of 189 grids
- Line transect-Marked 5 transects out of 48 transects
- Socio economic status of local communities-Visited and collected village level information from 15 out of 40 villages.

Cost of the project : Rs.47.14 Lakhs

Expected Outcome of Research:-

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

2.3.2 CLIMATE CHANGE, CLIMATE JUSTICE, REDD+

Mandate :

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

Achievements :

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

2.3.3 MONITORING & EVALUATION

Mandate

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

Ongoing Project : 01

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

Funding Agency : PCCF (Development) M.P. Bhopal

Project Summery

Ongoing Project

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 :-

वन विभाग द्वारा प्रत्येक वर्ष विभिन्न योजनाओं के अंतर्गत विभिन्न उददेश्यों की पूर्ति हेतु वृक्षारोपण किये जाते हैं।

- 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 ,oa 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 में से प्रथम चरण (2022–23) चयनित 180 वृक्षारोपणों का प्रथम चरण में मूल्यांकन किया गया।

Objective of Research:-

1. वृक्षारोपणों की सफलता का आंकलन।
2. उन कारकों का विश्लेषण जिनके कारण वृक्षारोपण सफल/असफल हुआ।
3. वृक्षारोपणों का सामाजिक आर्थिक प्रभाव।
4. वृक्षारोपण का प्रभाव।
5. वृक्षारोपण क्षेत्र की बेंच मार्किंग।

Activities Undertaken:-

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

Cost of the project : 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 तथा अनुसंधानकर्ताओं के लिए वृक्षारोपण के मूल्यांकन की तकनीक का विकास एवं विस्तार।

2.3.4 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
- Co-P.I. in the Network project on "Conservation of Lac insect genetic resources of IINRG, Ranchi."
- Training co-ordinator of the training programme "Preparation of plants in the root trainers and its transplantation in the field" organized by the institute.
- Training co-ordinator of the training programme "Logging and Timber Grading Skill Upgradation" organized by the institute.
- Member Secretary of the drafting committee of the Vision Document 2030 of the institute its preparation and publication.
- Theme associate of the Inaugral and Valedictory session of the International Wildlife Conference, Kanhna, 27-29 April, 2023.
- Team member of the Monitoring and Evaluation of plantations of M.P. Forest Department, 2015-2016 of 20 sites of Jabalpur and Chhindwara Forest Circles .

Dissemination of information

a. Annual Action Plan

Monitoring and evaluation of progress of the works as per the Annual Action Plan 2023-24 by conducting quarterly review meetings of each division periodically.

b. Annual Research Report

The Annual Research Report for 2021-22 was prepared, published and hosted on website of the institute.

c. Organization of workshop on the occassion of 100 Years of Forestry Research In Madhya Pradesh, 9th -10th June, 2022

A two days workshop on "Degraded Forest Ecosystems in Madhya Pradesh : Emerging Scenario & Way Forward" was jointly organized by State Forest Research Institute, Jabalpur and M.P. Forest Department on 9th – 10th June, 2022 in Hotel Kalchuri, Jabalpur. The themes of the workshop were :

1. Identification and classification of degraded forests
2. Assessment of impact of degraded forest rehabilitation activities
3. Degraded Forest Treatment Strategy
4. Microplanning

The workshop was attended by PCCF & HoFF, M.P. and other senior officers of M.P. Forest Department. During the deliberations in the workshop the speaker informed that the Forest Department is making tireless efforts to realize the goals of conservation of forests, wildlife, ecosystem services and increase in productivity of forests and forest cover to meet the requirements of Forest Policy. Combating forest degradation has always been one of the biggest challenges before forest policy makers, planners and managers. during the process of formation of degraded forests, the biological wealth of that area ends forever. At present it was suggested that, it is necessary to re-establish the productivity or structure of forests for the rehabilitation of degraded forests and there is a need to work on the issue of restoring all the damaged forests of the state and its ecorestoration.

d. Organization of two days training program on "Logging and Timber Grading Skill Upgradation" at State Forest Research Institute, Jabalpur

A two-day residential training program on "Logging and Timber Grading Skill Upgradation" was organized on September 21-22, 2022 and October, 14-15, 2022 at the State Forest Research Institute, Jabalpur. In the training programs 66 field level officers and staff of the production division of Dindori, Mandla, Seoni, Chhindwara, North, South Balaghat, Khandwa, Betul, Harda, Raisen and Jabalpur, North Shahdol, South Shahdol, Anuppur participated. The training programmes was sponsored by Principal Chief Conservator of Forests (Production) M.P.

Information on timber harvesting plan, felling, logging, transportation, timber management, classification of commercial grade wood, various records used in exploitation was provided through lectures by various subject experts. Practical demonstration of felling and logging in the identified Coup forest area of Mandla and Seoni production forest division was organized

Classroom session and field demonstration programme

e. Training programmes on preparation of plants by root trainer method and planting

State Forest Research Institute, Jabalpur in the month of April, May and June, 2022 organised 11 residential training programs of two days, for preparation and planting of saplings by root trainer method for field staff of 63 forest divisions and 11 social forestry circles, in which 297 participants participated. In the training program, importance of seed for preparation of seedlings in root trainers, nutrients of soil, preparation of potting mixture, need of infrastructure for root trainer nursery, nursery management, technique of transportation of root trainer from nursery to planting site and from root trainer to the plantation area. Information about practical demonstration and training of planting plants in the field was provided. In the training programme, scientists, senior research officers and officers and employees of Social Forestry Circle, Jabalpur played the role of resource persons. After the training, feedback was taken from all the trainees and certificates of participation in the training were distributed.

Classroom session and field demonstration programme

f. 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 Trainee Forest Range Officers posted in various forest divisions of M.P., trainee Forest Range Officers and trainee Forest Guards from Uttrakhand Forest Training Academy Haldwani, Telangana State Forest Academy, Hyderabad, Amarkantak Forest Training School, Forest Rangers College, Balaghat, Shivpuri Forest Training School, Indira Gandhi Forest Training School, Pachmarhi, Chandrapur Forest Academy, Maharashtra, students from Medicap Agricultural University, Indore, JNKVV, Jabalpur, Ordinance Factories Institute of Learning, Khamaria, Jabalpur, Guru Tegh Bahadur Khalsa College, Jabalpur, Govt. Science College, Dindori, Rani Laxmibai College of Agriculture and Forestry, Jhansi, Guru Ramdas Khalsa Institute of Science of Technology, Jabalpur, Ajay Satya Parkash Public School, Panagar, Jabalpur, Post Graduate Students of M.Sc. Environmental Studies, Delhi University and Ayurvedic Doctors from Government College under CME programme visited the institute during the year as a part of their course curriculum. They were acquainted with the research activities of the institute by class room lectures and visit to various laboratories, wildlife department, mist chambers, shade net houses, gene bank, botanical garden, nurseries, museum and herbarium, located in the campus.




Exposure visit of trainee forest rangers, forest guards and students

g. Plant distribution program on the foundation day of State Forest Research Institute, Jabalpur

On June 27, 2022, on the occasion of Foundation Day and the completion of 60 years i.e. Diamond Jubilee Year of the Institute plant distribution programme was organized in the early morning hours in the premises of the Institute. 270 medicinal plants were distributed free of cost to the visiting morning walkers and the residents residing near the institute.


Plant distribution programme on the Foundation Day of the Institute

h. World Tiger Day organized at State Forest Research Institute, Jabalpur

The World Tiger Day was observed at the State Forest Research Institute, Jabalpur on 29th July, 2022 in K. P. Sagreiya Auditorium. The program was sponsored by Rotary Club Jabalpur Excellence. The program was attended by the staff of the Institute along with the officers of the Rotary Club and other Rotarians.

In the programme, a brief description of the institute's research activities and World Tiger Day and tiger conservation efforts in India was given. The forest officials present shared their experiences and views about the efforts being made for the conservation of tigers and their habitat.


Organization of the World Tiger Day at SFRI

i. Foundation Day of the state of Madhya Pradesh organized in the State Forest Research Institute, Jabalpur

Foundation Day of Madhya Pradesh was organized on 1st November, 2022 in the State Forest Research Institute, Jabalpur. 90 school students along with the faculty members of Satya Prakash Public School, Jabalpur visited the institute's premises on this day. They were acquainted with various forestry research activities of the institution and were familiarized with the medicinal and aromatic plants in the medicinal plant gene bank nursery. 100 medicinal and aromatic plants were also distributed to them. They further were taken around the museum and explained about the exhibits on display.


Organization of the Madhya Pradesh Foundation Day in the institute

j. Establishment of sample plot of bamboo species *Bambusa tulda* in State Forest Research Institute campus

Establishment of Demonstration Plot of Bamboo Species *Bambusa Tulda* at State Forest Research Institute, Jabalpur was done by planting 800 sapllings, in an area of 2.0 hectares in the institute campus under the project funded by the State Bamboo Mission. Certified plants of *Bambusa tulda* were obtained from Rain Forest Research Institute (RFRI), Jorhat, Assam. The main purpose of establishing this demonstration plot was to observe the development of this species of bamboo in this agro-climatic zone and to demonstrate monitor and encourage its commercial cultivation to the various stakeholders. This species of bamboo is mainly used in the paper pulp industry and the solid culms are used for making furniture and boards etc. The Director of the Institute Mr. Amitabh Agnihotri, Deputy Director, Mr. Ravindra Mani Tripathi and the entire staff of the Institute participated in the plantation of bamboo.


Establishment of demonstration plot of Bamboosa tulda in SFRI campus

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

The monitoring and evaluation cell of the State Forest Research Institute, Jabalpur is conducting the work of evaluation of various plantations of Madhya Pradesh. This work is a project approved by Forest Department Madhya Pradesh. Monitoring and evaluation of tree plantations done in the year 2015-16 under various schemes is being carried out to comprehensively evaluate the plantation projects after their completion, which will prove to be helpful in the successful implementation of future plantation projects. For this work, evaluation teams have been constituted comprising by senior research officers, field staff and research fellows.

A four member team including Extension and Training cell was assigned the task of the monitoring and evaluation works of 20 sites in Jabalpur and Chhindwara forest circles which was conducted successfully. Field works of survey and data collection and data analysis and report submission was done as desired.


