Agenda Notes for the 13th meeting of Executive Committee of National CAMPA

on

7th June, 2021at 11.00 AM

Through video Conferencing

List of Agenda Items for 13th meeting of the Executive Committee of the National Authority to be held on 7th June, 2021 at 11.00 a.m. through VC

Agenda Item No. 1:	Confirmation of Minutes of 12th meeting of the Executive Committee of the National Authority.
Agenda Item No. 2:	Action Taken on 12th meeting of the Executive Committee.
Agenda Item No. 3:	APO for the year 2021-22 of **Gujarat** State Authority.
Agenda Item No. 4:	APO for the year 2021-22 of **Jharkhand** State Authority.
Agenda Item No. 5:	APO for the year 2021-22 of **Kerala** State Authority.
Agenda Item No. 6:	APO for the year 2021-22 of **Maharashtra** State Authority.
Agenda Item No. 7:	APO for the year 2021-22 of **Manipur** State Authority.
Agenda Item No. 8:	APO for the year 2021-22 of **Punjab** State Authority.
Agenda Item No. 9:	APO for the year 2021-22 of **Sikkim** State Authority.
Agenda Item No. 10:	I. Additional APO of Jammu & Kashmir for the year 2021-22. II. Supplementary APOs 2021-22 to clear liabilities under CAMPA of FY 2019-20.
Agenda Item No. 11:	Project proposal on **"Establishment of Centre of Excellence on Forest Fire (CoEFF)".**
Agenda Item No. 12:	Pilot project proposal on **"Forest for Food Security and Nutrition"**
Agenda Item No. 13:	The project proposal titled '**Enhancement of Water yield and water quality through soil Moisture conservation measures' has been submitted by ICFRE.**
Agenda Item No. 14:	Status of implementation of Project titled **"Preparation of DPR with LiDAR survey for one pilot watershed in forest area of each state/ UT"** implemented by WAPCOS Limited under Rule 15(1)(iii) of CAF Act and post-facto approval under Rule 15(1)(ii) of CAF Act
Agenda Item No. 15:	Any other matter with the permission of the chair.

Agenda Item No. 1: Confirmation of Minutes of 12th meeting of Executive Committee of National Authority

Minutes of the 12th Meeting of Executive Committee of National Authority circulated vide OM of even No. dated 07.05.2021 is placed before Executive Committee for Confirmation.

Agenda Item No. 2: Action Taken on 11thmeetingof the Executive Committee

Para No.	Subject	Action taken Report
1	**Decision:** Annual Plan of operation of six states namely Goa, Haryana, Rajasthan, Telangana, Uttar Pradesh and Uttarakhand were approved for the following activities as mentioned below : **Site-specific activities (Condition Compliance)-** All activities as per Part-II of the APO prepared in compliance of Rule 39 that is: "Compensatory Afforestation (CA), additional CA, penal CA, Catchment area treatment plan and any other site specific scheme submitted by the state along with approved proposals for diversion of forest land under the Forest (Conservation)Act, 1980 referred to in clause (a) of section 6 of the CAF Act. **Activities as per Rule 5 of CAF Rules, 2018-** a. All activities related to assisted natural regeneration/ artificial regeneration/ silvicultural operations/ soil and moisture conservation works improvement of availability of food, water and shelter for wildlife habitat as per management plan etc. b. Nursery works for the above activities c. Forest fire prevention and control	Decision of 12th Executive Committee meeting was conveyed/circulated through letter of even number dated the 07th May, 2021

Para No.	Subject	Action taken Report
	operations (under Rule 5(2)(f) d. Maintenance of modern nurseries and other planting stock facilities for production of quality planting materials on a perpetual basis. e. Independent (third party) monitoring/ evaluation of various works undertaken from State Fund. f. Production and distribution of quality planting material through certified nurseries at subsidized price for promoting of tress outside forest on Government lands as per rile 5 (3) j. **Activities as per Rule 6 of CAF Rules, 2018-** For disbursement of salary and allowances of members and staffs, both regular and contractual [Rule 6(a)(iv) and 6(a)(v)], management of office establishment, office equipment, hiring of vehicles for State Authority [Rule 6(b)(i) and 6(b)(iii)] In addition to above following decisions were taken: a. The EC also decided to approve casual engagement of local people or labours to assist regular staff of State forest department for protection of forest and wildlife undertaken from State fund as per rule 5(3)(f) subject to the limit of 25% of total cost under the component. These will be standalone and monitorable items of work, and there shall be no mixing of funding for the same work. b. The EC decided that for third party monitoring state shall immediately engage agency/agencies which are working independently; these should not be local NGOs/organizations which are attached /working with the forest department.	

Para No.	Subject	Action taken Report
	c. Those States, who have not submitted their APOs for the year 2021-2022 to National Authority, shall submit the same urgently and latest by 13.05.2021 with the approval of the State Steering Committee. d. CEO Odisha requested for approval of the component under protection of forests where casual labourers are engaged. EC decided to approve the wages of the casual labour engaged under the component subject to the limit of 25% of the total cost with the condition mentioned in clause (a) above. e. CEO Rajasthan for approval of the component for provision of drinking water for animals in wildlife areas. EC decided the matter. It was appreciated that this activity, being the primary responsibility of the State, could be primarily funded by the State's own scheme or under other Central/CSS scheme, e.g. Development of Wildlife Habitat scheme. The EC did not approve the proposal, and requested the CEO Rajasthan to make provision of water augmentation in wildlife areas from other sources as suggested. f. PCCF, Goa requested for allowing them to take up backlog of 1600 ha of CA plantation and informed that Madhya Pradesh (MP) has been requested for taking up the backlog of CA Plantation. He further informed that MP has made provisions for 300 ha of CA Plantation in the current year and state will transfer fund to MP for taking up such plantation. DGF requested PCCF Goa to seek approval of competent authority for change of CA areas.	

Agenda No 03-10

Annual Plans of Operations 2021-2022

Annual Plan of Operation (APOs) 2021-22 of following State Authorities have recently been received in the National Authority:

1. Gujarat
2. Jharkhand
3. Kerala
4. Maharashtra
5. Manipur
6. Punjab
7. Sikkim
8. Jammu & Kashmir

The currency of APO 2020-21 was expired on 31.03.2021; it is proposed to approve 'in principle' the following activities of APOs for the year 2021-22 in this meeting. The exact Physical and Financial details will be worked out thereafter,

1. Site specific schemes under Section 6(a) of CAF Act, 2016
2. ANR [Sub-rule 5(2)(a)]
3. AR [Sub-rule 5(2)(b)]
4. Silvicultural operations in forests [Sub-rule 5(2)(c)]
5. Forest fire prevention and control operation [Sub-rule 5(2)(f)]
6. Soil and moisture conservation works in forest [Sub-rule 5(2)(g)]
7. Improvement of availability of food, water and shelter for WL habitat as per management plan [Sub-rule 5(2)(i)]
8. Nursery [Sub-rule 5(3)(a)]
9. Third party monitoring [Sub-rule 5(3)(h)]
10. Activities as per Rule 6(a)(iv) and 6(a)(v)
11. Activities as per Rule 6(b)(i) and 6(b)(iii)
12. Casual engagement of local people 5(3)(f)

The activity wise details of the APOs are furnished below:

Agenda Item No.3
APO for the year 2021-22 of Gujarat State Authority

File No. NA-15/29/2020-NA

The Additional Principal Chief Conservator of Forests (Land) and Chief Executive Officer, Gujarat State CAMPA vide letter no.FCA/31A/78/2021-22 dated 26.05.2021 has submitted the Annual Plan of Operation for the Financial Year 2021-22. The APO has been approved by the Steering Committee of Gujarat State Authority in its meeting 06.04.2021. The outlay of various forestry and wildlife activities in APO 2021-22 is for Rs. 200.00 crore.

2. As per the APO provided by the Gujarat State Authority following activities have been proposed for the financial year 2021-22.

