Chapter - 1
THE INSTITUTE

1.1 INTRODUCTION:

The institute came into existence on 27th June, 1963, for the scientific development of forestry sector in the state following the impetus generated by the recommendations of tenth silvicultural conference held at Dehradun in 1961. It was granted autonomy on 29th October, 1994 and was registered on 2nd August, 1995 as a society under M.P. Societies Registration Act 1973. Over the years the institute has developed as an educational, training, research and consultancy organization at the state and national level. The institute is carrying out adaptive and applied research programmes. It is dedicated to research and tropical forestry, environment 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 peoples on matters related to forestry, with particular emphasis on conservation, sustainable utilization and scientific management of natural resources. The institute conducts multidisciplinary research, provides technical advice to practical problems. It also disseminates research findings through training, education, seminars, workshops, public fairs and consultancy services, technical bulletins, series of pamphlets, brochures and two quarterly journals namel 'Vaniki Sandesh' and 'Van-Dhan Vyapar'. '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. Journal of Tropical Forestry is also published from the institute campus by Society for Tropical Forestry Scientists comprising 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 N $23^0$07'.380' latitude and E 079^0 55'.923 longitude 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 creation of this institute here. It houses a rich infrastructure of various research and experimental plots, research nursery, ornamental nursery, clonal nursery, medicinal and aromatic plants nursery, rose garden, seasonal garden, gene-bank, glass-house, mist-chambers, shade-net houses, botanical garden, bambusetum, tissue culture, soil and seed testing laboratories along with administrative block, conference halls, lecture room, museum, herbarium, auditorium, library and documentation centre, guest house, officers' rest house, etc. The institute also has various types of residential accommodation for its employees inside the campus.

1.2 MISSION AND GOALS:

Mission:

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

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

Goals:

On-going research aims at:

1. Conservation of forests and forest resources - soil, water and floral and faunal diversity.
2. Enhancement of productivity of natural forests and plantations.
3. Efficient and sustainable utilization of forest resources and forest products – timber and NTFPs and expansion of tree cover.

4. Sustainable management of forests involving forest -dependent communities and people's participation
5. Mass production of high fruit yielding forest tree species through biotechnological approaches.
6. Preparation of inventory and biodiversity assessment in Madhya Pradesh.

1.3 THRUST AREAS:

1. Collection of quality seeds, its certification and disposal.
2. Production of quality planting material using biotechnological tools.
3. Development of micro and macro-propagation techniques.
4. Vegetational surveys to assess bio-diversity status and to identify rare and threatened species.
5. Germplasm collection, evaluation and conservation.
6. Cultivation, sustainable harvesting, processing, storage, certification and market information service for medicinal plants.
7. Collection of growth data and preparation of volume and yield tables.
8. Ecological studies and environmental impact assessment and preparation of environmental management plans.
9. Strengthening of *ex-situ* gene bank of medicinal and aromatic plants.
10. Development of botanical garden for conservation, of rare, endangered, threatened and endemic plants of MP for mass multiplication.
11. Vegetation and edaphic studies in different preservation plots, established in various forest types of MP.
12. Conservation of rare endangered and threatened (RET) species in natural condition.
13. Training on techniques of protection of sal forests affected by sal borer attack.
14. Protection, maintenance and successional study in terms of growth, biomass and carbon sequestration in preservation plots laid in different forest types of Madhya Pradesh.
15. Modernization and digitalization of existing forest herbarium of State Forest Research Institute, Jabalpur (M.P.).
16. Development, implementation of sustainable harvesting technologies and determination of sustainable harvesting limits of commercially important NTFPs in tribal dominated tropical forests.
17. Preparation of Wildlife Conservation Plan for the area being diverted for construction of power plants and National highways.
18. Establishment of an advanced laboratory for molecular characterization and chemoprofiling.
19. Sustainable harvesting and primary processing of gums and gum oleo resin.
20. Screening and management of diseases of some selected important medicinal & aromatic plants.
21. Training and extension programmes for transfer of research technologies.
22. Forest resources assessment survey in People's Protected Areas (PPAs).
23. Study on soil erosion/soil flow from the over burden areas with the help of GIS.
24. Habitat evaluation for habitat viability for endangerd wildlife species.
25. Preparation of form factor table for important miscellaneous timber species of M.P.
26. Effect of various pretreatment on seed germination of fresh and stored seed of *Tectona grandis* (Teak)

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 research contributions are enumerated below:

1. Developing techniques for afforestation of difficult and hostile mined sites.

2. Provenance trials related to fuel and fodder species and compilation of their growth data.
3. Study to ascertain causes of mortality in teak trees in different regions of M.P.
4. Preparation of volume and yield tables of several species.
5. Revision of form factors of teak and sal in different forest divisions of M.P.
6. Development of new hybrid seeds of teak through controlled pollination and tree improvement programmes for the production of quality seeds and planting material.
7. Establishment of seed production areas and of seedling seed orchards from superior germplasm of various commercially important forestry species.
8. Development of vegetative propagation and tissue culture protocols for mass propagation of important species.
9. Identification and collection of germplasm from plus trees.
10. Inventory of forest flora and plant resources with emphasis on rare and threatened species in various National Parks with special reference to wildlife management.
11. Studies on variation in size, weight, quality and maturity period of Aonla fruits in different agro-climatic zones of M.P.
12. Maintenance and upgradation of gene bank of medicinal plant species.
13. Cryogenic preservation of germplasm of endangered medicinal plant species.
14. Resource assessment in People's Protected Areas (PPAs) in different forest divisions of the state.
15. Preparation of Lok Vaniki Manual.
16. Study of socio-economic aspects of forestry, emphasizing economics of non-timber forest products, medicinal and aromatic plants and studies on dependency of tribals on forests for fuel and fodder.
17. Environmental impact assessment and preparation of environmental management plan of irrigation and power generating projects.
18. Studies on pollination biology, seed setting, fruit setting and germination behavior.
19. Comparative studies on the effect of inorganic and biofertilizers on growth and biomass of seedlings.
20. To study the effect of fruit harvesting time on the seed quality of *Buchanania lanzan* Spreng.
21. Production of vermiculture and vermicompost from various types of organic wastes and extension of its technology to rural population.
22. Standardization of protocols for micro propagation of endangered medicinal plant species of central India and their cryogenic preservation for future multiplication.
23. Development of integrated insect pest and disease control system for major economically important tree species.
24. Lac culture on various host plant species and transfer of adopted technology to rural population for their economic upliftment.
25. Assessment of different treatments on rehabilitation of gregariously flowered bamboo forests in Madhya Pradesh
26. Identification and documentation of plus trees of important tree species and evaluation of existing plus trees of teak in Madhya Pradesh for desired traits.
27. Assessment of sal regeneration in borer affected sal forests of Madhya Pradesh.
28. Impact assessment of reclamation of mined lands of Singrauli on physical and ecological attributes.
29. Assessment of status and role of sacred groves to conserve biodiversity at different levels in Madhya Pradesh - Chhindwara and Hoshangabad districts.
30. Germplasm evaluation of important medicinal plants through chemo-profiling technique.
31. Development of seed technology and nursery techniques for economically important indigenous species.

32. Germplasm evaluation and standardization of packages of propagation of important tree borne oil seeds.
33. To study the effect of various fertilizers and hormones on seed production in seed orchards and seed production areas of teak.
34. Enhancing flowering and fruiting in mahua trees through application of various fertilizers and chemicals.
35. Preparation of wildlife conservation plan for the areas being diverted for developmental projects.
36. Standardization of protocols for clonal multiplication of *Litsea glutinosa.*
37. Protection, maintenance and successional study of growth biomass and carbon sequestration in different forest types of MP.
38. Valuation of forest resources and its accounting a case study of South Balaghat Forest Division.
39. Causes and remedial measures of sal mortality and integrated management of diseases of economically important tree species of M.P.
40. Comprehensive wildlife conservation plan for the area being diverted for construction of naveen ash bund in district Betul, Madhya Pradesh for Satpura Taph Vidyut Grih Sarni in favour of MP Power Generating Company Ltd. Madhya Pradesh
41. Carrying out study/evaluation and submission of impact of Runj project on Wildlife and action to be taken to mitigate these impacts under Runj irrigation medium project district Panna (M.P.)
42. Environmental Impact Assessment on aquatic life/water supply and water quality of downstream due to reduce flow especially in lean period in Sanjay Gandhi Thermal Power Plant.
43. Studies on weight loss in stored lac in relation to storage time.
44. Development of packages of seed techniques for important forest tree species.
45. Development of nursery techniques and models for plantation of rare endangered and threatened (RET) species in natural condition.
46. Survey of existing Barahsingha & Blackbuck habitat evaluation for habitat viability assessment for Kanha Tiger Reserve and Satpura Tiger Reserve.
47. Estimation of carrying capacity of grazing in different forest types and canopy densities in Jabalpur forest division of Madhya Pradesh.
48. Sustainable harvesting and primary processing of gums and gum oleo resin in Madhya Pradesh.
49. *Ex- situ* conservation of medicinally important wild tuberous /rhizomatic plants and studies on their phenology and growth performance.

1.5 ADMINISTRATION:

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

1.	Honorable Minister of Forests, Forest Department, Govt. of M.P.	- Chairman
2.	PCCF, Madhya Pradesh	- Vice Chairman
3.	Addl. Chief Secretary, Dept. of Forests, Govt. of M.P.	- Member
4.	Principal Secretary, Dept. of Finance, Govt. of M.P.	- Member
5.	PCCF (Wild Life) M.P.	- Member
6.	Managing Director, M.P. Forest Development l Corporation	- Member
7.	Managing Director, M.P. Minor Forest Produce (Trade and Development) Federation	- 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	- Member

11. APCCF (R/E & Lok Vaniki) M.P. - Member
12. Director General, MP Council of Science & Technology, Bhopal - Member
13. Prof. S.D. Upadhyay, JNKVV, Jabalpur - Member (Nominated by Govt. of MP)
14. Dr. Jamaluddin (Retd. Sr. Scientist, ICFRE) - Member (Nominated by Govt. of MP)
15. Director, State Forest Research Institute, Jabalpur - Member Secretary & Treasurer

1.6 RESEARCH ADVISORY COMMITTEE:

The Research Advisory Committee of the institute comprising 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, M.P.	Chairman
2.	P.C.C.F. (Wildlife), M.P.	Member
3.	PCCF (Working Plan), M.P.	Member
4.	A.P.C.C.F./CCF (Development), M.P.	Member
5.	A.P.C.C.F./CCF (M.P. Forestry Project), M.P.	Member
6.	A.P.C.C.F./CCF (Production), M.P.	Member
7.	APCCF/C.C.F. (Research and Extension), M.P.	Member
8.	Director General, MPCOST, Bhopal	Member
9.	Managing Director, M.P.R.V.V.N, Bhopal	Member
10.	Managing Director, M.P.M.F.P. Federation, Bhopal	Member
11.	Director, T.F.R.I, Jabalpur	Member
12.	Director, I.I.F.M., Bhopal	Member
13.	Director (Research), JNKVV, Jabalpur	Member
14.	Head, Bioscience Division, R.D.V.V, Jabalpur	Member
15.	CCF (Central Circle), Jabalpur	Member
16.	DFO (Territorial), Jabalpur	Member
17	Director, Horticulture, Govt. of M.P.	Member
18	Dean, Veterinary and Animal Husbandry, JNKVV, Jabalpur	Member
19.	Representative of an NGO	Member
20	CCF/CF, NCL, Singrauli	Member
21.	Representative of traders of forest based products	Member
22.	Representative of forest based industries	Member
23.	Farmers' representative	Member
24.	Director, S.F.R.I., Jabalpur.	Member Secretary

1.7 ORGANIZATION:

S.No	Forestry Professionals	Sanctioned	Working
1	Director (PCCF/APCCF/CCF)	1	1
2	Addl. Director (CCF/CF)	1	1
3	Deputy Director (CF/Dy.CF)	4	2
4	Assistant Director (ACF)	3	3
5	Forest Ranger	1	1
6	Dy. Ranger	1	2
7	Forester	8	8
8	Forest Guard	10	9
	Total	**29**	**27**
	Scientist		
1	Forest Ecology Scientist (Scientist-E)	1	1
2	Forest Genetics Specialist (Scientist-D)	1	1
3	Seed Specialist (Scientist-D)	1	1
4	Tree Improvement Specialist (Scientist-D)	1	0
5	Forest Botanist (Scientist-D)	1	1
6	Biodiversity Scientist	1	0
7	Marketing Specialist (Scientist-D)	1	1
	Total	**7**	**5**
	Technical		
1	Statistical Assistant (Research Officer)	1	1
2	Technical Assistant (Social–economics), (Research Officer)	3	1
	Technical Assistant (Contingency)		2
3	Technical Assistant (Forestry Research), (Research Officer)	9	6
	Technical Assistant		2
4	Technical Assistant (Consultancy/Extension), (Research Officer)	1	1
5	Technical Assistant (Library), (Research Officer)	1	1
6	Technical Assistant (Documention) (Research Officer)	1	1
7	Technical Assistant(Computer) (Research Officer)	1	1
8	Lab. Technician, (Research Officer)	7	1
	Lab. Technician		1

9	Lab Incharge, (Research Officer)	3	1
10	Ledger Assistant (Senior Research Assistant)	3	1
	Ledger Assistant		1
11	Herbarium Assistant (Contingency)	1	1
12	Lab Assistant	3	1
13	Field Assistant	3	3
	Total	**37**	**25**
	Non-Technical		
1	Head Clerk	0	1
2	Assistant grade – II	1	1
3	Assistant grade – III	3	3
4	Driver	5	5
5	Daftari	2	4
6	Peon/Orderlies/ Chowkidar/ Mali/ Dak Runner	2	11
7	Sweeper	1	1
	Total	**14**	**26**

1.8 WORKING BRANCHES OF THE INSTITUTE:

Forestry research in the institute is categorized in 12 broad areas. They are as follows :

1. Biodiversity and Medicinal Plants
2. Forest Botany
3. Forest Ecology and Environment (EIA Cell)
4. Forest Genetics, Plant Propagation and Biotechnology
5. Forest Mensuration and Statistics
6. Silviculture
7. Seed
8. Social Economics and Marketing
9. Tree Improvement
10. Extension, Consultancy and Training
11. Library and Documentation
12. Computers and Information Technology

Chapter – 2
IMPORTANT RESEARCH PROGRAMMES

The mandate of the institute is to provide scientific technical support to the M.P. forest department and various forestry related institutions, as well as other stakeholders and forestry sector as a whole, in the state. In order to achieve this objective, the institute has undertaken various research programmes, monitoring and evaluation and extension activities. The important amongst them can be broadly classified as under:

A. Ecology and Biodiversity Conservation:

1. Studies on weight loss in stored lac in relation to storage time
2. Soil Erosion/Soil flow from the over burden areas with the help of GIS in Khadia project of Northern Coalfield Limited.
3. Comprehensive wildlife conservation plan for the area being diverted for construction of naveen ash bund in district Betul, Madhya Pradesh for Satpura Taph Vidyut Grih Sarni in favour of MP Power Generating Company Ltd. Madhya Pradesh.
4. Development of nursery techniques and models for plantation of rare endangered and threatened (RET) species in natural condition.
5. Assessment of status and role of sacred groves to conserve biodiversity at different levels in Madhya Pradesh.
6. Infrastructure development and enrichment of botanical garden in the institute campus.
7. Impact assessment on wild life habitat and assessment of biological diversity.
8. Enrichment of herbarium and development of electronic data base.
9. Environmental impact assessment of development projects and preparation of environmental management plans.
10. Ecological studies in natural regeneration of sal and grasslands of national parks with special reference to wildlife management.
11. Vegetational and edaphic studies in different forest types by establishing preservation plots.
12. Documentation of biodiversity status in different districts of Madhya Pradesh.
13. Development of natural resource information system for sustainable forest management in tribal belts of Madhya Pradesh.
14. Environmental impact assessment on wildlife habitat of village relocations with special reference to tiger and assessment of biological diversity with reference to rare endangered flora and fauna.
15. Study on status of ground flora diversity under Teak plantations of different ages raised by MPRVVN Ltd.
16. Studies on status survey of bio-health of river Narmada and its tributaries with special reference to Madhya Pradesh region.
17. Impact assessment on flora and fauna in diamond exploration prospecting sites in forest land of Baxwaha Range of Chhatarpur forest division.
18. Impact assessment of relocation and rehabilitation of forest village Sakot of Bori sanctuary MP.
19. EIA and EMP of Omkareshwar multipurpose project, command area development of Right Bank Canal.
20. Science plan for utilization of automatic weather station and agro-meteorological station data in Madhya Pradesh.
21. Protection, maintenance and successional study in terms of growth, biomass and carbon sequestration in preservation plots laid in different forest types of Madhya Pradesh.

B. Silviculture and Forest Management:

1. Assessment of sal regeneration in borer affected sal forests of Madhya Pradesh.

2. Impact assessment of reclamation of mined lands of Singrauli on physical, biological and ecological attributes.
3. Introduction of egg parasitoids *Trichogamma raoi* to protect teak seed orchards from the loss caused by teak leaf defoliator and skeletonizer.
4. Assessment of impact of different treatments on rehabilitation of gregariously flowered bamboo forests in M.P.
5. Study on technical feasibility and financial viability of undertaking plantations of miscellaneous species in M.P.
6. Evaluation of works of forest development authority and infrastructural developmental works in forest villages of Madhya Pradesh Forest Department.
7. Evaluation of teak plantations raised by M.P. Rajya Van Vikas Nigam and standardization of optimum thinning regime.
8. Monitoring & Evaluation (including project Impact assessment) work of Bundelkhand special package in Panna and Tikamgarh districts of M.P.
9. Enhancement of flowering in Mahua using various treatments with hormones and fertilizers.
10. Development of nursery and planting techniques of economically important indigenous species.
11. Development of integrated insect pest and disease control system for major economically important tree species.
12. Resource assessment of NTFPs in People's Protected Areas (PPA's).
13. Development of natural resource information system for sustainable forest management.
14. Integrated development of *Jatropha curcas*.
15. Biological control of teak seed orchards from teak leaf defoliators and skeletonizers.
16. Standardization of agro-cultivation techniques of *Stevia rebaudiana* and large scale production of quality plants.
17. Study on felling cycles of *Dendrocalamus strictus.*
18. Growth studies and determination of thinning regime in pine plantations raised in Madhya Pradesh.
19. Analysis of soil samples.
20. Estimation of carrying capacity of grazing in different forest types and canopy density in M.P.
21. Study on status of ground flora diversity under teak plantations of different ages.
22. Identification and documentation of plus trees of important tree species.
23. Development of nursery technique of Baibidang and Malkangni
24. Studies on weight loss in stored lac in relation to storage time.
25. Development of nursery techniques and models for plantation of rare endangered and threatened (RET) species in natural condition.
26. Standardization of potting mixtures of various soil type for optimum growth of *Tectona grandis* (Teak), *Gmelina arborea* (Khamar) *and Dendrocalamus strictus* (Bamboo) *species.*
27. Evaluation on National Afforestation Programme implemented through Forest Development Agencies (2007-08 & 2008-09).
28. Valuation of forest resources and its accounting: a case study of South Balaghat Forest Division.
29. Digitization of old records of M.P. Forest Department and forestry research.
30. Studies on screening and management of diseases of some selected important medicinal & aromatic plants.
31. Standardization of pruning techniques for optimum production of quality tendu leaves.

32. DNA based monitoring of presence of tiger and their movements in the Kanha Pench corridor of Madhya Pradesh.
33. Survey of existing Barahsingha & Blackbuck habitat evaluation for habitat viability assessment for Kanha Tiger Reserve and Satpura Tiger Reserve.
34. Effect of vermicompost and neem cake on plant growth of some forestry species.
35. Documentation of ethno-botanical information on natural gum and resin yielding plants of Madhya Pradesh.
36. Documentation of traditional knowledge of local tribal and communities of Malwa eco-region of Madhya Pradesh - Neemuch and Ratlam districts.
37. Sustainable livelihood based management plan for Kuno-Palpur wildlife sanctuary of Madhya Pradesh.
38. Ecological Studies on Grasslands of Bandhavgarh Tiger Reserve with special reference to wildlife management.
39. The study on top drying of *Gmelina arborea* and its management
40. Integrated management of diseases of economically important tree species Dhawada, Bija and Achar occurring in forests of M.P.
41. Causes and remedial measures of sal mortality (*Shorea robusta*) in forest areas of M.P.

C. Seed Technology:

1. Studies on quality seed production and germination behaviour of teak seeds in relation to age and size.
2. Effect of different periods of fruit harvesting on the seed quality of Achar.
3. Germplasm evaluation and conservation of *Madhuca latifolia* (Koenig) Mc-Bride-A tree borne oil seed.
4. Development of seed technology and nursery techniques for some economically important indigenous species.
5. Development of seed storage techniques of some important medicinal plants.
6. Germplasm evaluation and standardization of packages of propagation through seeds and vegetative propagation of important tree borne oil seeds.
7. Seed certification.
8. To study the effect of various fertilizers and hormones on seed production in seed orchards and seed production areas of teak.
9. Development of packages of seed techniques for important forest tree species.
10. Documentation and development of packages of seed and nursery techniques for some important indigenous species.
11. Effect of various pretreatment on seed germination of fresh and stored seeds of tectona grandis (Teak)
12. Documentation of developed Seed Technology, Nursery and Planting Techniques of Important Forestry tree Species Particularly of Economic, MFP and Medicinal Value.

D. Forest Mensuration and Biometrics:

1. Maintenance of sample plots, tree increment plots and linear tree increment plots and their periodic growth measurements.
2. Preparation of volume and yield tables.
3. Computation of form factors for timber and fuel wood production.
4. Establishment of new sample plots in coppice crop and plantation areas.
5. Revision of form factors of teak and sal in different regions of Madhya Pradesh.
6. Preparation of growth tables for coppice origin plants of important miscellaneous species in Madhya Pradesh.

E. Genetics, Plant Propagation and Tree Improvement:

1. Production of superior quality plants of different species for distribution to forest department, forest dependent communities and other people of Madhya Pradesh.
2. Mass production of high fruit yielding forest tree species through bio-technological approaches and its distribution in tribal areas.
3. Germplasm evaluation of important medicinal plants through chemo-profiling technique and production of quality planting stock through improved biotechnological tools.
4. Determination of the optimum harvesting time on the basis of alkaloid contents of identified medicinal plants.
5. Plantation technique of Salai (*Boswellia serrata*) through vegetative method (branch cutting) and its comparative growth study with seed origin plants.
6. Establishment of demonstration plots with superior planting stock of bamboo species viz. *Dendrocalmus asper, Bambus tulda* and *B. balcooa*.
7. Identification of high oil yielding trees of *Jatropha curcas* in various regions of the state and their provenance trials and propagation.
8. Production of quality grafted plants of fruit-bearing forest tree species – Mahua, Achar, Aonla, Harra and Bahera with early fruiting property and their distribution in tribal areas.
9. Cryogenic preservation of germplasm of medicinal plants for future breeding purposes.
10. Development of vegetative propagation techniques for Sarpagandha, Guggul, Gudmar and Brahmi.
11. Development of tissue culture protocols for Sarpagandha, Guggul, Gudmar, Teak and Bamboo.
12. Establishment of clonal seed orchards of Teak and Khamer and progeny trials of Teak.
13. Establishment of seedling seed orchard through full-sib new hybrids of teak.
14. Selection of superior (plus) trees and establishment of seedling seed orchards of khair, mahua, achar, bael, kaitha, aonla, harra, bahera, salai, teak and khamer.
15. Study on reproductive biology of teak with special reference to the seed productivity of clonal seed orchards.
16. Development of new recombinants of teak and evaluation of their field performance.
17. Evaluation of field performance of new hybrids of teak.
18. Evaluation of existing plus trees of teak in Madhya Pradesh for the selection of the desired traits.
19. Establishment of an advanced laboratory for molecular characterization and chemoprofiling of *Commiphora wightii* plant.
20. National network on integrated development of *Jatropha curcas.*
21. Preparation of clonal plants of Mahua (*Madhuca latifolia*).
22. Establishment of Bambosetum and Bamboo Interpretation Centre at SFRI Jabalpur.
23. Propagation techniques of economically important endangered and rare species.
24. Effect of Vermicompost and Neem cake on plant growth of some forestry species.
25. Genetic diversity assessment of *Boswellia serrata* and standardization of mirco clonal propagation protocols through biotechnological interventions for the production of elite planting material.
26. Standardization of protocols for clonal multiplication of *Litsea glutinosa* an endangered medicinal plant.
27. Standardization and multiplication of clonal propagation protocol for commercially important forestry species *Anogeissus pendula.*
28. Clonal multiplication of *Dendrocalamus asper* (Thailand bamboo) through miropropagation technique.

F. Non-Wood Forest Products (including medicinal plants):

a) *In-situ* conservation

1. Identification of potential pockets of endangered medicinal plants in Satpura Plateau.

b) *Ex-situ* conservation

1. *Ex- situ* conservation of medicinally important wild tuberous /rhizomatic plants and studies on their phenology and growth performance.
2. Mass multiplication of commercially important medicinal and aromatic plants.
3. Strengthening of *ex-situ* gene bank of medicinal and aromatic plants.
4. *Ex-situ* conservation of important rare and endangered medicinal plant species, through establishment of gene-bank and their mass propagation.
5. Mass multiplication of exotic varieties of ornamental plants.

c) Sustainable harvesting

1. Studies on variation in size, weight, quality and maturity period of Aonla fruits in different agro-climatic zones.
2. Sustainable harvesting practices, propagation, tree improvement, wildlife uses, marketing and consumption status of Non-Timber Forest produce and medicinal plants.
3. Determination of sustainable harvesting limits of commercially important wild medicinal plant species in natural forests with active participation of user forest dependent communities.
4. Standardization of pruning techniques for optimum production of quality tendu leaves.
5. Sustainable harvesting and primary processing of gums and gum oleo resin in Madhya Pradesh.

d) Processing, Storage and Marketing

1. Collection, processing and marketing of Achar.
2. Development of marketing information service of medicinal plants.
3. Standardization of primary processing and drying techniques of NWFPs.
4. Determination of drying percentage in *Boswellia serrata*.
5. Development of seed storage techniques.
6. Strengthening of MIS cell and establishment of five regional market data collection and analysis centers in Madhya Pradesh.

e) Certification

1. Chemoprofiling of *Andrographis paniculata* and *Bacopa monneri Aloe vera, Gymnema sylvestre, Gloriosa superba, Stevia rebaudiana, Enicostema littorale* (Chhota chirayta).

G. Ethno-botanical studies:

1. Documentation of ethno-botanical information on natural gum and resin yielding plants of Madhya Pradesh.
2. Documentation of traditional knowledge of local tribal and communities of Malwa eco-region of Madhya Pradesh - Neemuch and Ratlam districts.
3. Documentation of traditional tribal knowledge on utilization and sustainable management of forest resources in tribal belt of Mandla and Dindori districts.
4. Documentation of traditional knowledge of Baigas, Sahariyas and Bhariyas of M.P.
5. Role of sacred groves in biodiversity conservation.
6. Transcript and document the traditional knowledge of tribals of Bundelkhand eco region of M.P.

H. Socio-economic studies and impact assessment:

1. To study the socio-economic condition, income and employment of farmers engaged in cultivation of medicinal and aromatic plants.

2. Valuation of forest resources and its accounting.
3. Collection of data regading important gums of Madhya Pradesh and its impact on the socio-econimic condition of its collectors.
4. Economic analysis of various forest products found in both private and revenue areas for forest extension in various agroclimatic and soil of Madhya Pradesh

I. Transfer of technology:

1. Training on technical know how of gum tapping from *Butea monosperma* in Umaria and Tikamgarh districts to local people and frontline staff of forest department.
2. National seminar on advancement and recent development in tree seed technology to enhance forest productivity.
3. Workshop on plantation strategy.
4. Training on protection of forest from sal borer in Madhya Pradesh.
5. म.प्र. में साल बोरर से साल वनों की सुरक्षा हेतु प्रशिक्षण कार्यक्रम।
6. Extension of "Results of various research projects conducted at SFRI", through workshops to the field staff and beneficiaries, in 11 Research/Extension & LokVaniki Circles of MP Forest Department.
7. Training on soil water conservation technique and management for the field staff and beneficiaries under the Bundelkhand Special Package.
8. Exposure trips to the JFMCs and EDC members of UP Forest Department.
9. Demonstration and extension of processing, standardization and drying techniques of medicinal plants and their storage at rural level.
10. Training on biotechnology, plant propagation and tissue culture.
11. Training-cum-demonstration program in cultivation, processing and marketing of medicinal and aromatic plants.
12. Training and extension for the cultivation of medicinal and aromatic plants in PPA areas.
13. Training and demonstration programme for transfer of technology for enhancing flowering and fruiting in Mahua trees through application of various fertilizers and chemicals.
14. Trainings for the staff of forest department in the maintenance of seed orchards and seed production areas.
15. Training on sustainable harvesting, processing, grading and storage of Salai gum Oleo resin and Dhaora gum in Sheopur district.
16. Lac culture on various host plant species and transfer of adopted technology to rural population.
17. Production of vermiculture and vermicompost from organic wastes and its extension to the rural population.
18. Training programme on Global Positioning System (GPS).
19. Participation in exhibitions and fairs.
20. Digitization of old records of MP Forest Department and forestry research.

Chapter – 3
RESEARCH ACTIVITIES
Abstract of Research Activities

2013-2014

S. N.	Name of the Research Branch	No. of completed projects (2013-14)		No. of on-going projects		No. of newly initiated projects (2013-14)		No. of regular activities
		External Projects	Internal Projects	External Projects	Internal Projects	External Projects	Internal Projects	
1	Biodiversity and Medicinal Plants	01	-	04	-	04	-	02
2	Forest Botany	-	-	03	-	02	-	01
3	Forest Ecology and Environment	04	-	05	-	02	-	-
4	Forest Genetics, Plant Propagation and Biotechnology	-	-	04	-	-	-	01
5	Forest Mensuration & Statistics	01	-	01	-	-	-	01
6	Seed Technology	03	-	05	01	-	-	02
7	Silviculture	03	01	03	01	-	-	01
8	Social Economics and Marketing	02	-	07	-	02	-	-
9	Tree Improvement	-	-	05	-	03	-	09
	TOTAL	**14**	**01**	**37**	**02**	**13**	**0**	**17**

3.1 BIO-DIVERSITY BRANCH

Mandate

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

Staff

Dr. R.K. Pandey	:	Scientist and Head
Dr. Uday Homkar	:	Research Officer
Dr. S. K. Masih	:	Research Officer
Mr. Arvind Haldkar	:	Forester

Project Staff

Mr. Kundan Sharma	:	Research Fellow
Mr. Imrat Sen	:	Research Fellow

Completed projects

Internally funded: Nil

Externally funded: One

1. Studies on weight loss in stored lac in relation to storage time.

Ongoing Projects

Internally funded: Nil

Externally funded: Four

1. Development of nursery techniques and models for plantation of rare, endangered and threatened (RET) species in natural conditions.
2. म.प्र. में साल बोरर से साल वनों की सुरक्षा हेतु प्रशिक्षण कार्यक्रम।
3. Mass multiplication of medicinal and aromatic plants.
4. Up-gradation and Renovation of SFRI's Museum Jabalpur.

Newly initiated projects during the year

Internally funded: Nil

Externally funded: four

1. *Ex-situ* conservation of medicinally important wild tuberous/rhizomatic plants and studies on their phenology and growth performance.
2. Development of cultivation techniques of Van jeera (*Centrantherum anthelminiticum* (L) Kantze).
3. Documentation of traditional knowledge of local tribal and communities of Malwa eco region of Madhya Pradesh - Neemach and Ratlam districts
4. Documentation of ethno-botanical information on natural Gum and resin yielding plants of Madhya Pradesh.

Regular Activities:

Newly initiated activities during the year: Nil

Ongoing: Two

1. औषधीय पौधों के जींन बैंक एवं रोपणी का प्रबंधन एवं विकास।
2. Renovation and maintenance of SFRI's Museum Jabalpur.

Projects completed during the year

Internally funded: Nil

Externally funded: One

1. Title - Studies on weight loss in stored lac in relation to storage time.

I.D. No.	:	BD/P/E/10-11/03
Period	:	2 Years (November, 2010 – October, 2012)
Sponsoring agency	:	MPMFP, Federation, Bhopal
P.I.	:	Dr. Uday Homkar

Objectives:

- To study the weight loss in stored lac in relation to storage time.
- To study the impact of impurities on weight loss in stored lac.

Methodology:

Lac samples were collected from Balaghat and Annuppur district. Storage was done on concrete floor of room at normal temperature and studies on weight loss in relation to time and impurities were carried out. Impurities present in these lac samples were also observed.

Important findings: Weight loss percentage in stored lac in collection centre and fresh lac collected from farmers field is given in the following tables.

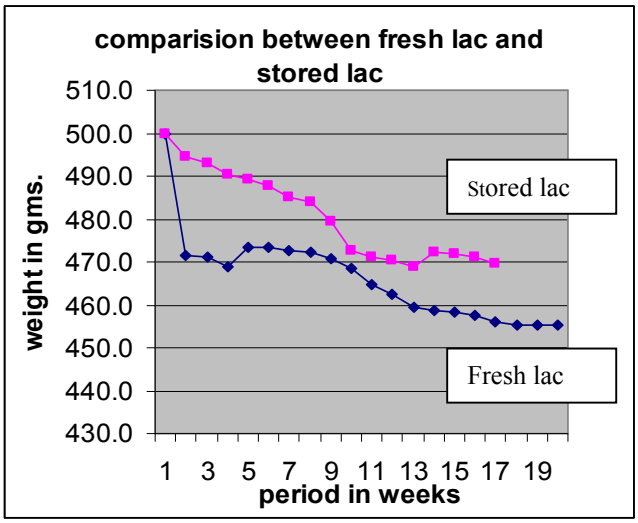
Table 1: Weight loss in stored lac collected from the collection centers.