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

l. Participation in the 9th International Herbal Fair Bhopal

State Forest Research Institute Jabalpur and Regional Cum-Facilitation Center Central Region Jabalpur participated in the 9th International Herbal Fair organized by Madhya Pradesh State Minor Forest Produce Association, Bhopal from 20-26 December 2022. The activities and achievements of the institute and the center were displayed in the fair. Visitors, farmers, students and various stakeholders of the medicinal plant sector were informed about the schemes and programs being conducted through posters and display of live medicinal plants, publications and brochures.

Under the Amrit Mahotsav of Independence, distribution of free medicinal plants was also done in the International Forest Fair under Ayush Aapke Dwar programme.

m. Activities of, Regional Cum-Facilitation Center, Central Region (RCFC) SFRI, Jabalpur

(i) Medicinal plant distribution program

Regional cum Facilitation Center of State Forest Research Institute, Jabalpur Central Zone National Medicinal Plants Board Ministry of AYUSH on November 1, 2022 in Madhya Pradesh. On the occasion of foundation day, distribution of medicinal plants was done in Rampur, Jabalpur area.

Under the scheme of “Ayush Aapki Kheti”, “Ayush Aapke Dwar” and Herbal Garden from April 2022 to December 2022, awareness about the importance and use of medicinal plants species and distribution of about three lakh seventy thousand medicinal plant species were done free of cost in various hospitals, schools and temple premises in M.P. & C.G.

(ii) Seva Pakhwada

The Seva Pakhwada program was organized under the scheme of the Ministry of AYUSH, Government of India from 17 September to 02 October 2022. Free distribution of medicinal tree species and cleanliness related activities were done. in different districts of Madhya Pradesh in schools, parks and public places.

(iii) Medicinal plant training program

Training programs related to cultivation, conservation, enrichment, non-destructive exploitation, marketing and market arrangement of important medicinal species like Ashwagandha, Satavar and Guggal in Chhindwara, Indore, Morena and Korba and Dhamtari districts of Chhattisgarh by RCFC was Organized in which around 550 farmers, members of Joint Forest Management Committees and employees of Forest Department were benefited.

(iv) International Seminar

Participated in “International seminar on Medicinal Plants at 9th World Ayurveda Congress” organized by World Institute of Ayurveda from 10th to 11th December 2022 in Goa by RCFC.

(v) 7th International Herbal Agriculture and Horti Technology

The 7th International Herbal Agri & Horti Technology Expo was organized by Bhartiya Media & Events Pvt Ltd at Vittal Market, Bhopal Madhya Pradesh from 27.12.2022 to 29.12.2022. RCFC, Jabalpur showcased its activities and achievements at the expo with information about the schemes and programs run by the RCFC, through the display of posters and live medicinal plants, publications and brochures to the visitors.

Meeting of Research Advisory Committee

Meeting of Board of Governors

Organization of Meetings

S. N.	Meeting	Organised by	Place	Date of organization	Participants
1.	Organization of 38th meeting of the Board of Governors of the Institute.	Extenstion and Training Cell, SFRI, Jabalpur	Bhopal	28/03/2023	Chairman and Members of the BOG
2.	Organization of 46th meeting of Research Advisory Committee of the Institute	Extenstion and Training Cell, SFRI, Jabalpur	Bhopal	13/05/2022	Chairman and Members of the RAC
3.	Population Habitat Viability Analysis (PHVA) of Hard ground Barashingha (Cervus duvauceli branderi) for introduction in Bandhavgarh Tiger Reserve, M.P.	Animal Ecology Division SFRI, Jabalpur	Bandhavgarh Tiger Reserve	17/12/2022	Forest Officials of Bandhavgarh Tiger Reserve
4.	Review meetings with Forest Department on ongoing Projects at Nauradehi Wildlife Sanctuary	Animal Ecology Division SFRI, Jabalpur	Nauradehi Wildlife Sanctuary	25/3/2023	Forest Officials & staff of Nauradehi Willdife Sanctuary

Participation in Fairs :

S.No.	Event	Date	Place
1.	7th International Herbal Agriculture and Horti Technology Expo	27/12/2022 to 29/12/2022.	Bhartiya Media & Events Pvt Ltd at Vittal Market, Bhopal
2.	9th International Herbal Fair	20/12/2022 to 26/12/2022	Bhopal
3.	Poster presentation on “Capacity Building of Frontline Forest Staff of Madhya Pradesh for 5thcycle of All India Tiger Estimation Programme-2021-22” and on “Network Project on Conservation of Lac Insect Genetic Resources” at G20 Fair through PCCF Development	21/01/2023	Bhopal

Organization of Seminars/Symposiums/Workshops

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	Workshop on "Degraded Forest Ecosystems in Madhya Pradesh : Emerging Scenario & Way Forward"	SFRI, Jabalpur	Hotel Kalchuri, Jabalpur.	9/06/2023, 10/06/2023	Forest officers, Scientists, Field Foresters and Researchers	80
2.	Workshop under the scheme "Azadi ka Amrit Mahostav"	RCFC Jabalpur and Balaghat Forest Division(M.P)	Van Vidhyalaya, Balaghat,	03/09/2021	Farmers, JFMC, Forest officials and staff	250
3.	Workshop under the scheme "Azadi ka Amrit Mahostav"	RCFC and Pragati Foundation, Jabalpur	Village-Nebuha District-Sidhi	04/09/2021	Farmers, JFMC, Forest officials and staff	300
4.	Living with Leopard	Jabalpur Territorial Forest Division & SFRI, Jabalpur	SFRI Jabalpur	21/12/2021	Govt Department Jabalpur, Media personnel, Conservation communities	60
5.	Global Tiger Day	Animal Ecology Division SFRI Jabalpur	KP Sagreiya Auditorium of SFRI Jabalpur	29/07/2022	Academicians, practitioners, professionals, researchers	50
6.	International Conference on Wildlife Conservation: Emerging Scenario and Way Forward,	M.P Forest Department and State Forest Research Institute Jabalpur	Kanha Tiger Reserve, India,	27/04/2023 to 29/04/2023	Academicians, practitioners, professionals, researchers and policymakers	250
7.	Workshop on "Development of Landscape Management Plan and Monitoring with reference to Ken-Betwa River Link Project in Panna Tiger Reserve, Madhya Pradesh"	Wildlife Institute of India (WII), Dehradun, Uttarakhand	India International Center, New Delhi	4-4-2022	Panna Tiger Reserve	45
8.	Workshop on "Grassland Management in Protected Area" at Kanha Tiger Reserve	Kanha Tiger Reserve	Kanha Tiger Reserve, Mandla	22 to 23-09-2022	Park Managers, Scientists and Researchers	60

Organization of trainings

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
1.	''रूट ट्रेनर पद्वति से पौधों की तैयारी कर रोपण'' प्रशिक्षण कार्यक्रम	Extension & Training Cell SFRI	SFRI, Jabalpur	04/04/2022, 05/04/2022 07/04/2022, 08/04/2022 18/04/2022, 19/04/2022 26/04/2022, 27/04/2022 28/04/2022, 29/04/2022 04/05/2022, 05/05/2022 10/05/2022, 11/05/2022 17/05/2022, 18/05/2022 19/05/2022, 20/05/2022 27/05/2022, 28/05/2022 30/05/2022, 31/05/2022	Field staff of 63 Forest Divisions & 11 Social Forestry Circles of M.P.	250
2.	Training programme on "Logging and timber grading skill up-gradation"	Extension & Training Cell SFRI	SFRI, Jabalpur	21/09/2023, 22/09/2023 & 14/10/2022, 15/10/2022	Field staff of Production Division of M.P. Forest Department	60
3.	Training provided to Shri Neetesh Daheria, Probationary FRO, South Seoni	SFRI	SFRI, Biotechnology, Animal Ecolgy, Habitat Ecology, Wildlife Management Division	07/03/2023	FRO	1
4.	Training provided to Shri Ankur Tiwari Probationary FRO, Panna	SFRI	SFRI, Animal Ecology, Habitat Ecology, Wildlife Management Division	07/03/2023	FRO	1
5.	Visit organized of B.Sc. (22 students) and M.Sc. Botany (13 students) with professor Dr. Archna More and Mr. Mahendra Patil of Neelkhadeswar PG College Khandwa	SFRI	SFRI, Biotechnology Division	16/11/2022	Students	35
6.	Identification & Control of Pests and Diseases in Medicinal Plants	SFRI	RCFC-CR On-line	15/07/2022	Farmers, villagers	50
7.	Cultivation & Marketing Process of Medicinal Plants	SFRI	RCFC-CR On-line	31/01/2023	Farmers, villagers	100
8.	Important Medicinal Plants Fount in Central Region	SFRI	RCFC-CR On-line	03/03/2023	Farmers, villagers	55

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
9.	Organic Cultivation, Nursery Techniques & Certification of Medicinal Plants	SFRI	RCFC-CR On-line	31/03/2023	Farmers, villagers	46
10.	हमारी कंद संपदाः मध्यप्रदेश मे पायी जाने वाली कंद प्रजातियों की पहचान एवं विवरण	Girnari Mandal Association, Gujarat	On line		Farmers, villagers Vaidhya	
11.	Educational tour of Dravyaguna National Institute of Ayurveda, Jaipur, Affiliated to Ministry of Ayush, Govt. of India	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation Division	07/10/2022 08/10/2022	Students	19
12.	Educational tour of Sri Guru Tegh Bahadur Khalsa College, Jabalpur, Madhya Pradesh	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation Division, Animal Ecology, Wildlife Management Division	20/10/2022	Students	45
13.	Educational tour of B.Sc students of Guru RamdasKhalsa Institute of Science and Technology, Barela, Jabalpur	SFRI	Animal Ecology Division, Ecology, Wildlife Management	16/12/2022	Students	80
14.	Educational tour of Department of Forest from Maharashtra, Karnataka and Mizoram	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation Division	08/11/2022	Trainee Foresters	43
15.	Educational tour of Rani Laxmibai Central Agricultural University, Jhansi, Uttar Pradesh	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation, Animal Ecology, Habitat Ecology, Wildlife Management Division	08/12/2022	Students	36
16.	Educational tour of Botany department of Rani Durgavati P G College, Mandla,M.P.	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation Division	21/12/2022	Students	34
17.	Educational tour of Agro Forestry Department of College of Forestry Jawahar Lal Nehru Krishi Vishva Vidhyalaya, Jabalpur	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation Division	22/12/2022	Students	20
18.	Educational tour of Ayurvedic MD Doctors / teachers from across India	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation Division	23/12/2022	Students	34
19.	Educational tour of trainees (Girls batch) of Bihar Forest Department from	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation,	14/02/2023 , 15/02/2023	Students	50