CAF Rules	Activity	Unit	Physical Target (in ha.)	Financial Target (Rs. in Crore)	Remarks
1.	**Site Specific Activities**				
Mandatory Activities	Compensatory Afforestation and maintenance of CA	Ha	16636.82	92.89	
	Additional conditions stipulated in the approval for various diversion proposals under FCA	Ha	389.29	3.99	
	Total			**96.88**	
2.	**Proposed Activities as per Rule 5(2) under 80%**				
5(2)(b)	Artificial regeneration		2634.8	20.27	
	Eco Restoration by plantation on the sides of Narmada Canal banks		1250	50.00	
5(2)(d)	Protection of plantation and forests;		6776	4.82	
5(2)(g)	Soil and moisture conservation works in the forests;				
	(i) Water conservation and Storage specially in tribal areas of Gujarat	Nos	87	8.01	
	(ii) River rejuvenation - Catchment treatment of Narmada River based on DPR prepared by ICFRE (TFRI Jabalpur)			5.00	

CAF Rules	Activity	Unit	Physical Target (in ha.)	Financial Target (Rs. in Crore)	Remarks
	(iii) Catchment treatment of Sabarmati River as per DPR prepared by using LIDAR Technology			5.00	
	Total Rule 5(2)			**93.10**	
3.	**Proposed Activities as per Rule 5 (3) under 20%**				
5(3)(a)	Establishment and Upgradation of modern nurseries and other planting stock production facilities for production of quality planting materials;			5.21	
5(3)(e)	Construction of residential and official buildings in forests for front line staff deployed for protection of forest and wildlife;		35	4.11	
5(3)(h)	Independent concurrent monitoring and evaluation and third party monitoring of various works undertaken from State Fund;	LS	LS	0.50	
	Total Rule 5(3)			**9.82**	
	Subtotal NPV			**102.92**	
4.	**Proposed Activities as per Rule 6**				
6(b)(i)	Management of Office establishment			0.20	
	Subtotal Rule 6			**0.20**	
	Grand Total			**200.00**	

Agenda Item No.4

APO for the year 2021-22 of Jharkhand State Authority

File No. NA-15/27/2020-NA

Annual Plan of Operation for the financial year 2021-22 has been received from the State CAMPA Authority, Government of Jharkhand vide their letter no. 189 dated 19th May, 2021 on the subject mentioned above. The state CAMPA Authority has reported that the Steering committee of State Authority

of Jharkhand CAMPA has approved the Annual Plan of Operation (APO) over an outlay of Rs.469.56 Crore only for the year 2021-22.

2. In this regard, the minutes of meeting of the Steering Committee of the State Authority of Jharkhand CAMPA for the APO of 2021-22. The details of the APO are provided as under:

CAF Rules	**Activity**	**Physical Target (Ha/Km/ Gab/ Nos.)**	**Proposed outlay (Rs. in Crore)**	**Remarks**
1.	**Site specific activities**			
Mandatory activities	**Ongoing works Completion and Maintenance works under ongoing schemes.**	Plantation, maintenance of plantations, & silvicultural operations	**40.26**	
	Compensatory Afforestation (New Work)			
	Advance work for block plantation (Forest land), Advance work for block plantation (Non Forest land), Advance work for block plantation Safety zone (Forest land) Advance work for block plantation (condition appliance) (ha)	6,927.906	57.22	
	Advance work for linear plantations safety zone (Forest land), Advance work for linear plantations, Advance work for linear plantations (condition compliance) (km)	166.467	20.99	
	Advance work for linear plantations, Advance work for linear plantations (condition compliance) (Gab)	28.08	3.19	
	Silviculture operation	2681.750	15.05	

CAF Rules	Activity	Physical Target (Ha/Km/ Gab/ Nos.)	Proposed outlay (Rs. in Crore)	Remarks
	(condition compliance) (ha)			
	Soil and moisture conservation (condition compliance (ha)	877.070	2.69	
	Construction of check dams (condition compliance) (No)	58	4.28	
	Renovation of pond (condition compliance) (No)	4	0.28	
	Purchase of vehicle (condition compliance) (No)	1	0.15	
	Entry point activity (Condition compliance) (LS)	-	0.48	
	Survey demarcation and erection of permanent pillar (Condition compliance) (No)	207	0.08	
	Protection of flora fauna (condition compliance) (Ha)	4607.840	0.55	
	Fire protection (condition compliance) (LS)		1.48	
	Total		**106.40**	
	Catchment Area Treatment Plan			
	Catchment area treatment plan activities (LS)	LS	**22.69**	
	Integrated Wildlife Management Plan			
	Integrated Wildlife management plan activities (LS)	LS	**51.91**	
	Subtotal of ongoing works + CA+ CAT+ IWLP		**221.26**	
2.	**Activities proposed under Net Present Value (NPV) 80%**			

CAF Rules	Activity	Physical Target (Ha/Km/ Gab/ Nos.)	Proposed outlay (Rs. in Crore)	Remarks
	Ongoing works: Completion and maintenance of old plantations: The physical and financial targets of various activities proposed under this head are as follow			
5(2)(b)	Maintenance of block plantation 6th year work (Ha)	3491.500	1.11	
5(2)(c)	Silviculture, Natural Regeneration & SMC 2nd year, 3rd year and 4th year work (Ha)	26,553.25	11.92	
5(2)(g)	Maintenance of Nurseries (previous year 2020-21), Maintenance of Nurseries (Ha)	124	11.18	
5(2)(i)	Silviculture, Natural regeneration and SMC 1st year work (Ha)	9645.00	54.15	
5(2)(j)	Advance work for block plantations (forest land) (Ha)	2900.00	17.13	
5(2)(k)	Soil and moisture conservation works (No)	380.00	24.70	
5(2)(d)	Miscellaneous interventions using Lidar technology (LS)		5.00	
5(2)(l)	Developing/ strengthening of permanent nursery infrastructure (LS)		2.00	
	Consolidation of Boundary pillars (No)	12000	5.40	
	Total		**132.59**	
3.	**Activities proposed under Net Present Value (NPV) 20%**			
5(3)(a)	Rejuvenation of identified rivers through forestry interventions (LS)		2.00	
5(3)(d)	Casual engagement of JFMCs/EDCs members for protection of forests.(No)	310	3.19	

CAF Rules	Activity	Physical Target (Ha/Km/ Gab/ Nos.)	Proposed outlay (Rs. in Crore)	Remarks
5(3)(e)	Provision of causeway/culvert (No)	68	3.28	
5(3)(f)	New building construction (Frontline staff quarters: forest gauard-39 sets of 4units+1 part (No)	39+1(part)	15.75	
5(3)(h)	Maintenance of forests roads (Km)	2567.20	5.33	
5(3)(i)	Wildlife habitat improvement and related activities (LS)		60.84	
5(3)(k)	Distribution of improved cook stove in forest fringes villages (No)	1809	0.36	
	Distribution of solar lantern in forest fringes villages (No)	2370	0.94	
	Casual engagement of home guards for strengthening forest protection (No)	310	7.35	
	Independent evaluation of works under CAMPA (LS)		0.70	
	e-green watch portal training, updating and uploading of information and strengthening of respective offices (LS)		0.30	
	Forest certification and food safety training activities (LS)		1.50	
	Maintenance of greening of denuded hills (LS)		1.50	
	Publicity-cum-awareness programme (LS)		2.00	
	Total		**105.04**	
	Subtotal of NPV		**237.63**	

CAF Rules	Activity	Physical Target (Ha/Km/ Gab/ Nos.)	Proposed outlay (Rs. in Crore)	Remarks
4.	**Activities proposed under Interest component [6(a) 60% & 6(b) 40%)]**			
6(a)(i)(ii)(iii)(iv)(v)	Activities to be undertaken for conservation and development of forest and wildlife (LS)		8.20	
6(b)(i)(ii)(iii)(iv)(v)	Activities to be undertaken for non-recurring and recurring expenditure of State Authority (LS)		1.80	
	Subtotal Interest		**10.00**	
	Others (LS)		**0.50**	
	Grand Total		**469.55**	

Agenda Item No.5

APO for the year 2021-22 of Kerala State Authority

File No. NA-15/12/2020-NA

The principal Chief Conservator of Forests, Government of Kerala vide their letter no. FC5-840/2021 dated 30.04.2021 has submitted the Annual Plan of Operation for the financial year 2021-22. The APO has been approved by the Steering Committee of Kerala State Authority in its meeting held on 12th May, 2021 under the chairmanship of Chief Secretary, Kerala. The outlay of various forestry and wildlife activities in APO 2021-22 is for Rs. 27.19 crore.