Sites	Lac type	Fresh weight in Gms	Dry weight in Gms	Total weight loss in Gms	Duration in weeks
Anooppur	Rangeeni	500	405.33	94.65 18.87%)	9
	Kusumi	500	441.6	58.4 (11.6%)	8
Balaghat	Rangeeni	500	435.15	64.85 12.97%)	12
	Kusumi	500	481.6	18.4 (3.68%)	12

Table 2 : Weight loss in fresh lac collected from the farmer's field.

Sites	Lac type	Fresh weight in Gms	Dry weight in Gms	Total weight loss in Gms	Duration in weeks
Anooppur	Rangeeni	250	170.4	79.6 (31.84%)	13-07-12 to 27-10-12
	Kusumi	250	200.5	59.4 (19.8%)	13-07-12 to 27-10-12
Balaghat	Rangeeni	250	162.2	87.8 (35.12%)	13-07-12 to 27-10-12
	Kusumi	250	187.4	62.6 (25.4%)	13-07-12 to 27-10-12
Ari lac (Rangeeni)		250	214.9	35.1 (14.04%)	10-06-12 to 27-10-12

In fresh lac, during first two weeks rapid weight loss was observed while in stored lac draige process was comparatively slow. Weight loss pattern of stored and fresh lac in relation to time is shown in the following chart.



Impurities present in lac: Lac samples were washed and recovered each part from lac was winnowed manually, dried and weighted separately. The impurities observed in lac samples are shown in the following table.

Table 3 : Impurities present in the lac

Samples of A* and B* consists 95 to 80% lac.

Current status of the project: completed

Ongoing projects
Internally funded: Nil
Externally funded: Four

Type of lac	Pure Lac				Impurities			
	Pure Lac (A) *	Lac+dust (B)*	Dust (C)*	Total Lac	Wooden part	Other impurities	Weight loss due to washing	Total impurities
Balaghat Rangeeni	50.5%	16.43%	16.8%	83.73%	3.5%	5.36%	7.41%	11.23%
Anooppur Rangini	62.96%	11.36%	2.4%	76.72%	6.5%	5.36%	11.42 %	23.28%
Balghat Kusumi	61.7%	3.4%	5.5%	70.6%	21.6%	0.9%	6.9%	29.4%
Anooppur Kusumi	54.04%	6.2%	3.03%	63.27%	27.6%	0.86%	8.27%	36.73%

1. Title - Development of nursery techniques and models for plantation of rare, endangered and threatened (RET) species in natural conditions.

I.D. No. : BD/P/E/10-11/08
Period : 5 Years (November, 2010 – October, 2015)
Sponsoring agency : MPMFD, (Research/Extension & Lok Vaniki) Bhopal., (M.P.)
P.I. : Dr. R.K. Pandey

Objectives:

- To develop nursery techniques for important RET species namely *Bauhini vahlii* (Mahul), *Barbaris aristata* (Daru Haldi), *Oroxulum indicum* (Sheonak), *Dillania pentagyna* (Kalla), *Semecarpus anacardium* (Bhilwa), *Randia dumentorum* (Menhar), *Radermachera xylocarpa*

(Garudphal), *Dioscoria daemona* (Baichandi), *Gloriosa superba* (Kalihari), *Leea macrophylla* (Hathpan).

- To find out suitable time and method of collection of seed/planting material for preparation of plants of R.E.T. species.
- To develop models for plantation of R.E.T. species in natural condition.
- To create awareness among the field staff by disseminating the developed technology regarding these selected species.

Activities carried out during the year:

- *Barbaris aristata* (Daru Haldi) was tried to multiply by seed.
- Mass multiplication of *Randia dumentorum* (Menhar), *Leea macrophylla* (Hathpan), *Dillania pentagyna* (Kalla), *Semecarpus anacardium* (Bhilwa) and *Radermachera xylocarpa* (Garudphal) was tried with stem cuttings.
- Plantation of *Oroxulum indicum* (Sheonak), *Dillania pentagyna* (Kalla), *Semecarpus anacardium* (Bhilwa) and *Radermachera xylocarpa* (Garudphal) was done at Katara.

Following experiments were laid.

A. Experiment 1: To find out suitable media for seed germination

Methodology:

- Healthy seeds were collected from the field.
- Experiments were laid in seed germination tray, inside the green net house.
- Kapu soil (River bank soil) was used.
- 3 replicates were taken.

Interim Finding:

Media	Composition	Avg. seed germination %
Soil	1	36
Sand	**1**	**64**
FYM	1	20
Soil: Sand: FYM	1:1:1	28

Treatment of sand was found the best among all treatments.

B. Experiment 2: Find out proper month for seed germination.

Methodology:

- Healthy seeds were collected from the field.
- Experiments were laid in seed germination tray, inside the green net house.

Date of Sowing	Daru Haldi *Barberis aristrata*	
	First germination was observed on	Germination %
18-05-13	16 days	76
16-06-13	12 days	57
16-07-13	7 days	89
16-08-13	69 days	8
16-09-13	-	Nil
16-10-13	-	Nil

Interim Findings: Seed sowing in July month gives best result

C. Experiment 3: Standardization of mass multiplication technique through seeds.

Methodology:

- Healthy seeds were collected from the field.
- Experiments were laid in seed germination tray, inside the green net house.
- Seeds were treated with different agents like cold water, hot water, acid etc. as shown in following table.

Layout of experiment

100 seeds in each replicates	
Treatments	**Replicates**
H_2SO_4 10%	3
H_2SO_4 20%	3
H_2SO_4 30%	3
H_2SO_4 40%	3
GA3 200ppm	3
GA3 500ppm	3
GA3 100ppm	3
Cold water 12hrs.	3
Cold water 24hrs	3
Hot water 12hrs	3
Hot water 24hrs	3
Control	3

Interim Findings

- ***Barbaris aristata* (Daru Haldi):** Seed germination was not observed in any treatment. This experiment will be repeated during June-July-2014.

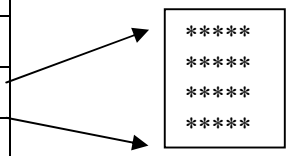
C. Experiment 3: Standardization of mass multiplication technique of selected RET species through stem cuttings.

Interim Findings:

In case of *Randia dumentorum* (Menhar), *Semecarpus anacardium* (Bhilwa) and *Radermachera xylocarpa* (Garudphal)) no rooting was observed in any treatment while in case of *Leea macrophylla* (Hathpan)) IBA 500ppm, NAA 250ppm and *Dillania pentagyna* (Kalla) IBA 500ppm was found the best treatment for rooting of stem cuttings.

Development of plantation model: for development of plantation model of selected species plantation design have been prepared. Site selected and prepared for plantation. Plantation of these 4 species was done in Environmental park of West Mandla Forest Division (T) during June- July 2014. Spacing was 2mX2m 3m x 3m & 4mx4m.

R1	R2	R3	R4
1	4	2	3
2	3	1	4
3	2	4	1
4	1	3	2



Sp. Code	Species taken for plantation	Local Name
1	*Oroxylum indicum*	Sheonak
2	*Dillania pentagyna*	Kalla
3	*Semecarpus anacardium*	Bhilawa
4	*Radermachera xylocarpa*	Garudphal

RET plants available:

S.No.	Local name	Plant species	Plants available
1	Kalla	*Dillania indica*	446
2	Menhar	*Randia dumentorum*	775
3	Sheonak	*Oroxylum indicum*	39*
4	Garudphal	*Radermachera xylocarpa*	644
5	Bhilawa	*Semecarpus anacardium*	118
6	Hathpan	*Leea macrophylla*	156
7	Daruhaldi	*Barberis aristata*	43

* - 10,000 plants will be prepared for Dabur company

Current status of the project: Ongoing

2. Title: म.प्र. में साल बोरर से साल वनों की सुरक्षा हेतु प्रशिक्षण कार्यक्रम।

I.D. No. : BD/P/E/11-12/22

Period : 1 वर्ष (जनवरी 2012 से दिसंबर 2012)

Sponsoring Agency : अपर प्रधान मुख्य वन संरक्षक, (अनुसंधान, विस्तार एवं लोकवानिकी) म.प्र. शासन वन विभाग, भोपाल

PI : डॉ. उदय होमकर

उद्देश्य:

चयनित क्षेत्रों में साल बोरर से साल वनों की सुरक्षा हेतु प्रशिक्षण एवं जागरूकता कार्यक्रम आयोजित करना।

प्रशिक्षण सामग्री :

साल बोरर से संबंधित उपलब्ध जानकारी का संकलन कर सरल भाषा में पाठ्य सामग्री तैयार की गयी जो की विभागीय अमले एवं वन सुरक्षा समिति के पदाधिकारियों को आसानी से समझ आ सके।

साल बोरर से होने वाले नुकसान का आंकलन एवं साल बोरर से प्रभावित वृक्षों का श्रेणीकरण करने तथा साल बोरर कीट का इतिहास, बोरर कीट का परिचय, बोरर कीट द्वारा साल वृक्षों को नुकसान पहुचानें की विधी एवं उनका नियंत्रण से संबंधित जानकारी को पोस्टर के रुप में भी तैयार किया गया।

प्रशिक्षण कार्यविधि :

साल वन क्षेत्रों सें चयनित 10 सामान्य वन मण्डलों में एक दिवसीय प्रशिक्षण–सह–जागरुकता कार्यक्रम आयोजित कर प्रशिक्षणार्थीयों को साल बोरर एवं उससे बचाव के उपायों पर प्रशिक्षण देकर संबधित साहित्य भी उपलब्ध करवाया गया।

मौखिक प्रशिक्षणः प्रशिक्षणार्थियों को साल बोरर संबंधित जानकारी जैसेः साल बोरर कीट का इतिहास, बोरर कीट का परिचय, बोरर कीट द्वारा साल वृक्षों को नुकसान पहुचानें की विधी एवं उनका नियंत्रण तथा साल बोरर से होने वाले नुकसान का आंकलन एवं साल बोरर से प्रभावित वृक्षों का श्रेणीकरण आदि पावरपाईंट के माध्यम से प्रदाय की गयी।

व्यवहारिक प्रशिक्षणः साल बोरर से प्रभावित साल वन क्षेत्रों में प्रशिक्षणार्थियों को ले जा कर व्यवहारिक प्रशिक्षण रुप मे जानकारी भी दी गयी तथा उनके द्वारा किये गये सवालों का जवाब दिया गया।

मण्डला, डिण्डोरी, सीधी, सिंगरौली, शहडोल, अनूपपुर, उमरिया, कटनी, बालाघाट एवं छिंदवाड़ा के साल वन क्षेत्रों के विभागीय अमले एवं वन सुरक्षा समिति के पदाधिकारियों को निम्नानुसार प्रशिक्षण दिया गया।

क्र.	वनमण्डल	दिनांक	प्रशिक्षणार्थीयों की संख्या
1	पूर्व मण्डला	26-2--12	68
2	डिण्डोरी	9-10-12	88
3	शहडोल	10-10-12	98
4	अनूपपुर	11-10-12	75
5	उमरिया	13-10-12	207
6	सिंगरौली	16-10-12	110
7	सीधी	18-10-12	94
8	उत्तर बालाघाट	4-02-14	148
9	प. छिन्दवाडा	7-02-14	69
10	कटनी	14-3-14	113
कुल			**1073**

Current status of the project: Trainings completed report under preparation.

3. Title : Mass multiplication of medicinal and aromatic plant.

I.D. No.	:	BD/P/E/11-12/24
Period	:	Dec. 2011 to Nov. 2013
Sponsoring Agency	:	Director, Horticulture and Medicinal Plant Mission, Bhopal (Madhya Pradesh)
PI	:	Dr. Uday Homkar

Activities carried out during the year:

- Site selected and area fenced.
- Site clearance completed.
- Construction of aphid proof net house and naturally ventilated poly house is in progress.

Progress: Plants prepared under the project are given in the following table.

S.No.	Plant species	Plants prepared
1	Bel	50,000
2	Aonla Local	1,26,000
3	Satawar	40,000
4	Coleus cuttings	20,000
5	Other plants	21,000
Total		**2,57,000**

- On demand we can prepared 1,00,000 rooted cuttings of Coleus.
- Amount of Rs. 1,57,000/- has been received by selling of plants.
- Dabur company is buying all Bel plants in coming months.

Current status of the project: On going

4. Title: Up-gradation and renovation of forestry museum at SFRI, Jabalpur.

I.D. No.	:	BD/P/E/11-12/18
Sponsoring Agency	:	13th finance commission (M.P.F.D.-Development Wing)
PI	:	Dr . R. K. Pandey

Objectives:

- To up-grade and renovate the existing museum of SFRI.

Expected Outcome:

All exhibits will be rearranged with information. Research activities of SFRI will be exhibited with educational material in both print and electronic media

Progress:

- As per direction of BOG, work is retendered.
- Post tender activities are in progress.

Present Status: On going

Newly initiated projects during the year

Internally funded: Nil

Externally funded: Four

1. Title: *Ex- situ* conservation of medicinally important wild tuberous / rhizomatic plants and studies on their phenology and growth performance.

I.D. No.	:	BD/P/E/13-14/05
Period	:	April 2013 – March. 2016.
Sponsoring agency	:	MPFD (R&E and Lok Vaniki), Bhopal
P.I.	:	Dr. Uday Homkar

Objectives:

- To identify the medicinally important wild tuberous/rhizomatic plants of Madhya Pradesh.
- Collection and *Ex-situ* conservation of these tuberous/rhizomatic plants in gene bank medicinal of SFRI.
- To study the phenology and growth performance of these plants.
- To study the harvesting technique as well as maturity period of harvesting.
- To develop a demo-herbal garden of these tuberous plants and for ex-situ propagation.

Progress: 40 tuberous/rhizomatic plants have already been collected and planted in demonstration plants.

Current status of the project: Newly initiated

2. Title: Development of cultivation techniques of Van jeera (*Centrantherum anthelminiticum* (L) Kantze).

ID. No.	:	BD/P/E/13-14/16
Period	:	April 2013 – March. 2016
Sponsoring agency	:	MPFD (R&E and Lok Vaniki), Bhopal
P.I.	:	Dr. Uday Homkar

Objective:

- Development of cultivation techniques of Van jeera (*Centrantherum anthelminiticum* (L) Kantze)

Progress:

- Land preparation for experiments is in progress.
- Experiments designs prepared.

Current status of the project: Newly initiated

3 Title: Documentation of ethno-botanical information on natural gum and resin yielding plants of Madhya Pradesh.

ID. No.	:	BD/P/E/13-14/17
Period	:	Two years (April, 2014 – March, 2016
Sponsoring agency	:	MPFD (R&E and Lok Vaniki), Bhopal
P.I.	:	Dr. S. K. Masih,

Objectives:

- Collection of secondary information from various information centers.
- To make an inventory of gums and resins yielding plants of Madhya Pradesh.
- To prepare a data base of ethno-botanical information of gums and resins yielding plants of Madhya Pradesh.

Progress:

- Collection of secondary information from various information centers is under progress

Current status of the project: Newly initiated

4. Title: Documentation of traditional knowledge of local tribal and communities of Malwa eco region of Madhya Pradesh - Neemach and Ratlam districts.

ID. No.	:	BD/P/E/13-14/19
Period	:	Two years (April, 2014 – March, 2016
Sponsoring agency	:	MPFD (R&E and Lok Vaniki), Bhopal
P.I.	:	Dr. S. K. Masih

Objectives:

- To carryout ethno-botanical survey of local tribe, villagers, communities in Neemach and Ratlam districts of Malwa eco-region.
- To enlist and identify plants species of different habitats, families, groups having traditional knowledge with reference to medicine, food and multipurpose plant categories.
- Survey of existing local primary weekly markets to catalogue plants, plants parts and their products available during different season.

Progress: Review of secondary information and review of literature work is under progress

Current status of the project: Newly initiated

Regular Activities

Ongoing: Two

1. Title: - औषधीय पौधों के जींन बैंक एवं रोपणी का प्रबंधन एवं विकास

ID. No.	:	BD/RA/I/01
Period	:	One year
Sponsoring agency	:	SFRI
P.I.	:	Dr. R. K. Pandey

उद्देश्यः

- जींन बैंक एवं औषधीय पौध रोपणी/उत्पादन क्षेत्र का प्रबंधन एवं विकास।
- औषधीय प्रजातियों की मातृ पौध तैयार करना।
- औषधीय प्रजातियों का संरक्षण एवं जींन बैंक का सुदृढ़ीकरण एवं विस्तार।
- सर्पगंधा, कालमेघ, काली हल्दी, तीखुर एवं केवकंद का मातृ पौध क्षेत्र तैयार करना।
- आर.ई.टी. (R.E.T) प्रजातियों का संरक्षण एवं विस्तार।

प्रगतिः

- जींन बैंक में संरक्षित औषधीय पौधों की प्रजातियॉ : 410
- औषधीय प्रजातियों का संरक्षण एवं जींन बैंक क्षेत्र का सुदृढ़ीकरण एवं विस्तार किया गया।
- मसाला वाटिका, नक्षत्र वाटिका, नवग्रह वाटिका, सर्पगंधा, काली हल्दी, तीखुर एवं केवकंद का मातृ पौध क्षेत्र तैयार किये गये।
- पौध विक्रय से 1,34,545 रु. प्राप्त हुए।

2. Title : Renovation and maintenance of SFRI's Museum Jabalpur.

I.D.	:	BD/RA/I/22
P.I.	:	Dr.Uday Homkar
Sponsoring agency	:	SFRI

Objectives:

- Renovation of old display boards.

- Maintenance of Museum.

Activities carried out during the year:

- Maintenance of museum was done.
- More than 500 visitors visited in the museum.
- Information regarding lac cultivation, medicinal plant cultivation was provided to the visitors who visited the museum.

3.2 FOREST BOTANY BRANCH

Mandate :

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

Staff:

Dr. O.P. Chaubey	:	Scientist and Branch Head
Dr. Awadhesh Sharma	:	Research Officer

.

Project Staff:

Mohd Asif Mansoori	:	Computer Operator
Ravindra Gupta	:	Project Assistant
Poonam Mishra	:	Junior Research Fellow

Completed project

Internal : Nil

Externally funded : Nil

Ongoing projects continued during the year:

Internal Funded : Nil

Externally Funded : Three

1. Modernization and digitalization of existing forest herbarium of State Forest Research Institute, Jabalpur (M.P.).
2. Protection, maintenance and successional study in terms of growth, biomass and carbon sequestration in preservation plots laid in different forest types of Madhya Pradesh.
3. Development and enrichment of existing botanic garden of S.F.R.I., Jabalpur with rare and endemic angiosperm and pteridophytes.

Newly initiated project during the year

Internally funded : Nil

External funded : Two

1. Inventorization and publication of illustrated flora of Achanakmar-Amarkantak biosphere reserve (AABR).
2. Sustainable livelihood based management plan for Kuno-Palpur wildlife sanctuary of Madhya Pradesh.

Regular Activities

Internally funded : One

1. Development and maintenance of botanic garden of SFRI.

Externally funded : Nil

Completed project : Nil

Ongoing external projects : Three

1. Title : Modernization and digitalization of existing forest herbarium of State Forest Research Institute, Jabalpur (M.P.)

Project ID	:	BOT/P/I/11-12/03
Project period	:	3 years (May 2011 – April 2014) - Extended for August 2014
Sponsoring Agency	:	M.P. Forest department (Land Management)
Principal investigator	:	Dr. O.P. Chaubey
Project Associates	:	Mohd Asif Mansoori
	:	Ravindra Gupta

Objectives:

- Modernization of existing forest herbarium by extending temperature and humidity controller, computer facilities/lighting/power points/ fittings and fixtures for e-herbarium.
- Preparation of electronic herbarium database.

Activities carried out during this year:

- Procurement of one computer and one scanner EPSON GT 20000.
- Renovation of main storage unit completed through PWD.
- Scanning of 100% herbarium sheets completed.
- Data entry/ artificial key for Identification software completed.
- Images of live specimens (100%) completed.
- Data entry of herbarium sheets (30%) completed.
- Software developed by tender agency under progress.
- Visited National herbarium of CSIR-NBRI, Lucknow.

Important findings / interim findings, if any

Renovation of main storage unit completed. The modern database with digital images and accompanying information pertaining to collection number, habit, habitat, local name, botanical name, distribution, taxonomical features, flowering and fruiting period, uses is under completion. Artificial key prepared. Images of live specimens and herbarium specimens completed. Data entry in software is under progress.

Current status of the project: On going

2. Title: Protection, maintenance and successional study in terms of growth, biomass and carbon sequestration in preservation plots laid in different forest types of Madhya Pradesh.

Project ID	:	BOT/P/E/11-12/07
Project period	:	5 years (April 2011 – March 2016)
Sponsoring Agency	:	M.P. Forest department (Land Management)
Principal Investigator	:	Dr. O.P. Chaubey
Co-PI	:	Dr. A.K. Sharma

Objectives:

- Demarcation, barbed wire fencing and erection of boards in 40 preservation plots.

- Collection of growth data of naturally occurring miscellaneous dominant tree species in different preservation plots established in different forest types of Madhya Pradesh.
- Estimation of biomass accumulation and rate of carbon sequestration of dominant tree species and soil in different forest types/ preservation plots.

Activities carried out during this year:

1. Physical target -39 preservation plots (Each plot 10 ha).
2. In protected areas barbed wire fencing was not permitted by the PCCF (Wildlife) in 07 preservation plots. Out of 32 plots fencing completed in 15 preservation plots and rest is under progress. Details are as under.

   I. Fencing completed in following preservation plots:-

   - Preservation plots laid in Ravine Thorn Forest type (6B/C2) of Goraghat range of Datia forest division (Comptt. No. 202).
   - Preservation plot laid in *Anogeissus pendula* scrub forest type (5/E1/DS1) of Seonda range of Datia forest division (Comptt. No. 115).
   - Preservation plot laid in Khair forest type (5/1S1) of Pohri range of Shivpuri forest division (Comptt. No. P-75).
   - Preservation plot laid in *Ziziphus scrub* forest type (6B/DS1) of Pohri range of Shivpuri forest division (Comptt. No. P-69).
   - Preservation plot laid in Northern dry mixed deciduous forest type (5B/C3) of Mohli range of Noradehi wildlife sanctuary forest division (Comptt. No. RF-107).
   - Preservation plot laid in Riparian fringing forest (4E/RS1) of North Betul division in Shahpur range(Banka beat), (compartment no P419).
   - Preservation plot laid in Southern dry mixed deciduous forest (5A/C3) of Dewas division in Udainagar range (Pipari), (compt. no 633).
   - Preservation plot laid in Butea forest (5/E5) of South Sagar division in Garhakota range (Ramna), (compt. no 896).
   - Preservation plot laid in Southern tropical riverain forest (5/1S1) of North Sagar division in Khurai range (Jaruakheda), (compt. no RF71).
   - Preservation plot laid in Secondary dry deciduous forest (5/2S1) of North Sagar division in Khurai range (Jaruakheda), (compt. no P69).
   - Preservation plot laid in Khair forest (5/1S1) of Guna division in North Guna range (Putlighati), (compt. no P481).
   - Preservation plot laid in Khair forest (5/1S1) of Guna division in Raghavgarh (Ruthai), (compt. no 458).
   - Preservation plot laid in Very dry teak forest (5A/C1a) of Guna division in Guna range (Garha), (compt. no 404).
   - Preservation plot laid in Dry deciduous scrub (5/DS1) of Rajgarh division in Rajgarh range, (compt. no 314).
   - Preservation plot laid in Southern dry mixed deciduous forest (5A/C3) of Badwaha division in Badwaha range (Chiktimodri), (compt. no 910)- poles erected, wiring under progress.
3. Fencing under progress in remaining 17 preservation plots laid in different forest types of M.P. In most of the divisions, fencing material has been procured; however, the erection of fencing in the field is under progress.
4. Demarcation, board erection and collection of growth data completed in 13 forest types. viz: Ravine thorn forest (6B/C2) of Datia division, *Anogeissus pendula* forest scrub (5/E1/DS 1) of Datia division, Dry peninsular sal forest (5B/C 1C) of Narsinghpur division, Dry savanah (5/DS 2) of Indore division, Khair forest (5/1S1) of Guna (Raghavgarh range) division, Khair forest (5/1S1) of Guna (North Guna range) division, Very dry teak forest (5A/C1a) of Guna division, Secondary dry deciduous forest (5/2S1) of North Sagar division, Southern tropical riverain forest (5/1S1) North Sagar division, Southern dry mixed deciduous forest (5A/C3) of Dewas,

Southern dry mixed deciduous forest (5A/C3) of West Chhindwara division, Southern moist mixed deciduous forest (3B/C 2) South Seoni division, Butea forest (5/E5) of South Sagar division.

Important findings / interim findings, if any

Data entry for volume and biomass production completed as per IPCC guidelines.

Current status of the project: On going

3. Title : Development and enrichment of existing botanic garden of S.F.R.I., Jabalpur with rare and endemic Angiosperm and Pteridophytes.

Project ID	:	BOT/P/E/12-13/26
Project period	:	1 year (April 2013– March 2014)- Extended for July 2014
Sponsoring Agency	:	APCCF (Research, Extension & Lok Vaniki), Satpura Bhawan, Bhopal (M.P.)
Principal investigator	:	Dr. O.P. Chaubey
Project Associate	:	Poonam Mishra

Objectives:

- Strengthening the infrastructure of the garden.
- Enrichment and multiplication of the garden with fern and fern allies and rare /endemic tree species.
- Extension programme for biodiversity conservation.
- Preparation of education materials.

Activities carried out during this year:

1. Fencing material procured and erected in the garden.
2. Micro irrigation material procured.
3. Flex and iron boards prepared and erected.
4. Level plates prepared and erected in the garden.
5. Beautification and cleaning of the garden.
6. Erection of lighting poles and stone boards is under process.
7. Following plants viz; *Pteris vittata, Microsorium punctatum, Nephrolepis tuberose, Adiantum capilus vneris, Diplazium esculentum, Cyclosorus dentatus, Colysis elliptica, Nephrolepis cordifolia, Microsorium alternifolium, Microlepia strigose, Hymenodictyon excelsum, Ougeinia oojeinensis* were collected, conserved and multiplied in the garden.
8. Education materials under preparation.

Important findings / interim findings, if any

Work on collection, conservation and preparation of education materials is under completion.

Current status of the project: On going

Newly initiated projects: Two

1. Title : Inventorization and publication of illustrated flora of Achanakmar-Amarkantak biosphere reserve (AABR).

Project ID	:	BOT/P/E/13-14/14
Project period	:	3 Year
Sponsoring Agency	:	APCCF (R/E & Lok Vaniki), Satpura Bhawan, Bhopal (M.P.)
Principal investigator	:	Dr. O.P. Chaubey
Co-PI	:	Dr. A.K. Sharma

Objectives:

- Inventorization and enrichment of forest herbarium with forest flora of Achanakmar-Amarkantak Biosphere Reserve
- Publication of illustrated flora of Achanakmar-Amarkantak Biosphere Reserve.

Activities carried out during this year: Nil

Important findings / interim findings, if any: Nil

Current status of the project: Work to be initiated

2. Title : Sustainable livelihood based management plan for Kuno-Palpur wildlife sanctuary of Madhya Pradesh.

Project ID	:	BOT/P/E/13-14/15
Project period	:	3 Year
Sponsoring Agency	:	APCCF (Research, Extension & Lok Vaniki), Satpura Bhawan, Bhopal (M.P.)
Principal investigator	:	Dr. O.P. Chaubey

Objectives:

- To work out the degree of reliance of the resident human population on the protected area (PA) resources, and people – PA interaction.
- To develop the package of sustainable and scientific utilization of important resources and preparation of management plan/working manual for the same.

Activities carried out during this year: Nil

Important findings / interim findings, if any: Nil

Current status of the project: Work to be initiated.

Regular activity: One

1. Title : Development and maintenance of botanic garden of State Forest Research Institute, Jabalpur (M.P.)

Project ID	:	BOT/P/I/11-12/06
Project period	:	5 years (April 2011 to March 2016)
Sponsoring Agency	:	Internal project
Principal investigator	:	Dr. O.P. Chaubey
Co-PI	:	Dr. A.K. Sharma

Objectives:

- Maintenance and protection of Infrastructure.
- Enrichment and development of the Garden.

Activities carried out during this year:

- Nakshatra Vatika has been inaugurated by Honorable Forest Minister Shri Sartaj Singh Ji.
- New species like *Ehretia laevis, Prosopis spicigera, Pinus roxburghii, Mesua nagassarium, Strichnos nuxvomica, Ficus virens, Grewia asiatica* were introduced in the garden.
- Ethno- medicinal plants and Pteridophytes were multiplied in the green house and their enrichment in different thematic beds was undertaken.
- One flex board showing details of conserved tree species was prepared.
- Label plates were prepared and erected in the green house and fixed on the standing trees conserved in the garden.
- Protection and maintenance of the garden is in continuation.

Progress :

1. Botanic garden becomes more educative after conservation and development.
2. Awareness regarding conservation of indigenous and threatened plants generated among the field foresters, academicians, researchers, stake holders and students.

Current status of the project: On going

3.3 FOREST ECOLOGY AND ENVIRONMENT

Mandate

1. Ecological studies in natural forests of M.P
2. Environmental Impact Assessment
3. Sustainable Forest Management

Staff

Dr. R.K. Pandey	**:**	Senior Scientist and Head
Dr.Anjana Rajput	**:**	Research Officer
Shri Rakesh Jain	**:**	Research Officer
Mr. Vijay Haldkar	**:**	Forester
Mrs.Madhuri Shrivastava	**:**	Technical Assistant

Project Staff

Dr. (Mrs) Satvant Kaur Saini	:	Scientist Fellow
Mr. Shailendra Nema	:	Junior Research Fellow
Mr. Vikas Jain	:	Junior Research Fellow
Mr. Praveen Sahu	:	Data Entry Operator
Mr. Sandeep Singh Bhandari	:	Data Entry Operator
Mr. Rakesh Sahu	:	Data Entry Operator

Completed Projects

Internally funded: Nil

Externally funded: Four

1. Preparation of Wildlife Conservation Plan for the area being diverted for construction of Naveen Ash Bund in district Betul, Madhya Pradesh for Satpura Tap Vidyut Grih Sarni in favour of M.P. Power Generating Company Ltd. Madhya Pradesh.
2. Carrying out study/evaluation and submission of impact of Runj project on Wildlife and action to be taken to mitigate these impacts under Runj irrigation medium project district Panna (M.P.)
3. Environmental Impact Assessment on aquatic life / water supply and water quality of downstream due to reduce flow especially in lean period in Sanjay Gandhi Thermal Power Plant.
4. Study on soil erosion/soil flow from the over burden areas with the help of GIS in Khadia project of Northern Coalfield Limited.

On–going projects

Internally funded: Nil

Externally funded: Five

1. Forest Resource assessment survey in four newly identified people's protected forest areas (PPAs) i.e. Jabalpur, Satna, East Chhindwara, and Anuppur forest divisions of Madhya Pradesh
2. Survey of existing Barahsingha & Blackbuck habitat evaluation for habitat viability assessment for Kanha Tiger Reserve and Satpura Tiger Reserve.

3. UP Forest Management and Poverty Alleviation Project on Non timber Forest Produce (NTFP) Resource Assessment and Development (UP-PFMPAP) under Japan International Corporation Agency.
4. Harvesting and post harvesting Technology of Non- timber Forest Produce (NTFP) (UP-PFMPAP) under Japan International Corporation Agency.
5. Impact Assessment of road up-gradation of National Highway No. 26 (B) on forest and wildlife habitat in the affected forest area (48.849 ha) of West Chhindwara Forest Division. (*Amarwara to Narsinghpur*)

Newly Initiated Projects

Internally funded: Nil

Externally Funded: Two

1. Ecological Studies on Grasslands of Bandhawgarh Tiger Reserve with Special Reference to Wildlife Management.
2. Development of technology for conservation and sustainable management of wild medicinal plants and NTFPs through community participation in Shahdol Forest circle of Madhya Pradesh.

Regular activities

On-going: Nil

New initiated during the year: Nil

Projects completed during the year

Externally funded: Four

1. Title : Preparation of Wildlife Conservation Plan for the area being diverted for construction of Naveen Ash Bund in district Betul, Madhya Pradesh for Satpura Tap Vidyut Grih Sarni in favour of M.P. Power Generating Company Ltd. Madhya Pradesh.

Project ID	:	ECO/P/E/12-13/07
Project period	:	July 2012- Oct 2013
Sponsoring Agency	:	MP Power Generating Company ltd. M.P.
Principal investigator	:	Dr. R.K. Pandey
Associates	:	Dr. (Mrs) Satvant Kaur Sain
	:	Mr. Shailendra Nema
	:	Mr. Vijay Haldkar
	:	Mr. Rakesh Jain

Objective:

- Preparation of Wildlife Conservation Plan for the area being diverted for construction of Naveen Ash Bund in district Betul, Madhya Pradesh for Satpura Tap Vidyut Grih Sarni

Activities carried out during the year:

- A detailed study has been made in 10 km radius from the diversion site of 111 ha of forestland. The study area comprises of about 15,940 ha of forest land of Sarni and Ranipur Ranges of N. Betul forest division, and Amla range of S. Betul forest divisions.
- Status of qualitative and quantitative parameters of floral and faunal components, existing major wild animals and its habitat, including required physical parameters i.e. canopy cover, waterholes, shrub cover, ground cover, obscurity status and basic life requisites of existing wild animals viz., food, water and shelter were studied extensively.
- Key habitat components were assessed for preparation of Comprehensive Conservation Plan by studying habitat characteristics (biological and physical) in all sub impact zones and

Habitat Suitability Indices (HSI) were derived with the help of various life requisite parameters.

Under Biological parameters, data on browsable (shrub, climbers, saplings of trees etc.) and ground (herbs and grasses) layer were collected.