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
	Amarkantak, Anupur Forest Training Centre, Madhya Pradesh		Animal Ecology, Habitat Ecology, Wildlife Management Division			
20.	Educational tour of Trainees (Boys batch) of Bihar Forest Department from Lakhnadon forest training centre, Seoni, M. P.	SFRI	SFRI, Medicinal Plant Gene Bank, Conservation, Animal Ecology Habitat Ecology, Wildlife Management Division	20/02/2023	Trainee Foresters	76
21.	One day Training "Program on Non-destructive harvesting, Primary Processing and Market linkage of Medicinal Species Satavar (*Asparagus racemosus*)"	RCFC-CR	Forest Eco Centre, J. F. M. Hall, District Korba, Chhattisgarh	26/07/2022	Farmers, Colletoror, Cultivators and JFMC	94
22.	One day Training Program on "Cultivation, Primary processing and Market system of Medicinal species Ashwagandha"	RCFC-CR	Samvad sadan, Former Forest Division Headquarters, Chhindwara, Madhya Pradesh	02/08/2022	Farmers, Colletoror, Cultivators and JFMC	120
23.	''औषधीय प्रजाति गुग्गल की खेती संग्रहण एवं विपणन तथा औषधीय पौधों का संरक्षण, संवर्धन, संवहनीय विदोहन पर प्रशिक्षण कार्यक्रम''	RCFC-CR	Krishi Vigyan Kendra, District Morena, Madhya Pradesh	13/09/2022	Farmers, Colletoror Cultivators and JFMC	90
24.	''जैविक पद्धति से औषधीय पौधों की खेती''	RCFC-CR	Office of Social Forestry Circle,District Indore, M.P.	17/09/2022	Farmers, Colletoror, Cultivators and JFMC	170
25.	एक दिवसीय प्रशिक्षण कार्यक्रम विषय :– औषधीय प्रजाति अश्वगंधा की खेती (विथेनिया सोम्नीफेरा)		Village Dugli, District Dhamtari (C.G)	17/11/2022		131
26.	Training and demonstration programme to field foresters of different forest divisions and R&E Circles on plant preparation in root trainers and their management in nurseries, seed technology for plant production in root trainer.	SFRI, Jabalpur	SFRI, Forest Productivity Division,	04/04/2022, 05/04/2022 07/04/2022, 08/04/2022 18/04/2022, 19/04/2022 26/04/2022, 27/04/2022 28/04/2022, 29/04/2022 04/05/2022, 05/05/2022 10/05/2022, 11/05/2022 17/05/2022, 18/05/2022 27/05/2022, 28/05/2022	Field foresters	250

S. N.	Topic	Organized by	Venue	Date	Target Group	No. of participants
				30/05/2022, 31/05/2022		
27.	One day lac cultivation training programme	SFRI, Jabalpur Animal Ecology Division	Katni	18/05/2022	Farmers, Van Samiti members and local forest staff of Katni	56
28.	Educational tour of trainee RFO of Uttarakhand Forestry Training Academy (U.K.)	SFRI, Jabalpur	Animal Ecology Division,	15/09/2022	Trainee Foresters	30
29.	Exposure visit of trainee Forest Guard of Forestry training School, Shivpuri (M.P.)	SFRI, Jabalpur	Animal Ecology, Habitat Ecology, Wildlife Management Division	12/10/2022 15/03/2023 16/03/2023	Trainee Foresters	40 46 48
30.	Exposure visit of trainee Forest Guards of Forest Academy Uttarakhand	SFRI, Jabalpur	Animal Ecology Division	12/10/2022	Trainee Foresters	55
31.	Exposure visit of trainee RFOs of Forestry training school, Chandrapur (M.H.)	SFRI, Jabalpur	Animal Ecology, Habitat Ecology, Wildlife Management Division	08/11/2022	Trainee Foresters	30
32.	Educational tour of M.Sc Zoology student and professors of Mata Gujri Mahila Mahavidyalay, Jabalpur (M.P	SFRI, Jabalpur	Animal Ecology Division	14/01/2023	Students	30
33.	Exposure visit of trainee forest guard, of Forestry training school, Balaghat (M.P.)	SFRI, Jabalpur	Animal Ecology, Habitat Ecology, Wildlife Management Division	15/02/2023	Trainee Foresters	40
34.	Exposure visit of trainee forester of Forestry Training School Lakhnadone (M.P.)	SFRI, Jabalpur	Animal Ecology Division	20/02/2023	Trainee Foresters	74
35.	Exposure visit of trainee forest guard of Forestry Training School Panchmari (M.P.)	SFRI, Jabalpur	Animal Ecology, Habitat Ecology, Wildlife Management Division	21/02/2023	Trainee Foresters	49
36.	Exposure visit of trainee forest guard trainees of Forestry Training School, Betul (M.P.)	SFRI, Jabalpur	Animal Ecology, Habitat Ecology, Wildlife Management Division	22/02/2023	Trainee Foresters	50
37.	Prpbationary IFS officers exposure visit	SFRI, Jabalpur	Animal Ecology Division	11/04/2023	Trainee IFS officers	02

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.	Training programme on "Preparation of plants and its plantation in the field by root trainer techniques"	SFRI	SFRI	04/04/2022, 05/04/2022	Dr. S.K. Tiwari Dr. A.K. Sharma Dr. Pratiksha Chaturvedi, Richa Seth, Dr. Archana Sharma
2.	Participated in two days workshop on “Rehabilitation of Degraded Forest Ecosystems in Madhya Pradesh: Emerging Scenario & Way Forward”	SFRI	Kalchuri Hotel, Jabalpur	09/06/2022, 10/06/2022	Dr. S.K. Tiwari Dr. A.K. Sharma Dr. Uday Homkar Amit Pandey Dr. Pratiksha Chaturvedi, Richa Seth, Dr. Jyoti Singh, Dr. Archana Sharma, Dr. Sachin Dixit, Amit Pandey, Dr. Aniruddha Majumdar, Dr. Archna Sharma, Dr. Mayank Verma
3.	औषधीय पौधों पर लगने वाले कीट और रोग की पहचान एवं उनका नियंत्रण Webinar	RCFC, Jabalpur	SFRI	15/07/2022	Dr. S.K. Tiwari Dr. A.K. Sharma
4.	Participated in plantation programme of tissue culture raised B.tulda	SFRI	SFRI	15/07/2022	Dr. S.K. Tiwari Dr. A.K. Sharma
5.	Participated in Celebration of International Tiger Day	Rotary club / SFRI	SFRI	29/07/2022	Dr. S.K. Tiwari Dr. A.K. Sharma
6.	Participated in training programme on "Logging and timber grading skill up-gradation”	SFRI	SFRI	14/10/2022 15/10/2022	Dr. S.K. Tiwari Dr. A.K. Sharma Dr. Pratiksha Chaturvedi, Richa Seth,
7.	National workshop on Avaiblity, sustainability, processing issues and market linkage of medicinal plants.	TFRI	Kalchuri Hotel Jabalpur	26/09/2022	Dr. Uday Homkar
8.	Carbon stock assessment for generating carbon finance through VERRA – Capacity building program for forest officials of Kanha Tiger Reserve	SFRI	SFRI	18-19 January 2023	Dr. Pratiksha Chaturvedi
9.	Global Ayush Investment & Innovation Summit 2022 (GAIIS)	Ministry of AYUSH, Govt. of India atMahatma Mandir, Gandhi Nager, Gujrat		20/04/2022 to 22/04/2022	Dr. Susheel Kumar Upadhyay, Pankaj Saini
10.	59th National Level Arogya fair	All India Ayurvedic Congress (AIAC) Kalidas Sanskrit Academy, Ujjain,		27/05/2022 to 30/05/2022	Dinesh Kumar Kuldeep, Pankaj Saini, Pradeep Kumar Kori

S.N.	Name of the programme	Organized by	Venue	Date	Participants
11.	"2nd International Conference and Buyers Sellers Meet on Medicinal Plants Used in Lifestyle Products"	Jadavpur University, Kolkata in Technical Assistance with RCFC-ER, NMPB, Ministry of AYUSH, Govt. of India		28/06/2022 to 30/06/2022	The RCFC-CR officials and staff (in virtual mode)
12.	"National Seminar on Securing Human Health through use of Medicinal plants"	Minor Forest Produce Processing and Research Centre, Bhopal.		03/09/2022 to 04/09/2022	R. S. Kori
13.	International nutritional Conclave- Workshop on "Entrepreneurship and Incubation Opportunities in Processing for Improved Nutrition."	Solidaridad Regional Expertise Centre with ICAR-Central Institute of Agricultural Engineering, Bhopal.		16/09/2022	R. S. Kori
14.	National Workshop on ''Availability, Sustainability, Processing issues and Market linkages of Medicinal Plants"	Tropical Forest Research Institute (TFRI), Jabalpur.		26/09/2022	R. S. Kori
15.	AROGYA EXPO and International seminar on "Medicinal plants" during 9th World Ayurveda Congress & AROGYA	World Ayurveda Foundation with active support from the Ministry of Ayush, Govt. of India.		08/12/2022 to 11/12/2022	R. S. Kori
16.	9th International Herbal Fair 2022 (Van Mela)	M.P. Forest Department & M.P. State Minor Forest Produce (T & D) Co-operative Federation Ltd.		20/12/2022 to 26/12/2022	R. S. Kori, Dr. Susheel Kumar Upadhyay, Dr. Ruby R. Duggal, Kundan Sharma, Mr. Pankaj Saini, Amardeep Rajak, Pradeep Kumar
17.	7th International Herbal Agri & Horti Technology Expo	Bharti media & Events Pvt. Ltd. Delhi		27/12/2022 to 29/12/2022	R. S. Kori, Dr. Susheel Kumar Upadhyay, Kundan Sharma, Pankaj Saini, Amardeep Rajak
18.	Workshop on Developing carbon stock assessment and carbon market project for Kanha Tiger Reserve.	Kanha Tiger Reserve, Mandla	Kanha Tiger Reserve, Mandla	18/01/2023, 19/01/2023	Director KTR, field foresters, staff of TERRI, renew power and stakeholders
19.	Term of reference meeting Kopra medium irrigation project through video conferencing	MoEFCC	Online Mode	06/04/2022	Dr.Aniruddha Majumdar Dr Jyoti Singh Dr Uday Homkar
20.	National webinar on World Environment Day	School of Environmental Biology, A.P.S.U.	Online Mode	05/06/2022	Dr. Aniruddha Majumdar