2. As per the APO provided by the Kerala State Authority following activities have been proposed for the financial year 2021-22:

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs. in crore)	Remarks
1.	**Site specific Activities - Compensatory Afforestation**			
Mandatory Works	Compensatory Afforestation (Creation/Preparatory	60.632 Ha	0.55	

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs. in crore)	Remarks
	works)			
	Compensatory Afforestation Works (Maintenance)	76.02 Ha	0.22	
	Total	136.652 Ha	**0.78**	
II	**Catchment Area Treatment Plan Fund Part**			
Mandatory Works	River Bank Stabilization-Raising and planting Bamboo, reed and other indigenous seedlings along the river belt	50 Ha	0.12	
	River Bank Stabilization-Raising seedlings		0.16	
	Total	50 Ha	**0.29**	
	Subtotal		**1.07**	
2.	**Activities under "Not less than 80%" of the NPV fund category**			
	(I) Eco Restoration of monoculture plantations to natural forests			
5(2)(a), (b), (d), (f), (g) & (h)	Eco-restoration activities in monoculture plantations (Creation-by planting indigenous/misc. species/preparatory works)	437.53 Ha.	3.86	
5(2)(b), (d), (f), (g)&(h)	Eco-restoration activities in monoculture plantations (Maintenance)	303.56 Ha	1.53	
	Sub Total	**741.09 Ha**	**5.4**	
5(2) (a)&(b)	**(II) Augmentation planting of mangroves along degraded mangrove forests**		0.05	
	Total		**0.05**	
5(2) (b)&(j)	**(III) Greening the Urban Spaces**		2	
	Total		**2**	
5(2)(d)	(IV) Protection of		0.063	

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs. in crore)	Remarks
	Research Plots and Seed Production Areas			
	Total		**0.063**	
	(V) Strengthening Forest Protection and Anti-poaching Units			
5(2)(d)	Organizing Joint Patrolling and Raids along inter-divisional and inter-state forest boundaries		0.46	
5(2)(d)	Interior Camp-shed maintenance		0.93	
5(2)(d)	Provision of field ration for interior camps		0.64	
5(2)(d)	Field survival kits and field equipments		0.34	
	Total		**2.37**	
	(V) Improvement of wildlife habitat as prescribed in the approved wildlife management plan/working plan			
5(2)(h)	Maintenance of Vayal (marshy grasslands which are source of fodder for herbivores)	102 Ha	0.15	
5(2)(h)	Removal of Exotic Weeds	262 Ha	0.45	
5(2)(h)	Habitat Enrichment in degraded areas	2 Ha	0.06	
5(2)(h)	Bird survey and conservation		0.06	
5(2)(h)	Sea Turtle Conservation		0.11	
	Total		**0.85**	
	(VII) Forest fire prevention and control operations			
5 (2) (f)	Engaging Fire Gangs through participatory forest management		2.15	
5 (2) (f)	Fire Awareness Campaigns		0.23	
5 (2) (f)	Fire Fighting Equipment's		0.8	
5 (2) (f)	Creation of fireline/ fire - break		1.72	
	Total		**4.9**	

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs. in crore)	Remarks
	(VIII) Human Animal Conflict Mitigation			
5(2)(k)	Establishment, operation and maintenance of animal rescue centre, and veterinary treatment facilities for wild animals.		1.25	
5(2)(d)(k)	Purchase of equipments /Ration for Rapid Response Teams (RRTs)		0.59	
5(2)(k)	Providing field equipments and medicines for animal rescue and veterinary care facilities		0.22	
5(2)(k)	Engaging watchers to mitigate human animal conflict		2.57	
5(2)(d)(k)	Protective Gears for wildlife conflict mitigation staffs		0.41	
	Total		**5.03**	
	(IX)Forest & Wildlife Protection			
5(2)(g)	Soil and Moisture Conservation Digging/ Distillation of Water Holes & Cleaning		0.13	
5(2)(d)&(k)	Providing Life Jackets		0.01	
5(2)(d)&(k)	Purchase of Camera Traps for monitoring Wildlife movement		0.07	
	Total		0.21	
	Subtotal		**20.89**	
3.	**Activities under "Not more than 20%" of the NPV fund category**			
	(I) Better connectivity (Maintenance of roads including bridges, roads, communications)			
5(3)(c)	Maintenance of forest roads		0.4	
5(3)(c)	Maintenance of trek paths/patrolling routes		0.43	
	Total		**0.83**	

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs. in crore)	Remarks
5(3)(h)	(II) Awareness Program		0.03	
5(3)(h)	Conducting Nature Camps to School and College		0.08	
5(3)(a)&(i)	Infrastructure Development in tribal colonies and setting up of district permanent nursery		1.06	
5(3)(g)	Monitoring & Evaluation		0.3	
5(3)(b)&(d)	Providing infrastructure at the State Forest Training Institutes for the Field Officers on mandatory training		1.27	
5(3)(b)	Purchase of 10 Bolero Jeeps (4WD) to facilities protection and rapid response in conflict situations activities in the field		0.90	
	Total		**3.64**	
	Total NPV 20%		**4.47**	
	Subtotal NPV		**25.37**	
IV	**Interest - Fund Part**			
4.	**Activities under "Not less than 60% of the fund category**			
6(a)(i),(ii),(iii) & (iv)	To offset the incremental cost of CA, penal CA, CAT plan, salary of CEO and staff etc.		0.54	
	Sub Total		**0.54**	
	Total		**0.54**	
5.	**Activities under "Not more than 40% of the fund category**			
6(b)	Procurement of Office stationary items		0.01	
6(b)	Procurement of Laptops		0.03	
6(b)	Procurement of Desktop computer system		0.02	
6(b)	Procurement of computer printers		0.01	
6(b)	Procurement of		0.005	

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs. in crore)	Remarks
	Photocopier			
6(b)	Procurement of Office Furniture		0.025	
6(b)	Hiring of staff car for the use of officers and staff of the State Authority		0.05	
6(a)	Inspection & Evaluation		0.05	
	Total		**0.20**	
	Subtotal Interest part		**0.74**	
	Grand Total		**27.19**	

Agenda Item No.6

APO for the year 2021-22 of Maharashtra State Authority

File No. NA-15/18/2020-NA

The Chief Executive Officer (Maharashtra State CAMPA) and Member Secretary, Steering Committee, Government of Maharashtra vide letter No. CAMPA/C.R.11(20-21)/49 dated 21st May, 2021 has submitted the Annual Plan of Operation for the Financial Year 2021-22. The APO has been approved by the Steering Committee of Maharashtra State Authority in its meeting 19.05.2021. The outlay of various forestry and wildlife activities in APO 2021-22 is for Rs. 688.27 crore.

2. As per the APO provided by the Maharashtra State Authority following activities have been proposed for the financial year 2021-22:

CAF Rules	Activity	Physical Target (in ha./km)	Financial Target (in crore)	Remarks
1.	**Site Specific Activities**			
Mandatory Activities	Compensatory Afforestation			
	i. PPO	2452.64 ha	76.58	
	ii. FYO	438.18 ha	5.49	
	iii. SYO to 10th Y.O	11577.14 ha	23.25	
	CAT Plan		17.94	
	IWMP		1.00	
	Others			
	i. Plantation under Conditi		2.56	

CAF Rules	Activity	Physical Target (in ha./km)	Financial Target (in crore)	Remarks
	onal Works IIA			
	ii. Other work under Conditional Works IIC		13.28	
	Subtotal		**140.11**	
2.	**Proposed Activities as per Rule 5(2) under NPV 80%**			
5(2)(a)	Assisted Natural Regeneration (PPO Works)	971.00 ha	14.91	
5(2)(b)	**Artificial Regeneration**			
	i. Artificial Regeneration TYO Works	8556.93 ha	23.71	
	ii. Plantation along rever banks (as per ICFRE DPR) (National Authority Scheme)	-	3.00	
	iii. Afforestation in scrub and barren land (National Authority Scheme) LIDAR	-	4.99	
	iv. Gramvan Plantation (Manitainance)	393.00 ha	0.68	
5(2)(c)	**Silvicultural operations in forests**			
	i. Fodder Development (PPO Works)	2233.50 ha	31.89	
	ii. Fodder Development (FYO Works)	8316.86 ha	27.84	
	iii. Cutback Operations	60.00 ha	0.03	
5(2)(d)	**Protection of plantations and forests**			
	i. Encroachment removal & Forest Protection	118.50 ha	12.03	
	ii. Survey, Demarcation & Fencing of Sensitive forest areas	9418.41 km	25.57	
	iii. Boundry Pillar Class I	8370 nos.	6.69	
	iv. Boundry Pillar Class I I	9236 nos.	3.70	
	v. Construction, upgradation and maintenance of Protection camps/Protection Huts/Forest Custody/Labour Shed etc.	169 nos.	16.15	