Important Findings:

- A total 70 species were recorded under shrub layer in various sub-impact zones in the project site, out of which 17 species were found to be used by wildlife as food/fodder species.
- In shrub layer, 12 species were recorded under threat category of IUCN Red List, of which two species i.e. *Smilax zeylanica* and *Flacourtia indica* are identified under Rare category. *Clerodendrum serratum* in Endagered class and 2 species of woody climbers i.e. *Bauhinia vahlii and Butea superba* were recorded under Near Threatened (NT) class. Six species were recorded under VU category i.e. *Litsea glutinosa, Careya arborea, Embelia basaal, Phyllanthus embelica, Pterocarpus marsupium, Sterculia urense*.
- Total 155 species were recorded in the ground layer, which include 40 species of grass category and 39 species of medicinal plant in entire project area.
- In ground cover, 10 species were found in VU and VU-NT category under IUCN Red List. The species recognized under Red list and in high demand due to economic importance were *Andrographis paniculata, Gymnema sylvestre, Dioscorea daemona, Nervilia arogoana, Isoetes* spp, *Chlorophytum tuberosum* etc.
- The project area provide congenial abode for several major wildlife species of RET categories. According to Wildlife Conservation Act 1972, amended in 2006, the wild fauna of the category of the Schedule-I were Panther (*Panthera pardus*) and Sloth bear (*Melursus ursinus*), peafowl (*Pavo cristata*), King cobra (*Naja naja*).
- Faunal species recorded in Schedule –II were common langur (*Presbytes entellus*), wild dog (*Cuon alpines*) and wild boar (*Sus scrofa*)
- In the Schedule-III of WL Conservation Act, Jackal (*Cuon aureus*), hyaena (*Hyaena hyaena*), barking deer (*Muntijack muntiacus)* and sambhar (*Cervus unicolor*) were recorded.
- Characteristics of wildlife habitat quality classes were assessed by studying the status of obscurity, shrub and ground cover, availability of food/fodder, water sources and other physical characteristics, and biotic pressure class in each sub-impact zone.
- Wildlife habitat based on the score points were categorized as core zone i. e. 0-1 km sub-impact zone and the adjoining impact zone of 1-3 km sub impact zone as Category “PH” i.e. poor quality with high biotic pressure class (However, in distant localities i.e. in 3-5 km sub-impact zone (MM) medium habitat quality with medium biotic pressure class and 5-7 km sub-impact zone (GM) good habitat quality with medium biotic pressure class. Sub-impact zone of 7-10 km was found to be good habitat with low pressure class (GL) or ideal habitat.
- Habitat mapping of various wildlife components and specific habitats were also done and GPS coordinates of various habitats were marked on the map in the form of polygonal.
- Observations on various disciplines of the study envisaged that the Zone of Influence (ZI) or core zone (0-1 & 1-3 km sub-impact zone) in the vicinity of STPS is categorized as highly affected zone. However, the sub-impact zones of distant localities i.e. beyond 3 km, within 10 km radius of impact zones provide better wildlife habitats with all basic life requisite parameters i.e. food, water and cover.
- The area of study site falls under rich forest vegetation, and provide shelter to the diverse flora as well as fauna of the area. It is also evident from field observations that the area of distant localities (7-10 km sub-impact zone) forms the part of a viable corridor to the Satpuda ranges. It is worth to mention that the forest locality have its own importance by forming nationwide wildlife corridor connecting north to the south.
- Suggested mitigation measures for habitat improvement were also identified along with GPS coordinates

- The details of the location along with GPS coordinates for improvement/ development of water holes, fodder availability, canopy cover, soil -water conservation etc. were recorded and provide the locations of available area within various compartments in between 3 km-10 km sub-impact zones and budget of Rs. 158.90 lakhs was proposed for the implementation of mitigation measures on:
- Forest protection and habitat improvement
- Development of perennial water sources.
- Soil & water conservation measures.

Fire protection measures and prevention from poaching.

Current status of the project: Completed

2. Title : Carrying out study/evaluation and submission of impact of Runj project on Wildlife and action to be taken to mitigate these impacts under Runj irrigation medium project district Panna (M.P.).

Project ID	:	ECO/P/E/12-13/08
Project period	:	One year (July 2012- Oct 2013)
Sponsoring Agency	:	Water Resource Department, Govt. of M.P.
Principal investigator	:	Dr. R. K. Pandey
Co-PI	:	Dr Anjana Rajput
Associates	:	Dr. (Smt.) S. K. Saini
	:	Mr. Shailendra Nema
	:	Mr. Vijay Kumar Haldkar
	:	Mr. Rakesh Jain

Objective:

- Evaluation of impact of Runj project on Wildlife and action to be taken to mitigate these impacts under Runj irrigation medium project.

Activities carried out during the year:

- A Runj medium irrigation project is proposed across the river Runj near village Vishramganj, Ajaygarh tehsil of Panna district.
- The total submergence area of proposed dam is estimated to be 482.82 ha. In which 154.91 ha of forest land of north panna forest division is coming under proposed submergence.
    - Study was carried out within 10 km radius from the proposed Runj dam and estimated study area was 466.08 sq km, total forest area 281.87 sq km (60 %) of North Panna division.
    - 11318 hectare area of 50 compartments of North Panna Division is notified as buffer zone of Panna Tiger Reserve and it is beyond the submergence area.

Important Findings:

- Observations on biological components envisaged that forest area provide good habitat for diverse flora and fauna.
- Tree density in submergence and in adjoining sub impact zone were observed to be ranging from 237.5 tree/ ha to 405.95 tree/ha at different locations.
- The forest area of study sites provides potential habitat for regenerating tree species particularly, Teak alongwith several perennial shrub and climber species and also provide congenial habitat for sustained wildlife of the area.
- Observation on the RET species of floral components envisaged that there are 18 RET species encountered in the study area.
- Evidences of 14 major wild faunal species were recorded of which, 6 species viz., *Tetracerus quadricornis* (Sch-I), *Melursus ursinus* (Sch-I), Manis *crassicaudata* (Sch-I), *Pavo cristatus*

(Sch-I), *Panthera pardus* (Sch-I) and *Gazella gazelle* (Sch-I) are categorized of Schedule I of wildlife (Protection) Act 1972 (amended in 2006). The evidences of major wild animal species of Schedule- II & III encountered were *Presbytes entellus*, *Hyaena hyaena*, *Canis aureus*, *Cervus unicolor*, *Boselaphus tragocamelus*, *Muntiacus muntijac*, *Axis axis*, *Sus scrofa, Cuon alpinus* etc. Similarly, evidences of only one species i.e. *Hystrix indica* of Schedule- IV was also recorded from the study site.

- Mitigation measures have also been suggested for:

  Habitat improvement, grassland improvement, improvement of water sources, soil water conservation measures alongwith awareness programme and monitoring.

- A budget provision of Rs.437 lakhs have also been suggested for mitigation of various activities as suggested in the report.

Current status of the project : Completed

3. Title : Environmental Impact Assessment on aquatic life/water supply and water quality of downstream due to reduce flow especially in lean period in Sanjay Gandhi Thermal Power Plant.

Project ID	:	ECO/P/E/11-12/27
Project period	:	One year (Nov. 2011-Oct. 2012) (Extension proposed upto Dec. 2012)
Sponsoring Agency	:	Sanjay Gandhi Thermal Power Plant, Birsinghpur, Umaria
Principal investigator	:	Dr. R. K.Pandey
Co-PI	:	Dr. Anjana Rajput
Associates	:	Mrs. Madhuri Shrivastava
	:	Mr. Vijay Haldkar
	:	Mr. Rakesh Jain

Objectives:

- Comparative ecological study on aquatic flora and fauna including weed species in the upstream and downstream of Johila Dam.
- Identification of factors responsible for obstruction of water flow towards the thermal power station.
- Assessment of Water quality & sedimentation load of flowing water which may be responsible for colonization of floral and faunal species.
- Development of mitigation measures to maintain continuous flow of water in the lean period to maintain continuous flow of water

Activities carried out during the year:

- For the assessment of water quality, flow, aquatic life, flora and fauna distance of 10 km along the Johila river in the upstream and 10 km in the downstream is taken for the study. Studies are being conducted at the selected sites to collect monthly data on flow intensity, depth, width and temperature of Johila River.
- Water quality sample were collected from two sites in the upstream (one at 5 km and other 10 km distance from the reservoir), three sites in the downstream, two in the reservoir water sample was collected and analyses for different parameters was done for the assessment of water quality from these sites as well as from the reservoir, return canal and from confluence point.
- Data on aquatic flora and fauna including weed are recorded from each site.
- Data collected related to different objectives were analyzed and compiled.

Important Findings:

- Sanjay Gandhi Thermal Power Plant (SGTPP) is one of the thermal power generating unit of Madhya Pradesh power generating company ltd. M.P.
- Present study indicates that there was no impact on water flow into the downstream of SGTPP reservoir made on Johila River. There is no significant difference between flow intensity (velocity) of upstream and downstream. Observations on flow intensity in upstream and downstream of the reservoir obviously envisaged that the water flow intensity was comparatively higher in downstream (0.399 m/sec at 0 km, 0.258 m/sec at 5 km and 0.765m/sec at 10 km in summer season; as compared to upstream.
- The aquatic life of the downstream was getting affected slightly due to the effluent discharge from the power plant. Presence of sensitive groups of macro-invertebrates was almost nil in reservoir as compared to the upstream and downstream sites. However, occurrence of 9 tolerant groups, represented by *pila spp., unio spp., Limnogonus nitidus* (insects) etc were observed in the reservoir only in comparison to upstream and downstream of the project site. It might be due to increase of pollution level due to power plant activities. Consequently, the faunal density in the reservoir was found to be minimum (3.0 m2) in comparison to upstream (32.93m2) and downstream (20.9m2) and indicated the non-congenial habitats for aquatic native flora and fauna except few weed species.
- Terrestrial plant species richness was recorded to be maximum (64 species) at downstream site which shows the resistance towards pollution. In the upstream sites, 52 species were recorded. This change in number of species might be due to their non resistance capacity to the changes occurring in water quality in the vicinity of reservoir in surrounding downstream.
- The major weed species *Typha latifolia and Ipomoea aquatica* were recorded in the return canal as well as near the reservoir. These weed species were found to be absent in the upstream and in the downstream. This might be due to effect of effluents discharge from thermal power plant. Moreover, some other plant species like *Aponogeton crispus, Potamogeton crispus, Valisnaria natans, Nymphoides indica, Polygonum barbatum etc* are predominantly overcoming in the reservoir site.

The analysis of water collected from various observation sites obviously envisaged that the COD, pH, conductivity, color and odor, hardness, suspended solids, sulphate nitrate, boron etc was found to be within acceptable limits. Nevertheless, some physico-chemical properties of water were found beyond the acceptable limit viz, water temperature, biological oxygen demand, dissolved oxygen and total dissolved solids, turbidity during rains in reservoir and downstream. Such physico-chemical properties of water need immediate attention for appropriate treatments to make the water healthy and hygienic in the downstream for the use of local inhabitants and their bovines.

Current status of the project : Completed

4. Title : Study on soil erosion/soil flow from the over burden areas with the help of GIS in Khadia project of Northern Coalfield Limited.

Project ID	:	ECO/P/E/11-12/28
Project period	:	6 months (April 2012 to August 2012) (Extension proposed up to Jan. 2014)
Sponsoring Agency	:	Northern Coalfield Limited Khadia Project, district Sonbhadra (U.P.)
Principal investigator	:	Dr. R. K. Pandey
Co-PI	:	Shri Rakesh Jain

Objectives:

- To assess the soil erosion/soil flow from over burden dumps.
- To estimate the soil erosion/soil flow from the OBDs with the help of GIS.
- To suggest the mitigation measures.

Activities carried out during the year:

- Vast data of both primary and secondary were collected from the study sites, concerned departments and annual soil loss was estimated by adopting Universal Soil Loss Equation (USLE) method, developed by Wischmeier and Smith (1978) to estimate the average annual soil loss of OBDs of the study. The USLE equation is summarized as **A = R * K * LS *C * P**

  Where;

  A = Estimation of average annual soil loss in tons per acre per year.

  R = Rainfall Erosivity Factor; K = Soil Erodibility Factor

  LS = Slope Length & Slope Steepness Factor

  C = Cover & Management Factor; P = Support Practice Factor
- Maps of land use/cover, drainage, grid, contour, DEM, slope, LS, soil erodibility, vegetation cover, soil erosion etc. of the study site were prepared with the help of satellite imagery of Resourcesat-2 L4FMx and toposheet 63L12 procured from NRSA Hyderabad and IT Section of CCF.
- Ground truthing for LS, soil, cover, support practices factors were undertaken in the ground surface of the study area with help of generated maps.
- A digital elevation model (DEM) interpolated from elevation contours was prepared. DEM was used to analyze the complex terrain of OBD of Khadia sites. A slope map was also derived from DEM, to generate slope length and slope steepness factor (LS).
- The rainfall data of 12 years from 2000 to 2012, procured from the NCL Khadia project for assessment of R factor.
- Soil survey was made to determine representative soil types for assessment of Soil factor (K).

Important Findings:

- Estimation of average annual soil loss of the study site envisaged that annual soil loss of central, western, eastern OBDs and open/mining site was found to be varies ranging from minimum 38.13 tons/acre/year to maximum 60.39 tons/acre/year. However, an average annual soil loss of the study area was estimated to be 49.99 tons/acre/year or 123.98 tons/ha/ year and categorized as extremely severe erosion class.

Current status of the project: Completed

On-Going Projects

1. Title : Forest Resource assessment survey in four newly identified people's protected forest areas (PPAs) i.e. Jabalpur, Satna, East Chhindwara, and Anuppur forest divisions of Madhya Pradesh.

Project ID	:	ECO/P/E/10-11/06
Project period	:	Five years (2010-16)
Sponsoring Agency	:	M.P. State MFP, Federation (Trade & Dev.), Bhopal.
Principal investigator	:	Dr. R. K. Pandey
Associates	:	Dr Anjana Rajput
	:	Mrs Madhuri Shrivastava
	:	Mr. Vijay Haldkar
	:	Mr. Shailendra Nema

Objectives:

- Forest resource assessment survey both qualitative and quantitative with reference to medicinal, aromatic plants and other utilizable NTFPs in various habitat types of newly identified 4 PPAs situated in Jabalpur, Anuppur, Satna and Chhindwara forest divisions respectively.
- To determine the status and potential of NTFPs and medicinal plants in each PPA.

- Organize training/workshop at field level to develop skill and capabilities of user communities for sustainable management of forest resources.

Activities carried out during the year:

- As per the guidelines for resource assessment survey provided by MPMFP Federation, Co-Op Ltd, Bhopal, the following methods were adopted in each PPA.
- During second resource assessment in the year 2012-2013 second resource assessment survey was done on the same Selection and demarcated plots for all the four sites. Entire PPA was explored extensively and inventory of forest resources was made. List of medicinal, aromatic plants and other important NTFPs were prepared.
- Field workshops/trainings have also been imparted to the VFC/FPC members
- Collected data were analyzed and second draft report was prepared and submitted to MPMFP Federation, Bhopal.
- As per the guidelines for resource assessment survey provided by MPMFP Federation, Co-Op Ltd, Bhopal, Resource assessment survey is to be done in the alternate years i.e., during the year 2014- 2015 3rd (final) resource assessment survey is to be taken up.

Important Findings:

- First Forest Resource Assessment Survey i.e. qualitative & quantitative for all the four selected PPAs (Jabalpur, Anuppur, Satna and Chhindwara) sites have been completed. NTFP and medicinally important plants listed in all the PPAs are as under:
- Anuppur division- Under tree category 7 species is recorded, whereas in shrub and ground layer 14 and 18 species found respectively. Some important species in this PPA are *Rubia cordifolia, Swertia angustifolia, Pteridophyte spp, Thalactrum javaonicum, Scoparia dulces, Asparagus racemosus, Chlorophytum tuberosum, Pueraria tuberose, Embelia basaal, Terminalia chebula, T. Bellirica, Embelica officinalis etc.*
- Jabalpur division- 9 species of tree, 13 species of shrub and climbers and 23 ground species of NTFP/medicinal importance were recorded in this site. Some important species recorded in this site are *Gymnema sylvestris, Chlorophytum tuberosum, Helicterus isora, Van Singhada, Mucuna pruriens, Abrus precatorius, Phyllanthus embelica, Andrographis paniculata, Aegle marmelos* etc. along with this, this PPA can also be recognized for hub of edible mushroom.
- Chhindwara division- some NTFP and medicinally important species recxorded were *Madhuca indica, Aegle marmelos, Buchanania lanzan Nyctanthus arbortris-tis, Andrographis paniculata, Phyllanthus amara, Hemidesmus indicus, Evolvulus alsinoides, Helicterus isora, Asparagus racemosus, Embelia basal, Celastrus paniculata etc.*
- Satna Divsion-This PPA includes area of 6 ranges i.e. Maihar, Uchehara, Chitrakoot, Mukundpur, Majhgawan, and Barondha. Main NTFP species and medicinally important species recorded in this PPA are : *Madhuca indica, Azadirechta indica, Acacia catechu, Diopspyros melanolon Emblika officinalis, Pterocarpus marsupium, Aegle marmelos, Evolvulus alsinoides, Phyllanthus amarus etc.* In this site most of the area is found degraded, damaged and under high biotic pressure.

Current status of the project: Ongoing

2. Title : Survey of existing Barahsingha & Blackbuck habitat evaluation for habitat viability assessment for Kanha Tiger Reserve and Satpura Tiger Reserve.

Project ID	:	ECO/P/E/11-12/26
Project period	:	Dec 2011- March 2013 (Proposed extension upto June 2014)
Sponsoring Agency	:	PCCF (Wild Life),M.P., Bhopal
Principal investigator	:	Dr.R.K.Pandey
Associates	:	Dr. (Mrs) Satvant Kaur Saini
	:	Mr. Shailendra Nema
	:	Mr. Vijay Haldkar

Objectives:

- Compare various habitat parameters of the barasingha in existing *in-situ* enclosure of Kanha and the proposed Bori *in-situ* enclosure in the Bori Wildlife Sanctuary of Satpuda Tiger Reserve (STR), Pachmarhi.
- Compare basic habitat parameters of the barasingha in Sonph meadow of Kanha
- Tiger Reserve (KTR) existing habitat, with proposed reintroduction site of Bori grasslands of STR for establishment of barasingha population. Explore the possibility of expansion of free-ranging barasingha population and suggest measures for habitat connectivity improvement in proposed reintroduction site.
- Prepare monitoring protocol for successful reintroduction.

Activities carried out during the year:

Progress:

- Wildlife Habitat Evaluation of various life requisite parameters for both the study sites i.e. existing barasingha habitat of Kanha TR and proposed reintroduction site of bori meadow of Satpura Tiger Reserve, Pachmarhi was made and final report was submitted.
- Mapping of various habitat parameters was made.
- Assessment of Prey-Predator Biomass
- Viability Assessment
- Habitat Viability Assessment (HVA) for blackbuck is in progress.

Current status of the project: Final report for barasingha has been completed and field works for blackbuck is in progress.

3. Title : UP Forest management and poverty alleviation project Non-timber Forest Produce (NTFP) Resource Assessment and Development (UP-PFMPAP) under Japan International Corporation Agency.

Project ID	:	ECO/P/E/11-12/13
Project period	:	Eighteen months (Jan. 2012 – June 2013) extended upto March-2014
Sponsoring Agency	:	U.P. Participatory Forest Management and Poverty Alleviation Project (UP-PFMPAP
Team Leader	:	Dr.R. K. Pandey
Key Professionals	:	Dr. P. Bhatnagar
	:	Dr Anjana Rajput
	:	Dr. S. K. Masih
Support Experts	:	Mr. Rakesh Jain
	:	Ms. Sapna Anthony

Objectives:

- To carry out situational analysis in three regions.
- To develop community based participatory mapping and appropriate assessment methodologies.
- To evolve a package of *In-situ/ex-situ* conservation, enrichment and propagation practices.
- To provide technical guidance for cultivation on private lands as pure crops/Agro forestry/farm forestry.
- To develop training materials/modules to be used for training the DMU/FMU/JFMC/ NSO/PNGO staffs and SHG /SHG consortium for the above topics.
- To give field guidance to DMU/FMU/NSO/PNGO staffs.

Activities carried out during the year:

- Situational analysis of NTFP resource of the area has been completed in three divisions i.e. Behraiach (Terai region), Renukut (Vindhyan region) and Lalitpur (Bundelkhand regions) of Uttar Pradesh.
- A master list of NTFPs resources availability and products from forest as well as non forest areas has been prepared which includes medicinal, aromatic and dye plants and fodder/grasses.
- Information on region wise NTFPs species being collected/being harvested and kinds of tools and equipments are being used for harvesting has been listed separately.
- Average house income from available NTFPs has been estimated.
- There were 33 NTFP species have been prioritized on the basis of ecological, technical and economical criteria.
- Methodology for community based participatory mapping and appropriate assessment has been developed.
- A manual has been prepared and submitted on evolving package of practices for in-situ/ex-situ conservation, enrichment and propagation practices for selected species.
- A manual has been prepared and submitted on cultivation on private lands as pure crop/ Agro-forestry/ Farm forestry for selected species.

Important Findings:

Current status of the project: On-going

4. Title : Harvesting and post harvesting Technology of Non- timber Forest Produce (NTFP) (UP-PFMPAP) under Japan International Corporation Agency.

Project ID	:	ECO/P/E/11-12/14
Project period	:	Fifteen months (Jan. 2012 – March 2013) extended upto March 2014
Sponsoring Agency	:	U.P. Participatory Forest Management and Poverty Alleviation Project (UP-PFMPAP)
Team Leader	:	Dr. R. K. Pandey
Key Professionals	:	Dr. (Mrs) Satvant Kaur Saini
	:	Dr. Uday Homkar
Support Experts	:	Mr. Rakesh Jain
	:	Mr. Shailendra Nema
	:	Mr. Vijay Haldkar

Objectives:

- Development of skill and capabilities of forest dependent communities for sustainable harvesting of NTFPs and MAPs through field training and awareness campaign.
- Secure sustainable forest management by improving harvesting practices especially implementing sustainable harvesting limits through community organizations and other stakeholders.

Activities carried out during the year:

- Extensive survey has been made in selected three regions of UP i.e. (i) Renukut Forest Division in Vindhyan; (ii) Lalitpur forest division in Bundelkhand region and (iii) Bahraich Forest Division, in tarai region at FMU level in selected 54 JFMCs.
- Regional workshop was organised for the members of FMU, PMU, DMU, NGOs, PNGOs, NSO at Katrniaghat, Bhraich in tarai region on 4th April 2012.
- Forest area allotted to selected JFMCs have been explored extensively along with team of subject matter experts, vaidyas, local collectors, traders, members of JFMCs and local staff of forest department.

- Prioritization of important NTFPs have been made on the basis of social, ecological, economic and technical consideration. Thus, total 33 species of various plant categories i.e. 14 species of trees, 12 species of shrub & climbers and 7 species of herbs were identified for detailed study.
- Species specific sustainable harvesting regime has been developed.
- Silvi-cultural prescriptions regarding growth and development, ground floor management were suggested for poor stocked areas, restocking of commercially important, threatened and potential NTFP species.
- Concept of selective and rotational harvesting was demonstrated for selected species at FMU level in all study sites.
- Developed participatory methodology for non destructive harvesting and imparted training to the members of JFMCs regarding prioritized NTFPs and their harvesting techniques in all the 54 samities of selected 3 regions of the State.
- Technique to determine the sustainable harvesting limit and sustainable harvesting techniques of various plant parts i.e. fruits flowers, seeds, bark, root, tubers, leaves or entire plant etc. demonstrated to the members of JFMCs at field level in all the study sites.
- Demonstrated the post harvesting technologies of collected plant part of medicinal plants i.e. cleaning, drying, grading, storage, transportation etc.
- Harvesting Code of prioritized 33 species was made and submitted to PMU.
- Technical-field guidance to the JFMCs/DMU/NWFP research centers/FMU/ NSOs PNGOs through templates is being prepared.

Progress report of the project was presented and submitted to the project authorities at office of PMU, Lucknow, U.P. and approved.

Important Findings:

Current status of the project: On-going

5. Title : Impact Assessment of road upgradation of National Highway No. 26 (B) on forest and wildlife habitat in the affected forest area (48.849 ha) of West Chhindwara Forest Division (Amarwara to Narsinghpur).

Project ID	:	ECO/P/E/13-14/01
Project period	:	One year (from April 2013- March 2014) Proposed to be extended upto Sept 2014
Sponsoring Agency	:	Project Director, Indian National Highway Authority Unit (NHAI), Distt. Chhindwara
Principal Investigator	:	Dr. R.K.Pandey
Associates	:	Dr. Anjana Rajput
	:	Dr. (Mrs) Satvant Kaur Saini
	:	Mr. Rakesh Jain
	:	Mr. Vijay Haldkar
	:	Mr. Shailendra Nema
	:	Mr. Vikas Jain

Objectives:

Assessment of impact due to proposed up-gradation and widening of road on:

- Forest ecology and structure
- Wild life habitat fragmentation, avifauna habitat and wildlife corridor values.
- To suggest mitigation measures.

Activities carried out during the year:

- Reconnaissance survey has been completed and interim report submitted.

- Field work on Assessment of floral and faunal components of the study area, valuation of wildlife habitat is under progress.

Progress:

Current status of the project: Ongoing

Newly Initiated

Internally funded: Nil

Externally funded: Two

1. Title : Project name: Ecological studies on Grasslands of Bandhavgarh Tiger Reserve with special reference to wildlife management

Project ID	:	ECO/P/E/12-13/24
Project period	:	2 years (from July. 2013- June 2015)
Sponsoring Agency	:	APCCF, (R/E & Lokvaniki), M.P. Bhopal
Principal Investigator	:	Dr. R.K.Pandey
SRA	:	Dr. (Mrs) Satvant Kaur Saini

Objectives:

- Identify the governing /responsible factors for deterioration of grasslands.
- Develop suitable strategy for congenial grassland habitat and suggest methods for sustainable management of existing grasslands with reference to wildlife.

Activities carried out during the year:

- A National Workshop was organized on **"Grassland Management in Protected Areas in India: Prospect and Retrospect"** on 4-6 July, 2013; to evolve practical and innovative methodologies for rehabilitation and sustainable management of grasslands in PAs, three days national workshop with fruitful brainstorming was organized at Tala in Bandhavgarh Tiger Reserve.
- Total 50 participants including eminent foresters, wildlife experts, researchers, wildlife managers etc, representing to various leading research organizations, forest department, project tiger's PAs and other Protected Areas of the country have been participated in the workshop.
- 25 technical research papers were presented in the national workshop and recommendations were drafted under and 39 points were framed under 9 sub-heads for development and management of grasslands.
- Qualitative assessment of grasslands of Bandhavgarh Tiger Reserve were made in major grasslands of Tala, Kalwah and Magdhi ranges.
- To assess the impact of Fire intensity, weed management and ploughing and seeding experimental sites were selected and plots were laid in Bathan patch of Tala range and Kudrakherwa wah in Kalwah range.
- Inventory and ecological study of the grasses found in various grasslands of Bandhawgarh National Park were made.
- Phyto-sociological study to understand the prevailing community structure in various grasslands were made by adopting standard ecological methods and various analytical parameters are being studied accordingly.
- Status of grass and available weed species found in grasslands and evacuated area of habitation and arable lands after village relocation were assessed.
- Assessment of palatable grass species of the area to determine utility percentage of grasslands is being assessed.

Plant specimens of grass species of various grasslands were collected and processed for preparation of herbarium.

Progress:

- This project is just initiated
- Reconnaissance survey of the project have been made.
- A workshop on Grassland management in PAs: Prospect and retrospect is proposed to be held on 04-06 April, 2013.
- Field works will be iniitiated with consultation of Field Officer Bandhavgarh TR.

Current status of the project: Ongoing

2. Title : Development of technology for conservation and sustainable management of wild medicinal plants and NTFPs through community participation in Shahdol Forest circle of Madhya Pradesh.

Project ID	:	ECO/P/E/14-15/01
Project period	:	3 years (from April 2014-March 2017)
Sponsoring Agency	:	PCCF, Bhopal. Govt. of M.P. (R & E Lokvaniki), Bhopal, Forest deptt. M.P.
Principal Investigator	:	Dr. R. K. Pandey
Associate	:	Mr. Shailendra Nema

Objectives:

Project aimed to develop a technology to determine sustainable harvesting limit (SHL) of commercially wild medicinal plants and NTFPs which are being collected from natural forest ecosystems with active participation of local dependent communities. The main objectives are:

- Ecological studies and inventory of commercially important wild medicinal plants and other utilizable NTFPs in potentially rich forest ecosystem.
- Status of commercially important wild medicinal plants and NTFPs in the site.
- Determination of SHL of the selected forest resources of commercially important medicinal plants and NTFPs on priority basis.
- Awareness and training to the user's communities for sustainable harvesting of wild medicinal plants and other NTFPs.

Activities carried out during the year:

Progress: Recently initiated in April 2014.

Current status of the project: Ongoing

3.4. FOREST GENETICS, PLANT PROPAGATION AND BIOTECHNOLOGY BRANCH

Mandate

1. To develop and standardize protocols through modern biotechnological tools for important forestry and medicinal plant species.
2. To produce clonal planting stock with desired characters through various vegetative propagation techniques.
3. To certify and identify of elite material of medicinal plants from their alkaloid content.
4. To organize training programmes on plant biotechnology and plant tissue culture.

Staff

Dr. S.K. Tiwari	:	Scientist and Head
Amit Pandey	:	Research Officer

Project staff

Mr. M.P. Goswami	:	Senior Research Fellow

Ms. Rashi Pandey	:	Junior Research Fellow
Mr. Pankaj Saini	:	Field Assistant
Mr. Vineet Mehra	:	Field Assistant

Projects completed during the year:

Internally funded : Nil

Externally funded : Nil

On-Going Projects during the year:

Internally funded : Nil

Externally funded : Four

1. Establishment of an advanced laboratory for molecular characterization and chemoprofiling of *Commiphora wightii* plant.
2. Genetic diversity assessment of *Boswellia serrata* and standardization of micro clonal propagation protocols through biotechnological interventions for the production of elite planting material.
3. Standardization and multiplication of clonal propagation protocol for commercially important forestry species *Anogeissus pendula.*
4. Cloanl multiplication of *Dendrocalamus asper* (Thailand Bamboo) through micropropagation technique

Newly Initiated project during the year:

Internally funded : Nil

Eexternally funded : Nil

Regular Activities

On-going: One

1. Training on plant biotechnology and plant tissue culture.

Newly initiated: Nil

Plants raised /disposed off during the year :

Dendrocalmus asper, Commiphora wighti, Aloe vera, Gmelina arborea and *Litsea glutinosa, Anogeisus pendula, Boswellia sreata*

New protocols/clone/varieties developed:

a. Standardization of macropropagation protocol for *Anogeisus pendula,* and *Boswellia sreata*

c. Chemoprofiling protocols: *Litsea glutinosa,* and *Commifera wightii.*

On-Going Projects:

1. Title : Establishment of an advanced laboratory for molecular characterization and chemoprofiling of *Commiphora wightii* plant

Project ID	:	GEN/P/E/10-11/18
Project period	:	Oct. 2010 to Sept.2013. (Proposed for extension up to Oct. 2014)
Sponsoring Agency	:	M.P. Biotechnology Council, Bhopal
Principal Investigator	:	Dr. S. K. Tiwari
Co-PI	:	Amit Pandey

Objectives:

- Collection of germplasm.
- Standardization of chemoprofiling techniques through HPLC for active ingredients.
- Assessment of genetic diversity of the designated species through molecular characterization

Activities carried out during the year :

(i) Chemoprofiling of bark samples collected form MP. Gujrat and Rajasthan have been completed. The percent concentration ranges of Guggulsterone in the accessions collected from Rajasthan, Gujarat and MP are presented below:

a. Rajasthan: 0.65 % to 2.32%.

b. Gujarat: 0.59 % to 2.22%.

c. MP: 0.54 % to 2.01%.

(ii) Genetic diversity assessment through DNA (ISSIR) markers of the collected population from Rajasthan, Gujarat and MP for evaluation of greater degree of polymorphism and reproducibility analysis is under progress.

Current status of the project: Ongoing

2. Title: Genetic diversity assessment of *Boswellia serrata* and standardization of micro clonal propagation protocol through biotechnological interventions for the production of elite planting material

Project ID	:	GEN/P/E/2012-13/05
Project period	:	April 2012 to March 2015
Sponsoring Agency	:	M.P. Minor Forest Produce Bhopal
Principal Investigator	:	Dr. S. K. Tiwari
Co-PI	:	Amit Pandey
Associate	:	Manish Puri Gowami
	:	Pankaj Sani

Provenances (Collection area): Dhar, Khandwa, Burhanpur, Dindori, Anuppur, Umariya, Sheopur, Shivpuri, Jabalpur

Objectives:

- Identification of potential pockets of *Boswellia serrata* from different agroclimatic zones of Madhya Pradesh.
- Study regarding genetic variations of *Boswellia serrata* within and between populations and at individual levels.
- Identification of genetically diversified population and elite genotypes for further studies.
- Standardization of the clonal propagation protocols for the production of quality planting material from elite genotypes.

Activities carried out during the year:

- Identification of potential pockets of *Boswellia serrata* from different agroclimatic zones of Madhya Pradesh,
- Maintenance of collected germplasm in mist chamber.
- Assessment of genetic diversity work is in progress.
- Standardization of propagation protocol after elite material selection .

Current status of the project: Ongoing

3 Title : Standardization and multiplication of clonal propagation protocol for commercially important forestry species *Anogeissus pendula*

Project ID	:	GEN/P/E/2012-13/17
Project period	:	June 2012 to May 2015.
Sponsoring Agency	:	Addl. PCCF, Research Extension & Lokvaniki Bhopal
Principal Investigator	:	Dr. S. K. Tiwari

Co-PI	:	Amit Pandey
Associate		Rashi Pandey

Objectives:

- To identify potentially rich areas and identification of CPT from different forest areas of M.P.
- To standardize clonal propagation protocol through macro & micropropagation technique from known phenotypic resource.
- To standardize hardening procedure for higher survival and establishment rate.
- Production of 5000 plants to refine the propagation protocol.
- To prepare field manual of macropropagation techniques to raise the plants by forest department.