S.N.	Name of the programme	Organized by	Venue	Date	Participants
		Rewa (M.P.) & Mahakaushal Vigyan Parisad			
21.	Forest and wildlife conservation	Sagar Public School	Online Mode	03/08/2022	Dr. Aniruddha Majumdar
22.	Participated as co-chairperson in National webinar on Heritage Sites, National Park, Tiger Reserves, Botanic Gardens, Zoological Parks, Museum and Monuments of India – Identification, Conservation and Managements.	Govt. M.S. Golwalkar College Rewa (M.P.)	Online Mode	28/08/2022	Dr. Aniruddha Majumdar
23.	Quarterly review meeting of lac project "Network Project on Conservation of Lac Insect Genetic Resources".	ICAR-Indian Institute of Secondary Agriculture, Ranchi	Online Mode	03/09/2022	Dr. Aniruddha Majumdar
24.	Monitoring Tiger & Co Predators	Govt. Science college Jabalpur	Govt. Science college Jabalpur	20/09/2022	Dr. Aniruddha Majumdar
25.	"Jigyasa" Skill development for Youth	IIITDM – Indian Institute of Information Technology, Design and manufacturing Jabalpur and Vigyan Bharti, New Delhi	IIITDM Jabalpur	22/11/2022	Dr. Aniruddha Majumdar
26.	IRALE Conference-Landscape Planning Process & Tools - By Dr Ramesh Krishnamurthy	Wildlife Institute of India Dehradun	Online	30/11/2022	Dr. Aniruddha Majumdar
27.	Official meeting (AITE IV Phase camera trap)	Pench Tiger Reserve	Pench Tiger Reserve	16/01/2023, 17/01/2023	Dr. Aniruddha Majumdar
28.	Skill Development on Wildlife Crime Prevention	GRP, Western Zone HQ	Jabalpur	23/01/2023	Dr. Aniruddha Majumdar
29.	Republic Day Program invited by collector Jabalpur	District Collector Jabalpur	Garrison Ground Jabalpur (M.P.)	26/01/2023	Dr. Aniruddha Majumdar
30.	REDD+s Conference On "Forest are carbon sinks and sequester the carbon by absorbing the CO2	State Forest Research Institute	SFRI Jabalpur	22/02/2023	Dr. Aniruddha Majumdar Dr. Anjana Rajput, Dr. Mayank Verma
31.	Online Workshop on Wildlife Census Method	Guru Ghasi Das Central University, Bilaspur (C.G)	Online	03/03/2023	Dr. Aniruddha Majumdar
32.	10th Coordination Committee Meeting cum Annual workshop of Lac project	ICAR-Indian Institute of Secondary Agriculture, Ranchi, Jharkhand	Online Mode	23/03/2023	Dr. Aniruddha Majumdar

S.N.	Name of the programme	Organized by	Venue	Date	Participants
33.	Advanced Wildlife Population Monitoring Techniques	Department of Zoology (Govt. PG College Bichhua, Chhindwara)	Online Mode	24/03/2023	Dr. Aniruddha Majumdar
34.	Attended meeting on Wildlife Action Plan of MP	MP Forest Department (Wildlife wing)	Meeting at Bhopal	27/03/2023, 28/03/2023	Dr. Aniruddha Majumdar
35.	"AITE-2022 MSTrIPES Desktop software"	SFRI, Jabalpur	SFRI	4-14 April 2022	PAs, Tiger Reserve,Territorial Forest Division Staff
36.	"National Programme for Training of Women Scientists and Technologists working in the Government Sector on Biodiversity Conservation"	Department of Science and Technology sponsored training under the Disha scheme for training of Women Scientists and Technologists working in the Government Sector on Biodiversity Conservation'	Wildlife Institute of India, Dehradun	14th – 18th November, 2022	Dr. Anjana Rajput Dr. Jyoti Singh,

2.3.5 DOCUMENTATION CENTRE

Mandate

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

Activities

1. Maintenance of general and specific ledger files. At present, 250 general and 165 specific ledger files are being maintained. The research findings published in various journals/bulletins and reports, etc. were photocopied and added regularly in the respective ledger files.
2. Documentation of technical literature on forestry research.
3. Documentation of research articles published in different Journals, Magazines, Newsletters, Bulletins, Vaniki Sandesh, Annual Research Report and Extension series.
4. Documentation of final reports of the projects financed by external agencies.
5. Publication of quarterly journal "Vaniki Sandesh", technical bulletins and extension series.
6. Sale of SFRI publications.

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

Journal Section

The branch is well furnished with a reading room. During the year 12 journals were received.

Achievements during the year

1. Two issues of Vaniki Sandesh Vol.12 No. 3 & 4, 2021 (July-December) and Vol. 13 No. 1 & 2, 2022 (Jan.-June) were published.
2. During the year 11 brochures are reprint
3. 08 project reports were documented.
4. 12 periodicals were received and displayed.
5. 45 articles were selected, photocopied, classified and filed into ledger files.
6. 160 damaged pages of ledger files were replaced by xerox copies.

Periodicals subscribed / complimentary

Sl. No.	Name of the Journal
1.	Indian Forester
2.	Journal of Non Timber Forest Product
3.	Indian Journal of Forestry
4.	Journal of Soil and Water Conservation
5.	Environmental Justice
6.	My Forest
7.	FRIM in FOCUS
8.	Journal of Tropical Forestry
9.	Wood is Good : Grow Move, Use Move
10.	मध्यप्रदेश वनांचल संदेश
11.	MPCST NEWS LETTER
12.	Annals of Forestry

SFRI PUBLICATIONS

1. Technical bulletins

S N.	Bulletin No.	Title	Year
1	2	Volume Table of Terminalia tomentosa for M.P.	1963
2	4	Yield Table of Sal for M.P.	1966
3	5	Seed Directory vol. I	1967
4	9	Standard Volume Table of Teak for S.Chhindwara in M.P.	1971
5	10	Family Ranunculaceae to Polygonaceae in M.P. (Monograph of 13 family)	1971
6	11	Teak growth tables of different ecological forest types in M.P.	1971
7	12	Standard volume tables of *Boswellia serrata* for Nimar tract in M.P.	1971
8	15	Bark Table for *Boswellia serrata*	1971
9	16	Family Linanceae to Berseraceae	1974
10	18	Species for plantation in M.P. (Reprint)	1977
11		मध्यप्रदेश में वृक्षारोपण के लिये उपयुक्त प्रजातियां	1977
12	22	Bamboo Plantation	1986
13	23	Fuel wood removal by headloads-A case study of Jabalpur	1987
14	24	Eucalyptus cultivation in M.P. – JTF	1987
15	26	Socio-economic Potential of Minor Forest Produce in M.P.	1991
16	28	Material for forest flora of Madhya Pradesh	1996
17	29	Tissue culture protocols for Teak, Neem & Khamer	1997
18	30	Growth statistics of forest plantations	1997
19	31	Medicinal plant of M.P. distribution, cultivation & trade	1998
20	32	Local Volume Table for Teak, Sal and other species	1997
21	33	Price Trends of some medicinal plants	1998
22	34	Biological Diversity of SFRI premises	1998
23	35	Seed production in Teak Seed Orchards in M.P.	1998
24	36	Seed certification protocol of forest tree species	1998
25	37	Tissue culture protocols for important medicinal plants of M.P.	1998
26	38	Macro-propagation protocol of some tree and medicinal plants species.	1998
27	39	Yield and stand tables of teak in Madhya Pradesh	1998
28	40	An Annotated Bibliography of Bamboo	1999
29	41	Status survey of Non Timber Forest Produce in primary Tribal Markets: A case study in Amarkantak Plateau.	1999
30	42	Application of laboratory seed testing results in nursery practices.	2000
31	43	म0प्र0 में भिलवा का सामाजिक आर्थिक विश्लेषणात्मक अध्ययन।	2000
32	44	Silviculture research in M.P.	2000
33	45	Handbook of Bamboos with particular reference to M.P.	2002
34	46	औषधीय पौधों की खेती की प्रचार प्रसार पत्रिका।	2003
35	47	Medicinal herbs in trade: a study of safed musli (chlorophytum species) in Madhya Pradesh	2003
36	48	Collection, processing and marketing of *Buchanania lanzan* in Madhya Pradesh	2005
37	49	मध्यप्रदेश के महत्वपूर्ण आयुर्वेदिक पादप	2005
38	50	आंवला वृक्षारोपण एवं आर्थिक महत्व	2008