CAF Rules	Activity	Physical Target (in ha./km)	Financial Target (in crore)	Remarks
	vi. Establishment and maintenance of wireless networks	37 nos.	6.17	
	vii. Improving mobility of frontline staff for forest protection & patrolling.		0.63	
5(2)(e)	**Pest and disease control in forest**	5.00 ha	0.18	
5(2)(f)	**Forest fire prevention and control operations**			
	i. Cutting and burning of fire lines		3.66	
	ii. Fire watchers		3.33	
5(2)(g)	**Soil and moisture conservation works in the forest**			
	i. Construction of GabiyanBandhara	1711 nos.	8.73	
	ii. Construction of Cement Bandhare	104 nos.	23.44	
	iii. Construction of check dams	92 nos.	0.28	
	iv. Creation of Forest ponds /Vantale/Khodtadi	182 nos.	5.47	
	v. Deep CCT	754 nos.	4.72	
	vi. Earthan/Mati NalaBumds	118 nos.	3.97	
	vii. Soil and Water Conservation / Harvesting works (National Authority Scheme) LIDAR	-	19.96	
	viii. Catchment Area Works (CCT, Deep CCT) in scrub and barren land (National Authority Scheme) LIDAR	-	3.88	
5(2)(h)	Voluntary relocation of villages from Protected areas (including cost of land and other property of the field owners)	-	100.00	
5(2)(i)	Improvement of wildlife habitat as provided in the approved wildlife managemen			

CAF Rules	Activity	Physical Target (in ha./km)	Financial Target (in crore)	Remarks
	t plan or working plan			
	i. All wildlife Management works like Rejuvenation of lakes & rivers, Medow development, Creation & maintenance of water sources/water holes for wildlife, Eradication of invasive species etc. will be carried out as per approved Management plan	-	20.00	
5(2)(k)	**Establishment, operation and maintenance of animal rescue centre and veterinary treatment facilities for wild animals**			
	i. Establishment, operation and maintenance of animal rescue centre/ Transit treatment Centre	-	10.70	
	ii. Veterinary treatment facilities for wild animals	-	5.50	
	iii. Animal seizing & capturing devices	-	1.50	
	iv. Rescue emergency operations	-	2.60	
	v. Strengthening of Rapid rescue teams	-	0.70	
	vi. Management of rewilding of tiger cubs	-	0.20	
5(2)(l)	Supply of wood-saving cooking appliances and other forest produce saving devices in forest fringe villages as specified by the National Authority from time to time	-	1.00	
5(2)(m)	**Management of biological diversity and biological resource**			
	i. New research projects by research wing of Maharashtra Forest Department	-	2.95	

CAF Rules	Activity	Physical Target (in ha./km)	Financial Target (in crore)	Remarks
	ii. Base studies for forestry and wildlife related subjects	-	7.63	
	iii. Conservation of Wildlife like GIB, Wild buffalo, Turtle, Vultures, Owl, Sparrow, etc.	-	0.30	
	Subtotal Rule 5(2)		**408.69**	
3.	**Proposed Activities as per Rule 5(3) under NPV 20%**			
5(3)(a)	Establishment, up-gradation and maintenance of modern nurseries and other planting stock production facilities for production of quality planting materials	-	1.00	
5(3)(b)	Promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land and folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity			
	i. Documentation and Publications of study materials for FTIs	-	0.20	
	ii. Conducting Workshops/Trainings/Seminars/ Conferences for promoting conservation & sustainable use of biological diversity and capacity building of the frontline staff & officers.	-	4.04	
	iii. Capacity building and gender sensitization of Forest Staff's through FTI /TERI/Forest academies/other institutions/CFRMC/JFMC /PRI	-	9.72	
	iv. Improving training input	-	0.17	

CAF Rules	Activity	Physical Target (in ha./km)	Financial Target (in crore)	Remarks
	s through guest faculties in Forest Training Institutes / Forest Academies			
5(3)(c)	Purchase and maintenance of equipment or devices used for communication and information technology for the purpose of protection of forest and wildlife/AMC	-	8.00	
5(3)(d)	Construction, up-gradation and maintenance of inspection paths, forest roads in forest area, fire lines, watch towers, check posts and timber depots	1458.02 nos. and km	21.88	
5(3)(e)	Construction of residential and official buildings in forests for front line staffs deployed for protection of forest and wildlife			
	i. Construction of Type I Quarters	74 nos.	14.06	
	ii. Construction of Type II Quarters	61 nos.	14.07	
	iii. Construction of Type III Quarters	21 nos.	5.67	
	iv. Construction of Range office	28 nos.	10.36	
	v. Amenities for Woman Front line staff	67 nos.	3.20	
	vi. Spillover-2020-21 (Ongoing Construction)	-	2.00	
5(3)(f)	Casual engagement of local people or labours to assist regular staff of State Forest Department for works for protection of forest and wildlife undertaken from State Fund	-	1.50	
5(3)(g)	Survey and mapping of forest areas for forest fire control, compensatory afforestation wo	-	1.00	

CAF Rules	Activity	Physical Target (in ha./km)	Financial Target (in crore)	Remarks
	rks, soil and moisture conse rvation, catchment area tre atment and wildlife manage ment for preparing annual p lans to be executed from the State Fund			
5(3)(h)	Independent concurrent mo nitoring and evaluation and third party monitoring of vari ous works undertaken from S tate Fund	-	2.00	
5(3)(i)	Publicity-cum-awareness pro gramme and exhibition on th e various schemes being impl emented by the State Authori ty from State Fund (including Nature Awareness Program c onduct by METDB)	-	3.29	
	Subtotal Rule 5(3)		**102.16**	
	Total NPV		**510.85**	
4.	**Proposed Activities as per Rule 6(a) of the CAF Rule s, 2018**			
6(a)(i)	to offset the incremental c ost of compensatory affore station and penal compens atory afforestation at the incr eased wage rates	-	3.00	
6(a)(ii)	to offset the incremental cost of catchment area treatment plan at the increased wage ra tes	-	1.00	
6(a)(iii)	to offset the incremental cost of wildlife management plan at the increased wage rates	-	1.00	
6(a)(iv)	for disbursement of salar y and allowances of memb ers and staffs, both regula r and contractual, of the Stat e Authority	-	6.00	
6(a)(v)	for disbursement of sitting fe es and allowances to nominat ed members of the State Auth	-	2.00	

CAF Rules	Activity	Physical Target (in ha./km)	Financial Target (in crore)	Remarks
	ority			
6(a)(vi)	Activities referred to in sub rules 2 and 3 of Rule 5.	-	2.00	
6(a)(vii)	**Road side plantation by Social Forestry**			
	i. Road side plantation (TYO) (km.)	525 km	5.16	
	ii. Spillover of 2020-21	-	7.31	
	iii. Spillover of 2019-20	-	4.84	
	Subtotal Rule 6(a)		**32.31**	
5.	**Proposed Activities as per Rule 6(b) of the CAF Rules, 2018**			
6(b)(i)	Management of office establishment	-	1.50	
6(b)(ii)	Office equipment including computers and peripherals and its maintenance for the State Authority	-	1.50	
6(b)(iii)	Hiring of staff cars for the use of the officers and officials of the State Authority	-	0.50	
6(b)(iv)	Hiring of buildings on lease for the office establishment and residences of the officers of State Authority	-	0.50	
6(b)(v)	Other contingencies for Management of the state Authority, with the approval of the Steering Committee of the State Authority.	-	0.50	
6(b)(vi)	Other activities for management of the forests and wildlife not referred to in sub-rules (2) and (3) with the prior approval of the steering committee of the State Authority and included in the annual plan of operation.	-	0.50	
	Total Rule 6(b)		**5.00**	
	Subtotal Interest		**37.31**	
	Grand Total		**688.27**	

Agenda Item No.7

APO for the year 2021-22 of Manipur State Authority

File No. NA-15/21/2020-NA

The Principal Chief Conservator of Forests and Head of Forest Force, Government of **Manipur** vide letter no.7/19/2010/Forests/CAMNPA dated 12.05.2021 has submitted the Annual Plan of Operation for the financial year 2021-22. The APO has been approved by the Steering Committee of Manipur State Authority in its meeting held on 12th May, 2021 under the chairmanship of Chief Secretary, Manipur. The outlay of various forestry and wildlife activities in APO 2021-22 is for **Rs.25.09 crore**.