Activities carried out during the year:

- Identification of potential pockets & collection of germplasm from Shivpuri, Sheopur. Orcha and SFRI, JBP
- Standardization of clonal propagation protocols through macropropagation and micropropagation is in progress.
- 33% rooting induced from stem branch cuttings through macropropagation. An abstract submitted in international meeting on plant Biotechnology, Australia.

Current status of the project: Ongoing

4. Title : Clonal multiplication of *Dendrocalamus asper* (Thailand bamboo) through miropropagation technique.

Project ID	:	GEN/P/E/2012-13/23
Project period	:	January 2013 to Dec.2014
Sponsoring Agency	:	APCCF (R/E & Lokvaniki) M.P., Bhopal
Principal Investigator	:	Dr. S. K. Tiwari,
Co-PI	:	Amit Pandey
Filed Assistant	:	Vinit Mehra

Objectives:

- To multiply & produce *Dendrocalamus asper* plants using micropropagation technique.
- To produce 3000 plants per year.

Activities carried out during the year:

- Fresh culturing from nodal explants is in progress for further multiplication.
- 2700 plants produced and hardened.

Current status of the project: Ongoing

Regular Activity:

1. Title : Trainings on Biotechnology and Plant tissue Culture.

Type of training	No. of students
15 days	1
30 days	4
3 months	3
6 months (PG, Dissertation)	7

3.5 FOREST MENSURATION AND STATISTICS BRANCH

Mandate

1. Measurements of growth for computing volume and finding the development of crop stands, for different species, in different quality classes and in different climatic zones of the state.
2. Designing of experiment and analysis of data for all branches of the Institute.

Staff:

Shri M.K. Parihar	:	Assistant Director
Smt. Richa Seth	:	Research Officer
Shri Shishupal Singh Mehta	:	Forester
Shri Mahesh Prasad Soni	:	Forester
Shri Rajesh Updhayaya	:	Forest guard

Project Staff

Shri Mahendra Dubey	:	Computer Operator

Projects completed during the year:

Internally funded : Nil

Externally funded : One

1. Preparation of growth tables for coppice origin plants of important species in different regions of Madhya Pradesh.

Ongoing projects

Internally funded : Nil

Externally funded : One

1. Revised form factors table for important miscellaneous timber tree species of Madhya Pradesh.

Newly Initiated project during the year

Internally funded : Nil

Externally funded : Nil

Regular Activity:

Ongoing- One

Newly initiated regular activity during the year: Nil

1. Measurement of sample plots due in the year 2013-14.

Completed project during the year

Externally funded : One

1. Title: Preparation of growth tables for coppice origin plants of important species in different regions of Madhya Pradesh.

I. D. No.	:	MEN/P/E/08-09/16
Period	:	March 2009 - Dec 2012
Sponsoring agency	:	Madhya Pradesh Forest Department (Development Wing)
PI	:	Shri M.K. Parihar
Co-PI	:	Smt. Richa Seth
Project associates	:	Shri S.P.S. Mehta
	:	Shri Mahesh Prasad Soni
	:	Shri Rajesh Updhayaya
	:	Shri Mahendra Dubey

Objective:

- To prepare coppice growth tables of plants of coppice origin of various important species in different regions of Madhya Pradesh.

Activities carried out during the year:

- Growth data were collected and compiled from all three divisions i.e. Umariya, Narsinghpur and South Balaghat forest divisions.
- Growth tables have been prepared for 7 main species i.e. Teak, Sal, Saja, Garari Lendia Dhawada, Bhirra found in the above divisions.

Current status of the project: Completed.

Ongoing projects:

Internally funded : Nil

Externally funded : One

1. Title : Revised form factors table for important miscellaneous timber tree species of Madhya Pradesh.

I. D. No.	:	MEN/P/E/ 11-12/12
Period	:	Oct 2011 - Sept 2013
Sponsoring agency	:	APCCF (Production) M.P., Bhopal
PI	:	Shri S.K. Jain
Co-PI	:	Smt. Richa Seth
Project associates	:	Shri S.P.S. Mehta
	:	Shri Mahesh Prasad Soni
	:	Shri Rajesh Updhayaya
	:	Shri Mahendra Dubey

Objective:

- Preparation of form factors table for important miscellaneous timber tree species of Madhya Pradesh.

Activities carried out during the year:

- Data for 11- Divisions have been received.
- Data entry for 9 divisions has been completed Analysis is in progress.

Current status of the project: Report for West Chhindwara has been completed.

Newly initiated projects: Nil

Regular activity:

On-going: One

1. Title : Measurement of sample plots due for measurement in the year 2013-14

I. D. No.	:	ID.No. MEN/RA/1/08
Period	:	April 2013 - March 2014
Sponsoring agency	:	Internal
PI	:	Shri S.K. Jain
Project associates	:	Smt. Richa Seth
	:	Shri S.P.S. Mehta
	:	Shri Mahesh Prasad Soni
	:	Shri Rajesh Updhyaya
	:	Shri Mahendra dubey

Objectives:

- To study growth pattern of different species in different site qualities and agro-climatic zones.

- To compute volume from growth data of different species in different site qualities and agro climatic zones.

Activities carried out during the year:

- Growth data on height and diameter were measured for the following 9 sample plots:-

SN	Sample Plot No.	Species	Forest Division	Range
1	SP 16	Pine	Dindori	Karanjia
2	SP 6	Pinus	Kanha National Park	Supkhar
3	SP 8	Pinus Longifolia	Kanha Natioal Park	Supkhar
4	SP 12	Sal	Kanha Natioal Park	Mukki
5	SP 1	Teak	Indore	Manpur
6	TIP 1	Anjan	Dewas	Punjapura
7	TIP 2	Misc.1986 Bija /Eucalyptus	Katni	Katni
8	TIP 3	Misc.1986 Neem 1986	Katni	Katni
9	TIP 4	Misc.1986 Aonla	Katni	Katni

Interim findings: Growth data was collected and compiled.
Current Status of the project: Growth data collected is being analysed and crop parameters are being calculated.

3.6 SEED TECHNOLOGY BRANCH

Mandate

- Collection of quality seeds from identified superior genetic sources.
- Seed storage.
- Seed certification.
- Research on seed biology, pollination biology, physiology and biochemistry.
- Contribution to the knowledge of seed technology with regard to enhanced germination and longevity of seeds.

Staff

Dr. Archana Sharma	:	Scientist- D and Head
Mrs. Manjula Parihar	:	Lab Assistant

Project Staff

Shri Pradeep Kori	:	Junior Research Fellow
Shri Abhishek Kumar Gupta	:	Computer Operator
Mr. Jeetendra Soni	:	Project Assistant
Mr. Brijpal Singh Rajawat	:	Project Assistant

Completed Projects

Externally funded : Three

1. Development of packages of seed techniques for important forest tree species.
2. Strengthening of Infrastructure of Testing and Certification of Forestry Seeds
3. Two Days National Seminar on "Advancement and Recent Development in Tree Seed Technology to Enhance Forest Productivity".

Internally funded : Nil

Ongoing Projects :

Externally funded : Five

1. Effect of Vermicompost and Neem cake on plant growth of some forestry species
2. Documentation and Development of Packages of Seed and Nursery Techniques for Some Important Indigenous Species
3. Effect of Various Pretreatment on Seed Germination of Fresh and Stored Seeds of *Tectona grandis* (Teak)
4. Documentation of Developed Seed Technology, Nursery and Planting Techniques of Important Forestry Tree Species.
5. Strengthening of Infrastructure of Collection, Testing, Certification and Storage of Forestry Seeds.

Internally funded : Nil

Regular Activities : Two

1. Seed procurement and disposal
2. Seed testing and certification

Completed Projects

Externally funded : Three

1. Title : Development of packages of seed techniques for important forest tree species

Project ID	:	SD/P/E/10-11/13
Project period	:	December 2010 - November, 2013
Sponsoring Agency	:	APCCF (R&E and Lokvaniki) M.P. Bhopal
Principal Investigator	:	Dr. Archana Sharma

Objective:

- To standardize the techniques to enhance the seed germination and seed longevity for production of quality seedlings.

Targeted Species-

- *Anogeissus latifolia*
- *Anogeissus pendula*
- *Lagerstroemia parviflora*
- *Cleistanthus collinus*
- *Schleichera oleosa*

Findings: On the basis of results, following conclusion were drawn

S. N.	Species	Best collection month	Best pretreatment	Best Storage container	Seed viability period in best storage condition	Best Before
1	*Anogeissus latifolia*	February	500 ppm GA_3 (T9) or 500 ppm IBA (T11) for 10 minute soaking	Plastic bottle with 4° C temperature.	0 to 2 months	2 months
2	*Anogeissus pendula*	January	germination tests under pink light produced by florescent transparent sheet	Plastic bottle with 4° C temperature.	0 to 2 months	2 months

S. N.	Species	Best collection month	Best pretreatment	Best Storage container	Seed viability period in best storage condition	Best Before
3	*Lagerstroemia parviflora*	March	10 % H_2SO_4 for 10 minutes	Plastic bottle with 4° C temperature.	18 to 21 months	12–15 months
4	*Cleistanthus collinus*	March	hot water treatment	Plastic bottle with 4° C temperature.	15 to18 months	9 to12 months
5	*Schliechera oleosa*	June	200 ppm of GA_3 for 10 minutes	Plastic bottle with 4° C temperature.	9 to 12 months	9 to 12 months

Note:

- In *Anogeissus latifolia* and *Anogeissus pendula*, germination was found very poor.
- - 4% seeds were found fertile.
- Majority of seeds were found to be pseudo seeds.

Current status of the project : Completed

2 Title : Strengthening of Infrastructure of Testing and Certification of Forestry Seeds

Project ID	:	SD/P/E/12-13/01
Project period	:	April, 2012- October, 2013
Sponsoring Agency	:	APCCF, (R/E & Lokvaniki) M.P., Bhopal
Principal Investigator	:	Dr. Archana Sharma

Objective:

- To improve the capability of the seed lab and proper functioning for testing and certification of seeds.

Findings

- Scientific equipment viz; BOD Incubator and seed germinator has been purchased through store as per store norms.

Current status of the project : Completed

3. Title : Two Days National Seminar on "Advancement and Recent Development in Tree Seed Technology to Enhance Forest Productivity".

Project ID	:	SD/P/E/13-14/09
Project period	:	August, 2013- July, 2014
Sponsoring Agency	:	APCCF, (R/E & Lokvaniki) M.P., Bhopal
Principal Investigator	:	Dr. Archana Sharma

Objectives:

- To identify the conditions required for genetic improvement of tree seeds.
- To identify some terms and some concepts of new bio-technology for genetic improvement.
- To identify for simple techniques for seed crop estimations.

- To recognize the crucial time when seed quality may be lost.
- Identified factor that affects seed longevity and storage.
- Learn the application of germination test results to direct impact on practical nursery and field conditions.
- Learn the concepts of seed quality or seed vigor.
- Recognize the type of injury that insect cause and control measure under storage and nursery conditions.
- Review basic seed technology for nursery management.

Findings:

In order to address the above concern, a two days National Seminar on "Advancement and recent development in tree seed technology to enhance forest productivity" was held at State Forest Research Institute, Jabalpur on 21st and 22nd February, 2014. The overriding aims of the seminar was to bring together Scientists, Foresters, Environmentalists, Academicians, Industrialists, Policy makers' NGO's, Stakeholders, etc. to share their experiences and to bring out fruitful recommendations about productivity enhancement through developing seed technological research, institution and infrastructure development.

Current status of the project : Completed

Ongoing Projects : Five

1. Title : Effect of Vermicompost and Neem cake on plant growth of some forestry species.

Project ID	:	SD/P/E/ 12-13/16
Project period	:	June, 2012– June, 2014
Sponsoring Agency	:	APCCF, (R&E) Bhopal
Principal Investigator	:	Dr. Archana Sharma

Objectives:

- To compare the effect of vermicompost, FYM (farm yard manure) and neem cake on plant growth and biomass production of Aonla, Khamer and Teak seedlings
- To determine the optimum doses of these fertilizers and neem cake.

Activities carried out during the year:

- Measurements were taken on plant height under different potting mixture at two months intervals.
- Observation were recorded on survival percentage of plant

Interim findings :

Species wise positive impact on growth and survival is as under:

Species	Treatment	Survival %	Growth (Shoot) increment against control (%)
Tectona grandis	T0	86	129
	T4	100	
Gmelina arborea	T0	53	138
	T7	93.33	
Emblica officinalis	T0	86	107
	T7	93	

T0 – Control (soil + sand + FYM) (1:1:1)

T4 – T0 + Neem cake (50g)

T7 – Soil, sand Vermicompost (1:1:1) and Neem cake (50g)

Current status of the project : On-going

2. Title : Documentation and development of packages of seed and nursery techniques for some important indigenous species

Project ID	:	SD/P/E/ 12-13/14
Project period	:	June, 2012- June, 2015
Sponsoring Agency	:	APCCF, (R/E & Lokvaniki) M.P., Bhopal
Principal Investigator	:	Dr. Archana Sharma

Objectives:

- To standardize seed and nursery techniques of indigenous species to raise quality seedlings.
- To promote plantations of indigenous species in afforestation programme.

Activities carried out during the year:

- Placement of project staff.
- Literature search from Institute library.
- Seed collection of targeted species
- Testing of collected seeds of various species for viability, moisture and germination percent.
- Preparation of nursery bed.
- Preparation of sowing media.
- Seed sowing in nursery bed/ germination tray
- Various pretreatment for standardization to hasten seed germination.
- Seed Stored in various conditions
- Observation on seed germination.
- Planting of seedlings in root trainers and polythene bags for standardization of size of root trainer and polythene bags.
- Various potting mixture were applied for standardization of potting mixture for better seedling growth.
- Various doses of organic/ inorganic fertilizers in potting mixture were used for standardization of doses for better plant growth under nursery stages.
- Various doses of insecticides and pesticide were applied to prevent of pests and diseases in nursery stock.

Interim findings

- Seeds of *Careya arborea, Mitragyna parviflora, Bauhinia vahlii* and *Semicarpus anacardium* have been collected and tested for moisture, viability and germination potential.
- In *Careya arborea,* the seed viability increased upto 45 days against two days as reported by C. Anil Kumar.
- The viability of seeds has been maintained at 4°C temperature for 45 days without de-pulping from fruits.
- 100% germination was found in the treatment of 10% H_2SO_4 or 500ppm IBA for 10 minutes seed soaking against 74% in control.
- In *Bauhinia vahlii* the highest germination 80% was found in 5% H_2SO_4 for 10 minutes seed soaking against 48% in control under storage at 4°C temperature after one year storage.
- In *Semicarpus anacardium* the highest germination 58% was found in 5% H2SO4 for 10 minutes seed soaking against 36% in control after 6 month of storage at 4°C temperature. After one year it was found 26% in 5% H_2SO_4 against 10% in control condition under storage at 4°C temperature.
- In *Mitragyna parviflora*, germination in fresh seeds was found to be 0%. After 6 month the highest germination (16%) was found with 60% H_2SO_4 for 10 minute soaking against 4% in control under storage at 4°C temperature.

Current status of the project : On-going

3. Title : - Effect of various pretreatment on seed germination of fresh and stored seeds of *Tectona grandis* (Teak)

Project ID	:	SD/P/E/ 12-13/13
Project period	:	July, 2012- July, 2014
Sponsoring Agency	:	APCCF, (R/E & Lokvaniki) M.P. Bhopal
Principal Investigator	:	Dr. Archana Sharma

Objectives:

- Find out an appropriate seed collection period for better germination.
- Find out an appropriate time of sowing for better seed germination.
- Find out the best sowing media for quick and higher germination.
- Find out the best pretreatment technique for hastening seed germination of teak seeds.
- Preparation of field manual.

Activities carried out during the year:

- Literature search on existing practice from M.P. and other states.
- Procurement of chemicals and other materials related to study.
- Seeds will be collected from identified superior sources in Jan, Feb, March and April to find out best collection period.
- Seed testing in terms of Seed weight, Number of seeds per 100 grams, Moisture %, Viability %, Germination percent, Germination Velocity Index (GVI), Root shoot ratio, Growth of Seedlings, Seed vigour (Fresh and old seeds every three months intervals)
- Application of various existing and new other pre treatments on fresh and stored seeds.
- Observation on seed germination, speed of germination, seedling growth and survival percentage**.**

Progress :

- Seeds were collected in the month of January, February, March and April.
- After collection, seeds were tested for physiological parameter.
- Two years old seeds also tested for germination potential.
- following treatments were tried:
    - ✓ Seed soaking in various concentration of bleaching powder solution.
    - ✓ Various concentrations of lime and jaggery.
    - ✓ Various concentration of cow urine.
    - ✓ Seed soaking in cow urine and cow dug.
    - ✓ 1% solution of sodium nitrate.

Interim Findings:

- Seed soaking in 5%, 10% and 20% bleaching powder for 1 hour shows positive effect with respect to enhance the germination percentage.
- In 20% bleaching powder treatment, the germination was found 39% in two year old seeds after 15 days of seed sowing against 4% germination was found in control (untreated).
- In one year old seeds the germination was found 32% in 20% bleaching powder against 0% in control.
- Best collection period - March

- The seed tested with various existing methods viz; seed soaking with lime and jaggery and cracking on the cemented platform, the maximum germination was found 12 to 14%.

Current status of the project : On-going

4. Title : Documentation of developed seed technology, nursery and planting techniques of important forestry tree species.

Project ID	:	SD/P/I/13-14/08
Project period	:	Jul, 2013- Jun, 2014
Sponsoring Agency	:	APCCF, (R/E & Lokvaniki) M.P., Bhopal
Principal Investigator	:	Dr. Archana Sharma

Objective:

- To prepare a field guide related to seed technology, nursery and planting techniques of 50 forestry species.

Activities carried out during the year

- Seed, nursery and plantation techniques of about 35 species have been recorded through published and unpublished literature on following lines:
  - ✓ Seed viability period/ life span
  - ✓ Dormancy Period (if any)
  - ✓ Germination potential
  - ✓ Appropriate storage method
  - ✓ Best before – in Month
  - ✓ Pretreatment before seed sowing
  - ✓ Media for germination
  - ✓ Seed sowing month
  - ✓ Seed quantity for raising 100 plants
  - ✓ Appropriate method for seed sowing
  - ✓ Disease and control measure in nursery stage
  - ✓ Potting mixture
  - ✓ Poly bag size / root trainers
  - ✓ Spacing
  - ✓ Pit size
  - ✓ Plant height for plantation
  - ✓ Irrigation and maintenance
  - ✓ Utility
  - ✓ Any other

Current status of the project : On-going

5. Title : Strengthening of infrastructure of collection, testing, certification and storage of forestry seeds

Project ID	:	SD/P/E/ 12-13/12
Project period	:	June, 2012- December, 2013
Sponsoring Agency	:	APCCF, (R/E & Lokvaniki) M.P., Bhopal
Principal Investigator	:	Dr. Archana Sharma

Objective:

- To improve the capability of the institute to develop a systematic and scientific approach of collection, testing, grading, certification, storage and distribution of quality seeds.

Activities carried out during the year:

- Preparation of tender document with the help of store officer.
- Official formalities were done as per store norms.

Progress:

- Scientific instrument procured and procurement of other materials is in progress.

Current status of the project : On-going

Regular Activities : Two

1. Seed procurement and disposal

- 1800 kg seed of teak was sold to the department.

2. Seed testing and certification

- 07 Seed samples of Teak and Khamer were received from identified sources and were certified with tested standards.

3.7 SILVICULTURE BRANCH

Mandate:

1. Development and standardization of nursery and planting techniques of different forestry species.
2. Development of technology for afforestation and eco-restoration of stress sites.
3. Contribution to the knowledge of silviculture of forestry species.
4. Determination of suitable thinning regimes for plantation of forestry species.
5. Determination of sustainable harvesting practices of timber and bamboo species (harvesting intensity, time, etc.)
6. Evaluation of impact of various silvicultural systems and evolution of new systems of management in the context of changed environment.
7. Studies on the effects of grazing and fire on forest eco-system.
8. Evaluation of plantations raised by the state forest department and forest development corporation.
9. Evaluation of the quality and impact of various development activities of the state forest department.
10. Provision of soil testing services to the SFD, FDC and other users.
11. Production of quality planting material.

Staff:

S.K. Palash	:	Dy. Director
S.K. Jain	:	Asst. Director
Dr. Pratiksha Chaturvedi	:	Research Officer
Vinay Kori	:	Forest Guard

Project Staff:

Snehlata Mishra	:	Computer Operator

Completed Projects

Internally funded: One

1. Biomass production capacity of *Gliricidia sepium.*

Externally funded: Three

1. Monitoring & Evaluation (including project Impact assessment) work of Bundelkhand special package in Panna and Tikamgarh district of M.P.
2. Workshop on plantation strategy.
3. Standardization of potting mixture of various soil types for optimum growth of *Tectona grandis, Gmelina arborea* and *Dendrocalamus strictus* species.

On-going projects

Internally funded: One

1. Study on felling cycles of *Dendrocalamus strictus.*

Externally funded: Three

1. म.प्र. राज्य वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्ष 2010–11 में प्रारंभ किये गये वनीकरण कार्यों (2011–12 में किये वृक्षारोपण) का अनुश्रवण मूल्यांकन किये जाने के संबंध में।
2. Estimation of carrying capacity of grazing in different forest types and canopy densities in Jabalpur Forest Division of M.P.
3. DNA based monitoring of Tigers presence and their movements in kanha- Pench corridor of M.P.

Newly initiated projects during the year: Nil

Regular activities

On-going: One

1. Analysis of soil samples

Projects completed during the year:

Internally funded: One

1. Title: Biomass production capacity of *Gliricidia sepium*.

Project ID	:	SIL/P/I/13-14/07
Project period	:	03 Month
Sponsoring Agency	:	SFRI
Principal Investigator	:	Dr. Pratiksha Chaturvedi

Objective:

- To know the potential of biomass production of *G. sepium.*

Activities carried out during the year: Draft report submitted.

Important/ interim findings:

- This study thus proves that *Gliricidia sepium* is an extremely valuable plant in tropical farming system and can be an alternative to subabul. The tree can be harvested at around 6 years but if it is retained it shows an increase in biomass at 1.452 tonnes per year per hectare. Thus it can be used as a combination crop successfully in agroforestry models.

Current status of the project: Completed

Externally funded: Three

1. Title: Monitoring & Evaluation (including project Impact assessment) work of Bundelkhand special package in Panna and Tikamgarh district of M.P.

Project ID	:	SIL/P/E/11-12/10
Project period	:	2 Years (June 2011 to June 2013)
Sponsoring Agency	:	APCCF, (JFM/FDA) MP, Bhopal
Principal Investigator	:	Kamalika Mohanta, Dy. Director
Co-PI	:	Dr. Pratiksha Chaturvedi

Activities carried out during the year:

- Final reports of Tikamgarh, North Panna and South Panna divisions completed.

Important findings:

Evaluation of the effect of SMC works (year 2010-11 & 2011-12).

- Increase in water table and its availability for longer duration in adjoining wells.
- Increase in water availability for irrigation.
- Increase in agriculture and fodder production.
- Partial increase in dairy products.
- Decrease in soil erosion and increase in soil moisture humidity.
- Increase in awareness through SMC works.

Over all evaluation status of activities undertaken in Tikamgarh, South Panna and North Panna Forest Division

Division	Technical aspect			Social aspect			Total		
	Max. Marks	Marks Obtained	Per. (%)	Max. Marks	Marks Obtained	Per. (%)	Max. Marks	Marks Obtained	Per. (%)
Tikamgarh	6720	4023.5	59.9	2880	1625	56.4	9600	5648.5	58.8
South Panna	1950	6308	67.0	4050	2433	60.0	13500	8741	65.0
North Panna	9450	5813.5	61.52	4050	2359	58.2	13500	8172.5	60.54

Current status of the project: Completed

2. Title : Workshop on plantation strategy.

Project ID : SIL/P/E/13-14/11

Project period : 12-13 Aug. 2013

Sponsoring Agency : APCCF (R/E & LokVaniki) MP, Bhopal

Principal Investigator : Kamalika Mohanta

Objective:

- Workshop on plantation strategy.

Activities carried out during the year: Final report submitted

Important findings:

Various presentations on plantation strategy and nursery technique were presented and the recommendations were made by the Senior Forest Officers.

Current status of the project: Completed

3. Title : Standardization of potting mixture of various soil types for optimum growth of *Tectona grandis, Gmelina arborea* and *Dendrocalamus strictus* species.

Project ID : SIL/P/E/ 10-11/14

Project period : 2011 - 2013

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

Principal Investigator : Mayank Makrand Verma

Project associates : Gajanand Sahu

Objective:

- To standardize proportion of ingredients of potting mixture for production of healthy planting stock of *Tectona grandis, Gmelina arborea* and *Dendrocalamus strictus* in major soil types of M.P.

Important findings:

1. *Tectona grandis* performance on Black Soil, Red Soil, Loam Soil, Alluvial Soil, Sandy Loamy Soil and Laterite Soil was found most suitable in 1:1:3, 3:3:2, 1:1:2, 3:2:2, 2:2:1, 2:2:3 ratio of Soil: Sand: Compost respectively after one year seed sowing.

- *Gmelina arborea* performance on Black Soil, Red Soil, Loam Soil, Alluvial Soil, Sandy Loamy Soil and Laterite Soil was found most suitable in 1:2:2, 2:3:1, 1:2:2, 1:3:2, 1:2:3, 2:3:3 ratio of Soil: Sand: Compost respectively after one year seed sowing.
- *Dendrocalamus strictus* performance on Black Soil, Red Soil, Loam Soil, Alluvial Soil, Sandy Loamy Soil and Laterite Soil was found most suitable in 1:3:2, 1:3:2, 2:2:3, 1:1:1, 3:3:2, 1:1:1 ratio of Soil: Sand: Compost respectively after one year seed sowing.

Current status of the project: Completed

On-going projects

Internally funded: One

1. Title: Study on felling cycles of *Dendrocalamus strictus.*

Project ID	:	SIL/P/E/04-05/08
Project period	:	July 2004- June 2017
Sponsoring Agency	:	Internal
Principal Investigator	:	S.K. Palash
Co-PI	:	Dr. Pratiksha Chaturvedi

Objective:

- To determine the most appropriate felling cycle for *Dendrocalamus strictus.*

Activities carried out during the year:

- Bamboo felling for the one and three year intervals in T_1, and T_3 treatment plot was done for study.

Interim Findings:

1. Two year treatment gave better yield than others followed by T1, T3, T4 in descending order.
2. T1 (one year interval) has more number of Karla production followed by T2, T4, and T3 in descending order.
3. T4 had a maximum number of matured culms (Pakia) due to maximum felling interval.

Current status of the project: On-going

Externally funded: Three

1. Title: म.प्र. राज्य वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्ष 2010–11 में प्रारंभ किये गये वनीकरण कार्यों (2011–12 में किये वृक्षारोपण) का अनुश्रवण मूल्यांकन किये जाने के संबंध में।

Project ID	:	SIL/P/E/13-14/12
Project period	:	06 Months
Sponsoring Agency	:	APCCF (JFM/FDA) M.P., Bhopal
Principal Investigator	:	S.K. Palash
Co-PI	:	S.K. Jain

Objectives:

- To promote peoples participation in afforestation works and forest management.
- Checking forest degradation and loss of bio-diversity.
- Ecological sustainability, environmental conservation and eco-development of project areas.
- To develop the degraded forest wastelands by appropriate afforestation activity.
- Assisting natural regeneration in degraded areas with good root stock.
- Ensuring sustainable use of forest produce obtained from the regenerated areas.
- To develop water resources through soil and moisture conservation efforts and water harvesting.
- To develop public awareness for forests as beneficial resource and use of its produce for the maximum benefit.
- Employment generation for the poor sections of society particularly the women SC/ST and landless labourers inhabiting forest.

Activities carried out during the year:

- Field work of all 17 Divisions completed.
- Interim reports of 02 forest divisions Ujjain and West Chhindwara submitted.
- Interim reports of 8 Division were completed.

Important/ interim findings:

- On the basis of overall grading the work of Jabalpur and Ujjain was found to be outstanding whereas the works of Dindori, Dhar, East Chhindwara, West Chhindwara, Singrauli, South Chhindwara, Indore and East Mandla has been found to be very good.

Overall Grading of various FDAs

S.N.	Forest Circle	Name of FDAs	Overall Project Grade
1	Ujjain	Ujjain	Outstanding
2	Jabalpur	Jabalpur	Outstanding
3	Jabalpur	E. Mandla	Very Good
4	Jabalpur	Dindori	Very Good
5	Indore	Dhar	Very Good
6	Indore	Indore	Very Good
7	Chhindwara	E. Chhindwara	Very Good
8	Chhindwara	S. Chhindwara	Very Good
9	Chhindwara	W. Chhindwara	Very Good
10	Rewa	Singrouli	Very Good

Current status of the project: On-going

2 Title: Estimation of carrying capacity of grazing in different forest types and canopy densities in Jabalpur Forest Division of M.P.

Project ID	:	SIL/P/E/09-10/07
Project period	:	2011 - 2015
Sponsoring Agency	:	Madhya Pradesh Forest Department (Development Wing)

Principal Investigator	:	Mayank Makrand Verma
Project associates	:	S.K Chaubey

Objectives:

- To estimate the carrying capacity of grazing.
- To prepare an inventory of palatable and non palatable grass species.
- To study the effect of grazing & browsing on the regeneration of tree, shrubs, herbs and grasses.

Activities carried out during the year:

- Grass inventory of palatable and non palatable prepared.
- Annual grass biomass estimation completed.
- Annual regeneration survey of forestry crops completed.

Current status of the project: On-going

3. Title : DNA based monitoring of Tigers presence and their movements in Kanha- Pench corridor of M.P.

Project ID	:	SIL/P/E/ 12-13/09
Project Period	:	2012 - 2015
Sponsoring Agency	:	APCCF (R/E & Lokvaniki) M.P. Bhopal
Principal Investigator	:	Mayank Makrand Verma
Project associate	:	Aradhana Singh

Objectives:

- Non- invasive genetic analysis to establish tiger presence, minimum tiger numbers and distribution using DNA extracted from non- invasively collected faecal samples from Kanha-Pench corridor of Madhya Pradesh.
- Assessment of the importance of corridor in maintaining genetic exchange between Kanha and Pench source population of tiger in Madhya Pradesh.
- To study on functionality of Kanha-Pench corridor for genetic exchange.

Activities carried out during the year:

- First round sign mark survey of the Kanha-Pench corridor area completed.
- Tiger scat sample collection is in progress.
- DNA analysis of the sample is in progress.

Current status of the project: On-going

Regular activities

Internally funded: One

1. Title : Analysis of soil samples:

ID No. : SIL/ RA/ 15

PI : Shri Vinay Kori

Objective:

- Physico–chemical analysis of soil samples received from forest department, MPRVVN Ltd, private agencies, NGO's and various branches of the institute.

Activities carried out during the year:

1339 samples for biomass determination of leaf litter and herbacious material and 246 soil samples were received from forest department, MPRVVN Ltd., private agencies (NGO's) and various branches of the institute. These were analysed for their physical and chemical properties and nutrients status for various parameters viz. moisture, pH, EC, organic carbon%, organic matter, available nitrogen, phosphorus, potassium, calcium, sodium, water holding capacity, textural class, bulk density, specific gravity, etc. Soil analysis reports were sent to the concerned agencies and various branches of the institute.

3.8 SOCIAL ECONOMICS AND MARKETING BRANCH

Mandate

The branch conducts research on social, economic, utilization and marketing aspects related to forestry. The broad areas of research are:

Social Economics

Forestry in the context of socio- economic development and tribal economy.

People's participation in JFM and other forestry programmes.

Marketing

Marketing of forestry products.

Marketing information service.

Utilization

Forest based industries and rural development.

NWFP processing

Archive

Maintenance of Forest Archive.

Restoration and preservation of old records.

Staff:

Dr. Pratibha Bhatnagar	:	Scientist and Head
Dr G.S. Mishra	:	Research Officer
Mr. Alok Raikwar	:	Technical Assistant
Mr. Jatashankar	:	Technical Assistant
Mr. Vijay Bahadur Singh	:	Technical Assistant

Project Staff

Ms. Radhika Urmalia	:	Research Associate
Ms. Kiran Kawade	:	Research Associate
Ms. Sonam Jain	:	Lab Assistant
Mr. Ajay Prakash Tiwari	:	Lab Assistant
Mr. Rajesh Barman	:	Sales Promotion Representative
Mr. Mukesh Gawane	:	Sales Promotion Representative
Mr. Nitin Jaiswal	:	Sales Promotion Representative
Mr. Rahul Kushwaha	:	Sales Promotion Representative

Completed projects during the year

Internally funded: Nil

Externally funded : Two

1. 150 years of forestry in Madhya Pradesh
2. मध्यप्रदेश में निजी एवं राजस्व क्षेत्रों में वानिकी प्रसार हेतु विभिन्न प्रकार की जलवायु एवं मिट्टियों में प्राप्त हो सकने वाली वनोपज का आर्थिक विष्लेषण

Ongoing projects

Internally funded : Nil

Externally funded : Seven

1. Valuation of forest resources and its accounting: a casestudy of South Balaghat Forest Division.
2. Sustainable harvesting and primary processing of gums and gum oleo resin in Madhya Pradesh.
3. Strengthening of MIS Cell at SFRI and establishments of five regional marketing analysis centres.
4. Standardization of primary processing and drying techniques of NWFPs including medicinal plants.
5. Preservation and digitization of research in SFRI
6. Compilation of 50 years of forestry research in SFRI (1963-2013)
7. Development of storage system in Archive rooms of State Forest Research Institute.