S N.	Bulletin No.	Title	Year
39	51	उच्च गुणवत्ता के बीज एकत्रीकरण, भण्डारण, उपचारण, प्रमाणीकरण तथा बीजोत्पादन क्षेत्रों के चयन एवं प्रबंधन पर दिग्दर्शिका।	2008
40	52	Floral Diversity of Kanha Tiger Reserve	2009
41	53	Nursery and Planting technique of Tree Species	2010
42	54	Forest Glossary for All (English – Hindi)	2010
43	55	वृक्षारोपण मार्गदर्शिका	2011
44	56	संग्रहित लाख में समय के साथ वनोपजों में होने वाली कमी का अध्ययन।	2014
45	57	Status of natural gum and gum oleo-resin of M.P.	2014
46	58	बीज प्रक्षेत्र का चयन, बीज उत्पादन क्षेत्र की स्थापना, प्रबंधन, बीज संग्रहण, भण्डारण, उपचारण, परीक्षण एवं रोपणी प्रबंधन	2014
47	59	वानिकी में मेक्रोक्लोनल प्रोपेगेशन तकनीक द्वारा वृक्ष एवं औषधीय प्रजातियों के क्लोनल पौधे तैयार करने की विधियॉ।	2014
48	60	सामुदायिक भागीदारी द्वारा अकाष्ठीय वनोपजों के मानचित्रण एवं आंकलन विधि मार्गदर्शिका।	2015
49	61	अकाष्ठीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2015
50	62	कैमरा ट्रैप मार्गदर्शिका	2016
51	63	अकाष्ठीय वनोपज प्रजातियों का अंतःस्थलीय, बाह्य स्थलीय संरक्षण, नवप्रवर्तन – वनवर्धन एवं विकास।	2016
52	64	अकाष्ठीय वनोपज सतत् विदोहन एवं प्रबंधन नियमावली।	2016
53	65	Volume table of Teak for various divisions of Madhya Pradesh	2016
54	66	Volume table *of Shorea robusta* (Sal) for various forest divisions of Madhya Pradesh	2016
55	67	रोपणी मार्गदर्शिका	2016
56	68	Growth table of important coppices origin species for Madhya Pradesh	2016
57	69	वन एवं औषधीय प्रजातियों की रोपणी एवं रोपण तकनीक मार्गदर्शिका	2016
58	70	कट रूट स्टाक विधि : लेन्टाना उन्मूलन की नई तकनीक	2017
59	71	बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण हेतु मार्गदर्शिका	2017
60	72	प्रशिक्षण मार्गदर्शिका – आधुनिक जीपीएस, रेंज फाईडर एवं कम्पास हेतु	2017
61	73	Primary Processing and Drying Techniques of NTFPs	2017
62	74	Directory of Medicinal Plants Traders and ISM Industries in Madhya Pradesh	2017
63	75	Selection of superior races of Khamer (*Gmelina arborea*) through clonal propagation	2017
64		क्लोनल प्रोपेगेशन द्वारा खमेर (*मेलाईना आरबोरिया*) की श्रेष्ठ नस्लो (रेसेस) का चयन	2017
65	76	Quantitative estimation of bioactive compounds through Chemo-fingerprinting (HPLC) for the identification of quality germplasm - *Andrographis paniculata, Bacopa monnieri and Swertia angustifolia*	2017
66	77	औषधीय पौध प्रजातियों की जबलपुर वन वृत्त के वनक्षेत्रों में वर्तमान स्थिति, संख्यात्मक घनत्व एवं उपलब्ध मात्रा का आंकलन ''सर्वेक्षण एवं आंकलन मार्गदर्शिका''	2017
67	78	बाघ, सह–परभक्षी, चौपायों एवं उनके वासस्थल का अनुश्रवण- 2018 हेतु मार्गदर्शिका	2018
68	79	Volume table of miscellaneous species for various divisions of Madhya Pradesh.	2018
69	80	हमारी कंद संपदा : मध्यप्रदेश में पायी जाने वाली कंद प्रजातियों की पहचान एवं विवरण	2018
70	81	Propagation techniques of economically important endangered and rare species (salai, shisham, achar, maida lakdi and bija) of Madhya Pradesh	2018

S N.	Bulletin No.	Title	Year
71	82	पलाश के वृक्षो में लाख की कृषि प्रक्रिया	2018
72	83	बांधवगढ़ टाईगर रिजर्व के घास मैदानों का पारिस्थितिकीय अध्ययन : वन्य प्राणी प्रबंधन के संदर्भ में	2018
73	84	कुसुम के वृक्षो में लाख की कृषि प्रक्रिया	2019
74	85	Climate Change and Role of Communities in Adaptation and Mitigation	2019
75	86	मध्यप्रदेश की प्रमुख गोंदों के उत्पादन एवं संग्रहण क्षेत्र	2019
76	87	कार्बन का महत्व, पर्यावरणीय घटनाओं से इसका संबंध एवं वनों में कार्बन संचयन का आंकलन ।	2019
77	88	Quantitative estimation of bioactive compounds of 5 commercially important medicinal plants through chemo-fingerprinting (HPLC) for the identification of quality planting material.	2019
78	89	दुर्लभ एवं संकटग्रस्त प्रजातियों की रोपणी तकनीक का प्रचार प्रसार	2019
79	90	वनों एवं वन रोपणियों में लगने वाली कीट व्याधियों एवं उनके निदान पर किये गये कार्यो का सरल भाषा में संकलन : मध्यप्रदेश के संदर्भ मे	2019
80	91	Species specific cage designs to rescue & transport the wildlife & nest boxes for birds.	2020
81	92	Quantitative determination of bio-active compounds of critically endangered and rare medicinal plants Alectra chitrakutensis and Butea superb through chemoprofiling	2021
82	93	Clonal propagation studies of Alectra chitrakutensis and Butea superb critically endangered and rare medicinal plants	2021

1. **Extension Series**

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

Ext. Series	Title	Year
22.	सफेद मूसली (क्लोरोफाइटम बोरिविलियानम)	2001
23.	कलिहारी (ग्लोरिओसा सुपरबा)	2001
24.	सनाय (केसिया आगस्टफोलिया)	2001
25.	सर्पगंधा (रावोल्फिया सर्पेन्टिना)	2001
26.	अश्वगंधा (विद्यानिया सोमनीफेरा)	2001
27.	मुश्कदाना (एबलेमासकस मास्केटस)	2001
28.	लेमनग्रास (सिंबोपोगन फ्लेक्सिपोसस)	2001
29.	मेन्था या पोदीना (मेन्था आर्वेसिस)	2001
30.	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 1)	2003
31	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 2)	2007
32	Directory of Medicinal Plants Trades and ISM Industries of Central India	2009
33	Monograph on *Alectra chitrakutensis*	2011
34	Monograph on *Ceropegia bulbosa and Ceropegia macrantha*	2011
35	Monograph on *Crateva magna* and *ficus cupulata*	2011
36	Monograph on *Dioscorea tomentosa*, *D. wallichia* and *d. alata*	2011
37	Monograph on *Flemingia stricta* and *F. paniculata*	2011
38	Monograph on *Guggal (Commiphora wightii)*	2011
39	Monograph on Maida tree (*Litsea glutinosa)*	2011
40	Monograph on Padri tree (*Radermachera xylocarpa)*	2011
41	Monograph on Shyonaka (*Oroxylum indicum)*	2011
42	Some ethnic plants in cure of various human diseases	2011
43	कमरकस (पलाश) गोंद का सतत् विदोहन, प्राथमिक प्रसंस्करण, श्रेणीकरण एवं भण्डारण तकनीकों का प्रदर्शन	2012
44	साल बोरर से साल वनो की सुरक्षा	2014
45	Education material on Conservation , multiplication and utilization of rare, endemic Angiosperms and Pteridophytes in Forest Botanic Garden of State Forest Research Institute, Jabalpur (M.P.)	2014
46	Education material on Herbarium preparation and its management	2015
47	मध्यप्रदेश के वनों में पायी जाने वाली महत्वपूर्ण दुर्लभ प्रजातियों की उपयुक्त रोपणी तकनीकी का विकास।	2015
48	खमेर शीर्ष सूखन रोग एवं प्रबंधन तकनीकी मार्गदर्शिका	2015
49	खनन क्षेत्रों में वनीकरण एवं पारिस्थितिकीय पुर्नस्थापना हेतु तकनीकी मार्गदर्शिका	2015
50	नर्मदा तट पर वृक्षारोपण हेतु उपयुक्त प्रजातियाँ एवं रोपण विधियाँ	2017
51	मार्गदर्शिका–साल वृक्षों की मृत्युदर को प्रभावित करने वाले कारकों का अध्ययन एवं उनके रोकथाम के उपाय	2017
52	मार्गदर्शिका–आर्थिक महत्व की प्रजातियों बीजा, धावड़ा एवं अचार मे होने वाले रोगों का समेकित प्रबधंन एवं तकनीक	2017
53	महुआ प्रशिक्षण एवं प्रदर्शन मार्गदर्शिका	2018
54	सलई वृक्ष में वैज्ञानिक विधि से टैंपिंग तकनीक, सतत् विनाश विहीन विदोहन, प्राथमिक प्रसंस्करण एवं भंडारण विधि – मार्गदर्शिका	2018
55	पौधों की विक्रय दरें ।	2018
56	मध्यप्रदेश में पाई जाने वाली प्रमुख गोंदों की विदोहन एवं विदोहनोत्तर तकनीक	2018

Brouchers

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

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

TM - Training Material

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

2.3.6 LIBRARY AND INFORMATION CENTRE

Mandate

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

The library and information centre maintains literature on forestry and allied subjects. It has books on environment, silviculture, forest protection, mensuration, management, marketing, utilization, social forestry, biodiversity, ecology, botany, tissue culture, tree improvement, law, medicinal plants, wildlife, seed science and computer science, etc. approximately 10258 books are available.

Following activities were undertaken during the year.