2. As per the APO provided by the Manipur State Authority following activities have been proposed for the financial year 2021-22:

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs.in crore)	Remarks
1.	**Site Specific Activities**			
Mandatory Activities	**Compensatory Afforestation**			
	i. Maintenance-I	666.94	0.80	
	ii. Maintenance-III	223.86	0.13	
	iii. Maintenance-IV	3227.94	1.89	
	iv. Maintenance-V	212.50	0.12	
	Total CA -	**4331.24**	**2.94**	
	Addl./Penal CA			
	i. Maintenance-IV	520.14	0.30	
	Total Addl./Penal CA -	**520.14**	**0.30**	
	Catchment Area Treatment Plan			
	i. Creation	1125.00	1.96	
	ii. Maintenance-I	2250.00	1.67	
	ii. Maintenance-III	500.00	0.20	
	Total CAT Plan -	**3875.00**	**3.82**	
	Dwarf Species Plantation			
	i. Maintenance-IV	2.67	0.002	
	ii. Maintenance-V	18.00	0.011	
	Total DS Plantation	**20.67**	**0.012**	

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs.in crore)	Remarks
	Sub Total	**8747.05**	**7.08**	
2.	**Proposed Activities as per Rule 5(2) under NPV 80%**			
5(2)(a) & (b)	**Penal Net Present Value**			
	i. Maintenance-IV Mixed Plantation	400.00	0.16	
	ii. Maintenance-IV ANR	600.00	0.14	
	Total Penal Net Present Value-	**1000.00**	**0.30**	
5(2)(a)	**Artificial Regeneration**			
	i. Advance work	850.00	2.67	
	ii. Creation	80.00	0.17	
	iii. Maintenance-I	1335.00	0.96	
	iv. Maintenance-III	1210.00	0.48	
	v. Maintenance-IV	180.00	0.07	
	vi. Maintenance-V	430.00	0.17	
	Total Artificial Regeneration	**4085.00**	**4.52**	
5(2)(a)	**Mixed Plantation**			
	i. Advance work	1090.00	3.42	
	ii. Creation	500.00	1.09	
	iii. Maintenance-I	1345.00	1.08	
	iv. Maintenance-II	0.00	0.00	
	v. Maintenance-III	795.00	0.35	
	vi. Maintenance-IV	1335.00	0.53	
	vii. Maintenance-V	30.00	0.01	
	Total Mixed Plantation	**5095.00**	**6.48**	
5(2)(b)	**Assisted Natural Regeneration**			
	i. Advance + Creation	450.00	1.40	
	ii. Maintenance-I	460.00	0.21	
	iii. Maintenance-II	280.00	0.08	
	iv. Maintenance-V	513.00	0.12	
	Total ANR	**1703.00**	**1.81**	
5(2)(f)	Forest fire prevention and Cont		1.07	
5(2)(g)	Soil and Moisture Conservation		0.77	
	Subtotal Rule 5 (2)	**11883.00**	**14.95**	
3.	**Proposed Activities as per Rule 5 (3) UNDER NPV 20%**			
5(3)(d)	Modern/ Special Nursery		0.16	
	Maintenance of Nursery		0.78	

CAF Rules	Works Name	Physical Target (Area in Ha/Km)	Financial Target (Rs.in crore)	Remarks
	Construction of Quarter/ Office/ Retaining Wall for RO/BO		1.50	
5(3)(h)	Monitoring		0.30	
5(3)(i)	Awareness	15.00	0.26	
	Subtotal 5(3)	**15.00**	**3.00**	
	Subtotal of NPV	**11898.00**	**17.95**	
4.	**Proposed Activities as per Rule 6(a) and Rule 6(b)**			
6(a)(iv)	Wages of Contract Staff		0.03	
6(b)(i)	Management of office establishment		0.03	
	Total of Interest		**0.06**	
	Grand Total		**25.09**	

Agenda Item No.8

APO for the year 2021-22 of Punjab State Authority

File No.NA-15/33/2020-NA

The Principal Chief Conservator of Forests and Head of Forest Force, Government of Punjab vide letter no. State Authority/2021-22/SPL/360 dated 12th May, 2021 has submitted the Annual Plan of Operation for the financial year 2021-22. The APO has been approved by the Steering Committee of Punjab State Authority in its meeting held on 04th May, 2021 under the chairmanship of Chief Secretary, Punjab. The outlay of various forestry and wildlife activities in APO 2021-22 is for Rs.222.15 crore.

2. As per the APO provided by the Punjab State Authority following activities have been proposed for the financial year 2021-22:

CAF Rules	Works Name	Financial Target (Rs. in crore)	Remarks
1.	**Site Specific Activities**		
Mandatory Activities	**Compensatory Afforestation and Penal CA (Site Specific scheme as per approval of GoI**		
	i Compensatory Afforestation in Degraded	23.87	

CAF Rules	Works Name		Financial Target (Rs. in crore)	Remarks
		Forest on forest land		
		Compensatory Afforestation in Penal CA(All Category)	0.25	
		Compensatory Afforestation on Non Forest Land Category(All Category)	0.06	
	ii	Compensatory Afforestation in Alkaline areas(Forest land)	0.34	
	iii	Compensatory Afforestation in waterlogged areas (Forest land)	0.07	
	iv	Enrichment Plantation under CA	3.69	
	v	Additional Compensatory Afforestation (Tall Plants)	5.36	
	vi	Other activities under CA (patrolling, Protection and monitoring related equipment)	13.37	
	vii	Entry Point Activities	2.64	
	Subtotal Site Specific Activities		**49.65**	
2.	**Activities as per Rule 5(2) of the CAF Rules, 2018**			
A)	**Artificial regeneration (by Plantation)**			
5(2) (b)	i	Rehabilitation of Degraded Forest Areas	58.92	
5(2) (b)	ii	Enrichment Plantation under CA	28.88	
5(2) (b)	iii	Plantation in waterlogged areas	0.75	
5(2) (b)	iv	Plantation in alkaline areas	2.26	
5(2) (b)	v	plantation with Tall Plants on major roads	8.89	
5(2) (b)	vi	Irrigated Bamboo plantation Model in Forest area	3.93	
5(2) (c)and (g)	b)	Silvicultural operations, Soil and Moisture Conservation works in the Forest	17.3	
5(2) (d) (e) and (f)	c)	protection of Plantation and Forest, forest Fire prevention, control operation and pest and disease control in Forest	16.8	
5(2)(i)	d)	Biodiversity Management in wildlife other than Zoos	9.82	
	Subtotal Rule 5(2)		**147.55**	
3.	**Activities as per Rule 5(3) of the CAF Rules, 2018**			
5(3)(e)	a)	Construction of residential and official buildings in forest for frontline staff up to the rank of range officers deployed for	1.84	

CAF Rules	Works Name		Financial Target (Rs. in crore)	Remarks
		protection of forest and wildlife, Construction, up-gradation and maintenance of inspection paths, forest roads in forest area, fire lines, watch towers, check posts and timber depots		
5(3)(g)	b)	Survey and mapping of forest area for forest fire control compensatory afforestation works and wildlife management for preparing Annual plan to be executed form State Fund, Independent concurrent monitoring and evaluation and third party monitoring of various works under taken from State Fund	3.65	
5(3)(a)	d)	Establishment, up-gradation and maintenance of modern nurseries and other planting stock production facilities for production of quality planting material for Research activities	0.41	
5(3)(c)	e)	Purchase and maintenance of equipment or devices used for communication and information technology for the purpose of protection of forest and wildlife	1.41	
5(3)(i)	f)	Publicity cum awareness programme and exhibition on various schemes being implemented by the State Authority from State Fund and Capacity building of personal involved in utilization of State Fund	1.05	
5(2)(L)	g)	Supply of wood saving cooking appliances and other forest produce saving devices in forest fringe villagers	4.08	
5(3)	h)	Biodiversity Management in wildlife other than Zoos	3.56	
	Subtotal Rule 5(3)		**16.01**	
	Total NPV		**163.56**	
4.	**Activities as per Rule 6(a) and 6(b) of the CAF Rules, 2018**			
6(a)	a)	Activities out of 60% of Interest accured on deposit in State Fund	1.8	
6(b)	b)	(i) Activities out of 40% of interest	0.95	

CAF Rules	Works Name	Financial Target (Rs. in crore)	Remarks
	incurred on deposit in State Fund		
6(b)	(ii) Innovative Projects (out of interest 40%)	6.19	
	Subtotal Rule 6(a) and 6(b)	**8.94**	
	Grand Total	**222.15**	

Agenda Item No.9

APO for the year 2021-22 of Sikkim State Authority

File No. NA-15/30/2020-NA

The Chief Conservator of Forests cum Chief Executive Officer, Government of Sikkim vide letter no.A-23/SCaS/F&ED/2020-21/236 dated 31.05.2021 has submitted the Annual Plan of Operation for the financial year 2021-22. The APO has been approved by the Steering Committee of Sikkim State Authority in its meeting held on 27.05.2021 under the chairmanship of Chief Secretary, Sikkim. The outlay of various forestry and wildlife activities in APO 2021-22 is for Rs.95.30 crore including spill over liabilities of APO of 2020-21.