Newly initiated projects during the year

Internally funded: Nil

Externally funded: Two

1. Training on technical know how of gum tapping from *Butea monosperma* in Umaria and Tikamgarh districts to local people and frontline staff of forest department**.**
2. मध्यप्रदेश में प्रमुख गोंदों के संग्रहण के ऑकड़ों का संकलन एवं प्राथमिक संग्राहकों पर सामाजिक आर्थिक प्रभाव।

Projects completed during the year
Externally funded: Two

1. Title: 150 Years of Forestry in Madhya Pradesh.

Project ID	:	SEM/P/E/11-12/20
Project Period	:	1st June.2011 to Dec. 2012
Sponsoring Agency	:	APCCF (R/E & Lokvaninki) M.P. Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar

Objectives:

- To organize Fourth K.P. Sagrieya Memorial lecture.
- Publication of special issue of Vaniki Sandesh.

Activities carried out during the year:

- The 4th K.P. Sagreiya Memorial Lecture was delivered by Dr. CTS Nair jointly organized by SFRI and Society of Tropical Forestry Scientists on 23rd Feb 2013. Dr. CTS Nair, formerly Chief economist, FAO, Rome delivered a lecture on Forests and forestry in a changing society: challenges and possible responses.The function was attended with more that 150 participants from various institutions.
- Special issue of 150 years commenuration of Vaniki Sandesh was published.

Current status of the project: completed

2. Title : मध्यप्रदेष में निजी एवं राजस्व क्षेत्रों में वानिकी प्रसार हेतु विभिन्न प्रकार की जलवायु एवं मिट्टियों में प्राप्त हो सकने वाली वनोपज का आर्थिक विष्लेषण।

Project ID	:	SEM/P/E/10-11/09
Project Period	:	2 years (June 2010-11 to Nov. 2013)

Sponsoring Agency	:	APCCF (R/E & Lokvaninki) M.P. Bhopal
Principal Investigator	:	Dr. G.S. Mishra
Project associate	:	Mr. Shekhar Saxena

उद्देश्य

- वानिकी प्रसार हेतु जलवायु एवं मिट्टी के अनुसार कृषकों के सफल वृक्षारोपण का अध्ययन।
- कृषकों की पड़ती तथा कृषि के लिए अनुपयुक्त भूमि में उगाई जा सकने वाली वृक्ष एवं औषधीय प्रजातियों का अध्ययन।

निष्कर्ष

- औषधीय प्रजातियों के कीमत निर्धारण, मांग, पूर्ति, बाजार संबंधी औपचारिक स्पष्ट नीति का अभाव, गुणवत्ता वाले बीज एवं पौधों की समुचित व्यवस्था न होना तथा कृषकों का इनके प्रसंस्करण की अज्ञानता, मजदूरों की समस्या एवं अधिक मजदूरी के कारण लागत में वृद्धि आदि कारणों से औषधीय प्रजातियों की खेती करने वाले कृषकों को बहुत अधिक हानि उठानी पड़ी है।
- मध्यप्रदेश में इन्दौर, खरगौन, धार, नीमच, दतिया, छतरपुर के कुछ नाम मात्र के कृषकों को छोड़कर व्यावसायिक रूप से लाभ कमाने के उद्देश्य से कही भी औषधीय प्रजातियों की खेती नही की जा रही है।
- औषधीय प्रजातियों में से केवल ऑवला सभी कृषि जलवायु क्षेत्र में तथा मेंन्था, ईसबगोल, अश्वगंधा एवं मूसली कुछ जिलों के बहुत कम कृषकों द्वारा की जा रही है।
- औषधीय पादप बोर्ड, नई दिल्ली से अनुदान प्राप्त कर औषधीय प्रजातियों की खेती करने वाले कृषकों ने लगभग औषधीय प्रजातियों की खेती करना बंद कर दिया है।
- औषधीय प्रजातियों के कीमत निर्धारण, मांग, पूर्ति, बाजार संबंधी औपचारिक स्पष्ट नीति का अभाव, गुणवत्ता वाले बीज एवं पौधों की समुचित व्यवस्था न होना तथा कृषकों का इनके प्रसंस्करण की अज्ञानता, मजदूरों की समस्या एवं अधिक मजदूरी के कारण लागत में वृद्धि आदि कारणों से औषधीय प्रजातियों की खेती करने वाले कृषकों को बहुत अधिक हानि उठानी पड़ी है।
- औषधीय प्रजाति की मात्रा में भी कमी होने की जानकारी प्राप्त हुई है। इसका मुख्य कारण केंन्द्र सरकार की मनरेगा एवं राज्य सरकार की कई योजनाये, निजी क्षेत्र के भवन निर्माण योजना के अंतर्गत मिलने वाली मजदूरी में वृद्धि, आदिवासी एवं पिछड़े तबके के बच्चों की शिक्षा के प्रति शासन की अनुकूल नीति के कारण वनोपज संग्रहण के लिए उन्हे समय नही मिल पाता, साथ ही प्रदेश शासन द्वारा राशन व्यवस्था के तहत कम आय में गरीब आदिवासी लोगों की आवश्यकता की पूर्ति सरलता से हो जाती है।
- मालवा का पठार कृषि जलवायु क्षेत्र के अंतर्गत इन्दौर और बड़वानी जिले में सफेद मूसली की खेती की जा रही है तथा कृषकों को न्यूनतम प्रति एकड़ लगभग रु. 0.38 लाख एवं अधिकतम रु. 1.78 लाख शुद्ध वार्षिक आय प्राप्त होती है। ईशबगोल की खेती में न्यूनतम प्रति एकड़ लगभग रु. 0.11 लाख एवं अधिकतम रु. 0.45 लाख, अश्वगंधा की खेती से न्यूनतम प्रति एकड़ लगभग रु. 0.19 लाख एवं अधिकतम रु. 0.25 लाख तथा ऑवला की खेती से न्यूनतम प्रति एकड़ लगभग रु. 0.02 लाख एवं अधिकतम रु. 0.09 लाख प्रति वर्ष प्राप्त होते है। ऑवला की खेती से प्रति एकड़ प्राप्त होने वाली अधिकतम आय रु. 0.20 लाख एवं न्यूनतम रु. 0.01 लाख प्रति एकड़ रही जबकि सफेद मूसली से प्राप्त होने वाली आय रु. 2.67 लाख प्रति एकड़ रही।
- बुन्देलखण्ड कृषि जलवायु क्षेत्र में मेंथा की खेती से संबंधित ऑकड़ों का विश्लेषण करने पर ज्ञात होता है कि कृषकों को प्रति एकड़ औसत रूप से रु. 0.37 लाख आय प्राप्त हो जाती है जबकि प्रति एकड़ औसत लागत रु. 0.12 लाख अर्थात् प्रति एकड़ शुद्ध आय रु. 0.25 लाख प्राप्त होती है। इस कृषि जलवायु क्षेत्र में मेंथा की खेती काफी लोकप्रिय है। ऑवला की खेती से प्रति एकड़ प्राप्त होने वाली वार्षिक आय रु. 0.02 से 0.06 लाख रही।

- कृषि वानिकी के अंतर्गत ऑवला के कुछ रोपण पाये गये जिनके साथ कृषकों ने गेंहूँ, सोयाबीन, चना, टमाटर की फसले उगा रखी थी। कृषकों द्वारा दी गई जानकारी के अनुसार ऑवला रोपण स्थल में गेहूँ, एवं सब्जियों की खेती करने से ऑवला के पौधों को अधिक पानी की वजह से हानि पहुँची है। ऐसे ऑवला रोपण स्थल में होने वाले रोगों का आक्रमण एवं फलों का न लगना कृषक पानी एवं रासायनिक खादों के प्रयोग को उत्तरदायी मानते है। साथ ही कृषि उत्पादन में 15 से 20 प्रतिशत की कमी होने की जानकारी दी। ऑवला के फलों की वर्तमान कीमत एवं मजदूरी की दर को ध्यान में रखते हुए कृषि योग्य भूमि में व्यावसायिक दृष्टिकोण से कृषकों में ऑवला रोपण के प्रति कोई रूचि नहीं दिखाई दी।
- मालवा का पठार कृषि जलवायु क्षेत्र में औषधीय प्रजातियों के अंतर्गत ऑवला, अश्वगंधा, ईशबगोल एवं सफेद मूसली की खेती पाई गई।
- बुन्देलखण्ड कृषि जलवायु क्षेत्र में निजी भूमि के अंतर्गत किये गये वृक्षारोपण में केवल सागौन तथा औषधीय प्रजातियों के अंतर्गत सर्वाधिक मेंथा की खेती पाई गई।
- सागौन रोपण के लिए उपयुक्त पौधों की उपलब्धता, उनसे प्राप्त होने वाली आय, रोपण से कृषि पर पड़ने वाले प्रभाव, पौधों के रजिस्ट्रेशन एवं उनके रोपण के पश्चात् स्वयं के उपयोग अथवा धन की अवश्यकता होने पर निवर्तन में कानूनी अड़चन आदि के भय से लोग सागौन सहित अन्य किसी भी जंगली प्रजाति का रोपण करने से कतराते है।
- ऐसे भूमि स्वामी जिनके पास पर्याप्त भूमि है, लेकिन वे अन्य व्यवसाय में संलग्न होने एवं मजदूरों की कमी, अत्यधिक मजदूरी दर में वृद्धि, प्राकृतिक अनिश्चितता के कारण खेती नही कर पा रहे है वे अपनी भूमि के कुछ भाग में वृक्षारोपण के लिए इच्छुक है लेकिन पौधों की उपलब्धता, वृक्षारोपण की तकनीक एवं उसके निवर्तन आदि के बारे में जानकारी न होने के कारण नही कर सके।
- जिन कृषकों ने निजी भूमि में सागौन का रोपण किया हुआ है उनमें से अधिकांश कृषकों के पौधों का अभी तक वन विभाग में एवं राजस्व खसरा में दर्ज नही किया जा सका। कुछ कृषकों ने खसरा में दर्ज करा दिया है लेकिन वन विभाग के पास आवेदन करने के बावजूद भी उनके प्रकरण में उन्हे कोई संतोषजनक उत्तर नही दिये जाने से उनमें निवर्तन के लिए आशंका बनी हुई है।
- कुछ ऐसे कृषक जिन्होने अपनी भूमि में सागौन का रोपण किया था, लेकिन बाद में उनकी भूमि नगर निगम की सीमा में आ गई। कृषक ने वन विभाग से अनुमति प्राप्त कर आवश्यकतानुसार पौधे कटवा दिये लेकिन नगर निगम (जबलपुर) की कड़ी आपत्ति एवं पेनाल्टी के कारण कृषक को समय, धन एवं मानसिक कष्ट के दौर से गुजरना पड़ा। ऐसी स्थिति उत्पन्न होने के कारण इस परिस्थिति से अन्य कई कृषक विचलित हो जाते है और उनमें वृक्षारोपण के प्रति अनायास ही दूरी पैदा हो जाती है।
- मध्यप्रदेश में एक निजी संस्था शिवशक्ती, रोपणी, हैदराबाद के द्वारा कृषकों को अत्यन्त कम समय में सागौन के रोपण से मालामाल होने का झूंठा लालच दिखाकर स्वयं के द्वारा तैयार किये गये सागौन एवं ऑवला के पौधे, मध्यप्रदेश में उक्त पौधों के लिए निर्धारित अधिकतम कीमत से कई गुना अधिक कीमत पर स्थानीय दलालों के माध्यम बेचा गया तथा अधिकांश कृषक ठगी के शिकार हुए लेकिन इसे रोकने एवं वास्तविक स्थिति से कृषकों को सचेत करने के कोई कदम न उठाया जाना दुर्भाग्यपूर्ण रहा।
- सिवनी जिले के कृषक द्वारा कृषि वानिकी के रूप में क्लोनल यूकेलिप्टस के साथ गेंहूँ की फसल ली गई तथा 5 वर्ष पश्चात् पौधों का निवर्तन किया गया। कृषक को पॉच वर्ष में प्रति एकड़ शुद्ध आय रु. 1.15 लाख अर्थात् प्रति एकड़ रु. 0.23 हजार वार्षिक प्राप्त हुए। इसी प्रकार ऑवला से प्रति एकड़ प्राप्त होने वाली अधिकतम आय रु. 0.096 लाख एवं न्यूनतम रु. 0.026 लाख प्रति एकड़ रही।
- नर्मदा घाटी कृषि जलवायु क्षेत्र के अंतर्गत जबलपुर जिले के कृषकों द्वारा कृषि वानिकी के रूप में क्लोनल यूकेलिप्टस के रोपण से पौधो का वर्ष 2010 में निवर्तन भी किया गया है। जिसमें प्रति

एकड़ (लगभग 3.83 वर्ष में) लगभग रु. 1.36 लाख अर्थात् लगभग रु. 0.36 लाख वार्षिक शुद्ध आय अर्जित किया। जबकि क्लोनल यूकेलिप्टस का समूह रोपण करने वाले एक अन्य कृषक को प्रति एकड़ (लगभग 4.58 वर्ष में) लगभग रु. 0.84 लाख अर्थात् रु. 0.18 लाख वार्षिक शुद्ध आय प्राप्त हुई। इस रोपण स्थल में कभी खेती नही की जाती थी अर्थात् मिट्टी अनुपजाऊ किस्म की है। इसी प्रकार ऑवला की खेती से प्रति एकड़ प्राप्त होने वाली अधिकतम आय रु. 1.04 लाख एवं न्यूनतम रु. 0.47 लाख प्रति एकड़ रही।

- यूकेलिप्टस का रोपण मध्यप्रदेश के कुल 6 कृषि जलवायु क्षेत्रों यथा छत्तीसगढ़ से लगा पहाड़ी क्षेत्र, कैमोर एवं सतपुड़ा की पहाडियां, नर्मदाघाटी, वैनगंगा घाटी, गिर्द क्षेत्र एवं सतपुड़ा का पठार कृषि जलवायु क्षेत्र में किया गया है। इसमें से सर्वाधिक रोपण एवं वानिकी के अंतर्गत कैमोर एवं सतपुड़ा की पहाड़ियां तथा नर्मदा घाटी कृषि जलवायु क्षेत्र के कृषकों द्वारा क्लोनल यूकेलिप्टस के साथ सफलतापूर्वक परम्परागत खेती की जा रही है।
- मध्यप्रदेश के किसी भी कृषि जलवायु क्षेत्र में कृषि वानिकी के अंतर्गत सागौन, खमेर, शीशम का रोपण सर्वेक्षण के दौरान नही पाया गया।
- जबकि खमेर का रोपण नर्मदा घाटी एवं वैन गंगा कृषि जलवायु क्षेत्र के अंतर्गत जबलपुर एवं बालाघाट जिले में समूह रोपण तथा कैमोर एवं सतपुड़ा की पहाड़ियां कृषि जलवायु क्षेत्र के अंतर्गत सतना जिले में कृषक के खेत के मेंड़ में पाया गया। एक मात्र शीशम का रोपण गुना जिले में निजी कपड़ा फैक्ट्री के परिसर में लगभग 2.30 एकड़ रकवा में पाया गया।
- मालवा, निमार एवं विन्ध्य का पठार कृषि जलवायु क्षेत्र में अधिकांश कृषकों ने खेतों के मेंड़ों में सागौन का रोपण किया है।
- अध्ययनित वृक्षारोपणें को देखने से ज्ञात होता है कि वृक्षारोपणों में अच्छी वृद्धि वही पर है जहां मृदा गहरी काली ककरीली, रेतीली दुमट है तथा मृदा में आर्दता, जल धारण क्षमता, रन्ध्रता एवं पोषक तत्वों की अच्छी उपलब्धता है जबकि उथली, ककरीली पीली, चिकनी, कड़ी एवं चूना युक्त मृदा में वृद्धि कम है।
- अध्ययन में यह भी पाया गया कि अधिकांश कृषकों ने पौधों की सिंचाई बहाव एवं नाली के माध्यम से किया तथा कुछ कृषकों ने ड्रिप के द्वारा सिंचाई की पद्धति को अपनाया। अतः ड्रिप के द्वारा सिंचाई वाले रोपणों में पौधों की आवश्यकतानुसार पानी मिलने से जहॉ पानी का सदुपयोग हुआ वहीं पौधों की वृद्धि दर पर भी अनुकूल प्रभाव देखने को मिला।
- सागौन का रोपण करने वाले लगभग 95 प्रतिशत कृषकों ने पौधा शिवशक्ती निजी रोपणी, हैदराबाद से प्रति पौधा रु. 55.00 से रु. 90.00 में प्राप्त किये है जबकि 5 प्रतिशत कृषकों ने वन विभाग से प्रति पौधा लगभग रु. 2.00 से 5.00 में प्राप्त कर रोपण किया है।
- अध्ययन में पाया गया कि जिन कृषकों ने पौधा से पौधा एवं कतार से कतार के बीच 8 से 12 फीट की दूरी रखी है तथा रोपण स्थल की वर्ष में 1–2 जुताई की है उस रोपण में पौधों की औसत गोलाई अपेक्षाकृत अधिक पाई गई, लेकिन ऑकड़ों के विश्लेषण में पाया गया कि ऐसे रोपण जिनमें पौधा एवं कतार के मध्य 4 से 6 फीट का अंतर रखा गया है उन रोपणों में पौधों की औसत गोलाई कम होने के बावजूद भी प्रति एकड़ औसत काष्ठ का वाल्यूम अधिक पाया गया।

Current status of the project: completed

Ongoing projects

Externally funded : Eight

1. Title : - Valuation of forest resources and its accounting: a casestudy of South Balaghat Forest Division.

Project ID : SEM/P/E/09-10/06

Project Period : Jan.2010 to Dec 2012

Sponsoring Agency	:	APCCF (Dev.) M.P.Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar
Project associate	:	Ms. Kiran Kawde

Objectives :

- To undertake a specific study for forest valuation and resource accounting of contribution of forests at division level.
- To suggest a method and framework for adopting an improved Forest Resource Accounting (FRA) system.

Interim Findings:

Estimates of value of all recorded and unrecorded benefits and costs

Particulars	Benefits	Costs	Net benefit (Rs. Lakh)
Recorded	4358	4304	54
Unrecorded	13059	6824	6235
All	17417.31	11128	6289

Extent of unrecorded benefits and costs

Estimates based on the study			Unrecorded (Rs. crore)
Recorded (Rs. crore)	Unrecorded (Rs. crore)	Total (Rs. crore)	
1.	2.	3.(1+2)	4.(2-1)
0.54	62.35	62.89	61.81

The extent of unrecorded for the division was Rs. 61.81 crores. The study undertook accounting of recorded and unrecorded removals from the Forest Division which revealed a distortion to the extent of Rs. 61.81 crores

Current status of the project: Ongoing

2. Title : Sustainable harvesting and primary processing of gums and gum oleo resin in Madhya Pradesh.

Project ID	:	SEM/P/E/10-11/04
Project Period	:	Dec 2010 –Dec 2012, extended upto June, 2013
Sponsoring Agency	:	MP MFP (Trade & Dev.) Co-operative Federation, Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar
Project associates	:	Ms. Radhika Urmalia
	:	Ms. Sonam Jain

Objectives:

- To study and document the present status of sustainable harvesting, processing, utilization and marketing of important gums and gum oleo-resin viz gum karaya, Dhaora gum, Kamarkas gum and Salai oleo resin in the state.
- To standardize methods of sustainable harvesting and primary processing of Dhaora, kullu, kamarkas gum and salai oleo-resin.
- To evolve proper methods of storage to maintain its properties.
- Extension of improved harvesting, processing, value addition and storage technologies to model villages through training.

Activities carried out during the year:

Interim findings:

A) To assess current status of harvesting gums, field survey were done in seven districts by laying sample plots of 50 X 50 m, 10 X 10 m and 1 X 1 m for tree enumeration and estimating regenerating status. Criteria for estimating harvesting intensity of *Sterculia urens* and *Boswellia serrata* are as follows:

Low	< 1 feet
Moderate	>1 feet < 2 feet
High or severe	> 2 feet

and for *Butea monosperma:*

Low	0-50 incisions
Moderate	50-100 incisions
High or severe	>100 incisions

The field survey revealed that intensity of *Sterculia urens* and *Boswellia serrata* was high in Sheopur district whereas, on *Butea monosperma* it was reported high in Tikamgarh district, as shown in figs. 1-3 respectively.

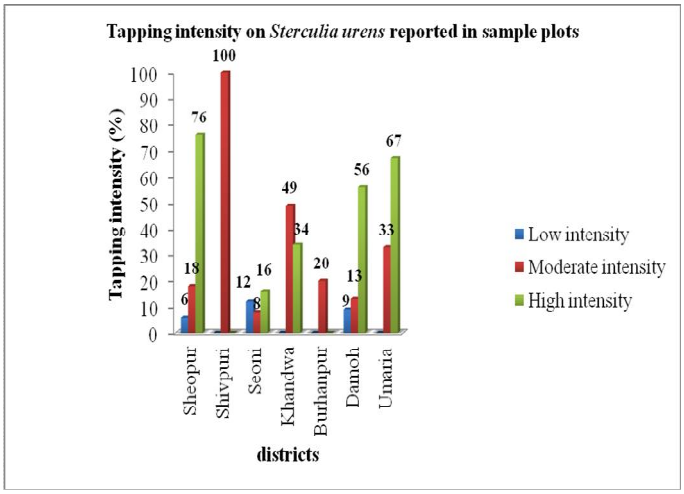


Fig. 1: Status of tapping intensity on *Sterculia urens* in different surveyed districts.

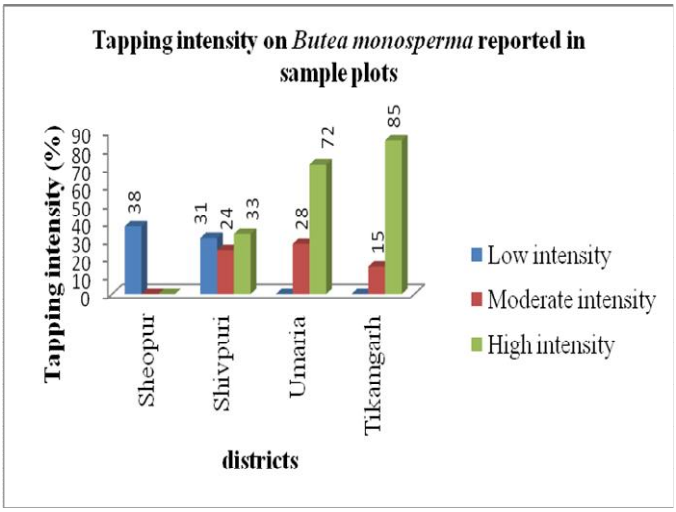


Fig. 2: Status of tapping intensity on *Butea monosperma* in different surveyed districts

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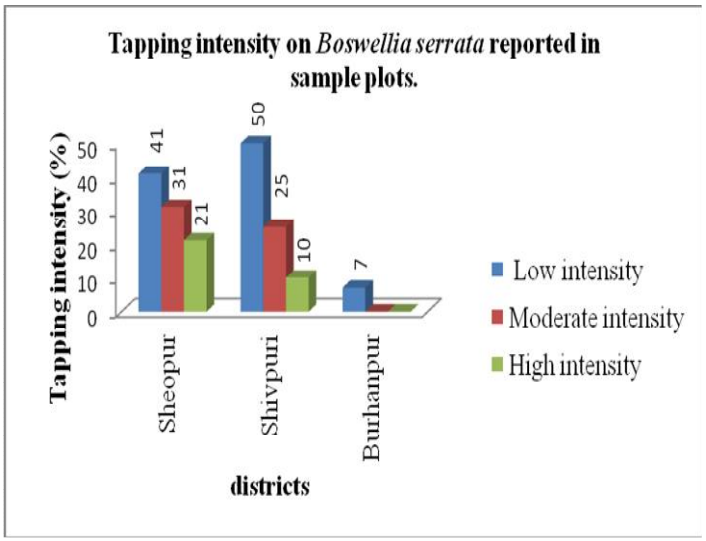


Fig. 3: Status of tapping intensity on *Boswellia serrata* in different surveyed districts

Survey carried out to assess the current status of processing and storage of gums revealed that gums are not cleaned, graded or processed.

B) To evolve sustainable harvesting techniques of *Karaya*, *Kamarkas* and *Salai* gum different experiment were done; details are given in Table 1.

Table No.1: Experiments to evolve sustainable harvesting techniques

S. No.	Tapping experiments	Treatments and Replicates	Girth class (in cm)
1	*Sterculia urens*	T0- Traditional method T1- 1 blaze T2- 2 blaze opposite side 5 replicates in each girth class	90-140 141-190 191-240
2	*Butea monosperma*	T1- 10 incisions T2- 20 incisions T3- 30 incisions 5 replicates in each girth class	80-110 111-150 151-200

3	*Boswellia serrata*	T0- Traditional method T1- ½ Circular band T2- ½ Circular opposite alternate side 10 replicates in each girth class	90-120 121-160 161-200

The result of the experiment has shown that, maximum *Karaya gum* production of 1697.9 gm/tree was found in girth class 191-240 cm under treatment T_2 with 2 blazes on opposite sides of the tree. Details are given in Table No. 2.

Table No.2 Yield of *Karaya gum* under different treatment of girth class.

S. No	Month	90-140 cm			141-190 cm			191-240 cm		
		T0	T1	T2	T0	T1	T2	T0	T1	T2
1	March	179.5	194.6	215.9	203.1	158.1	231.1	197.3	208.8	325.7
2	April	341.8	356.6	434.6	364.4	366.8	459.8	422.8	458.2	631.2
3	May	336.4	395.8	477.0	389.0	449.8	509.6	457.2	494.2	741.0
Total yield/tree		857.7	947.0	1127.5	956.5	974.7	1200.5	1077.3	1161.2	1697.9

Maximum *Kamarkas* gum production of 709 gm /tree was observed in girth class 151-200 cm under treatment T_3 with 30 incisions. Details are shown in Table No. 3.

Table No.3: Yield of *Kamarkas* gum under different treatments and girth classes

S. No.	Month	80-110 cm			111-150 cm			151-200 cm		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
1	Feb	28.0	27.0	12.1	59.5	74.5	99.0	115.0	173.6	137.5
2	March	51.0	100.0	222.0	58.0	162.5	371.0	93.0	413.0	571.5
Total yield/tree		79.0	127.0	234.1	117.5	237.0	470.0	208.0	586.6	709.0

Maximum Salai gum production of 406.5 gms/tree was found in 161-200 cms girth class under treatment T_2 following ½ circular band on opposite alternate side. Details are given in Table No. 4

Table No. 4: Yield of *Salai* gum under different treatment and girth classes.

S. No.	Month	80-120 cm			121-160 cm			161-200 cm		
		T0	T1	T2	T0	T1	T2	T0	T1	T2
1	Nov	1.1	5.8	3.3	8.3	3.8	6.0	10.8	14.8	13.1
2	Dec	24.5	15.2	26.8	20.1	18.5	23.4	41.4	62.9	57.9
3	Jan	32.6	36.9	38.2	31.3	34.4	26.3	89.8	78.3	84.5
4	Feb	6.6	11.3	25.7	15.6	6.0	20.8	55.9	37.4	53.0
5	March	27.1	35.1	47.0	25.4	33.5	50.6	80.3	40.2	94.1
6	April	34.7	41.2	38.3	32.2	26.9	53.2	69.7	52.3	85.4
7	May	20.4	10.2	10.5	13.6	13.2	17.2	17.3	6.0	18.5
Total yield/tree		147	155.7	189.8	146.5	136.3	197.5	365.2	291.9	406.5

Progress:

- A Book on " Gums and resin yielding plants: Harvesting, processing and quality control" is under publication by Avishkar Publishers, Jaipur.
- One training on sustainable harvesting processing and value addition of gums is to be undertaken.

Current status of the project: On going

3. Title: Strengthening of MIS cell and establishment of five regional market data collection and analysis Centers in Madhya Pradesh.

Project ID	:	SEM/P/E/11-12/01
Project Period	:	May 2011 –Apr 2015
Sponsoring Agency	:	MP MFP Federation, Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar
Project Associates	:	Ms. Radhika Urmalia
	:	Mr. Rajesh Barman
	:	Mr. Mukesh Gawane
	:	Mr. Nitin Jaiswal

Objectives :

- Collect and analyze market information.
- To assess market demand for medicinal plants.
- Market promotion.
- Market research and intelligence.

Activities carried out during the year

Table 1: Details of MIS centres and markets

Zones	Centres	Markets/Districts
Eastern	Katni	Rewa, Shahdol, Umaria, Katni Satna, Chhatarpur, Tikamgarh and Sidhi.
Southern	Chhindwara	Chhindwara, Betul, Harda, Seoni, Hoshangabad and Narsinghpur.
Central	Bhopal	Bhopal, Vidisha, Sehore, Raisen, Shajapur, Raigarh.
Northern	Shivpuri	Shivpuri, Sheopur, Morena, Gwalior, and Guna
Western	Indore	Indore, Khandwa, Jhabua, Dhar, Dewas, Ujjain, Ratlam and Neemuch
Nodal Centre	MIS Cell, SFRI	Jabalpur, Mandla, Dindori, Balaghat, Sagar, Damoh, Panna, and national market.

Progress:

1. Market information

- Periodical market survey and collection of market rates from national, state level, district & village level markets in Madhya Pradesh, Maharashtra and Chhattisgarh
- Printing, publishing and dispatch of Van Dhan Newsletter Vol 13.
- Upgradation of trader's directory/ ISM directory-addresses of 310 traders and 183 ISM industries were upgraded.

2. Market promotion

Three Market promotion workshops/ meetings were organized at Harrai, (Chhindwara district), Manpur (Umaria district) and Singaurgarh (Damoh district).

3. Market research

Two projects were completed during the period

- Marketing and utilization of medicinal plants.
- Demand study of medicinal plants required by ISM (Ayurvedic) industries.

To assess the current demand of medicinal species by ISM industries of the state, study was carried out in 44 districts by five market analysis centres in all zones and out of 231 ISM industries operational in the state survey was conducted of 191 industries. Western zone accounts for approximately 62 percent of industries.

Analysis of collected data from ISM industries revealed that:

- The total estimated requirement of medicinal plants in the state by ISM industries is 46298 qtls.
- Among the total 218 medicinal species, requirement of raw aonla alone is reported highest as 11, 000 tonnes during year 2013.
- Out of medicinal species required by ISM industries, 89 are supplied from within the State and 47 are imported from outside.
- 28 medicinal species required can also be cultivated in farms.
- Price trend reports of 65 medicinal species were prepared.

Current status of the project: on going

4. Title : Standardization of primary processing and drying techniques for selected medicinal species and NWFPs

Project ID	:	SEM/P/E/11-12/25
Project Period	:	1st Jan.2012 to Dec. 2015
Sponsoring Agency	:	APCCF (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar

Objectives :

- To standardize primary processing and drying techniques of NWFPs including medicinal plants of commercial importance.
- To find optimal drying conditions.

Activities carried out during the year:

- Driage of *Eclipta alba* (Linn.)Hassk, *Costus speciosus* Koen.Retz and *Acorus calamus* Linn has completed.

Under three treatments

T_0 - Sun drying

T_1 - Solar drying

T_2 - Shade drying under room condition

Table 1: Driage percentage of *Eclipta alba* (Linn.)Hassk

S. No	Treatment	Fresh weight (gms)	Days	Driage percentage	Mean Wt.	SD	Variance	SE
1.	Sun drying	400	2	82.75	69.0	3.16	10.0	1.41
2.	Solar drying	400	2	83.50	66.2	1.79	3.2	0.80

3.	Shade drying under room condition.	400	3	80.55	77.8	1.48	2.2	0.66

Table 2: Driage percentage of *Costus speciosus Koen.Retz*

S. No.	Treatment	Fresh weight (gms)	Days	Driage percentage	Mean Wt.	SD	Variance	SE
1.	Sun drying	300	12	66.00	102	2.74	7.50	1.22
2.	Solar drying	300	12	64.26	107.2	2.59	6.70	1.16
3.	Shade drying under room condition.	300	15	59.13	122.6	3.78	14.30	1.69

Table 3: Driage percentage of *Acorus calamus* Linn.

S. No.	Treatment	Fresh weight (gms)	Days	Driage percentage	Mean Wt.	SD	Variance	SE
1.	Sun drying	300	3	69.33	92	2.12	4.50	0.95
2.	Solar drying	300	3	68.46	94.6	2.07	4.3	0.93
3.	Shade drying under room condition.	300	4	66.06	101.8	5.22	27.2	2.33

Current status of the project: on going

5. Title : Preservation and Digitization of research records of SFRI

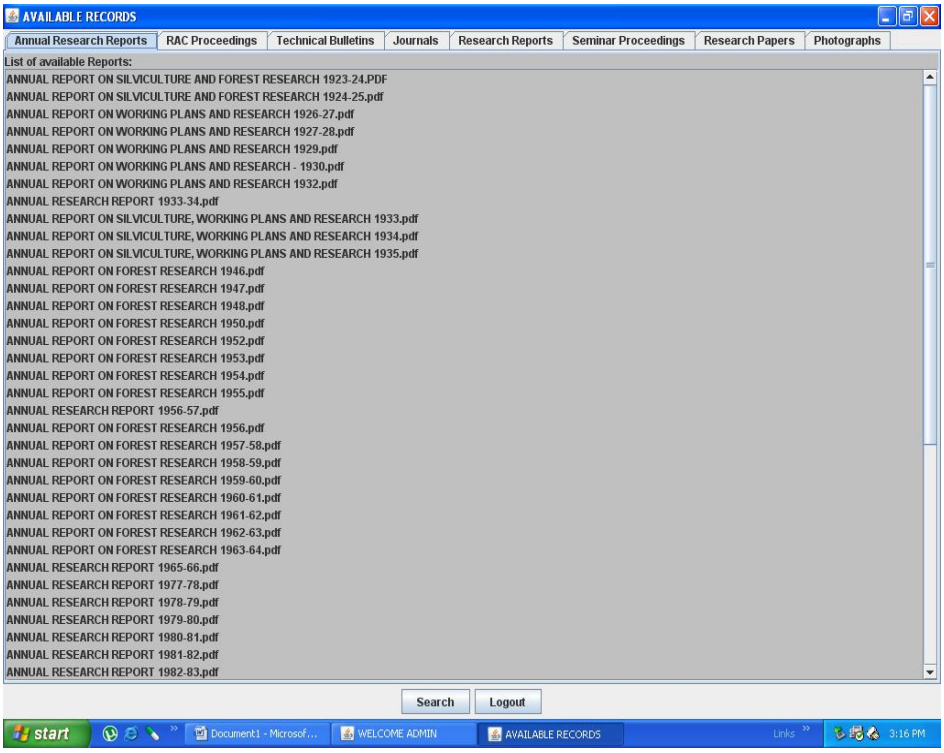
Project ID	:	SEM/P/E / 12-13/15
Project Period	:	June 2012 to June 2014.
Sponsoring Agency	:	APCCF (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar

Objective:

- To digitize old research records of SFRI.