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

2.3.7 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 2022 to March 2023)

Papers published in Journals (National and International)

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.
1.	Journal of Tropical Forestry	Price Trend of Important Medicinal Plant Species in Markets of Madhya Pradesh and National Market, New Delhi During the Covid-19out break	Rajesh Barman, Aniruddha Majumdar, Pratibha Bhatnagar and Vijay Bahadur Singh	2022/38(1&2): 49-58
2.	Journal of Non-Timber Forest Products	Socio economic status of lac growing farmers of Balaghat district of Madhya Pradesh and Gondia district of Maharashtra	BalramLodhi, AniruddhaMajumdar, Rajesh Barman, Vijay Bahadur Singh, PratibhaBhatnagar, Anirudhwa Sarkar and Amitabh Agnihotri	2022/29(1):22-27
3.	Journal of Tropical Forestry	Income generation & challenges of local communities on kusmi lac at Dindori and Mandla districts of Madhya Pradesh	BalramLodhi, Aniruddha Majumdar, Bharat Singh Aarmo, Anirudhwa Sarkar, Amitabh Agnihotri and Ravindra Mani Tripathi	2022 38(3&4): 70-81
4.	Journal of Animal Diversity	Global scenario on human-big cats interactions and coexistence patterns- a critical review.	Suryan, T., Raghav, G., Majumdar, A. and Tripathi, R. M.	5 (1): 92–109.
5.	Journal of Tropical Forestry	"Tiger Occupancy in Ratapani-Kheoni Landscape: Factors for Tiger Presence near Bhopal, Madhya Pradesh"	Mayank Makrand Verma and Satyadeep Nag	Vol. 38, January-June 2022, No. 1&2.
6.	Journal of Tropical Forestry	"Phyto-sociological attributes of tree species and their distribution in Shikara Range, North Forest Division Seoni district, Madhya Pradesh, India."	Jyoti Singh, Ramdeen Bhalavi and Vijay Kumar Haldkar,	July-Dec. 2022/vol. 38, No. 3&4 (Published in May 2023)
7.	Van Dhan Vyapaar	अकरकरा की खेती दृ *Anacyclus pyrethrum (L.)*	Dr. S. K. Masih, Alok Raikwar & Rajesh Burman	Vol. 2, April-June 2022
8.	Van Dhan Vyapaar	लघुवनोपज बाजारए कराहलए जिला श्योपुर – एक परिचय	Dr. S. K. Masih, Alok Raikwar & Rajesh Burman	Vol. 3, July-September 2022
9.	Van Dhan Vyapaar	सतावर *(Asparagus racemosus)* के औषधीय उपयोगए संग्रहणए प्रसंस्करण तकनीक एवं बाजार व्यवस्था	Dr. S. K. Masih, Alok Raikwar & Rajesh Burman	Vol. 4, October - December 2022

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.	लघुवनोपज संदेश स्मारिका अंतर्राष्ट्रीय वन मेला	Market Information service cell of Minor Forest Produce in Central India established in S.F.R.I.	Dr. S. K. Masih, Alok Raikwar & Rajesh Burman	2022
2.	International conference on "Wildlife conservation: Emerging scenario and way forword"	Mass translocation of captive spotted deer (*Axis axis Erxleben*) through oral sedation method – three case studies	Uday Homkar Ravindra Mani Tripathi and Amitabh Agnihotri	-
3.	'Rehabilitation of degraded forest ecosystems in Madhya Pradesh: Emerging scenario and way forward'	Impact assessment of various treatments in degraded forest of Dindori and East Mandla Forest Divisions	Richa Seth	-
4.		Assessment of impact of degraded forest rehabilitation activities	Dr. Pratiksha Chaturvedi	-
5.	3rd International Weed Conference on Weed Problems and Management challenges : Future prospective held at Anand Agriculture University, Gujarat dated 20-23.12.2022	"Approaches for integrated weed management system"	Archana Sharma	2022
6.	लघु वनोपज संदेश, स्मारिका, अर्न्तराष्ट्रीय हर्बल फेयर, 20–26 दिसम्बर, 2022, भोपाल(म.प्र.)	उन्नत तकनीक से सेमियालाता (*Flemingia semialata*) के पौधे पर कुसमी लाख उत्पादन की प्रकिृया,	बलराम लोधी, भारत आर्मो, राकेश पुर्विया, अनिरुद्ध मजूमदार, अनिरुद्ध सरकार	9/95-104
7.	International Wildlife Conference on "Wildlife Conservation: Emerging Scenario and Way Forward" at Kanha Tiger Reserve, Mandla (M.P.). Book of Abstract.	Status of anthropogenic grasslands at village relocation sites in Satpura Tiger Reserve, Central India.	Anjana Rajput (2023).	-
8.	The 5th Central Indian Landscape Symposium CILS 5	Infrastructure impacts and mitigation strategies to allow for wildlife conservation and connectivity; case study of Ratapani landscape	Dr. Mayank Makrand Verma, Mr. Satyadeep Nag , Dr. Uma Ramakrishnan and Dr. Dharmendra Verma	CILS5 Jugalbandi Feb15-18-2023, Infinity resorts, Kanha Tiger Reserve MP

Publication of technical bulletins / brochures

S. No.	Name of technical bulletins/brochures	Authors	Bulletin/ brochure No.
1.	Van Dhan Vyapar	Dr. S.K. Masih	Vol. 22(1)
2.	Van Dhan Vyapar	Dr. S.K. Masih	Vol. 22(2)
3.	Van Dhan Vyapar	Dr. S.K. Masih	Vol. 22(3)
4.	Van Dhan Vyapar	Dr. S.K. Masih	Vol. 22(4)
5.	International Wildlife Conference " Wildlife Conservation: Emerging Scenario and Way forward"		6

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 2022-23

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)	-	45,000,000	45,000,000	**77,944,012**
Deposit Works (Sponsored projects)	67,479,897	47,340,620	114,820,517	**42,029,959**
Total Rs.	**67,479,897**	**92,340,620**	**159,820,517**	**119,973,971**

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 2022-23 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 (1.4.22 to 31.3.23) Rs.
On-Going Projects						
1	मध्यप्रदेश में महुआ फूल एंव अचार गुठली के उत्पादन एवं संग्रहण मात्रा का आंकलनं! **AF/P/E/18-19/22**	APCCF R&E Lokvaniki M.P Bhopal	605,325	1,241,000	1,846,325	777,202
2	पश्चिमी मध्य प्रदेश के मालवा का पठार कृषि जलवायु प्रक्षेत्र (क्षेत्रीय वन वृत्त उज्जैन) के अंतर्गत कृषक समृद्धि योजना द्वारा कृषि वानिकी के तहत निजि भूमि के रोपण एवं वर्तमान कृषि वानिकी मॉडल का अध्ययन। **AF/P/E/18-19/17**	APCCF R&E Lokvaniki M.P Bhopal	763,759	-	763,759	163,826
3	मध्यप्रदेश के विभिन्न कृषि–जलवायु क्षेत्रों में कृषि–वानिकी मॉडल की सफलता एवं असफलता के कारकों की पहचान। **New Project**	APCCF R&E Lokvaniki M.P Bhopal	-	500,000	500,000	-
4	Genetic diversity assessment using molecular markers for elite indentification of existing candidate plus trees of Teak (*Tectona grandis*) Madhya pradesh. **GEN/P/E/21-22/11**	APCCF R&E Lokvaniki M.P Bhopal	-	2,760,000	2,760,000	-

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 (1.4.22 to 31.3.23) Rs.
5	Germplasm evaluation and standardization of propagation technology for production of quality planting stock of medicinally important tree species viz.*Anogeissus latifolia & Commiphora wightii* **SD/P/E/19-20/04**	APCCF R&E Lokvaniki M.P Bhopal	1,773,107	500,000	2,273,107	910,598
6	अनुसंधान एवं विस्तार रोपणियों का श्रेणीकरण, मान्यता एवं लघु शोध कार्यो की अद्यतन स्थिति का आंकलन। **SD/P/E/19-20/09**	APCCF R&E Lokvaniki M.P Bhopal	335,616	100,000	435,616	102,118
7	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	1,774,938		1,774,938	877,211
8	Multilocational cum provenance trials of important forestry and bamboo speies in different forest divisions of Madhya Pradesh. **FD/BT/P/E/22-23/07**	APCCF R&E Lokvaniki M.P Bhopal	-	600,000	600,000	8,012
9	International Conference" Wildlife conservation: Emerging scenario and way forword" **WD/AED/P/E/22-23/08**	APCCF R&E Lokvaniki M.P Bhopal	-	15,398,191	15,398,191	10,266
10	Establishment of "Regional - Cum- Facililtation Center (RCFC) for Central Region at SFRI. **BD/P/E/17-18/11** Duration 1 YEAR Extended from Apr.2021 to Mar-2022	(National Medicinal Plants Board) New Delhi	8,007,947	8,321,034	16,328,981	9,731,608
11	Network project on conservation of Lac insect genetic resource has tentatvely been shoduled on **SEM/P/E/14-15-05**	IINRG Ranchi (ICAR)	1,043	835,000	836,043	611,336
12	Maintenance of monitoring and evaluation facilities and data base of predators prey in Madhya Pradesh" **WL/RA/32**	PCCF, Wildlife, M.P, Bhopal	6,820,664	-	6,820,664	-
13	Study on leopard (*Panthera pardus L*) presence identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of jabalpur and indore city, Madhya Pradesh" **WL/P/E/21-22/01**	PCCF, Wildlife, M.P, Bhopal	742,708	2,583,600	3,326,308	1,516,115
14	AITE: Evalution of wild Animal Populations & Habitat in M.P." **WD/AED/P/E/22-23/02**	PCCF, Wildlife, M.P, Bhopal	-	2,135,000	2,135,000	701,180
15	MII: Data Scratiny and submission." **WD/AED/P/E/22-23/03**	PCCF, Wildlife, M.P, Bhopal	-	1,615,000	1,615,000	167,048

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 (1.4.22 to 31.3.23) Rs.
16	Impact Assessment of proposed Sheopur kalan & **b**adoda towns as group water supply scheme-Parbati river sub-project under MPUSIP on Aquatic fauna, river hydrology & ecology and its mitigation **WL/P/E/21-22/05**	MP Urban Service Improvement, Bhopal	4,714,014	-	4,714,014	1,840,949
17	विभिन्न परियोजनाओं अंतर्गत किये गये वृक्षारोपण का अनुश्रवण एवं मूल्यांकन। **M&E/P/E/22-23/01**	PCCF (Development) M.P. Bhopal	-	-	-	1,687,953
18	Establishment of demonstration plot of *Bambusa tulda* at SFRI, Jabalpur **GEN/P/E/20-21/05**	Director, M.P. State Bamboo Mission Bhopal	503,300	-	503,300	384,715
19	Environmental Impack Assessment on Flora, Fauna & Socio Economic Status of Local communities and action to be taken to Mitigate impact of Kopra medium project at Nauradehi Wildlife Sanctuary, Sagar. **ECO/EIA/P/E/21-22/08**	Water Resources Department Govt. of Madhya Pradesh	3,845,264	-	3,845,264	1,278,100
20	Preparation of quality planting material of RET and other important species. **BD/P/I/21-22/07**	State Forest Research Institute Jabalpur (Internal Project)	-	904,000	904,000	194,332
21	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. **WL/WM/P/E/22-23/06**	PCCF (CAMPA) Bhopal	-	5,000,000	5,000,000	3,757
	Total Rs.		**29,887,685**	**42,492,825**	**72,380,510**	**20,966,326**
	Completed Projects					
1	Extension of developed nursery techniques of some important NTFPs and medicinal plant species through Research and Extension centres of Madhya Pradesh**. BD/P/E/18-19/16**	APCCF R&E Lokvaniki M.P Bhopal	166,071	-	166,071	166,071
2	चलित मृदा परीक्षण प्रयोगशाला के माध्यम से म.प्र. के अनुसंधान एवं विस्तार केन्दों में मृदा परीक्षण कर मृदा में उपस्थित पोषक तत्वों की जानकारी प्रदान करना। **SIL/P/E/18-19/18**	APCCF R&E Lokvaniki M.P Bhopal	1,392,450	-	1,392,450	1,392,450
3	Phytosociological study of river bank flora from Amarkantak to Mandla with special reference to impact on water quality in river Narmada. **ECO/P/E/18-19/19**	APCCF R&E Lokvaniki M.P Bhopal	425,969	-	425,969	425,969