2. As per the APO provided by the Sikkim State Authority following activities have been proposed for the financial year 2021-22:

CAF Rules	Activity	Unit	Phy. Target (in ha.)	Fin. Target (Rs. in Crore)	Remarks
1.	**Site Specific Activities**				
Mandatory Activities	Compensatory Afforestation (CA) Schemes			6.60	
	Catchment Area Treatment (CAT) Plan			5.50	
	Integrated Wildlife Management Plan			5.20	
	Subtotal			**17.30**	
2.	**Proposed Activities as per Rule 5(2) under 80%**				
5(2) (a)	Maintenance ANR (3rd year)	HA	110	0.05	
		LA	245	0.07	
	Aided Natural Regeneration	LS	20	0.16	

CAF Rules	Activity	Unit	Phy. Target (in ha.)	Fin. Target (Rs. in Crore)	Remarks
	and allied activities including protection, SMC etc. of *Shorearobusta (Sal)*through seed dibbling				
5(2)(b)	**Artificial Regeneration**				
	a. (Maintenance of nursery for production of seedlings for Artificial Regeneration)		35	0.46	
	b. Fodder Plantation	LA	500	1.11	
	i. Maintenance (1st yr.)	LA	100	0.05	
	c. Silvipasture Development	LA	100	0.26	
	i. Maintenance (1st yr.)	LA	100	0.05	
	d. Avenue Plantation	LA	30	0.19	
	i. Maintenance (1st yr.)	LA	30	0.01	
	e. Plantation of zanthoxylumarmatum (Bokeytimbur) and linderaneesiana (SelTimbur)		10	0.06	
	f. Plantation of mixed species of medicinal plants		50	0.28	
	g. Bamboo Plantation (Large bamboo with Rhizome)	LA	200	1.14	
	h. Aerial Plantation	LA	10	0.25	
5(2)(c)	**Silviculture Operation in forests**				
	a. Patch plantation of Lakuri		4	0.02	
	b. Malagiri patch plantation		4	0.02	
	c. Raising of oak seedlings		1	0.04	
	d. Silviculture thining of cryptomeria (Dhupi)		35	0.46	
	e. Study on status of introduced exotic tree species in Sikkim	LS		0.02	
	f. Restoration of locally threatened plant species	LS		0.15	
	g. Demonstration / pilot studies plot for raising prioritised HA medicinal plants in cultivation model	LS		0.03	

CAF Rules	Activity	Unit	Phy. Target (in ha.)	Fin. Target (Rs. in Crore)	Remarks
	h. Cost and collection of priotised medicinal plant species including land development and QPM development	LS		0.04	
	i. Testing of phytochemical profile / nutritional content of prioritised medicinal species	LS		0.06	
	j. Thining of teak plantation (*Tectonagrandis*)		5	0.07	
	k. Study to assess present status of natural Cycaspectinatapopulation in Sikkim	**LS**		0.10	
	l. Preparation of biodiversity learning kits	LS		0.14	
	m. Field survey for assessment of degraded forest land by Working Plan Division	LS		0.25	
5(2)(d)	**Protection of plantations and forests**				
	a. Construction of Dry Stone Fencing	HA	12	1.35	
		LA	20	1.91	
	b. Construction of water tank for protection of plantations		4	0.12	
	c. Construction of Catch Water Drain in different locations	LA	1700	0.81	
		HA	500	0.28	
	d. Construction of CCM Wall in land slide areas		2552	1.43	
	e. Construction of Sausage Wall/Crate Wall in land slide areas	LA	2094	0.76	
		HA	400	0.17	
	f. Construction of DRSM Wall in land slide areas		1900	0.44	
	g. Barbed Wire Fencing with wooden post along forest boundary line at vulnerable areas		10	0.38	

CAF Rules	Activity	Unit	Phy. Target (in ha.)	Fin. Target (Rs. in Crore)	Remarks
5(2)(f)	**Forest fire prevention and control operations**				
	a. Strengthening / maintenance of WT communication system			0.15	
	b. Procurement of high altitude protective field gears to forest field staffs	LS		0.30	
5(2)(g)	Soil & Moisture Conservation in forests	LA	200	1.10	
		HA	70	0.57	
	Broom Grass Plantation		300	0.58	
	a. Maintenance (1st yr.)		565	0.30	
5(2)(i)	Improvement of wildlife habitat as provided in the approved wildlife management plan or working plan				
	a. Management of wildlife habitat of Barsey Rhododendron Sanctuary, West Sikkim	LS		2.85	
	b. Management of wildlife habitat of Khangchendzonga National Park (KNP)	LS		1.19	
	c. Management of wildlife habitat of Fambonglho Wildlife Sanctuary, East Range	LS		1.00	
	d. Management of wildlife habitat of Kitam Bird Sanctuary	LS		0.40	
	e. Management of wildlife habitat of Shingba Rhododendron Sanctuary, North Sikkim	LS		0.36	
5(2)(k)	**Establishment, operation & maintenance of animal rescue centre and veterinary treatment facilities for wild animal**				
	a. Maintenance of animal rescue Centre at HZP		LS	0.15	

CAF Rules	Activity	Unit	Phy. Target (in ha.)	Fin. Target (Rs. in Crore)	Remarks
	b. Improvement and upgradation of HZP		LS	0.63	
	c. Veterinary treatment of wild animals		LS	0.15	
5(2)(m)	**Management of Biological diversity land biological resource**				
	a. Development of biodiversity park and oper butterfly garden along with other allied activities and research node at Kitchudumra, South Sikkim (Phase II)		LS	3.27	
	b. Management and reclamation of degraded forest land into nature park / biodiversity park at Labarbotey in North Sikkim (Phase I)		LS	2.37	
	c. Management and improvement of Biodiversity Loop Garden at Kabi, North Sikkim (Phase II)		LS	0.90	
	d. Rejuvination and conservation of Kechupalri Lake, West Sikkim		LS	1.00	
	Subtotal Rule 5(2)			**30.45**	
3.	**Proposed Activities as per Rule 5 (3) under 20%**				
5(3)(a)	Establishment, up-gradation and maintenance of modern nurseries and other planting stock production facilities for production of quality planting materials.			0.20	
5(3)(d)	Construction, up-gradation and maintenance of inspection paths, forest roads in forest area, watch towers, check posts, timber depots			1.20	
5(3)(e)	Construction/upgradation of			4.61	

CAF Rules	Activity	Unit	Phy. Target (in ha.)	Fin. Target (Rs. in Crore)	Remarks
	residential quarters/barrack of Head Forest Guard/Forest Guard and official building in forests for frontline staffs up the rank of Range officers				
5(3)(f)	Casual engagement of local people or labours to assist regular staff of forest department for protection of forest and wildlife			0.90	
5(3)(h)	Independent concurrent monitoring and evaluation and third party monitoring of works undertaken from State Fund of various works undertaken from state fund.			0.70	
	Subtotal Rule 5(3)			**7.61**	
4. Proposed Activities as per Rule 6(a) under 60%					
6(a)(i)	Compensatory afforestation (Cost escalation)			1.77	
6(a)(ii)	Catchment Area Treatment Plan for Hydro Electric Project (Cost escalation)			3.79	
6(a)(iii)	Integrated Wildlife Management Plan (Cost escalation)			0.16	
	Others (Biodiversity Conservation & Management Plan) (Cost escalation)			0.20	
6(a)(iv)	Salaries and Allowances of Members and Staff (list enclosed)			0.31	
	Salary of proposed drivers			0.12	
	Salary of Monitoring Assistant			0.04	
6(a)(vi)	Activities referred to in sub-rules (2) and (3) of rule 5				
	a. Upgradation and imrovement of government timber depot, Chuba, East Sikkim			2.05	

CAF Rules	Activity	Unit	Phy. Target (in ha.)	Fin. Target (Rs. in Crore)	Remarks
6(a)(vi)	Survey & demarcation of forest areas:-				
	a. Survey of khasmal and protected forests for development of graphical database on protected forests Phase 2			0.60	
	b. Procurement of survey equipment for Survey & Demarcation Division			0.10	
	Maintenance of World Hertiage site (Khangchendzonga National Park)			0.40	
	Subtotal Rule 6(a)			**9.54**	
4.	**Proposed Activities as per Rule 6(b) under 40%**				
6(b)(i)	Management of office establishment:-				
	a. Maintenance/strengthening of office of the State Authority			0.40	
6(b)(ii)	Office equipment including computers and peripherals and its annual maintenance for State Authority			0.10	
	CAG Audit Fees			0.07	
6(b)(i)	POL/HSD and maintenance of vehicles & machineries of state authority offices			0.40	
	Construction of new conference hall for State Authority			0.50	
	Improvement of Database Management System			0.21	
	Advertisement / publication / conference under State Authority			0.10	
6(b)(vi)	**Other activities for management of forest and wildlife including upgradation/improvement etc.**				
	a. Upgradation and			2.50	