Activities carried out during the year:

SFRI has old research records and grey literature which needs to be preserved and digitized, for easy availability. In this year, the following works were undertaken.



Software was designed and all digitized records were appended under different sub heads for use. Thereafter collection of old SFRI reports/bulletins/RAC proceedings/old research papers in journals was done. These records were then listed and cleaned.

Digitization work done

- Annual Research Reports from 1923 to 2013
- 50 SFRI Technical bulletins
- Vaniki Sandesh from Vol-1 to 37.
- Old research papers relating to Central Provinces from (1895-1975).
- 40 RAC proceedings

Current status of the project: on going

6. Title : Compilation of 50 years of forestry research in SFRI (1963-2013)

Project ID	:	EM/P/E/12-13/03
Project Period	:	1st May 2012 to April 2013.
Sponsoring Agency	:	APCCF, (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar

Objective:

- To compile research experiments undertaken for the past fifty years (1962-2013)

Activities carried out during the year:

Compilation of research work was completed for the years 1977-1987

Current status of the project: on going

7. Title : Development of storage system in archive record rooms of State Forest Research Institute.

Project ID	:	SEM/P/E12-13/20
Project Period	:	June 2012 to May 2013
Sponsoring Agency	:	APCCF, (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar

Objective:

- Installation of storage system in archive record rooms of State Forest Research Institute.

Activities carried out during the year:

- Storage systems installed in two Archive record rooms and one lab.
- Archive rooms been upgraded.
- Listing of old records of Forests Dept and SFRI completed.

Progress:

S.No.	Product	No. of items	Room No.	Archive Records
1. (a)	Compact storage unit 16 bodies	1 Set	73 (Archive Record Room)	Old records of MP Forest Dept. & SFRI
(b)	Open plain office system	Plain office work system to 1 person		
2 (a)	Compact storage unit 40 bodies	In two sets	72 (SFRI Record room)	SFRI records
3	Compact storage system	1 set	67 (Archive Lab)	Old ledger files of C.P. & Berar
4.	Book cases	10 Nos.	72 SFRI Record Room	Indian Foresters 1875 onwards for Archive

Current status of the project: on going

Newly initiated project dueing the year
Externally funded : Two

1. Title : Training on technical know how of gum tapping from *Butea monosperma* in Umaria and Tikamgarh districts to local people and frontline staff of forest department.

Project ID	:	SEM/P/E/13-14/13
Project Period	:	Feb 2014 to Feb 2015
Sponsoring Agency	:	APCCF, (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. Pratibha Bhatnagar

Objective:

- To impart training on sustainable harvesting, processing and marketing of *Butea monosperma*

Progress:

- Collection of primary information on current harvesting intensity and methods, tools used for improvement of technique. Tour to Tikamgarh and Umaria districts.
- Review of literature done
- Design course contents and instructional strategies.
- Preparation of training manual and charts/flex and other training material.

Current status of the project: on going

2. Title : मध्यप्रदेश में प्रमुख गोंदों के संग्रहण के ऑकड़ों का संकलन एवं प्राथमिक संग्राहकों पर सामाजिक आर्थिक प्रभाव

Project ID	:	SEM/P/E/13-14/18
Project Period	:	3 years (Oct. 2013 – Sept., 2016)
Sponsoring Agency	:	APCCF, (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. G. S. Mishra

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- प्रजातिवार गोंद संग्रहण क्षेत्र एवं मात्रा का ऑकलन।
- जिलेवार गोंद संग्रहण की प्रचलित विधि, गोद उत्पादन में होने वाली कमी एवं वृद्धि के कारणों का ऑकलन।
- गोद की विपणन प्रकिया, बाजार एवं कीमत निर्धारण प्रकिया का अध्ययन।
- विभिन्न प्रजाति की खाद्य एवं अखाद्य गोंदो के परम्परागत औषधीय उपयोग का अध्ययन।

. **Current status of the project:** on going

3.9 TREE IMPROVEMENT BRANCH

Mandate

1. To select, document and maintain the plus trees.
2. To raise seedling and clonal seed orchards.
3. To conduct progeny trials.
4. Tree breeding.
5. To raise quality planting stock.
6. To study reproductive biology of trees.
7. To propagate rare and endangered species.

Staff

Dr. Parvez Jalil	:	Scientist & Head
Dr. Sachin Dixit	:	Research Officer
Dr. Jyoti Singh	:	Research Officer
Sunil Rajak	:	Forester

Project Staff

Krishna Kumar Patel	:	JRF
Jitendra Singh	:	JRF
Anupama Gosowmi	:	JRF
Nitin Kumar Verma	:	Computer Operator

Completed project during the year : Nil

On-going projects

Internally funded : Nil

Externally funded : Five

1. Science plan for utilization of automatic weather station and agro-meteorological station data in Madhya Pradesh. India in Collaboration with MP forest Department.
2. Establishment of Bambosetum and Bamboo Interpretation Centre at SFRI Jabalpur.
3. Establishment of leaf orchard of Tendu.

4. Selection of superior races of Khamer (*Gmelina arborea*) through clonal propagation.
5. Development of suitable nursery techniques of some important rare species of Madhya Pradesh forests.

Newly initiated projects

Externally funded : Three

1. The study on top drying of Gmelina arborea and its management.
2. Causes and remedial measures of sal mortality (Shorea robusta) in forest areas of M.P.
3. Integrated management of diseases of economically important tree species Dhawada, Bija and Achar occurring in forests of M.P.

Regular activities : Nine

1. Identification, documentation and maintenance of plus trees of important tree species.
2. Maintenance of progeny trials (Half-Sib) of *Tectona grandis.*
3. Maintenance of Seedling seed orchard of *Gmelina arborea*.
4. Maintenance of clonal orchard of *Zizyphus jujuba*.
5. Maintenance of germplasm of fruit bearing species
6. Maintenance of seedling seed orchard of khamer
7. Maintenance of clonal germplasm of *Madhuca latifolia* (Mahua)
8. Preparation of clonal plants of Mahua (*Madhuca latifolia*) and Aonla (*Embilica officinalis*)
9. Provenance trial of Litsea (*Litsea glutinosa*).

Completed projects during the year : Nil

On-going projects :

Externally funded : Five

1. Title : Science plan for utilization of automatic weather station and agro-meteorological station data in Madhya Pradesh, India in Collaboration with MP Forest Department.

Project ID	:	TI/P/E/09-10/04
Project Period	:	Nov. 2009 to March 2015
Sponsoring Agency	:	Madhya Pradesh Forest Deptt., Bhopal and SAC, Ahmedabad
Principal Investigator	:	Dr Parvez Jalil
Co-PI	:	Dr Sachin Dixit

Objectives :

- To collect data on height and girth of forest trees in different forest types of protected areas.
- To estimate the litter biomass in different forest types of protected areas.
- To estimate the herbaceous biomass in different forest types of protected areas.
- Soil analysis study in different forest areas.

Achievements :

- 10 Plots in each study site have been established.
- Height and GBH of trees in plots are recorded.
- Soil samples are collected.
- Litter is collected.
- Herbaceous biomass is collected & estimated.
- All the collected data sent to SAC, Ahemedabad and PCCF (Planning), Bhopal

Current status of project: On-going

2. Title : Establishment of Bambosetum and Bamboo Interpretation Centre at SFRI Jabalpur.

Project ID	:	TI/P/E/10-11/01
Project Period	:	April 2010 – March 2011 (Extended upto March 15)
Sponsoring Agency	:	MP Forest Department, Bhopal
Principal Investigator	:	Dr. Parvez Jalil
Co-PI	:	Dr. Sachin Dixit
	:	Dr Jyoti Singh

Objectives :

- To establishment bamboo interpretation centre at SFRI to exhibit information about bamboo and its utilization.
- To enrich and maintain the existing bambusetum of SFRI.

Achievements :

- Maintained established bambosetum (11 varities) and two new varities introduced.
- Collected bamboo made articles.
- Infrastructure development under progress.

Current status of project: On-going

3. Title : Establishment of leaf orchard of Tendu.

Project ID	:	TI/E/P/10-11/21
Project Period	:	March, 2011 - March, 2014 (Extended upto September 2014)
Sponsoring Agency	:	MPMFP (T&D) Fed. Bhopal
Principal Investigator	:	Dr. Parvez Jalil
	:	Dr. Sachin Dixit
	:	Dr. Jyoti singh

Objectives :

- To develop protocol for raising tendu leaf orchard.
- To develop tendu leaf resources near villages.
- To demonstrate and train the tendu leaf pluckers.

Achievements :

Leaf orchard was established in July 2011 at SFRI campus. Experiment was laid with 6 treatments and 4 replications. A total of 150 plants of tendu were raised. The treatments are different propagation techniques i.e. seed, seedling, polypotted, root-trainer, root-shoot and root-sucker. The finding of the project is given below:

- The highest survival (74%) is found in polypotted plants followed by root trainer plants (46%), Root shout (36%), seed (39%) and Seedling (27%). Planting through root sucker is totally failure.
- The height of plant varies from 10.8 cm to 13.9 cm. Maximum height (13.9 cm) and maximum collar girth (4 mm) is found in root shoot plants in comparison to other plants i.e. through seed, seedling, polypotted and root trainer.
- The number of leaves per plant ranged between 10.8 to 12.2. Root shoot plant have the maximum number of leaves while, plants propagated through seed have the minimum.

- The polypotted seedlings performed the best growth in shaded area.

Treatment	Total Plant	% of success plant	Height of Plant (cm)	Collar Dia (mm)	No. of Leaf
Seed	100	39	12.8	3.7	10.8
Seedling	100	27	10.8	3.7	19.1
Polypotted	100	74	12.7	3.4	12.8
Root-trainer	100	46	11.4	3.3	16.0
Root-Shoot	100	36	13.9	4.0	20.2
Root Sucker	100	0	0	0	0

Effect of shade

Treatment	Total Plant	% of success plant	Height of Plant (cm)	Collar Dia (mm)	No. of Leaf
Polypotted	25	76	9.1	3.2	10.1
Root-trainer	25	64	6.0	2.2	7.0
Seed	25	16	0.5	0.4	0.5
Naked Seedling	25	0	0	0	0

Current status of project: On-going

4. Title : Selection of superior races of Khamer (*Gmelina arborea*) through clonal propagation

Project ID	:	TI/P/E/12-13/02
Project Period	:	April, 2012 - March, 2015 (Extended upto March 2018)
Sponsoring Agency	:	APCCF(R/E & Lokvaniki) MP Bhopal
Principal Investigator	:	Dr. Parvez Jalil
Co-PI	:	Dr. Sachin Dixit
	:	Dr. Jyoti Singh

Objectives:

- To Identify superior germplasm of *Gmelina arborea* form natural forest and plantations of M.P. and Chhattisgarh
- To establish clonal plants in the field
- To prepare second generation of clonal plants of superior races

Achievements:

- A total of 20 plus trees were identified from SFRI, Jabalpur, Tewar, Saliwada, Sigma (Raipur), Morga (Bilaspur), Belgahna (Bilaspur) and Rewa.

- Nearly 250 stacklings of above selected plus trees were raised. These stacklings are going well and rooting was initiated.

Selected no. of plus trees – 20		
	Girth in cm	Height in mt
JSFRI 1	75	17
JSFRI 2	64	15
JSFRI 3	35	8
JSFRI 4	42	8
JSFRI 5	150	17
JJC 6	142	16.5
JJC 7	138	16
JSC 8	138	18
JSC 9	104	17
JSC 10	88	15
RSC 11	70	18
RSC 12	69	17
RSC 13	68	16
KMC 14	114	26
KMC 15	104	25
KMC 16	131	26
BBC 17	158.5	26
RCC 18	69	24
RCC 19	88	15

Current status of project: On-going

5. Title : Development of suitable nursery techniques of some important rare species of Madhya Pradesh forests

Project ID	:	TI/P/E/12-13/11
Project Period	:	April, 2012 - March, 2014 (Extended upto September 2014)
Sponsoring Agency	:	APCCF (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. Parvez Jalil
Co-PI	:	Dr. Sachin Dixit
	:	Dr. Jyoti Singh

Objectives:

- To procure germplasm of important rare and endangered tree species, namely Kardhai, Tinsa, Garari, Kullu, Dahiman, Kuchla, Reetha, Mundi, Haldu and Rakt Chandan.
- To know the impact of growth harmone on seed dormancy
- To standardize size of polythene bag for optimum growth in nursery.

- To standardize size of root trainer for optimum growth in nursery.
- To determine best potting mixture for better growth of targeted species in nursery.
- To develop a field manual on nursery techniques for targeted species.
- To supply quality plants of targeted species to forest department to strengthen the germplasm

Achievements:

- Germplasm of Kardhai, Tinsa, Garari, Kullu, Kuchla, Reetha, Mundi and Rakt Chandan has been collected and plants of Tinsa, Garari, Kullu, Kuchla, Reetha, Mundi and Rakt chandan have been prepared.
- No effect of growth harmone on seed dormancy was observed. However, germination of Reetha initiated within 6 days after puncturing seed coat by nut-cutter. Rakt chandan gives maximum germination in sphagnum moss grass. Kullu, Kuchla best germinate in sand bed with cold water treatment. Haldu give best result of germination in 50% sand and 50% FYM with indirect watering.

Result of seed dormancy is as under

Species	Type of dormancy	Breaking method
Reetha	Seed coat impermeable	By puncturing the seed coat. Need not to apply costly hormone.
Kuchla	After ripening (3 months)	IBA – 100 and GA3 – 30 (39 & 38)
Haldu	Physiological process	IBA – 80 and GA3 – 10 (27 & 28)
Mundi	Internal/ Physiological process	IBA – 80 and GA3 – 10 (11 & 13)
Rakt chandan	No dormancy but empty embryo problem	-
Kardhai	No dormancy	-
Kullu	No dormancy	-
Tinsa	No dormancy	-
Garari	No dormancy	-
Dahiman	No dormancy	-

Result of pre seed treatments are as under :

Species	Result Pattern	Detail of treatment
Kardhai	T1-T0-T2	T0-Control; T1-Soaking with warm water; T2-Soaking with cold water
Kullu	T2-T0-T1	T0-Control; T1-Soaking with warm water; T2-Soaking with cold water
Garari	T2-T1-T0	T0-Control; T1-Soaking with warm water; T2-Soaking with cold water
Tinsa	T3-T2-T1-T0	T0-Control; T1-Soaking with warm water; T2-Soaking with cold water; T3- Extracted Kernel
Reetha	T3-T1-T2-T0	T0-Control; T1-Soaking with warm water; T2-Soaking with cold water; T3- Puncture seed coat

Species	Result Pattern	Detail of treatment
Rakt Chandan	T5-T4-T3-T1-T2-T0	T0-Control; T1-Soaking with warm water; T2- Soaking with cold water; T3- Moist Jute bag; T4- Coir pit; T5- Moist moss grass
Kuchla	T3-T1-T2-T0	T0-Control; T1-Soaking with warm water; T2- Soaking with cold water; T3- Pure sand
Dahiman	T3-T2-T1-T0	T0-Control; T1-Soaking with warm water; T2- Soaking with cold water; T3- Coarse sand
Mundi	T3-T2-T1-T0	T0-Control; T1-Soaking with warm water; T2-Soaking with cold water; T3- Pure sand
Haldu	T3-T1-T2-T0	T0-Control; T1-Soaking with warm water; T2-Soaking with cold water; T3- Sand+Humus (50:50)

The standard size of polythene bag for optimum growth was found as under :

Species	Size
Kardhai	25 cm x 30 cm
Kullu	12 cm x 25 cm
Reetha	25 cm x 30 cm
Tinsa	25 cm x 30 cm
Garari	25 cm x 30 cm
Rakt chandan	25 cm x 30 cm
Kuchla	12 cm x 25 cm
Dahiman	25 cm x 30 cm
Mundi	25 cm x 30 cm
Haldu	25 cm x 30 cm

Big polythene bag - 25 cm x 30 cm, Medium polythene bag- 12 cm x 25 cm
Small polythene bag - 12 cm x 20 cm

The standard size of root trainer for optimum growth was found as under :

Species	Size
Kardhai	6.5 cm x 10 cm
Kullu	5 cm x 10 cm
Reetha	6.5 cm x 10 cm
Tinsa	6.5 cm x 10 cm
Garari	6.5 cm x 10 cm
Rakt chandan	6.5 cm x 10 cm

Species	Size
Kuchla	5 cm x 10 cm
Dahiman	6.5 cm x 10 cm
Mundi	6.5 cm x 10 cm
Haldu	6.5 cm x 10 cm

Large Root trainer - 6.5 cm x 10 cm, Medium Root trainer- 5 cm x 10 cm
Small Root trainer - 4 cm x 10 cm

The best potting mixture for better growth was found as under

Species	Potting mixture
Kardhai	Soil:Sand:Leaf littter (1:1:1)
Kullu	Soil:Sand:FYM (1:1:1)
Reetha	Soil:Sand:FYM (1:1:1)
Tinsa	Soil:Sand:FYM (1:1:1)
Garari	Soil:Sand:Leaf littter (1:1:1)
Rakt chandan	Soil:Sand:FYM (1:1:1)
Kuchla	Soil:Sand:FYM (1:1:1)
Dahiman	Soil:Sand:FYM (1:1:1)
Mundi	Soil:Sand:FYM (1:1:1)
Haldu	Soil:Sand:FYM (1:1:1)

T1 - So:S:FYM (1:1:1), T2 - So:S:Leaf litter (1:1:1),
T3 - So:S:Vermicompost (1:1:1)

Current status of project: On-going
Newly initiated project during the year
Externally funded : Three

1. Title : The study on top drying *of Gmelina arborea* and its management

Project ID	:	TI/P/E/13-14/02
Project Period	:	April 2013 – March. 2015
Sponsoring Agency	:	APCCF (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. Jyoti Singh

Objectives:

- To study the biotic and abiotic factors affecting top drying
- To study the impact of microbial flora and edaphic factors on top dying
- Survey of study sites to know about the effect of crop composition on top dying
- To study the mode of infection and conditions favourable for disease development
- Preparation of check list of organism causing the disease.
- To evolve suitable management strategies and its dissemination to users

- Preparation of working manual to field officers for management of top drying .

Achievements:

- Recruitment of project staff.
- Two sites selected for study Bamandehi plantation in South Seoni and SFRI khamer plantations
- Survey to study the biotic and abiotic factors affecting top drying and effect of crop composition is in progress.
- Height and GBH of affected trees is recorded.
- For the study of impact of microbial flora, samples of root, leaves, bark and stem collected from both sites and isolation of pathogens and identification of pathogens is in progress.
- For the study of impact of edaphic factors soil samples of 30cm, 60cm and 90 cm depth have been collected from both sites and analysis is in progress.
- Check list of causal organism is in progress.

Current status of project: On-going

2. Title : Causes and remedial measures of sal mortality (*Shorea robusta*) in forest areas of M.P.

Project ID	:	TI/P/E/13-14/04
Project Period	:	April 2013 - March, 2016
Sponsoring Agency	:	APCCF (R/E & Lok Vaniki), MP Bhopal
Principal Investigator	:	Dr. Jyoti Singh

Objectives:

- To study the intensity of diseases in relation to seasonal variation.
- To study the impact of microbial flora, edaphic factors, girth at breast height and coppicing on sal mortality in natural forests
- To develop suitable methods for management of diseases and prepare working manual for the same.
- Collection of samples (soil, root, bark etc.) from selected sites.
- Examination of samples (soil, root, bark etc.) in laboratory and different experiments of remedial measures.

Achievements:

- Recruitment of project staff.
- Literature survey is in progress.
- Sites selected for study were Anuppur, Kotma, Jaithari and Latar range in Anuppur forest division of Shahdol circle
- Survey and collection of samples (soil, root, bark and stem from selected sites is completed for rainy and winter season
- Examination of samples (soil, root, bark etc.) in laboratory is in progress.
- Data collection to study effect of girth at breast height and height of affected trees recorded.

Current status of project: On-going

3 Title: Integrated management of diseases of economically important tree species Dhawada, Bija and Achar occurring in forests of M.P.

Project ID	:	TI/P/E/13-14/03
Project Period	:	April 2013 – March 2016
Sponsoring Agency	:	APCCF (R/E & Lok Vaniki), MP Bhopal

Principal Investigator : Dr. Jyoti Singh

Objectives :

- Survey of infected areas of forests to identify the intensity of diseases in relation to seasonal variations.
- Collection, isolation and identification of pathogens found on the affected trees and seedlings.
- To standardize integrated management practices to control diseases occurring in Dhawada, Bija and Achar
- Preparation of working manual to field officers for remedial measures.

Achievements:

- Recruitment of project staff.
- Literature survey is in progress.
- Sites selected for study were South Seon Forest Division, Dindori forest division and East Mandla Forest Division.
- Survey of infected areas of forests of selected sites is done in rainy and winter season to identify the intensity of diseases in relation to seasonal variations is done and summer season observation taken in May 2014.
- For examination of fungus samples of infected leaves, bark, root and stem were collected & isolation is done and identification of pathogens found on the affected trees is in progress.
- Examination of soil samples of 30cm, 60cm and 90 cm depth collected from all sites is in progress.

Regular Activities

1. Title : Identification, documentation and maintenance of plus trees of important tree species.

PI : Dr. Parvez Jalil
ID No. : TI/RA/I/09

Objective:

- To create a source of genetically superior material to be used in future tree improvement programmes.

Achievements:

- Previously selected plus trees of different forest tree species have been documented.
- A total of 40 plus trees of Khamer, Khair, Dhawa,Kardhai, Safed Siris, Eucalyptus, Chandan, Shisham, Mundi, Kullu, Teak, Lendia, Haldu and Kadam have been identified and documented.

2. Title : Maintenance of progeny trials (Half-Sib) of *Tectona grandis.*

PI : Dr. Parvez Jalil
ID No. : TI/RA/I/13

Objective:

- To select best performing clones to get improved genetic material.

Achievement:

- Growth data on height and girth of trees raised in progeny trials were collected along with phonological behavior. These data reflect the trend of different tested progenies and indicate that BBC-15 was found the best plus tree among other selected candidate trees on the basis of their progenies. Other plus trees were KEKC-2, NRLC-17 which followed BBC-15.
- The average height and girth of such progeny (BBC-15) was recorded 9.7 m and 44.3 cm respectively.

3. Title : Maintenance of Seedling seed orchard of *Gmelina arborea*.

PI : Dr. Parvez Jalil

ID No. : TI/RA/I/19

Objectives:

- To establish broader genetic base through seeds of selected plus trees.
- Progeny testing of half-sib families.
- To get quality seed for further tree improvement work.

Achievements:

Plantation was established in 0.5 ha area in July 2005 at SFRI campus. A total of 480 plants of 30 families were raised. Flowering and fruit setting has been observed in few trees.

Brush shoot clearance and Bordeaux mixture were pasted in trunk for insect pest control. Three trees were marked as a candidate plus tree from the orchard.

Average girth and height of Khamer orchard established in 2005 are 24.9 cm and 4.9 m, respectively.

Khamer orchard established in 2002 having average girth 45.5 cm and height 11.4 m while.

4. Title : Maintenance of clonal orchard of *Zizyphus jujuba*.

PI : Dr. Parvez Jalil

ID No. : TI/RA/I/25

Objective:

- Maintenance of clonal orchard of *Zizyphus jujuba* as germplasm/gene bank for further propagation for agroforestry

Achievements :

- Chain link fencing of orchard has been raised.
- Bordeaux mixture and brush shoot clearance works have been done.

5. Title : Maintenance of germplasm of fruit bearing species

PI : Dr. Parvez Jalil

ID No. : TI/RA/I/26

Objectives:

- Germplasm bank of fruit bearing species as genetic resource.
- The germplasm can be used for plant production through clonal multiplication and seed.

Achievements :

- Chain link fencing of orchard has been raised.
- Bordeaux mixture and brush shoot clearance works have been done.
- A total of 190 kg of Bel fruit were collected from the orchard. Seeds utilized for plant preparation in nursery.

6. Title : Maintenance of seedling seed orchard of khamer

PI : Dr. Parvez Jalil

ID No. : TI/RA/I/27

Objectives :

- Maintenance of seedling seed orchard as a genetic resource
- Quality seed production and clonal propagation

Achievements :

- Chain link fencing of orchard has been raised.
- Bordeaux mixture and soil working have been done.

- A total of 15 kg of khamer fruit were collected from the orchard. Seeds utilized for plant preparation in nursery.

7. Title : Maintenance of clonal germplasm of *Madhuca latifolia* (Mahua)

PI : Dr. Parvez Jalil

ID No. : TI/RA/I/28

Objective :

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

Achievements :

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

8. Title : Preparation of clonal plants of Mahua (*Madhuca latifolia*) and Aonla (*Embilica officinalis*)

PI : Dr. Parvez Jalil

ID No. : TI/RA/I/29

Objective :

- To prepare 10000 quality clonal plants of Mahua and Aonla

Achievements:

- Root stock of Mahua and Aonla for grafting has been raised.
- 500 grafted plants of Mahua and 3000 plants of Aonla were prepared.

9. Title: Provenance trial of Litsea (*Litsea glutinosa*).

PI : Dr. Parvez Jalil

ID No. : TI/RA/I/30

Objective :

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

Achievements :

- Seedling of eight provenance (places) were planted in 15 replication with spacing of 3m X 3m.
- The performance of Patalkot provenances was found the best over other tried provenances with average girth 6.2 mm and height 41.1 cm.

Chapter - 4

EXTENSION, TRAINING AND CONSULTANCY BRANCH

Mandate

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

Staff

K.V. Diwakar, IFS	:	Dy. Director (Extension)
Anirudhwa Sarkar	:	Research Officer

Activities

- Publication of Annual Research Report and Annual Action Plan of the institute.
- Organization of trainings, workshops, meetings and seminars.
- Participation in 'Kishan Mela', herbal fairs' and public event.
- Providing logistic support and co-ordination with different branches.
- Maintainance of xeroxing, operation of audio-visual equipment's, public address system and binding etc.
- Providing desired information to the users through correspondence, consultancy and visits.
- Preparation of Annual Administrative Report and Annual Statistical Report of the institute for the M.P. Forest Department.
- Allocation of ID Nos. distribution of budget to all the ongoing and new projects as received from APCCF (R/E & Lokvaniki) Bhopal in each quarter.

Dissemination of information through publications

a. Annual Action Plan

The Annual Action Plan of the institute for the year 2013-2014 was compiled and prepared on quarterly basis from April 2013 to March 2014 and progress of the works were monitored and evaluated by conducting review meetings of each branch after the end of each quarter.

b. Annual Research Report

The Annual Research Report for 2012-2013 was prepared, published, and disseminated to all the stakeholders.

c. Dissemination of research technologies and strengthening of extension linkages.

i) 03 Training programmes for 138 nursery managers and volunteers from Sagar, Rewa and Jabalpur Divisions were conducted by the institute regarding nursery development and management. The trainings were sponserd by MP Jan Abhiyan Parishad, Department of Finance Planing, Economics and Statistics, MP Governement, Bhopal under its Prasfutan Scheme for establishement of nursery in villages.

ii) 05 Residentital training programme on nusery training and management of field staff of Research and Extension Circle of MP Forest Department were conducted. The training programmes of participated by 139 trainees from Sagar, Betul, Bhopal, Jabalpur, Ratlam, Jhabua, Indore and Khandwa circles.

iii) Trainee Forest Range Officers posted in various forest divisions of M.P., Rangers Training College, Dullapaly, Andhra Pradesh and forest guards from Forestry Training School Panchmarni, Lakhnadon, Amarkantak, Umariya, Rewa and Balaghat 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, mist chambers, shade net houses, gene bank, botanical garden, nurseries, museum and herbarium, located in the campus.

iv) Exposure visit of 30 villagers from an NGO (Lakshya) from Katni regardings medicinal plants cultivation techniques.

v) Exposure visit of 38 students of B.Sc. Biotechnology & Microbiology from Loyala College, Kunkuni District Jashpur (CG), Surguja University, Ambikapur regarding forestry research activites of SFRI.
vi) Exposure visit of 180 students from Ekalavya Adarsh Residential School, Jabalpur regarding forestry research activites of SFRI.
vii) Exposure visit of 50 formers from the office of Asst. Director, Hoticulture, Banswada, Rajasthan regarding interstate tour and training (2013-14) on identification and cultivation of bamboo techniques.

Visit of dignitaries

Shri Sartaj Singh Hon'ble Forest Minister, Govt of M.P. visited the institute on 5th May, 2013 p Plantation was done by Hon'ble Forest Minister, Govt of M.P. & PCCF, M.P. in the Botanical garden of the institute.

Organization of meetings

S. N.	Meeting	Place	Date of organization
1.	27th meeting of Board of Governors of SFRI, Jabalpur	Vallabh Bhawan, Bhopal	16th August, 2013
2.	Review of progress of on-going projects of various branches of the institute	SFRI, Jabalpur	16th-28th September, 2013

Organization of Seminars/Symposiums/Workshops

S.N.	Topic	Organized by	Date	Participants
1.	National Seminar on "Grassland Management in protected area in India in Bandhavgarh Tiger Reserve"	Forest Ecology and Environment, Jabalpur (M.P.)	4th-6th July 2013	Dr. R. K. Pandey Dr. Parvez Jalil Dr. Satvant Kaur Saini Dr. Anjana Rajput Mr. Rakesh Jain Mr. S.K. Nema Mr. Vijay Patel & Mr. S.S. Bhandari
2.	National Seminar on "Advancement and recent development in tree seed technology to enhance forest productivity"	SFRI, Jabalpur (M.P.)	21st and 22nd February, 2014	
3.	Organization of National Workshop at Bandhavgarth NP. Tala, Umaria. Meeting with PCCF (Wildlife) Madhya Pradesh and FD Bandhavgarh	SFRI, Jabalpur (M.P.)	10th June 2013	Dr. R. K. Pandey and Dr. Satvant Kaur Saini
4.	National Workshop at Bandhavgarth NP, Tala, Umaria. meeting with Field Director, Dy. Director and Assistant Director of Bandhavgarh Tiger Reserve, Umaria	Director, Bandhavgarh Tiger Reserve, Umaria	25-26 June, 2013	Dr. R. K. Pandey Mr Rakesh Jain Mr. S.K. Nema and Dr. Satvant Kaur Saini
5.	Workshop on Plantation strategy by MP Forest Department	MP Forest Department & SFRI, Jabalpur	12-13 August, 2013	Honorable's Forest Minister, Sr. Forest Officers and Scientific staff of SFRI

Organization of trainings

S.N.	Name of the programme	Organized by	Date	Organized for	No. of participants
1.	म.प्र. में साल बोरर से साल वनों की सुरक्षा हेतु प्रशिक्षण कार्यक्रम।	SFRI, Jabalpur	26-2-12 09-10-12 18-10-12	विभागीय अमले एवं वन सुरक्षा समिति के पदाधिकारी	150
2.	Grassland Management identification of important grasses and assessment of utility percentage in various grasslands of Bandhavgarh	Ecology & Environment, Branch Jabalpur (M.P.)	19-21 July, 2013 23-30 Sept., 2013	Field staff of Bandhavgarh Tiger reserve	40 in experimental site of Tala and 15 in Kalwah range.
3.	Plant Biotechnology/ Plant Tissue Culture Training/dissertation Programme	Forest Genetics Plant Propagation and Biotechnology Division, SFRI	April 13 to March 14	Under Graduate, Post Graduate, and self motivated students	15

Trainings/workshops/meetings attended by officers/scientists and research staff of the institute.

S.N.	Name of the programme	Organized by	Date	Participants
1.	साल बोरर पर चर्चा हेतु कार्यशाला	मध्य वन वृत्त जबलपुर खटिया इको सेंटर	24.02.2014	Dr. Uday Homkar
2.	Market promotion meeting on medicinal plants & NTFPs	Social Economics and Marketing Branch	11.01.14 18.01.14 31.01.14	60 Bijori (Umaria) 30 Harrai (Chhindwara) 22 Singaurgarh (Damoh) farmers
3.	Midterm review meeting of JICA project at Lucknow	Lucknow	28-30 April, 2013	Dr. R. K. Pandey Dr. Anjana Rajput
4.	Progress presentation meeting at Lucknow	Lucknow	04 June 2013	Dr. R. K. Pandey Dr. Anjana Rajput
5.	Two days National Seminar on "Advancement and Recent Development in	State Forest Research Institute, Jabalpur (M.P.)	21-22 February 2014	Dr. Archana Sharma (convenor), Senior Forest Officers, Scientist from SFRI

S.N.	Name of the programme	Organized by	Date	Participants
	Tree Seed Technology to Enhance Forest Productivity"			and other institutes, Universities
6.	Workshop on Plantation strategy by MP Forest Department	M.P. Forest Department	12-13 August 2013	Dr. Archana Sharma
7.	National workshop on "Tree seed science and Silviculture"	Institute of forest genetics and tree breeding, Coimbatore, Tamil Nadu	28-29, November, 2013	Dr. Archana Sharma
8.	International Bamboo conclave & Expo 2014,	University of agricultural and sciences, GKVK, Bangalore,	22-23 February, 2014	Dr. Archana Sharma
9.	National seminar on "Role of green technology in agriculture, horticulture and forestry"	Dr. Hari Singh Gour University, Sagar	26-27 February, 2014	Dr. Archana Sharma
10.	National workshop on "Forest seed science: Recent Advances & challenges in seed research"	Forest Research Institute, Dehradun (UK)	26-27 February, 2014	Dr. Archana Sharma
11.	World Congress on Agroforestry - 2014	ICRAF Nairobi, at New Delhi	10^{th} to 14^{th} Feb	Radhika Urmalia
12.	Training on Nursery development and its management	Madhya Pradesh Jan Abhiyan Parishad, Jabalpur, Sagar, Rewa	Feb 2013, March 2013 April 2013	Dr. Parvez Jalil, Dr. Jyoti Singh
13.	Presenation of scientific report SAC/ISRO- "Forest Biophysical characterization and hydrological modeling in M.P." at Ahemdabad	ISRO, Ahmedabad in collaboration with M.P. Forest Department, Bhopal	July 2013 and October 2013	Dr. Parvez Jalil and Dr. Sachin Dixit

Chapter - 5
DOCUMENTATION BRANCH

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.