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 (1.4.22 to 31.3.23) Rs.
4	Phenological studies and determination of sustainable harvesting limits of some important wild medicinal plants and other NTFPs with active participation of user forest dependent communities in Satna Forest Division of Madhya Pradesh" **ECO/P/E/18-19/23**	APCCF R&E Lokvaniki M.P Bhopal	1,894,927	-	1,894,927	1,894,927
5	Forensic DNA profiling and timber tracing for origin of wood with special reference to *Tectona grandis* (Teak) & *Pterocarpus marsupium* (Bija) **GEN/P/E/17-18/16**	APCCF R&E Lokvaniki M.P Bhopal	-	-	-	-
6	The scheduled tribes and other traditional forest dwellers (Recongition of forest Rights Act), 2006 implementation and its impact in Madhya Pradesh **SEM/P/E/15-16/11**	APCCF R&E Lokvaniki M.P Bhopal	239,653	-	239,653	239,653
7	Climate change and its impact on forest and livelihood of people in Damoh District **SEM/P/E/16-17/07**	APCCF R&E Lokvaniki M.P Bhopal	119,776	-	119,776	119,776
8	Estimation of wood demand and supply in Madhya Pradesh **SEM/P/E/16-17/10**	APCCF R&E Lokvaniki M.P Bhopal	208,695		208,695	208,695
9	Dissemination of knowledge through training programme for sustainable management and quality fruit collection of Chironji to stakeholders. **SD/P/E/19-20/05**	APCCF R&E Lokvaniki M.P Bhopal	1,189,382		1,189,382	1,219,382
10	Training and demonstration programme on establishment and best management of seed production areas, seed technology and nursery management for field foresters.. **SD/P/E/19-20/06**	APCCF R&E Lokvaniki M.P Bhopal	1,367,536	-	1,367,536	1,364,736
11	देवास जिले में लोक वानिकी प्रबंध योजना क्रियान्वन का अनुश्रवण एवं मूल्यांकन''। **AF/P/E/19-20/07**	APCCF R&E Lokvaniki M.P Bhopal	446,579	-	446,579	225,349
12	Identification of potential pockets and selection of candidate plus trees of Achar, Beeja, Tinsa, Haldu, Dhaman and Shisham and standardization of their clonal propagation technique. **GEN/P/E/18-19/24**	APCCF R&E Lokvaniki M.P Bhopal	828,128	-	828,128	733,477
13	रोपणी में रूट ट्रेनर में पौध तैयारी, पौधों में होने वाली बीमारियों का निदान एवं रोपणी प्रबंधन पर प्रशिक्षण एवं प्रदर्शन। **SD/P/E/21-22/03**	APCCF R&E Lokvaniki M.P Bhopal	158,302	-	158,302	-

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 (1.4.22 to 31.3.23) Rs.
14	Sequestered carbon in roadside plantation: an assessment of potential contribution in climate mitigation in Jabalpur Smart City. **SEM/P/E/18-19/06**	Enviromental Planning & Coordination Organisation (EPCO), M.P.	54,716	-	54,716	-
15	Biodversity Assessment of Encroachment removed area of Madan Mahal Hills of Jabalpur and it's surrounding forest area for ecological restoration through plantation and conservation of cleaned area. **BD/P/E/19-20/01**	Nagar Nigam Jabalpur (M.P.) (Smart City)	343,029	-	343,029	620
16	Collection of baseline data and impact of airport activities on proposed Tiger Safari at Dumna Nature Park. **WL/P/E/19-20/03**	Nagar Nigam Jabalpur (M.P.) (Smart City)	111,082	-	111,082	-
17	Monitoring and evaluation of wildlife and their habitats for sustainable management and development in the protected areas/non-protected areas of Madhya Pradesh **WL/P/E/17-18/17**	PCCF, Wildlife, M.P, Bhopal	7,445,681	-	7,445,681	153,023
18	Capacity building of Frontline Forest staff of Madhya Pradesh for 5th cycle of All india Tiger Estimation Programme 2021-2022 **WL/P/E/21-22/02**	PCCF, Wildlife, M.P, Bhopal	4,034,582	-	4,034,582	3,892,931
19	Tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vhindhyan range. **WL/P/E/17-18/09**	PCCF, Wildlife, M.P, Bhopal	247,159		247,159	178,832
20	Monitoring of re- introduced tigers (Panthera tigris) In Nauradehi Wildlife Sanctuary" **WL/P/E/18-19/01**	PCCF, Wildlife, M.P, Bhopal	1,241,535		1,241,535	346,588
21	Population habitat viability Analysis (PHVA) of Hard ground Barashingha (*Cervus duvauceli branderi*) for introduction in Bandhavgarh Tiger Reserve M.P. **WD/AE/P/E/21-22/12**	PCCF, Wildlife, M.P, Bhopal	340,000		340,000	96,189
22	Strengthining of Market Analysis centers for technical support in Marketing of Minor Forest Produce in Madhya Pradesh. **SEM/P/E/20-21/02**	MP MFP Federation, Bhopal	449,371		449,371	340,839
23	Identification of best performing bamboo species for enhancement of income of farmers in Madhya Pradesh **SEM/P/E/20-21/06**	Director, M.P. State Bamboo Mission Bhopal	361,001		361,001	359,647
24	Use of excavated soil for enhancing natural regeneration and plantation activities of Greenko Energy Pvt. Ltd., Rampura forest range, Neemuch district of M.P. **GEN/P/E/21-22/09**	Geenko Energies Private Limited	650,500		650,500	1,055

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 (1.4.22 to 31.3.23) Rs.
25	Assessment of impact of Doubling of Katni-Singrauli Railline Project on flora, fauna and habitats of Sanjay- Dubri Tiger Reserve (M.P.) **ECO/EIA/P/E/21-22/10**	Ircon International Limited (Govt. of India)	2,231,938	1,113,263	3,345,201	1,374,610
26	Logging and Timber Grading Skill Upgradation Training. **EXT/P/E/22-23/04**	PCCF (Production) M.P. Bhopal	-	696,400	696,400	387,989
27	Development of quality planting material of medicinal Plant **BD/P/E/21-22/06**	RCFC Project under Head : Development of QPM	-	304,225	304,225	106,220
28	रूट ट्रैनर पद्धति से पौधों की तैयारी कर रोपण प्रशिक्षण कार्यक्रम। **EXT/P/E/2021-22/13**	Budget Received From Various Divisions for Root Training.	3,479,900	-	3,479,900	220,376
29	Survey, population density and quantitative assessment of medicinal plants of the sustainable development of livelihood generation in Jabalpur Forest Circle M.P. **BD/P/E/17-18/04**	(National Medicinal Plants Board) New Delhi	739,006	-	739,006	752,245
30	म.प्र. वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्ष 2015–16 (द्वितीय मूल्यांकन) एंव 2016–17 (प्रथम मूल्यांकन) के वर्षों ऋतु में हुए वृक्षारोपण कार्यो का अनुश्रवण मूल्योंकन एवं प्रोजेक्ट इम्पेक्ट असिसमेंट किये जाने के संबंध में। **SIL/P/E/20-21/01**	APCCF JFM/FDA M.P. Bhopal	1,520,467	-	1,520,467	65,974
31	To study the impact of proposed Morena water supply sub-project under MPUDP (funded by the World Bank) on the Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial Wildlife Sanctuary, Morena (M.P.) **WL/P/E/18-19/20**	MP Urban Development Company Limited, Bhopal	356,546	1,903,046	2,259,592	483,827
	Total Rs.		**32,043,981**	**4,016,934**	**36,060,915**	**16,751,450**
	Interest from Bank Deposits		495,536	471,330	966,866	549,675
	GST Received Under Project		1,310,887	290,296	1,601,183	-
	Misce.Project - 3987		42,214	48,535	90,749	42,214
	Institutional Charge		3,699,594	20,700	**3,720,294**	3,720,294
	Total Rs.		**5,548,231**	**830,861**	**6,379,092**	**4,312,183**
	Gross Total		**67,479,897**	**47,340,620**	**114,820,517**	**42,029,959**

INCOME (Revolving Funds for the year 2022-2023)		
S.No.	**HEAD**	**Income (In Lakh)**
1	Gate Entry Fee	952,744
2	Guest House Charges	21,734
3	Rest House (Hostel) charges	312,110
4	House Rent & Water Charges	821,120
5	Misc Receipts	359,683

INCOME (Revolving Funds for the year 2022-2023)		
S.No.	**HEAD**	**Income (In Lakh)**
6	Plant Supply	61,031
7	Seed Supply	-
8	Sale of tender Form	27,000
9	Training Fee	509,694
10	RTI charges	-
11	Bank Rent (Indian Bank)	7,000
12	Institutional Charge	1,965,892
13	Completed Project Balance	6,317,382
	Interest Received :-	
14	Interest on FDR	583,454
	Grand Total	**11,938,844**

EXPENDITURE (Revolving Funds) for the year 2022-2023)		
S.No.	**HEAD**	**Expenditure (In lakh)**
1	Daily Wages	759,434
2	Repair & Maintenance	570,503
3	Travelling Expenditure	12,916
4	Bank Charge	628
5	Electricity	157,185
6	Office Expenses	45,958
7	POL Expenses	-
8	Seminar & Meeting Expenses	11,718
9	Stationary Expenses	57,422
10	Workshop Expenses	443,212
	Gross Total	**2,058,976**