CAF Rules	Activity	Unit	Phy. Target (in ha.)	Fin. Target (Rs. in Crore)	Remarks
	improvement of Red Panda Camp and conservation zone in Barsey Rhododendron Sanctuary				
	b. Protection of Forest Property (Range Office, Nursery, FG Quarters) at Yoksam from Landslide			0.26	
	Conservation and treatment of landslide areas at Tsong RF, West Sikkim damaged due to landslide created by cloud burst that occurred on 16-09-2019			1.24	
	Conservation and treatment of landslide areas at Lingchom, North Sikkim			0.59	
	Subtotal Rule 6(b)			**6.36**	
	Others (Biodiversity Conservation Plan)			**1.88**	
	Grand Total			**73.15**	

Sl. No.	Activities	APO 2021-22 (Amount in crore)	Spill-over liabilities of APO 2020-21 (Amount in crore)	Grand Total (Amount in crore)
1	Compensatory Afforestation (CA) schemes	6.60	7.60	7.36
2	Catchment Area Treatment (CAT) Plan	5.50	1.20	6.70
2	Integrated Wildlife Management Plan	5.20	4.12	9.32
3	Net Present Value	38.06	8.13	46.19
4	CAF Interest	15.91	6.28	22.19
5	Others (Biodiversity Conservation Plan)	1.88	1.66	3.54
	Grand Total	**73.15**	**22.15**	**95.30**

Agenda No. 10

(I) Additional APO Jammu & Kashmir for the year 2021-22

The Principal Chief Conservator of Forests & HoFF, Jammu and Kashmir vide letter no. PCCF/CAMPA/2021-22/756-57 dated 22nd May, 2021 has submitted an Additional APO for the Financial Year 2021-22 for Rs.19.00 crore. It has been stated that the additional APO is as per the decision of the State Steering committee of Jammu and Kashmir (J&K) CAMPA in its 19th meeting held on 26th February 2021 and the Chief Secretary, J&K Govt. (Chairman, Steering Committee) has approved it. The activity wise details of Additional APOs for the Financial Year 2021-22 are as follows:

Sl. No.	Activity	Physical Target	Financial Target (in crore)	CAF Rule
1.	**Activities proposed as per Rule 5(2) of the CAF Rule, 2018**			
a	Artificial/Natural regeneration			5(2)(a)
	Area (In ha)	799.57		
	i. Plantation (in lakh nos)	5.36	1.32	
	ii. Fencing (in lakh Rft)	1.75	9.25	
	iii. Patch Sowing (Patching in lakh nos)	0.68	0.05	
	iv. Grass/MFP Slips (in lakh nos)	0.1	0.01	
	v. Seed Balls (in lakh nos)	1.58	0.03	
	vi. Fodder/Pasture Development (Patches in Lakh No.)	2.06	0.16	
	vii. Plant Production (Plants in lakh no)	6.94	0.50	
b	Silvicultural Operation in Forests			5(2)(c)
	i. Bush/Lantana Clearance (in Ha)	8.3	0.02	
c	Soil and Moisture Conservation Works in Forests			5(2)(g)
	i. SMC works/DRSM (in cum)	6247	1.33	
	ii. Crates (in nos)	1532	2.75	
	iii. WHS (in nos)	6	0.12	
	iv. Land surface dressing (in cum)	490	0.02	
	v. Check Dam (in nos)	6	0.05	
	vi. Rock falling protection work/soil erosion control materials/speed barriers		0.35	
	Subtotal Rule 5(2)		**15.94**	
2.	**Activities as per Rule 5(3) of the CAF Rule, 2018**			
a	Purchase and maintenance of IT equipment's for communication and Information Technology for forest		1.33	5(3)(c)

Sl. No.	Activity	Physical Target	Financial Target (in crore)	CAF Rule
	protection/awareness			
B	Construction, up-gradation & maintenance of inspection paths, forest roads, watch towers and check posts		1.30	5(3)(d)
C	Construction of residential and official buildings in forests for front line staffs deployed for protection of forests		0.35	5(3)(e)
D	Casual engagement of local people or labours to assist regular staff for works for protection of Forests		0.05	5(3)(f)
E	Training & capacity building		0.03	5(3)
	Subtotal Rule 5(3)		**3.06**	
	Grand Total		**19.00**	

(II) Supplementary APOs 2021-22 to clear liabilities under CAMPA of Financial Year 2019-20

The Principal Chief Conservator of Forests & HoFF, Jammu and Kashmir vide the same letter has also submitted a Supplementary APO for 2021-22 for Rs 7.68 crore. It has been stated that these are basically liabilities under CAMPA of FY 2019-20 which arose due to lockdown related to COVID-19 pandemic in the last week of March 2020. The liabilities were verified by a committee constituted for the purpose. The Supplementary APO was placed before the State Steering Committee of Jammu and Kashmir (J&K) CAMPA in its 19th meeting held on 26th February 2021. The Committee agreed to the proposal and suggested that "the liability amount could be adjusted against the overall un-utilized outlay of the current financial year, considering that the anticipated expenditure at the end of the current financial year is likely to be less in relation to the approved APO". The details of liabilities mentioned in the Supplementary APO are as follows:

Sl. No.	Activity	Financial Target (in crore)	CAF Rule
1.	**Activities as per Rule 5(2) of the CAF Rule, 2018**		
a.	Artificial/Natural regeneration		5(2)(a)
	i. Plantation	0.23	
	ii. Fencing	1.70	
	iii. Sowing / Dibbling	0.00	
	iv. Pasture Development	0.01	
	v. Plant Production	0.27	
b.	Protection of plantations and forests		5(2)(d)

Sl. No.	Activity	Financial Target (in crore)	CAF Rule
	i. Management of Forest boundaries	0.70	
	ii. Maintenance of old closures	0.03	
c.	Forest Fire Prevention and Control Operations	0.04	5(2)(f)
d.	Solid and Moisture Conservation works in Forests		5(2)(g)
	i. DRSM	0.08	
	ii. Crates	0.17	
	iii. WHS	0.30	
e.	Catchment Area Treatment Plan (Rejevunation of Rivers of J&K	0.21	5(2)(a to g)
f	Conservation, Protection and management of protected areas (Wildlife Main)	0.21	5(2)(i)
	Subtotal Rule 5(2)	**3.97**	
2.	**Activities as per Rule 5(3) of the CAF Rule, 2018**		
a	Purchase and maintenance of equipment's for communication and information technology for forest protection	0.06	5(3)(c)
b	Construction, up-gradation & maintenance of inspection paths, forest roads, watch towers and check posts	0.02	5(3)(d)
c	Construction of residential and official buildings in forests for front line staffs deployed for protection of forests	0.95	5(3)(e)
d	Casual engagement of local people or labours to assist regular staff for works for protection of Forests	0.08	5(3)(f)
e	Studies and Publications	0.08	5(3)(i)
f	Infrastructure for protection and management of protected area	2.53	5(3)
	Subtotal Rule 5(3)	**3.72**	
	Grand Total	**7.68**	

Earlier, PCCF & HoFF had sought approval of the National Authority to clear the pending liabilities without the approval of the Steering Committee of the State Authority. The National Authority vide communication No. F. No. NA-15/14/2020-NA dated 24th February 2021 conveyed that the liability amount should be submitted in a form of S the Supplementary APO after due approval of the Steering Committee of the State Authority.

The Addition APO for 2020-21 and Supplementary APO for 2020-21 of J&K State CAMAP is submitted for the consideration of the Executive Committee of the National Authority.

Agenda Item No.11

Project proposal on Establishment of Centre of Excellence on Forest Fire

A proposal has been submitted by Forest Protection Division for establishment of Centre of Excellence on Forest Fire (CoEFF) at the Forest Research Institute, Dehradun and is enclosed as **Annexure-A**

The vision of the centre is to provide leadership for deriving global solutions to issues related to forest fires across the world; to excel in prevention, detection & suppression and Post Fire management including assessment of losses & restoration by providing leadership, best practices, research and support and to serve as "think tank" for MOEF&CC, Government of India. The Centre will be established at ICFRE whereas all the administrative setup will be in Forest Research Institute, Dehradun with Forest Survey of India and Directorate of Forestry Education as two major partner institutes. The Director, FRI will act as Head of the Centre. Head, Silviculture will act as member secretary of Advisory Board.