Staff

Shri S. K. Palash	:	Dy. Director
Shri S. K. Jain	:	Asst. Director
Shri K. L. Verma	:	Research Officer
Dr. S. Chakravarty	:	Ledger Assistant

Activities

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

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

Sale of Publications

The institute has published 60 technical bulletins and 43 extension series till date which are available for sale.

Journal section

The branch is well furnished with a reading room. During the year 29 Indian journals, 3 foreign journals, 5 Indian magazines, 6 foreign newsletters and 12 Indian newsletters were subscribed for reference to the users.

Achievements during the year

1. Four issues of Vaniki Sandesh (Vol. 4 New No. 1-4) were published.
2. 09 project reports were documented.
3. A sum of Rs. 66385/- was received from the sale of bulletins, extension series, Vaniki Sandesh and Van Dhan.
4. 50 periodicals were received and displayed.
5. 480 articles were selected, photocopied, classified and filed into ledger files.
6. 130 damaged pages of ledger files were replaced by xerox copies.

Periodicals subscribed during the year
(April 2013 to March 2014)

A. Journals (Indian):

S. N.	Name of the Journal	Volume/Year	No.
1.	Annals of Arid Zone	Vol. 50	3-2
2.	Annals of Forestry	Vol. 20	1-2
3.	Advanced Biotech	Vol. 13	1-6
4.	Down to Earth	Year 2013	1-24
5.	Economic and Political Weekly	Year 2013	12-52
6.	Journal of Tropical Forestry	Vol.29	1-4
7.	Indian Journal of Forestry	Vol. 36	2,3.4
8.	Indian Journal of Agroforestry	Vol. 14	1-2
9.	Journal of Non Timber Forest Products	Vol. 20	2,3,4
10.	Journal of Economic & Taxonomic Botany	Vol. 37	1-4
11.	Journal of Nature Conservation	Vol. 25	1-2
12.	Journal of Genetics	Vol. 22	1,2,3
13.	Journal of Soil & Water Conservation	Vol. 11	3, 4
14.	RE & D (Resources, Energy & Development)	Year 2003	2
15.	The Indian Forester	Vol. 139	3-10
16.	TIDEE	Vol. 13	1
17.	Tropical Ecology	Vol. 54	1-2
18.	Krishi Vaniki Alok	Vol. 8	1
19.	The BAIF Journal	Vol.34	1-4
20.	Jharkhand journal of Development And Management Studies	Vol.11 (Year) 2013	1-4
22.	My Forest	Vol.49	1,2,3
23.	Foreign Trade Review	Vol. XLVI	3, 4
24.	Indian Journal of Agricultural Economics	Vol.47	4
25.	Indian Phytopathelogy	Vol. 66	2
26.	Current Science	Vol. 106	7-10
27.	Indian Journal of Tropical Biodiversity	Vol. 20	1-2
28	Volume of Medicinal & Arometic Plants	Vol. 35	1-2
29	Journal of Mycology and Plant Pathology	Vol. 43 Vol. 44	3-4 1

B. Journals (Foreign):

S. No.	Name of the Journal	Volume/Year	No.
1.	Banko Janakari	Vol.22	2
2.	Bangladesh Journal of Forest Science	Vol. 34	1-2
3.	SAARC Journal of Agriculture	Vol. 11	1-2

C. News letters (Indian) :

S. No.	Name of the News Letter	Volume	No.
1.	Agro Forestry Newsletter	Vol. 25	1,2
2.	Akshay Urja	Vol. 6	2-3
3.	Dream-2047	Vol.15	7-13
4.	MLBD News Letter	Vol.35	4-12
5.	Nitti Marg	Year 2013	June - Dec.
6.	NBRI News Letter	Vol. 340	2-4
7.	Parti Bhumi Samachar	Year 2013	2-4
8.	PTI Science Service	Vol. 32	April-Nov.
9.	Udhyamita Samachar Patra	Vol.22	1-4
10.	XIVANI News Letter	Vol.18	3-4
11.	Wastelands News	Vol. 27	2-4
12.	Green File	Vol. 224	1-4

D. News letters (Foreign) :

S.N.	Name of the Journal	Volume/Year	No.
1.	Asia Pacific Agro Forestry News	Year 2013	39-40
2.	APAFRI Brief	Year 2013	26-27
3.	SAARC Agri News	Vol.7	1-2
4.	Non Wood News	Year 2013	1-2
5	Tropical Forest Update	Vol. 22	2-3
6	Tiger Paper	Vol. 39 Vol. 40	3-4 1-2

E. Magazines :

S. No.	Name of the Magazine	Volume	No.
1.	Amruth Magazine	Vol. 9 Vol.10	2-4 1-3
2.	Vaniki Sandesh (Official)	Vol. 37	1-4
3.	Van Dhan (Official)	Year 2013	1-4
4.	Vanoshadhi Darpan	Vol. 8	2-4
5.	Paryavaran Digest (Hindi)	Vol.26	4-8

S.F.R.I PUBLICATIONS

Technical bulletins

S N.	Bulletin No.	Title	Year	Price
1	2	Volume Table of *Terminalia tomentosa* for M.P.	1963	70.00
2	4	Yield Table of Sal for M.P.	1966	70.00
3	5	Seed Directory vol. I	1967	30.00
4	9	Standard Volume Table of Teak for S.Chhindwara in M.P.	1971	70.00
5	10	Family *Ranunculaceae* to *Polygonaceae* in M.P. (Monograph of 13 family)	1971	25.00
6	11	Teak growth tables of different ecological forest types in M.P.	1971	70.00
7	12	Standard volume tables of *Boswellia serrata* for Nimar tract in M.P.	1971	70.00
8	15	Bark Table for *Boswellia serrata*	1971	25.00
9	16	Family *Linanceae* to *Berseraceae*	1974	25.00
10	18	Species for plantation in M.P. (Reprint)	1977	100.00
		मध्यप्रदेश में वृक्षारोपण के लिये उपयुक्त प्रजातियां	1977	100.00
11	22	Bamboo Plantation	1986	50.00
12	23	Fuel wood removal by headloads-A case study of Jabalpur	1987	20.00
13	24	Eucalyptus cultivation in M.P. – JTF	1987	25.00
14	26	Socio-economic Potential of Minor Forest Produce in M.P.	1991	75.00
15	28	Material for forest flora of Madhya Pradesh	1996	150.00
16	29	Tissue culture protocols for Teak, Neem & Khamer	1997	150.00
17	30	Growth statistics of forest plantations	1997	75.00
18	31	Medicinal plant of M.P. distribution, cultivation & trade	1998	200.00
19	32	Local Volume Table for Teak, Sal and other species	1997	60.00
20	33	Price Trends of some medicinal plants	1998	80.00
21	34	Biological Diversity of SFRI premises	1998	50.00
22	35	Seed production in Teak Seed Orchards in M.P.	1998	100.00
23	36	Seed certification protocol of forest tree species	1998	75.00
24	37	Tissue culture protocols for important medicinal plants of M.P.	1998	30.00
25	38	Macro-propagation protocol of some tree and medicinal plants species.	1998	40.00
26	39	Yield and stand tables of teak in Madhya Pradesh	1998	200.00
27	40	An Annotated Bibliography of Bamboo	1999	50.00
28	41	Status survey of Non Timber Forest Produce in primary Tribal Markets: A case study in Amarkantak Plateau.	1999	100.00
29	42	Application of laboratory seed testing results in nursery	2000	50.00

S N.	Bulletin No.	Title	Year	Price
		practices.		
30	43	म0प्र0 में भिलवा का सामाजिक आर्थिक विश्लेषणात्मक अध्ययन।	2000	100.00
31	44	Silviculture research in M.P.	2000	150.00
32	45	Handbook of Bamboos with particular reference to M.P.	2002	80.00
33	46	औषधीय पौधौं की खेती की प्रचार प्रसार पत्रिका।	2003	150.00
34	47	Medicinal herbs in trade: a study of safed musli, (chlorophytum species) in Madhya Pradesh	2003	20.00
35	48	Collection, processing and marketing of *Buchanania lanzan* in Madhya Pradesh	2005	20.00
36	49	मध्यप्रदेश के महत्वपूर्ण आयुर्वेदिक पादप	2005	70.00
37	50	आंवला वृक्षारोपण एवं आर्थिक महत्व	2008	50.00
38	51	उच्च गुणवत्ता के बीज एकत्रीकरण, भण्डारण, उपचारण, प्रमाणीकरण तथा बीजोत्पादन क्षेत्रों के चयन एवं प्रबंधन पर दिग्दर्शिका।	2008	50.00
39	52	Floral Diversity of Kanha Tiger Reserve	2009	900.00
40	53	Nursery and Planting technique of Tree Species	2010	100.00
41	54	Forest Glossary for All (English – Hindi)	2010	50.00
42	55	वृक्षारोपण मार्गदर्षिका	2011	150.00

2. Extension series

Ext. Series	Title	Year	Price
1.	Teak Seed collection and uses	1981	10.00
2.	वृक्षारोपण में बीजों का महत्व	1981	15.00
3.	म.प्र. में साल रोपण की तकनीक	1991	15.00
4.	पड़त भूमि विकास हेतु उपयुक्त प्रजाति लेडिंया	1991	10.00
5.	ईसबगोल	1994	5.00
6.	सर्पगन्धा	1994	5.00
7.	रोसा घास	1995	5.00
8.	A mechanical device for pre sowing treatment of teak seeds	1995	5.00
9.	वृक्षारोपण कैसे करें	1996	25.00
10.	S.F.R.I Publications	1999	40.00
11.	माइकोराइजा (वैम)	1999	-
12.	राजजोबियम	1999	-
13.	एजेटोबेक्टर	2000	-
14.	पी.एस.बी. (फास्फोरस विलायक)	2000	-
15.	ऑवला : वनो से किसानों तक	2000	40.00

Ext. Series	Title	Year	Price
16.	बाँस : वनो से किसानों तक	2000	40.00
17.	सागौन : वनो से किसानों तक	2000	60.00
18.	खमेर : वनो से किसानों तक	2000	60.00
19.	यूकेलिप्टस : वनो से किसानों तक	2000	50.00
20.	बच (एकोरस केलेमस)	2001	5.00
21.	सतावर (एस्पेरेगस रेसीमोसस)	2001	5.00
22.	सफेद मूसली (क्लोरोफाइटम बोरिविलियानम)	2001	5.00
23.	कलिहारी (ग्लोरिओसा सुपरबा)	2001	5.00
24.	सनाय (केसिया आगस्टफोलिया)	2001	5.00
25.	सर्पगंधा (रावोल्फिया सर्पेन्टिना)	2001	5.00
26.	अष्वगंधा (विद्यानिया सोमनीफेरा)	2001	5.00
27.	मुष्कदाना (एबलेमासकस मास्केटस)	2001	5.00
28.	लेमनग्रास (सिंबोपोगन फ्लेक्सिपोसस)	2001	5.00
29.	मेन्था या पोदीना (मेन्था आर्वेसिस)	2001	5.00
30.	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 1)	2003	20.00
31	लघुवनोपजों का प्राथमिक प्रसंस्करण (भाग 2)	2007	20.00
32	Directory of Medicinal Plants Trades and ISM Industries of Central India	2009	100.00
33	Monograph on *Alectra chitrakutensis*	2011	60.00
34	Monograph on *Ceropegia bulbosa and Ceropegia macrantha*	2011	60.00
35	Monograph on *Crateva magna* and *ficus cupulata*	2011	60.00
36	Monograph on *Dioscorea tomentosa, D. wallichia* and *d. alata*	2011	60.00
37	Monograph on *Flemingia stricta* and *F. paniculata*	2011	60.00
38	Monograph on *Guggal (Commiphora wightii)*	2011	60.00
39	Monograph on Maida tree (*Litsea glutinosa)*	2011	60.00
40	Monograph on Padri tree (*Radermachera xylocarpa)*	2011	60.00
41	Monograph on Shyonaka (*Oroxylum indicum)*	2011	60.00
42	Some ethnic plants in cure of various human diseases	2011	250.00

Note: Payment for the above bulletins and extension series may be made by Demand Draft in favour of the Director, State Forest Research Institute, Polipathar, Jabalpur (M.P.) 482008

Payment for the Bulletin No. 24 (Eucalyptus cultivation in M.P.) may be made by D.D. in favour of the Treasurer, Society for Tropical Forestry Scientist, SFRI, Jabalpur.

Chapter - 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 scheme and computer science, etc.

Staff

Shri S. K. Palash	:	Dy. Director
Shri S. K. Jain	:	Asst. Director
S.S. Raghuvanshi	:	Research Officer
Girish Kumar Shukla	:	Senior Research Assistant

Activities

During the year 2013-2014, 26 new books were received with the total as under:

1.	Books (including 2587 gratis books)	7466
2.	Reports (Govt. and NGO's)	378
3.	Indian Forest Records	641
4.	Working Plans	1410
5.	Sanctuary Plans	24
6.	Working Schemes	85
7.	Forest Resource Surveys	27
	Total	**10003**

Following activities were undertaken during the year.

S. No.	Works	Status
1.	Preparation of book card slips and pasting of book pockets on books	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.	Circulation of books, working plans, reports and other reading material	Routine work
6.	Accession of books	26 books added
7.	Data entry of books in Libsoft library software	In progress

Chapter - 7
COMPUTER AND INFORMATION TECHNOLOGY BRANCH

Mandate

1. Application of computers in forestry.
2. Design, development and implementation of computer based information system.
3. Analysis of the forestry based statistical/mathematical data.
4. Analysis of the Geographical Information System (GIS) data.

Staff

S.N. Nachane	:	Addl. Director
Jyotsna Gupta	:	Computer In-charge

Objectives

1. To design, develop and implement computer based information system.
2. To analyze the forestry based statistical/mathematical data.
3. To design and develop the website of the institute.
4. To convert old forestry literature in to storage media.
5. To provide logistics and maintainance of all the computers of the institute.

Computer Centre

Computer centre has a number of computer systems (Desktop - 35, Laptop - 12) connected to each other via local area network (LAN). The computer system is shared by a router to access World Wide Web information, which is connected by local area network.

Activities carried out during the year

1. Presentation of powerpoint for BOG, RAC, workshops, meetings, seminars and trainings, etc.
2. Updation of the website of the institute.
3. Providing internet surfing and e-mail facilities to users through LAN.
4. Maintenance of computer equipments viz., computer systems, printers, scanners, LAN, UPS, photocopier, etc.

Chapter - 8

PUBLICATION OF BOOKS AND PRESENTATION OF RESEARCH PAPERS/ARTICLES BY SCIENTISTS/RESEARCH PERSONNEL OF THE INSTITUTE

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.	Page No.
Paper published in Journals (National and International)					
1.	Indian Journal Tropical Biodiversity.	A check list of fish fauna of Narsinghpur district of Madhya Pradesh.	C.L. Choudhary, Uday Homkar and Praveen Ojha	20 (1)	99-102
2.	International Journal of Bio-Science and Bio-Technology	Impact of Crop Composition and Stand Structure on Natural Regeneration of Shorea Robusta Gaertn. f. (Sal)- Case Study	O.P Chaubey, Archana Sharma and S. S. Dhuria	5 (4), 2013	35-44
3.	-do-	Population Structure and Regeneration Potential of Sal (Shorea robusta Gaertn. f.) and its Associates in Sal Bearing Forests of Satpura Tiger Reserve.	P. Chaubey and Archana Sharma	5 (6), 2013	63-70
4.	International Journal of Mycorrhizae News	Microbial succession and restoration of degraded ecosystem under different tree cover	O.P. Chaubey, Priyanka Bohre, Jamaluddin and P.K. Singhal	25 (2), 2013	2-13
5.	International Journal of Bio-Science and Bio-Technology	Biomass accumulation and carbon sequestration in Tectona grandis Linn. f. and Gmelina arborea Roxb.	Priyanka Bohre, O. P. Chaubey and P. K. Singhal	5 (3), 2013	
6.	International journal of Mycorrhizae News	Microbial Restoration of Degraded Lands through Plantation Forests	O.P. Chaubey, Priyanka Bohre, Archana Sharma and Jamaluddin	Accepted 2014	-
7.	VEGETOS- International Journal of Plant Research (International Journal)	Carbon Management by Plantation Forests Raised on Degraded Lands.	Priyanka Bohre, O. P. Chaubey and P. K. Singhal	Accepted (2014)	-
8.	International Journal of Bio-Science and Bio-Technology	Biomass production and carbon sequestration by Pongamia pinnata (Linn) Pierre in tropical environment.	Priyanka Bohre, O. P. Chaubey and P. K. Singhal	Accepted (2014).	-
9.	Global Journal of Science Frontier Research:D, Agriculture and Veterinary	Eco-Silvicultural Interventions for Rehabilitation of Gregariously Flowered Bamboo Forests with Special Reference to *Dendrocalamus strictus* (Roxb) Nees.13(13): 31-38	O.P. Chaubey, Archana Sharma and Ram Prakash	13(13), 2013	31-38
Papers published from SFRI					
1.	Journal of Tropical Forestry	Development of integrated pest management (IPM) for Gall Forming Insect, *Betousa stylophora* (Swinhoe) in aonla (*Emblica officinalis L.*) plantation.	Uday Homkar, P.B. Meshram and Ram Prakash		

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.	Page No.
2.	-do-	Standardization of different drying techniques of important medicinal plants	Pratibha Bhatnagar, Sonam Jain and Radhika Urmalia	Vol.29 (I & II) Jan- Jun 2013	23-26
3.	-do-	Regeneration status of a regional near threatened plan species known as *Ougenis oojeinesis* (Roxb.) Hochr. under plantation of *Tectona grandis* L.F.	Radhika Urmalia	Vol. 29 No. (IV) Oct-Dec 2013	36-41
4.	-do-	Salient features of biologica control of Sal borer	A.K. Sharma and O.P. Chaubey	29(I&II), 2013	76-78
5.	Indian Journal of Tropical Biodiversity	Litter production and carbor content in plantation forests to restore degraded ecosystem	Priyanka Bohre, O. P. Chaubey and P. K. Singhal	20 (2), 2012	159-166
6.	Indian Journal of Tropical Biodiversity (TFRI)	Bio-restoration of Degraded Ecosystem under Different Tree Cover in Flagstone Mines	O.P. Chaubey, A.K. Sharma, Jamaluddin and Ram Prakash	Accepted, 2013	-
7.	-do-	Biomass production and carbon sequestration by *Azadirachta indica* A. Juss.	Priyanka Bohre, O. P. Chaubey and P. K. Singhal	Accepted, 2013	-
8.	Global Journal of Science Frontier Research: C Biological Science	Restoration of Degraded Lands through Plantation Forests	Priyanka Bohre and O.P. Chaubey	14(1), 2014	19-27
9.	I. K. International Publishing House Pvt. Ltd. S 25, Green park Extension, New Delhi-110016	Community oriented technology development for sustainable forest resource management under JFM participation	R. K, Pandey	In press	-
10.	Vaniki Sandesh	बाइबिडंग (*Embelia basaal*): सतत् विदोहन हेतु मानकों का निर्धारण (हिंदी में)	R. K, Pandey	2013 (3)	
11.	-do-	Growth trend in salai (B*oswellia serrata*) trees in gwalior region of Madhya Pradesh. Vaniki Sandesh	Richa Seth and S.K. Chadhar	Vol. No. 2 (April-June) 2013	page no. 1-5
12.	-do-	बीजा : नर्सरी एवं रोपण तकनीक	Pratiksha Chaturvedi, Kamalika Mohanta S.S. Raghuvanshi	4(2)	39-44
13.	-do-	करधई : नर्सरी एवं रोपण तकनीक	Kamalika Mohanta Pratiksha Chaturvedi S.S. Raghuvanshi	4(1)	46-50
14.	-do-	Standardization of drying technique for *Acorus calamus* Linn	Pratibha Bhatnagar & Sonam Jain	Vol.4 (3) Jul-Sep 2013	8-10
15.	-do-	Production & Marketing of lac in Balaghat District of M.P.	Pratibha Bhatnagar, Radhika Urmalia,Alok Raikwar & Rajesh	Vol. 13 (4) Dec 2013	3-13
16.	-do-	Price movement of *Cassia tora* Linn. in district level markets of M.P. and Chhattisgarh.	Pratibha Bhatnagar, Radhika Urmalia & Alok Raikwar	Vol. 14 (1) March 2014	3-8
17.	-do-	Price movement of Kalmegh (*Andrographis paniculata)* in regional markets of M.P. and C.G.	Pratibha Bhatnagar, Alok Raikwar & Radhika Urmalia	Vol 4 (4) Oct-Dec 2013	

S.N.	Name of Journal	Title of paper	Author(s)	Vol. No.	Page No.
18.	Vaniki Sandesh (2013) July - Sept.2013	Diseases of medicinal plant Tulsi (*Ocimum sanctum*) L. in different seasons	Jyoti Singh, Mrs. Anupama Goswami and Parvez Jalil,	July-Sept 2013 Vol. (4) 3	11-14
19.	*Vaniki Sandesh* (2012)	Fungi associated with medicinal plant (*Rauvolfia serpentina* Benth. Ex.Kurz)	Jyoti Singh, Parvez Jalil and Ram Prakash	Oct. Nov. 12 year 2 No.-4	9-11
20.	Vaniki Sandesh (SFRI)	Collection, pretreatment, storage and nursery management of Teak seeds	Archana Sharma	4(1), 2013	31–34
21.	-do-	Seed collection, storage, pretreatment and nursery management of Khamer	Archana Sharma	4(2), 2013	45-48
22.	-do-	Effect of collection, processing and storage on quality of flower and fruits of Mahua	Archana Sharma	4(3), 2013	38-44
23.	-do-	Status of Seed Production Areas, advancement of seed research and future strategies for tree improvement programme	Archana Sharma	4(4), 2013	–
24.	-do-	वृक्षारोपण तथा संवहनीय प्रबंधन हेतु तकनीकी रणनीति	O.P. Chaubey	4(3), 2013	24-28
25.	-do-	Bamboo for enterprise development	O.P Chaubey and A.K. Sharma	4(1), 2013	24-30
26.	-do-	Standardization of drying technique for *Acorus calamus* Linn	Pratibha Bhatnagar & Sonam Jain	Vol.4 (3) Jul-Sep 2013	8-10
27.	-do-	Price movement of Kalmegh (*Andrographis paniculata)* in regional markets of M.P. and Chhattisgarh	Pratibha Bhatnagar, Alok Raikwar & Radhika Urmalia	Vol 4 (4) Oct-Dec 2013	
28.	Van Dhan Vyapar	Production & Marketing of lac in Balaghat District of M.P.	Pratibha Bhatnagar, Radhika Urmalia, Alok Raikwar & Rajesh Barman	Vol. 13 (4) Dec 2013	3-13
29.	Van Dhan Vyapar	Price movement of *Cassia tora* Linn. in district level markets of M.P. and Chhattisgarh.	Pratibha Bhatnagar, Radhika Urmalia & Alok Raikwar	Vol. 14 (1) March 2014	3-8

Papers presented in seminars/ symposiums/ workshops

S. No.	Name of seminars/ symposiums/ workshops	Title of paper	Author(s)	Vol. No.	Page No.
1.	Workshop on Plantation strategy by MP Forest Department 12-13 August, 2013 at SFRI, Jabalpur	Establishment and management of Seed Production Areas, planning of seed collection and collection of quality seeds, appropriate storage methods and pre sowing treatments of various forestry species	Dr. Archana Sharma	Proceedings	

Papers presented in seminars/ symposiums/ workshops					
S. No.	**Name of seminars/ symposiums/ workshops**	**Title of paper**	**Author(s)**	**Vol. No.**	**Page No.**
2.	National workshop on "Tree seed science and Silviculture" 28-29, November, 2013 at Institute of Forest Genetics And Tree Breeding, Coimbatore, Tamil Nadu	"Impact of Application of Chemical Fertilizers and Biofertilizers on Growth and Biomass Production of Mahua Seedlings under Nursery Stages"	Dr. Archana Sharma	Proceedings	
3.	International Bamboo conclave & Expo 2014 22-23 February, 2014 at University of Agricultural Sciences, GKVK, Bangalore	"Seed longevity and germination potential of *Dandrocalamus strictus*"	Dr. Archana Sharma	Proceedings	
4.	National seminar on "Role of green technology in agriculture, horticulture and forestry" 26-27 February, 2014 at Dr. Hari Singh Gour University, Sagar	"Biotechnological approach to enhance the growth and biomass of *Tectona grandis* Linn. F. (Teak) Seedlings."	Dr. Archana Sharma	Proceedings	
5.	National workshop on "Forest seed science: Recent Advances & challenges in seed research" 26-27 February, 2014 at Forest Research Institute, Dehradun (UK)	Effect of different harvesting periods of fruit collection on seed quality of *Emblica officinalis* Gaertn (Aonla)	Dr. Archana Sharma	Proceedings	
6.	National seminar on advancement and recent development in tree seed technology to enhance forest productivity. 21-22 February 2014 at SFRI, Jabalpur	Development of Nursery techniques of some RET species of Madhya Pradesh	R.K Pandey, Uday Homkar, Kundan Sharma, Imrat sen and Manju Homkar		
7.	-do-	Mass multiplication techniques of Bai-bidang (*Embelia bassal*) and Malkangani (*Celastrus paniculata*)	R.K Pandey, Uday Homkar, Manju Homkar, Kundan Sharma and Imrat Sen		

Papers presented in seminars/ symposiums/ workshops					
S. No.	**Name of seminars/ symposiums/ workshops**	**Title of paper**	**Author(s)**	**Vol. No.**	**Page No.**
8.	-do-	Eco-silvicultural requirements of problematic forestry species for maintaining ecological resilience	O.P. Chaubey and P.K. Shukla	Souvenir	40-41
9.	-do-	Technology for evaluation and standardization of quality seed collection of *Schliechera oleosa*	Archana Sharma	Souvenir	
10.	National Seminar "role of green technology in agriculture, horticulture and forestry" held at Sagar from 26th to 27th February. 2014.	Restoration of degraded lands through planting of threatened and ethno-medicinally valued forestry species	O.P. Chaubey	Souvenir	-
11.	International Bamboo conclave & Expo-2013 held at Bangalore from 23rd to 24th February. 2014. Note: Excellent comments from the peer reviewers	Eco-silvicultural treatments for rehabilitation of gregariously flowered bamboo (*Dendrocalamus strictus*) forests: An overview	O.P. Chaubey and Ram Prakash	Souvenir	-
12.	World Teak Conference 2013 held at Bangkok Thailand from 25th to 27th March. 2013.	Silvicultural Options for Management of Degraded Teak Forests under Joint Forest Management - Case Study	O.P. Chaubey and Ram Prakash	Souvenir	-
13.	World Congress on Agroforestry, 2014 (10-14 Feb, 2014) held at Dehli India from 10-14 February 2014	Traditional knowledge systems and advances in agroforestry research to cope with ecological and environmental degradation	O.P. Chaubey and Archana Sharma	Accepted in Poster Presentation	-
14.	Workshop on Promotion of plantations in non forestry areas organized by Research and Extension center Jabalpur on 26 December 2013	Technology on Bamboo and Khamer plantations	O.P. Chaubey	Souvenir	-
15.	National Workshop on "Grassland Management in PAs" at Bandhavgarh Tiger Reserve	Spatio-temporal changes on structure and function attributes of the grasslands of Kanha Tiger Reserve : A case study.	R. K. Pandey, SFRI, Jabalpur	Proceedings	51-66
16.	-do-	Weeds of Grasslands in Bandhavgarh Tiger Reserve	R.K. Pandey, Ram Prakash & S.K. Saini	-do-	117-120

Papers presented in seminars/ symposiums/ workshops					
S. No.	**Name of seminars/ symposiums/ workshops**	**Title of paper**	**Author(s)**	**Vol. No.**	**Page No.**
17.	-do-	Prospects of grassland development in evacuated village sites in Wildlife Protected Areas: A case study of Satpura Tiger Reserve Madhya Pradesh	R.K. Pandey & (Mrs) S.K. Saini, SFRI, Jabalpur	-do-	121-131
18.	-do-	Estimation of Forage and Grazing land Requirement for existing population of Herbivores in Pench Tiger Reserve (M.P.)	R.K. Pandey S K Saini & A. Rajput	-do-	169-174
19.	-do-	Ecological Studies on Grasslands of Bandhawgarh Tiger Reserve with Special Reference to Wildlife Management.	R.K. Pandey	-do-	205-207
20.	"National Seminar on Medicinal Plants and Their Utilization" on 9-10 December, 2013. Hingoli Nanded (M.H.)	Challenges for Conservation and Sustainable Use of Wild Medicinal Plants in Natural Forest Ecosystem in India	R. K, Pandey	Proceedings	1-26
21.	International Seminar at Bangalore organised by AP forest Deptt. and NMBA	*In-vitro* multiplication of Bamboo species- *Denderocalamus asper* on low cost culture media	S.K.Tiwari and Amit Pandey	Accepted	
22.	International Association of Plant Biotechnology Congress 2014 Australia	Standardization of macropropagation technique of *Anogeissus pendula* a recalcitrant tree species through stem branch cuttings	S.K.Tiwari, Ram Prakash and Amit Pandey	Accepted	
23.	World Congress on Agroforestry - 2014	Potetential of Bamboo in Agroforestry system for economic development of tribals.	Pratibha Bhatnagar & Radhika Urmalia		
24.	-do-	Potential of integrating gum yielding species under agroforestry system for livelihood enhancement.	Pratibha Bhatnagar & Radhika Urmalia		

Paper published in edited books/ souvenirs					
S. No.	**Name of the edited books/ souvenirs**	**Title of the paper**	**Author(s)**	**Vol. No.**	**Page No.**
1.	"Bio-resources management in India" By Prof. A.K. Kandya and Prof. J.P.N. Pandeya, Published by I.K. International publishing house Pvt. Ltd. New Delhi, book	Scientific harvesting of fruits of Achar (*Buchanania lanzan)*,	Archana Sharma & P. K Shukla	ISBN No. 978-81-7910-370-8, (2013)	152- 161
2.	"Sustainable bio-diversity conservation in the landscape" by Dr. O.P. Chaubey, Archana Sharma	Seed technology of *Sapindus trifoliatus* (Linn.) for	Archana Sharma	Published book ISBN No. 978-81-	153-164

Paper published in edited books/ souvenirs					
S. No.	**Name of the edited books/ souvenirs**	**Title of the paper**	**Author(s)**	**Vol. No.**	**Page No.**
	and Dr. Ram Prakash	enhancing seed longevity and germination		7910-427-9, (2013)	
3.	"Sustainable bio-diversity conservation in the landscape" by Dr. O.P. Chaubey and Dr. Ram Prakash	Germination characteristics and seedling growth in *Terminalia chebula* Retz. as affected by various pre sowing treatments under storage	Archana Sharma	Published book ISBN No. 978-81-7910-427-9, (2013)	165-170
4.	"Ram Prasad Felicitation volume" (eds. Prof. P. Bhattacharya and Prof. A.K. Kandya),	Pre sowing seed treatment in *Sterculia urens* to enhance seed germination and seedling growth under storage,	Archana Sharma	Felicitation volume published by I.K. International Publishing House Pvt. Ltd., New Delhi, (2014)	
5.	"Seed technology and seed pathology" (eds. Archana Sharma, O.P. Chaubey and Ram Prakash), Aavishkar publishers, distributors, Jaipur, Raj. India., (2014)	Seed technology for gum yielding tree species of *Sterculia urens*	Archana Sharma	ISBN No. 978-81-7132-777-5	
6.	-do-	Technology for evaluation and standardization of quality seed collection of *Madhuca latifolia*,	Archana Sharma and Ram Prakash	ISBN No. 978-81-7132-777-5	
7.	Participated and presented the paper as key speaker in the National Seminar titled "role of green technology in agriculture, horticulture and forestry" held at Sagar from 26th to 27th February. 2014.	Biotechnological approach to enhance the growth and biomass of *Tectona grandis* Linn. F. (Teak) seedlings	Dr. Archana Sharma	Souvenir	-
8.	Contributed the paper as resource person in the International bamboo conclave & Expo-2014 held at Bangalore from 22nd to 23rd February, 2014.	Seed longevity and germination potential of *Dandrocalamus strictus*	Dr. Archana Sharma	Souvenir	-
9.	Two days National Seminar on "Advancement and Recent Development in Tree Seed Technology to Enhance Forest Productivity held at State Forest Research Institute, Jabalpur from 21-22 February 2014		Dr. Archana Sharma	Souvenir	

Paper published in edited books/ souvenirs					
S. No.	**Name of the edited books/ souvenirs**	**Title of the paper**	**Author(s)**	**Vol. No.**	**Page No.**
10.	World Congress on Agroforestry, 2014 (10-14 Feb, 2014) held at Delhi India from 10-14 February 2014	Traditional knowledge systems and advances in agroforestry research to cope with ecological and environmental degradation (Accepted in Poster Presentation)	O.P. Chaubey and Archana Sharma	Souvenir	-
11.	"Bio-resources management in India" By Prof. A.K. Kandya and Prof. J.P.N. Pandeya	Sustainable Management of Gregariously Flowered Bamboo Areas: An Overview	Dr. O.P. Chaubey	Published book ISBN No. 978-81-7910-370-8, (2013)	137-152
12.	"sustainable bio-diversity conservation in the landscape" by Dr. O.P. Chaubey and Dr. Ram Prakash	Conservation and creation of databases for associated indigenous knowledge of threatened and ethno-medicinal plants	Dr. O.P. Chaubey	Published book ISBN No. 978-81-7910-427-9, (2013)	108-143
13.	Edited book titled "sustainable bio-diversity conservation in the landscape" by Dr. O.P. Chaubey and Dr. Ram Prakash	Holistic conservation approach for restoration of biodiversity in natural forests.	Dr. O.P. Chaubey and Dr. P.K. Shukla	Published book ISBN No. 978-81-7910-427-9, (2013)	68-93
14.	Global Journal of Science Frontier Research: D, Agriculture and Veterinary	Eco-Silvicultural Interventions for Rehabilitation of Gregariously Flowered Bamboo Forests with Special Reference to *Dendrocalamus strictus* (Roxb) Nees. 13(13): 31-38	Dr. O.P. Chaubey, Dr. Archana Sharma and Dr. Ram Prakash	13(13), 2013	31-38
15.	Edited book titled "Land Restoration and Green Technology" (eds. Dr. Jamaluddin).	Microbial restoration in mined-out areas under reduced ecosystem - An overview. Accepted in the	Dr. O.P. Chaubey, Dr. Priyanka Bohre, Prof. P. K. Singhal and Dr. Jamaluddin	Accepted, Under Printing (2014)	-
16.	Edited book titled "Seed technology and seed pathology" (eds. Archana Sharma, O.P. Chaubey and Ram	Eco-silvicultural requirements of problematic forestry	Dr. O.P. Chaubey and Dr. P.K. Shukla	Accepted, Under Printing	-

Paper published in edited books/ souvenirs					
S. No.	**Name of the edited books/ souvenirs**	**Title of the paper**	**Author(s)**	**Vol. No.**	**Page No.**
	Prakash), Aavishkar publishers, distributors, Jaipur, Raj. India.	species for maintaining ecological resilience.		(2014)	
17.	The edited book titled "Dr. Ram Prasad Felicitation volume" (eds. Prof. P. Bhattacharya and Prof. A.K. Kandya), published by I.K. International Publishing House Pvt. Ltd., New Delhi	Population structure and regeneration potential in Sal forests of Kanha Tiger Reserve	Dr. O.P. Chaubey and DR. Archana Sharma	Accepted, Under Printing (2014)	-

Publication of technical bulletins / brochures

S. No.	Name of technical bulletins/ brochures	Authors	Bulletin/ brochure Number	No. of pages
1.	Harvesting Code of NTFPs (under JICA project)	Dr. R. K. Pandey Dr. S K Saini Mr. S. K. Nema & Mr. V K Patel	Bulletin	177
2.	Training manual on forest resource assessment and management (under JICA project)	Dr. R. K. Pandey Dr. A. Rajput & Dr. S. K. Masih	Bulletin	263

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Chapter – 9
BUDGET / FINANCE

Funding sources

1. Grant-in-aid under non-plan budget of the Govt. of Madhya Pradesh, Forest Department
2. Project Based exterma 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 (2013-14)

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)	**47.84**	**480.00**	**527.84**	**524.41**
Deposit Works (Sponsored projects)	**412.13**	**242.18**	**654.31**	**124.75**
Total Rs.	**459.97**	**722.18**	**1182.15**	**649.16**

Details of sponsored projects

Various projects have been funded by govt./semi govt./non-govt. and private agencies from time to time. Such on-going projects during the year 2013-14 are given below.