Income (Reserve Funds) for the year 2022-23		
	Details	**Income**
1	POL Recovery	12,250
2	Soil Testing charges	81,810
3	RTI Fee	166
4	Misc.	68,536
5	Institutional Charges	1,965,892
6	Book Magzine Sale	-
7	Interest on FDR	358,292
8	Interest on Saving	122,663
	Total Rs.	**2,609,609**

Expenditure (Reserve Fund) for the year 2022-23		
1	Repair & Maintenanc	-
2	Bank Charges	207.00
	Total Rs.	**207.00**

Details of Accounts Financial Status as on 31st March, 2023				
S.No.	**Details**	**Cash in Bank**	**F.D.R.**	**Total**
1	Revolving Fund (Indian Bank)	3,110,174	-	3,110,174
2	Grant-In-aid	5,908,983	-	5,908,983
3	Deposit Work (Project Funds)	7,505,244	43,300,000	50,805,244
	International Wildlife Conference SBI Account	15,387,925		15,387,925
	RCFC Project	6,597,373	-	6,597,373
4	Sanchit Nidhi	840,574	54,499,000	55,339,574
	Total Rs.	**39,350,273**	**97,799,000**	**137,149,273**

5. ESTABLISHMENT

Postings, Transfers, and Retirement (2022-2023)

Postings :

S.No.	Name	Designation	Date of Joining
1.	Shri Ravindra Mani Tripathi	DCF	06.04.2022

Retirement :

S.No.	Name	Designation	Date of Retirement
1.	Shri Vijay Kumar Barman	Asstt. Gr.-2	30.06.2022

Temporary project staff engaged during the year (April 2022 to March 2023)

S. No	Name	Designation	Project under which appointed	Period	
				From	To
1.	R.S. Kori	Regional Director	Regional-Cum-Facilitation Centre (RCFC) Central Region, SFRI, Jabalpur MP.	Aug. 2022	Mar. 2023
2.	Dr. Sushil Kumar Upadhyay	Dy.Director		Mar. 2022	Feb. 2023
3.	Dinesh Kumar Kuldeep	Consultant (TO)		Mar. 2022	Feb. 2023
4.	Ruby Rai Duggal	Consultant (TO)		Mar. 2022	Feb. 2023
5.	Kundan Sharma	Consultant (TO)		Aug. 2022	Mar. 2023
6.	Neelendra Singh Verma	Consultant (TO)		Aug. 2022	Mar. 2023
7.	Pankaj Saini	PA		Apr. 2022	Mar. 2023
8.	Pradeep Kumar Kori	MTS/Attendant		Apr. 2022	Mar. 2023
9.	Saurabh Sharma	DEO		Sep. 2022	Mar. 2023
10.	Amardeep Rajak	Office Asstt.		Nov. 2022	Mar. 2023
11.	Suneel Kumar Payasi	Manager (Marketing)		Jan. 2023	Mar. 2023
12.	Deepali Namdeo	Consultant (Marketing)		Jan. 2023	Mar. 2023
13.	Gunjan Nema	JRF	Dissemination of knowledge through training programme for sustainable management and quality fruit collection of Chironji to stakeholders	Jan.2022	Mar.2022
14.	P.S. Bhandari	Field Astt.	Monitring reintroduced Tigers (*Panthera tigris*) in Nauradehi Wild Life Sanctuary	Aug. 2021	Jul. 2022
15.	Ajay Lavishkar	JRF		Nov. 2021	Jul. 2022
16.	Mohd. Ashad Hussain	Field Astt.	Impact assessment of proposed Sheopur Kalan & Baroda towns a group water supply scheme.	Dec. 2021	Apr. 2023
17.	Pratap Rao Vagh	Computer Operator		Dec. 2021	Apr. 2023
18.	Shailendra Yadav	Research Associate		Nov. 2021	Apr. 2023
19.	Shubhanjan Ghatak	JRF		Jan.2022	Apr. 2023
20.	Deepak Kumar Singh	FA-I		Nov. 2021	Apr. 2023
21.	Priyanka Birha	Comp.Prg./Asstt.		Sep. 2022	Apr. 2023
22.	Shahbaz Ahmed	JRF	AITE 2022 Evaluation of wild	Sep. 2022	Apr. 2023

S. No	Name	Designation	Project under which appointed	Period	
				From	To
	Khan		animals population and habitat in M.P.		
23.	Pavitra Ahlawat	Project Assistant		Sep. 2022	Apr. 2023
24.	Aleem Khan	JRF		Sep. 2022	Apr. 2023
25.	Divya Paliwal	Project Assistant		Oct. 2022	Apr. 2023
26.	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*	Jan. 2022	Aug. 2023
27.	Shailendra Nema	JRF		Jan. 2022	Aug. 2023
28.	Himanshu Kushwaha	Field Asstt.	Selection of species specific root trainer sizes and potting mixes to be adopted by the Forest Department nurseries of M.P. for ten selected tree species.	Sep. 2022	Aug. 2023
29.	Balram Lodhi	SRF	Network Project on conservation of Lac insect genetic resources.	Apr. 2022	Mar. 2023
30.	Bharat Singh Armo	Field Asstt.		Apr. 2022	Mar. 2023
31.	Rajesh Barman	Field Asstt.	Strengthening of market analysis centre for technical support in marketing of Minor Forest Produce in M.P.	Nov.2022	Dec.2022
32.	Bhagwati Prasad Kalar	Field Asstt.	Identification of best performing bamboo species for enhancement of income of farmers in M.P.	Aug.2021	Jul.2022
33.	Arvind Yadav	Comp. Operator		Aug.2021	Jul.2022
34.	Imrat Sen	Field Asstt.		Aug.2021	Jul.2022
35.	Shakti Shukla	Field Asstt.	Study on lepopard (*Panthera oardus L.*) presence, identification of conflict zones and developing suitable mitigation measures on human-leopard interactions in the urban areas of Jabalpur nad Indore, M.P.	Nov. 2021	Oct. 2022
36.	Amit Jaiswal	Field Asstt.		Nov. 2021	Mar. 2023
37.	Tanuj Suryan	JRF		Nov. 2021	Mar. 2023
38.	Syed Tanveer Abbas Rizvi	JRF		Oct. 2021	Mar. 2023
39.	Jashandeep Singh	Field Asstt.		Oct. 2022	Mar. 2023
40.	Ramdeen Bhalavi	SRF	EIA on flora fauna & socio economic status of local communities and action to be taken to mitigation impact of Kopra Medium project at Nauradehi wildlife sanctuary, Sagar district	Feb. 2022	Mar. 2023
41.	Bhupendra Patel	Field Asst.		Feb. 2022	Dec. 2022
42.	Alka Verma	Comp. Operator		Feb. 2022	Dec. 2022
43.	Rakesh Purviya	Field Asstt.		Feb. 2022	Mar. 2023
44.	Janam Jai	JRF		Jan. 2022	Dec. 2022
45.	Siddharth Dixit	JRF		Sep. 2022	Mar. 2023
46.	Satyadeep Nag	JRF	Study on tiger presence and their dispersal movements in Ratapani-Kheoni landscape of Vhindhyan range	Oct. 2019	Jul. 2022
47.			AITE-2022 Evaluation of Wild population and habitat in M.P.	Sep. 2022	Apr. 2023
48.	Suneel Kumar Payasi	JRF	म.प्र. में महुआ फूल एवं आचार गुठली के उत्पादन संग्रहण मात्रा का आंकलन।	Dec. 2021	Nov. 2022
49.	Naresh Singh Marko	Field Asstt.-1		Dec. 2021	Mar. 2022
50.	Sachin Patwa	Comp. Asst. / Prog.		Mar. 2022	Nov. 2022
51.	Ram Mohan	Project Asstt.		Mar. 2022	Apr. 2022

S. No	Name	Designation	Project under which appointed	Period	
				From	To
	Tiwari				
52.	Susheel Sonwanshi	Project Asstt.		Mar. 2022	Mar. 2023
53.	Sachin Sharma	Field Asstt.-1	देवास जिले में लोक वानिकी प्रबंध योजना क्रियान्वयन का अनुश्रवण एवं मूल्यांकन	Mar. 2021	Aug. 2022
54.	Ajay Kumar Shah	JRF	पश्चिमी मध्यप्रदेश के मालवा का पठार कृषि जलवायु प्रक्षेत्र (Agro Climate Zone) के लिए उपयुक्त कृषि वानिकी पद्धतियों (Agro Forestry models) का विकास एवं उनका कृषकों की निजी भूमियों पर प्रदर्शन	Sep. 2022	Aug. 2023
55.	Satyam Saxena	Comp. Operator	वन विभाग द्वारा विभिन्न योजनाओं के अंतर्गत किये गये वृक्षारोपण का अनुश्रवण एवं मूल्यांकन।	Mar. 2022	Jul. 2022
56.	Vikram Singh Dhurve	JRF		Nov. 2022	Mar. 2023
57.	Sonal Chaturvedi	JRF		Nov. 2022	Mar. 2023
58.	Priyanka Verma	JRF		Nov. 2022	Mar. 2023
59.	Anil Kumar Kori	JRF		Nov. 2022	Mar. 2023
60.	Gunjan Nema	JRF		Nov. 2022	Mar. 2023
61.	Imrat Sen	JRF		Nov. 2022	Mar. 2023
62.	Rahul Rathore	JRF	Identification of potential pockets and selection of candidate plus trees of Achar, Beeja, Tinsa, Haldu, Dhaman, Sissum and standardization of their clonal propagation technique.	Jun. 2021	Dec. 2022
63.	Bhavuk Vijay	JRF	Assessment of impact of doubling of Katni-Singrauli railline project on flora, fauna and habitates of Sanjay-Dubri Tiger Researve, M.P.	Feb. 2022	Aug. 2022

Trainee Forest Range officers being briefed about Sal Borer

Trainee Forest Range officers being briefed about Herbarium

Trainee Forest Guards being explained about corridor management

Demonstration of vegetative propagation

Trainees in the Lac Gene Bank

School students in the Museum

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Extension, Training & Consultancy Cell

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