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
1	Development of nursery techniques of Bai-bidang (Embella ribes) Malkangani (Celastrus paniculata) **BD/P/E/09-10/11**	म.प्र. राज्य लघु वनोपज व्यापार एवं विकास सहकारी संघ मर्यादित म.प्र.भोपाल	85992	0	85992	1628
2	Development of nursery technuques and modlesl for plantation of rare, endangered and threatened (R.E.T.) species in natural conditions **BD/P/E/10-11/08**	APCCF (Research, Extension & Lok Vaniki)	1048536	570000	1618536	786666
3	म.प्र. में साल बोरर से साल वनों की सुरक्षा हेतु प्रशिक्षण कार्यक्रम। **BD/P/E/11-12/22**	APCCF (Research, Extension & Lok Vaniki)	358537	0	358537	174310
4	Mass Mulltiplication of Medicinal Plant Mission. **BD/P/E/11-12/24**	Horticulture and Medicinal Plant Mission Bhopal.	1402691	0	1402691	198242
5	Upgradation and renvation of Museum at SFRI Jabalpur (M.P) **(13वें वित्त आयोग) BD/P/E/12-13/18**	APCCF Devlopment	8507000	0	8507000	41734
6	Ex- situ Conservation of medicinally important wild life Tuburoow/Rhizonatic plant and studies on their phenology and grouth performance. **BD/P/E/13-14/05**	APCCF R&D Extension and Lokvaniki (M.P. Satpura Bhawan Bhopal	0	1800000	1800000	477119

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
7	Development of cultivation techniques of vandeera (Black Cumine) Centrantherum antheleminiticum (L) Kantze. **BD/P/E/13-14/16**	APCCF & Lokviniki Bhopal.	0	0	0	0
8	Documentation of ethnobotanical in formation on natural gum and resin yielding plant of (M.P.) **BD/P/E/13-14/17**	APCCF R&D Extension and Lokvaniki (M.P.) Bhopal	0	0	0	8832
9	Documentation of Some traditional knowledge of Local & Communities of Malwo Eco Region of M.P. **BD/P/E/13-14/19**	M.P. Concil of Science of Technology	0	196000	196000	0
10	Impact Assesment of different treatments on rehabilitation of gregariously flowered bamboo forests in Madhya Pradesh. (सामूहिक बांस पुष्पन परियोजना) **BOT/P/E/06-07/11**	APCCF (Development)	998715	0	998715	38982
11	Modernization and diginatization of esisting fresh herbarium of state forest research Institute Jabalpur (M.P.) **BOT/P/E/11-12/03**	APCCF (भू–प्रबंध) Bhopal	898049	0	898049	239780
12	Protection maintenance and growth study of dominant tree species for estimation of bimass and carbon seequestration in preservation plots laid in different forest types of M.P. **BOT/P/E/11-12/07**	अपर प्रधान मुख्य वन संरक्षक (भू–प्रबंध) म.प्र. भोपाल,	1550006	0	1550006	207639
13	Prepration on & Roclomation Plan & flag Mines of Shivpuri District, M.P **BOT/P/E/11-12/18**	The M.P. State Mining Corporation Bhopal	303129	0	303129	0
14	National Seminar on " Strategy for Restoration of Forest Bio-diversity of Natural Forest and Plantation" **BOT/P/E/12-13/04**	अपर प्रधान मुख्य वन संरक्षक (कक्ष–समन्वय)म.प्र. भोपाल,	72416	0	72416	300
15	Development of Enrichment of existing Botanic garden of SFRI Jabalpur with Rarte landk Endemic Angioperm and Pteridophyters **BOT/P/E/12-13/26**	APCCF Res. Ext. & Lokvaniki M.P.Bhopal	95850	1500000	1595850	420019
16	Impact assessment of proposed relocation of **Five villages** of Panna Tiger Reserve with reference to conservation of tiger and its habitat **ECO/P/E/07-08/04**	Field Director PTR Panna	384341	0	384341	0
17	Determination of sustainable harvesting limits of commercially important wild plant species in Natural Forest with active Participation of user's forest	National Medicinal Plants Board New Delhi	393019	0	393019	2476

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
	Development communities in Chhindwara district of M.P. **ECO/P/E/08-09/05**					
18	Consultancy for deciding in voilate space in Kanha Tiger Reserve. **ECO/P/E/09-10/02**	Field Director Kanha Tiger Reserve Mandla	8001	0	8001	0
19	4 नये लोक संरक्षित क्षेत्र में प्रथम रिसोर्स सर्वे हेतु अध्ययन। **ECO/P/E/10-11/06**	म.प्र.राज्य लघु वनोपज व्यापार एवं विकास सहकारी संघ मर्यादित म.प्र. भोपाल	1368771	0	1368771	131090
20	Forest Resources Assesment of Peoplus Protuted Forest areas of Madhya Pradesh **ECO/P/E/10-11/07**	APCCF (R/E & Lok Vaniki) M.P. Bhopal	240645	0	240645	41823
21	Impact assesment on Flora & fauna in Bunder Project in Baxwana forest Range of Chhatarpur Forest Division. **ECO/P/E/10-11/11**	Rio Tinto Exploration India Private Ltd. New Delhi.	185442	0	185442	1454
22	Impact Assement of relocation and regabilitation of forest village khakrapura of Bari Sancturies **ECO/P/E/10-11/17**	Field Director Satpura Tiger Reserve, Hashagabad	179000	208000	387000	700
23	**JICA Project** of UP Forest Management and powerty Alibenation (New Project) Non-Timber Forest Produces Resource Assessiment and Development **ECO/P/E/11-12/13**	Japan International Corporation	156677	475200	631877	343193
24	JICA Non-timber forest produces resource assessiment & development **ECO/P/E/11-12/14**	Japan International Corporation	842793	418500	1261293	189906
25	बोर–होल खनन वनस्पति एवं वन्य प्राणियों पर पड़ने वाले प्रभाव का मूल्यांकन अध्ययन।**ECO/P/E/11-12/15**	Central Mine Planning & Design Institute Ltd.	431555	0	431555	11350
26	Survey of existing Barahsingha & Blackbuck habitat evaluation for habitat viablity asessment for Kanha Tiger Reserve and Satupra Tiger Reserve. **ECO/P/E/11-12/26**	क्षेत्र संचालक सतपुड़ा टाइगर रिजर्व होशंगाबाद	221157	0	221157	37921
27	Environmental impact asessment on aquatic life/water supply and water quality of down stream due toreduce flow especially in lean period in Sanjay Gandhi Thermal Power Plant. **ECO/P/E/11-12/27**	संजय गांधी थर्मर पॉवर प्लांट बिरसिंहपुर उमरियॉ	772448	0	772448	126031
28	Study on soil erosion/soil flow from the overburden areas of Khadia Project with the help of G.I.S. **ECO/P/E/11-12/28**	Northern Coalfields Ltd. Sonebhadra (UP)	799905	0	799905	63658

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
29	सतपुडा ताप विधुत गृह सारणी स्थित वर्तमान राखड़ बांध हेतु रिक्लेमेशन प्लान एवं वन्य प्राणी प्लान तैयार करना। **ECO/P/E/12-13/07**	A.E.(Gen) MP. Power Generating Co. Ltd. Shakti Bhawan Rampur Jabalpur	955484	0	955484	115532
30	Study evaluation of impact of runj project on wildlfe and action to be taken to mitigate the impacts under runj irrigation medium project, (Runj Panna) **ECO/P/E/12-13/08**	Executive Engineer Water Resources Division Panna(M.P.)	928205	2100000	3028205	411744
31	Impect assement on habits progmention and wild life habitat along with fbrol and fau nd stu dies for the forest and to be used for 4-6 for laning of national highway 26-in dhashioand lalitpur section in Madhy Predesh **ECO/P/E/12-13/10**	National Highway Authority of India (Minitry of Road Transport and Highway	840662	0	840662	3502
32	Ecological Studies on Grasslands of Bandhawgarh Tiger Reserve with Special Reference To Wildlife Management. **ECO/P/E/12-13/24**	APCCF Res. Ext. & Lokvaniki M.P.Bhopal	876000	1177000	2053000	629043
33	Impact Assessmeent of road upgradation of National Highway No.26 (B) on forest wildlife habitat in the affected forest area (48.849 ha) of East Chhindwara Forest Division. **ECO/P/E/13-14/01**	National Highway Authority of India (Minitry of Road Transport and Highways) Project Implementation Unit Chhindwara	0	4982000	4982000	504351
34	राज्य वन अनुसंधान संस्थान जबलपुर के अनुसंधान परियोजनाओं के निष्कर्षो का प्रचार–प्रसार हेतु कार्यशालाओं का आयोजन स्थल सिवनी **EXT/P/E/11-12/08**	APCCF(Research,Extension & Lok Vaniki) Bhopal	181146	0	181146	26666
35	Exposure Trips to the JFMCs & EDC Members of U.P. Forest Department **EXT/P/E/11-12/19**	APCCF (R/E & Lok Vaniki) M.P. Bhopal	130560	0	130560	0
36	बुंदेलखंड विशेष पैकेज के अंतर्गत हितग्रहियों तथा फील्ड स्टाफ का भू–जल सरंक्षण तकनीक एवं प्रबंधन कार्य एवं प्रशिक्षण हेतु कार्यशाला का आयोजन। **EXT/P/E/11-12/21**	APCCF(Research, Extension & Lok Vaniki) Bhopal	508939	0	508939	0
37	Exposure visit of JEMCs of U.P. PFM P.A.P. **EXT/P/E/12-13/22**	Chif Project Director PMU UP PFM PAP	1077	0	1077	0

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
38	नर्सरी संचालको के प्रशिक्षण के सम्बन्ध। **EXT/P/E/12-13/27**	संभागीय कार्यालय म.प्र.जन अभियान परिसर कमिश्नर जबलपुर सभाग	134700	0	134700	133921
39	अनुसंधान विस्तार वृत्त, में पदस्थ अधिकारीयों कर्मचारियों हेतु नर्सरी प्रबंधन पर दों दिवसीय आवसीय प्रशिक्षण कार्यक्रम **EXT/P/E/13-14/06**	APCCF (R & D) Lokvaniki M.P. Bhopal	0	379000	379000	66967
40	राज्य वन अनुसंधान संस्थान जबलपुर के अनुसंधान परियोजनाओं के निष्कर्षो का प्रचार–प्रसार हेतु कार्यशाला द्वितीय चरण का आयोजन। **EXT/P/E/13-14/10**	APCCF (R & D) Lokvaniki M.P. Bhopal	0	379500	379500	0
41	National Network on integrated Development of Jatropha. **GEN/P/E/2004-05/17**	NOVOD Board Gurgaon	221104	0	221104	53351
42	Germplasm evaluation of important medicinal plants through chemo profiling techniques and improved biotechnological tools. **GEN/P/E/06-07/15**	National Medicinal Plant Board New Delhi	1218	0	1218	807
43	Standardization of protocols for clonal multiplication of Litsea glutinosa (lour cb, rob and endangered medicinal plant. **GEN/P/E/2008-09/07**	NMPB,New Delhi	257205	0	257205	1465
44	The Establishment of an Advanced Laboratory for Molecular Characterization and Chemo Profiling of Commiphora wightii Plant **GEN/P/E/2010-11/18**	M.P. Biotechnholigy Council Bhopal	56429	0	56429	7833
45	Gentic diversity assessment of Boswllia serrta and standardization of microclonal propagation protocols through biotechnological interventions for the production of elite planting material. **GEN/P/E/12-13/05**	म.प्र.राज्य लघु वनोपज व्यापार एवं विकास सहकारी संघ मर्यादित म.प्र. भोपाल	352465	0	352465	285041
46	Clonal mass multip0lication of Commiphora wightii a red-listed medicinal Plant. **GEN/P/E/12-13/06**	म.प्र.राज्य लघु वनोपज व्यापार एवं विकास सहकारी संघ मर्यादित म.प्र. भोपाल	78523	0	78523	0
47	Standaridization of clonal propagtion protocol for commercially important farestry species anogeissus pendula. **GEN/P/E/12-13/17**	Research Extesion and Lokvaniki	131745	320000	451745	204532

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
48	Clonal Multiplication of Dendocamamas as per (Thailand bamboo) through Micropropogation technique **GEN/P/E/12-13/23**	APCCF Res. Ext. & Lokvaniki M.P.Bhopal	12858	72000	84858	72000
49	Preparation of growth for coppice origin plants of important species in different regions of M.P. **MEN/P/E/08-09/16**	APCCF Res. Ext. & Lokvaniki M.P.Bhopal	968392	0	968392	1500
50	Revision of Farm factors for Teak & Sal in different Divisions of M.P. **MEN/P/E/09-10/03**	वनमण्डलाधिकारी उत्पादन वन मण्डल मण्डला	15526	0	15526	0
51	Revised- form factors table for important miscellaneous timber tree species of Madhya Pradesh. **MEN/P/E/11-12/12**	APCCF(Research,Extension & Lok Vaniki) Bhopal	402309	15000	417309	74793
52	Revision of Farm factors of Teak For Raisen Divisions of M.P. **New Project MEN/P/E/11-12/16**	वनमण्डलाधिकारी उत्पादन वन मण्डल रायसेन	12122	0	12122	2525
53	रोपणी मार्गदर्शिका का प्रकाशन **MEN/P/E/12-13/25**	APCCF (R/E & Lok Vaniki) MP Bhopal	38030	100000	138030	19008
54	Digitisation of old records of M.P. Forest Department and Forestry Research. **SEM/P/E/09-10/ 05**	APCCF (Development.) Bhopal	60675	0	60675	0
55	Valuation of Forest Resources and its accounting. A case study of South Balaghat Forest Division. **SEM/P/E/09-10/ 06**	APCCF (Development.) Bhopal	90950	0	90950	0
56	Sustainable harvesting and primary processsing of gums and gum oleoresing in M.P. **SEM/P/E/10-11/04**	म.प्र. राज्य लघु वनोपज व्यापार एवं विकास सहकारी संघ मर्यादित म.प्र. भोपाल	67609	291000	358609	157515
57	म.प्र. में निजी एवं राजस्व क्षेत्रों में वानिकी प्रसार हेतु विभिन्न प्रकार के जलवायु एवं मिट्टीयों में प्राप्त हो सकने वाली वनोपज का आर्थिक विश्लेषण। **SEM/P/E/10-11/09**	APCCF(Research,Extension & Lok Vaniki) Bhopal	400970	0	400970	72074
58	Training of sustainable harvesting processing grading and storage of gums. **SEM/P/E/10-11/20**	MPRLP Bhopal	511171	0	511171	0
59	Strenthehing of MIS call and Establishment of five regional markets data collection and analysis centre in Madhya Pradesh. **SEM/P/E/11-12/01**	MSP Fedration Trade and Development Bhopal	-384157	1000000	615843	716798
60	**वन विभाग का 150 वर्ष कार्यक्रम मनाने हेतु (New Project) SEM/P/E/11-12/20**	APCCF (R/E & Lok Vaniki) MP, Bhopal	295557	100000	395557	7780

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
61	Standardization of primary processing and drying techniques for selected medicinal species and NWFP. **SEM/P/E/11-12/25**	APCCF (R/E & Lok Vaniki) MP, Bhopal	98950	0	98950	14833
62	Compilation of 50 years of forestry research at State Forest Research Institute. Jabalpur. **SEM/P/E/12-13/03**	APCCF (R/E & Lok Vaniki) MP, Bhopal	200000	0	200000	0
63	Proservation and digitization of Research records of SFRI **SEM/P/E/12-13/15**	APCCF (R/E & Lok Vaniki) MP, Bhopal	94580	175000	269580	203425
64	Devlopment of Storage system in Archive Room of SFRI (13 वें वित्त आयोग) **SEM/P/E/12-13/20**	APCCF Development, (M.P.)	1493000	0	1493000	1056815
65	Tranining on technical know how of gum tapping fram how of gum tapping Butea monosperina in Umaria and Tikamgarh districts to local people and frontline staff of forest department. **SEM/P/E/13-14/13**	APCCF (Research,Extension & Lok Vaniki) Bhopal	0	0	0	6000
66	म.प्र. प्रमुख गोंदो के संग्रहण के आंकड़ों का संकलन एवं प्राथमिक संग्राइकों पर सामाजिक आर्थिक प्रभाव। **SEM/P/E/13-14/18**	APCCF (R/E & Lok Vaniki) MP, Bhopal	0	0	0	0
67	Germplasm evaluation and standardization of packages of propagation through seeds and vegetyative propagatyion of important tree borne oil seeds of Mahua and Kusum. **SD/P/E/08-09/10**	APCCF (R/E & Lok Vaniki) MP, Bhopal	353612	0	353612	33
68	Training and demonstration programmefor transfer of technology of enhancing flowering and fruiting in Mahua trees through application lof fertilizers/Chemicals growth retardants. **SD/P/E/2008-09/15**	APCCF (R/E & Lok Vaniki) MP, Bhopal	390584	0	390584	0
69	Development of packages of seed techniques for important forestry species. **SD/P/E/2010-11/13**	APCCF (R/E & Lok Vaniki) MP, Bhopal	931826	303000	1234826	185076
70	Strengthening of Infrastructure of collection. Testing certification and storage of forestry seeds. **SD/P/E/12-13/01**	APCCF (R/E & Lok Vaniki) MP, Bhopal	627960	0	627960	314729
71	Strengthening of Infrastructure of collection, testing, certification and storage of forestry seeds. **SD/P/E/12-13/12**	APCCF (R/E & Lok Vaniki) MP, Bhopal	540000	91000	631000	266460
72	Effect of various pretreatment on Seed germination of fresh and stored Seeds of tactona gradis (Teak) **SD/P/E/12-13/13**	APCCF (R/E & Lok Vaniki) MP, Bhopal	192740	240000	432740	187871

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
73	Documentation and Development & Packages of seed and nursery techniques for some important indigenous Species. **SD/P/E/12-13/14**	APCCF (R/E & Lok Vaniki) MP, Bhopal	229773	357000	586773	152424
74	Effect of vermicompost and Neem cake on Plant growth of same farestry species. **SD/P/E/12-13/16**	APCCF (R/E & Lok Vaniki) MP, Bhopal	139150	20000	159150	26894
75	Advance and recent development in tree seed technology to enhance forest productvity 2 day National Seminar. **SD/P/E/13-14/09**	APCCF R&D Lokvanikii M.P. Bhopal	0	454000	454000	391652
76	Estimation of carying capacity of grazing in different forest types and canopy density in Jabalpur Forest Division **SIL/P/E/2009-10/ 07**	APCCF(Research,Extension & Lok Vaniki) Bhopal	309952	1500000	1809952	282431
77	राष्ट्रीय वनीकरण कार्यक्रम से सम्बंधित कार्यों का मूल्यांकन **SIL/P/E/09-10/08**	CCF (JFM) FDA	782902	0	782902	0
78	Evaluation of Developmental works of Forest Villages. (वन ग्राम विकास कार्यक्रम से सम्बंधित कार्योंका मूल्यांकन) (वन ग्राम) **SIL/P/E/09-10/09**	संयुक्त वन प्रबंधन एवं वन विकास अभिकरण सतपुडा भवन भोपाल	907918	0	907918	406
79	Standaridization of potting mixture of various soil type for optimum growth of Tectona grandis (Khamer) abd Dendrocalamus strictus (Banboo) species. **SIL/P/E/10-11/14**	APCCF (R/E & Lok Vaniki) MP, Bhopal	324495	0	324495	22578
80	बुंदेलखंड विशेष पैकेज के विकास कार्यो का मूल्यांकन। **SIL/P/E/11-12/10 (New Project)**	अपर प्रधान मुख्य वन संरक्षक संयुक्त वन प्रबंधन/वन विकास अभिकरण सतपुड़ा भवन भोपाल,	-16052	1514800	1498748	215438
81	DNA-Based monitaring of tigers and their movment in the Kanha,Pench corridon of (M.P.) **SIL/P/E/12-13/09**	APCCF (R/E & Lok Vaniki) MP, Bhopal	1021980	200000	1221980	403704
82	Confrenece on "Silvicture issues for producting enhancement and ecological security. **SIL/P/E/12-13/19**	APCCF (R/E & Lok Vaniki) MP, Bhopal	-92360	123000	30640	0
83	वन विभाग द्वारा वृक्षारोपण की रणनीति पर कार्यशाला। **SIL/P/E/13-14/11**	APCCF (R/E & Lok Vaniki) MP, Bhopal	0	402500	402500	332628
84	म0प्र0 राज्य वन विकास अभिकरण द्वारा विभिन्न वन विकास अभिकरणों में वित्तीय वर्श 2011–12 में प्रारंभ किए गए वनीकरण कार्यो 2011–12 में किए गए वृक्षारोपण का अनुश्रवण मूल्यांकन किए जाने के संबंध में। **SIL/P/E/13-14/12**	APCCF (R/E & Lok Vaniki) MP, Bhopal	0	297000	297000	386038

S. N.	Title of the project	Sponsoring agency	Balance available in the beginning of the year	Amount received in the year	Total Amount	Total Exp. (1.4.13 to 31.3.14) Rs.
85	Standardization of pruning techniques for optimum production of quality tendu leaves. **TI/P/E/09-10/01**	MP State Minor Forest Produce (T&D) Fed. Bhopal	786668	0	786668	0
86	Science Plan for Utilization of Automatic Weather Station (AWS) and Agrometeorological Station (AMS) data in Madhya Pradesh, India (in collaboration with M.P. Forest Department) **TI/P/E/09-10/04**	APCCF (Project) Bhopal	1364507	0	1364507	200637
87	Studies on screening and management of diseases of some selected important medicinal aromatic plants. **TI/P/E/10-11/05**	APCCF(Research,Extension & Lok Vaniki) Bhopal	227027	0	227027	4682
88	Establishment of Bamborium/ Bambusetum and Bamboo interpretation centre at SFRI, Jabalpur (बांस वाटिका एवं बैम्बू इंटरप्रिटेशन सेंटर की स्थापना) **TI/P/E/10-11/01**	वन संरक्षक सामान्य वन मण्डल जबलपुर	652956	0	652956	6829
89	Establishment of LEAF Orchard of Tandu. **TI/P/E/10-11/21**	MFP Fedration Bhopal	227075	0	227075	0
90	Selection of superior races of Khamer (Gmelina arborea through clonal propagation **TI/P/E/12-13/02**	APCCF (R/E & Lok Vaniki) MP, Bhopal	524199	250000	774199	190276
91	Devlopment of Suitable nursery techniques of Some important rare tree Species of (M.P.**) TI/P/E/12-13/11**	APCCF (R/E & Lok Vaniki) MP, Bhopal	328783	565000	893783	65121
92	The Study on top during of Gmetina arborea and its management. **TI/P/E/13-14/02**	APCCF (R/E & Lok Vaniki) MP, Bhopal	0	564000	564000	163037
93	Integratedf management of disease of economically important tree Species Dhawada, Bija, and Achar Occuring in forest of (M.P.) **TI/P/E/13-14/03**	APCCF (R/E & Lok Vaniki) MP, Bhopal	0	557000	557000	129212
94	Causes and remedial measures of Sal mortallity Sharea robusta in forest area of (M.P) **TI/P/E/13-14/04**	APCCF (R/E & Lok Vaniki) MP, Bhopal	0	522000	522000	123473
95	औषधीय पौधों के जीन बैंक एवं रोपणी का प्रबंधन एवं विकास। **BD/RA/1//01**	SFRI Jabalpur (Regular Activities)	232587	0	232587	29072
96	DNA-Based monitaring of tigers and their movment in the Kanha,Pench corridon of (M.P.) **SIL/P/E/12-13/09**	APCCF (R/E & Lok Vaniki) MP, Bhopal	1021980	200000	1221980	403704
	Not Distributed Amt. APCCF	Year 2013-14	1973200		1973200	0
	Total Exp. Rs.		**41212982**	**24218500**	**65431482**	**12475375**

Income of the A/c SB/3990 Revoving Funds for the year 2013-14

S.No.	HEAD	Income (In Lakh)
1	House Rent / Water Charge	1044885
2	Gate Entery Fees	604475
3	Guest House Reservation	569605
4	Misc. Head	240404
5	Training Head	187495
6	Plant Sale Head	343833
Interest Account under A/c SB/3990		
1	FDR Interest	136384
2	Saving Interest	109957
	Total	**3237038**

EXPENDITURE of the A/c SB/3990 Revoving Funds for the year 2013-14

S.No.	HEAD	Expenditure (In lakh)
1	Civil, Electric & Maintenance	2700
2	Wages	260498
3	Travelling Expenses (T.A)	23847
4	Reservation Refund Amt. of House Rent / Hostel Rooms / Training Fees	56900
5	Nursary Exp.	1305
6	Work Advance	2400
7	Misc. Head	645
	TOTAL EXP.	**348295**

Income & Expenditure incurred from the Reserve Fund for the year 2013-14 (Sanchit Nidhi) A/c 5007081661

S.No	Details	Income	Expenditure
1	Reserve funds A/c Sanchit Nidhi 50070181661	**10608729**	**1550651**

Financial Status as on 31st March, 2014

S.No.	Details	Cash in Bank	F.D.R.	Total
1	Revolving Fund A/c SB/3990	8106061	3600000	11706061
2	Grant-In-aid A/c SB/3268	4356016	0	4356016
3	Depposit Work A/c SB/3987	23412479	36826611	60239090
4	Reserve funds A/c Sanchit Nidhi 50070181661	11435521	25999000	37434521

`Chapter-10

ESTABLISHMENT

Postings, Transfers, Retirements and Death (2013-2014)

Postings:-

S.No.	Name	Designation	Date of Joining
1	Shri R.D. Mahla, IFS	Dy. Director	21-10-2013

Transfers:-

S.No.	Name	Designation	Date of Relieving
1	Shir K. P. Singh, IFS	Addl. Director	08-08-2013
2	Smt. Kamalika Mohanta, IFS	Dy. Director	23-08-2013
3	Shir M. K. Parihar	Asst. Director	27-08-2013

Retirement:-

S.No.	Name	Designation	Date of Reliving
1	Shri Arun Kumar Nandeswar	Dakrunner	31-01-2014
2	Shri S. K. Chadhar, IFS	Dy. Director	30-04-2013
3	Shir T. G. Soman Pillail	Driver	30-08-2013

Temporary project staff engaged during the year (April 2013 to March 2014)

S. No	Name	Designation	Project under which appointed	Period	
				From	To
1	Shilendra Nema	SRF	Forest Recourse assessment in people protected forest areas of M.P.	March 2013	March 2014
2	Shilendra Nema	SRF	Forest Recourse assessment in people protected forest areas of M.P.	March 2013	March 2014
3	Sunil Singh Bhor	Project Asosiate	Forest Recourse assessment in people protected forest areas of M.P.	March 2013	March 2014
4	Manish Puri Goswami	RA	Gentic divercity assessment of Boswellia serrata and standarlization of micro clonal propagation protocales.	March 2013	March 2014
5	Krishna Kumar Patel	Project Associate	Causes and remedial measures of sal mortality (Shorea robusta) in forest sareas of m.p.	27.06.2013	30.06.2015
6	Rajesh Barman	SPR	Strengthening of MIS cell and Establishment of five regional marketing data collection and analysis centre in M.P.	Jan.2013	Jan.2015
7	Moh. Asif Mansoori	Data Entry Operator	Modernization and digitatization of exisiting forest herbarium of SFRI	May 2012	Nov.2014
8	Abhisek Gupta	Data Entry Operator	Development of packages of seed techniques for important forest tree species.	March 2013	July 2014
9	Kundan Sharma	Project Astt.	Development of nursery technique and model for plantation of RET species in natural condition.	March-2013	March 2014
10	Ajay Prakash Tiwari	Lab Astt.	Preservation & Digitization of old Research record of SFRI	Oct.2013	Oct.2014
11	Anuradha Tiwari	JRF	National Network on integrated Development of jetrofa curcus.	March 2013	Sept. 2013
12	Mahendra Dubey	Computer Operator	Revised form factor tables for important.	March 2013	March 2014
13	Nitin Kumar Verma	Computer Operator	The Study on top dying of Gmelina arborea and its	28.06.2013	31.03.2015
14	Sonam Jain	Lab Astt.	Sustainable Harvesting Primary Processing of Gum and Oleo Resin	March 2013	March 2014

S. No	Name	Designation	Project under which appointed	Period	
				From	To
15	Bhawna Tathod	JRF	Development of packages of seed techniques for important forest tree species.	March 2013	March 2014
16	Shekhar Saxena	Field Astt.	मध्यप्रदेश में निजि एवं राजस्व क्षेत्रों में वानिकी प्रसार हेतु विभिन्न प्रकार के जलवायु एवं मिट्टियों में प्राप्त हो सकने वाली वनोपज काष्ठ एवं औषधीय का आर्थिक विश्लेषण	March 2013	March 2014
17	Sunil Sutrakar	SRF	Strengthening of MIS cell and Establishment	March 2013	March 2014
18	R.C. Siddaki	JRF	Preservation and Digitization of old research	March 2013	March 2014
19	Ramakant Shukla	Project Astt.	Monitoring & Evaluation	March 2013	March 2014
20	Praveen Sahu	Compute Operator	Non timber forest produce (NTFP) Resource Assessment and Development (UP-PFMPAP)-JICA	March 2013	March 2014
21	Dr. Satwant Kour Saini	SRF	Preparation of Wildlife Conservation Plan for the area being diverted for constrcution of ash bund in district Betul, M.P. for satpuda tap vidyut grih sarni	March 2013	March 2014
22	Mukesh Gavane	SPR	Strengthening of MIS cell and Establishment of five regional marketing data collection and analysis centre in M.P.	Jan.2014	Jan.2015
23	Nitin Jaiswal	SPR	Strengthening of MIS cell and Establishment of five regional marketing data collection and analysis centre in M.P.	Jan.2014	Jan.2015
24	Jitendra Singh	JRF	The Study on top dyin of Gmelina arborea and its management.	27.06.2013	31.03.2015
25	Surkant Choubey	Field Astt.	Estimation of carrying capacity of grazing in different forest types & canopy densities in mp.	Nov.2012	Nov.2014
26	Kiran Kawre	JRF	Training on technical know how of gum tapping from Butea monosperma in Umaria and Tikamgarh districts to local people.	10.02.2014	28.02.2015