The activities of the Centre may be categorized into 'Pre-Fire, During-Fire and Post-Fire management' in forest areas. In this endeavour, Centre will work on the following thrust areas for Forest Fire Research as given below: -

1. Real time Detection and monitoring of Forest Fire
2. Early warning system
3. Forest Fire vulnerability and Climate Change
4. Economic and Ecological impact of Forest Fire
5. Forest Fire and biodiversity
6. Forest Fire and weed
7. Forest Fire and livelihood
8. Post-fire restoration and rehabilitation
9. Training and capacity building

Activity wise requirement of funds for CoEFF

Sr.	Activity	Year wise Financial Requirement (Rs. In Lakhs)				
		2021-22	2022-23	2023-24	2024-25	Total
1.	**FOREST RESEARCH INSTITUTE**					
a.	Establishment Cost of Centre (Basic Infrastructure)					**84.50**
b.	Development of National Web Portal for Database Management and Knowledge Dissemination	24.96	9.46	9.46	9.46	**53.34**
c.	Development of national forest fire knowledge network	55.73	60.73	60.73	60.73	**237.92**
d.	Development of Standard Operating Procedures (SOPs)	15	27	24.5	24.5	**91.00**
e.	Study on impact of future Climate change scenario on Forest Fire vulnerability	65.73	50.73	42.73	36.73	**195.92**
f.	Strengthening of SFDs and communities by Fire suppression tools and techniques	This activity is being undertaken through AICRP-14 Forest Fire Research and Knowledge Management (2020-25)				
g.	Assessment of damage and economic losses due to forest fire	This activity is being undertaken through AICRP-14 Forest Fire Research and Knowledge Management (2020-25) on pilot basis in 5 forest types and 15 states for 8 parameters only (Timber, Fuel wood, Fodder, NTFP, Biodiversity (floral), Carbon storage. carbon				
h.	Post fire restoration and rehabilitation strategy in fire affected areas	52.49	52.49	52.49	52.49	**209.96**
	TOTAL (FRI COMPONENT)	**275.91**	**208.41**	**197.91**	**190.41**	**872.64**
2.	**DIRECTORATE OF FORESTRY EDUCATION**					
a.	Training of trainers (ToTs) and capacity building of forestry personnel, JFMCs, EDCs and other stakeholders (Training in fire suppression, prevention, detection, and post-fire reporting for field staff)	26.15	26.15	26.15	26.15	**104.6**
3.	**FOREST SURVEY OF INDIA**					
a.	Establishment of lab	150	20	20	20	**210**

Sr.	Activity	Year wise Financial Requirement (Rs. In Lakhs)				
		2021-22	2022-23	2023-24	2024-25	Total
b.	Procurement of hardware, softw are and other equipment	100	10	10	10	**130**
c.	Novel studies, data acquisition and special studies	80	45	45	45	**215**
d.	Procurement and maintenan ce of vehicle, HR support	84.96	71.96	71.96	71.96	**300.84**
e.	Travel, GT, Report printing and contingency charges	60.19	31.20	31.196	31.196	**153.78**
	Subtotal	**475.15**	**178.16**	**178.16**	**178.16**	**1009.62**
	Forest Fire Risk Zonation Mapp ing	176.02	57.77	11	NIL	**244.79**
	TOTAL (FSI COMPONENT)	**651.17**	**235.93**	**189.16**	**178.16**	**1254.41**
	GRAND TOTAL (FRI, DFE, FSI)	***953.24***	***470.49***	***413.22***	***394.72***	***2231.65***

The proposal is submitted for consideration of the Executive Committee of the National Authority under Section15 (1) (ii) of CAF Act, 2016.

Agenda Item No.12

Pilot project on "Forest for Food Security and Nutrition"

A project proposal entitled, "Forest for Food Security and Nutrition" has been submitted by Research & Training Division of this Ministry vide email dated the 1st June, 2021and is enclosed as **Annexure-B**

The pilot project aims to target people with extreme poverty, living in the forest fringes of Madhya Pradesh, Jharkhand and Odisha. These states have rich forest reserve and large population of poor forest dependent communities. The project has been formulated in collaboration with State Forest Departments and World Food Programme (WFP), India.

The project will be implemented through respective state Forest Departments of the participant states with technical support from World Food Programme, India and ICFRE. One Forest Division in each state will be taken up for the pilot. The project will work with range of stakeholders to increase productivity of forests for food and nutrition for the local communities and establish a system of sustainable harvest and to improve forest management for concomitant improvement in the flow of eco-system services (water and

nutrients) from forests to the nearby agricultural/fish, which will help both the forests and the farms. Investment in community empowerment through improved knowledge, livelihoods and improved physical and economic access to forest foods will lead to a positive sustainable change. This will further lead to re-establishing the weakened organic link between forests and local communities thereby increasing community support towards forest conservation.

The total cost of the pilot project is Rs.45.55 Crore out of which Rs.40.35 Crore are proposed to be funded from National Fund and the remaining amount is proposed to be funded from WFP India and other ministries, like Ministry of Agriculture and Ministry of Tribal Affairs through TRIFED.

The proposal is submitted for consideration of the Executive Committee of the National Authority under Section15 (1) (ii) of CAF Act, 2016.

Agenda Item No.13

'**Project Proposal on Enhancement of Water Yield and Water Quality through Soil and Moisture Conservation Measures**'

A project proposal titled ' **Enhancement of Water Yield and Water Quality through Soil and Moisture Conservation Measures' has been submitted by ICFRE** in response to the communication from NAEB - No.E.13-5/2021-B-I (NAEB) dated 20th May 2021 and as decided in the meeting Chaired by DGF&SS on 15th May 2021. The proposal is attached at **Annexure -C**. This is to be taken up in collaboration with TERI, New Delhi covering 6 states namely Jharkhand, Madhya Pradesh, Meghalaya, Rajasthan, Telangana and Uttarakhand.

The main thrust of the proposal is to enhance the hydrological services (i.e water yield and water quality) of degraded watershed in Uttarakhand, Rajasthan, Madhya Pradesh, Jharkhand, Telangana and Meghalaya. The objectives are as below:

1. To quantify the morphometric characteristics and prioritization of watershed
2. To restore the degraded watershed by intervening soil and water conservation measures.
3. To enhance water yield and water quality (surface and ground water)
4. To minimize the sediment concentration and sediment load in streams/runoff/river water.

Proposed Activities:

1. Selection of watershed
2. Detailed topographical survey of the watershed
3. Prioritization of the watershed for implementation of protection and conservation measures through multi criteria analysis.
4. Preparation of detail plan of interventions
5. Social acceptance & approval of plan by society
6. Implementation of the soil and water conservation measures
7. Capacity Building
8. Dissemination of watershed management information through web-portal
9. Monitoring and Evaluation

Methodology:

1. Study to be conducted in six states (Uttarakhand, Rajasthan, Madhya Pradesh, Jharkhand, Telangana and Meghalaya) covering three watersheds from each state. Assessment of the water yield and water quality requires the estimation of hydro-meteorological variables and a comprehensive quantification of other hydrological processes occurring in the catchment.
2. High resolution (1:100) data required for planning with high accuracy and it would be possible by survey using drone and DGPS
3. The watershed proposed to be divided into sub watershed on the basis of stream order for prioritization of the sub-watershed. Different kind of tools and techniques (i.e. MCA, Hierarchical model, ANN, PCA and other suitable/appropriate tools and techniques) to be used for prioritization of the sub-watershed and further implementation of protection and conservation measures proposed to be executed.
4. Capacity building through various programs to identified training groups such as the forest department and local stakeholders including JFMCs.
5. Periodic monitoring and evaluation for all the trials by maintaining database of all activities, tree species etc Based on the performance of different combinations of species including ground, mid and top flora, the protocols to be standardized.
6. The indicators for monitoring would include: Tree species, Grass and shrub species etc.
7. Unmanned Arial Vehicle (Drone) Applications in Watershed management for (a) Digital Elevation Model prepared using UAV (b) High Resolution Aerial Imagery prepared by UAV.

Timeline: The proposed activities are spread over 4 years

Anticipated results and outcome:

The project would facilitate the enhancement of water yield and water quality of the watershed. Information collected from this study would be helpful to understand and analyze the relative contribution of these land uses towards important ecosystem services which would aid decision making and devising state-wide mitigation strategies towards soil, water and vegetation conservation for tangible and intangible benefits in the watershed. The project work is also expected to produce quality research publications and extension materials.

Financial Proposal: Rs.90.00 Crores. Execution Cost proposed for six states covering 8080 ha @ Rs.1 lakh /ha would be Rs. 80.80 crores.

A. **Details of Project Cost (Rs. in Crore).**

Sl. No.	**Particulars**	**ICFRE**	**TERI**
1.	Professional Cost (for four years)	2.00	1.00
2.	Direct Expenses for Boarding and Lodging (for four years)	0.40	0.20
3.	Detailed topographical survey (by using DGPS and Drone to generate the geospatial data and maps i.e. Contour Map, Slope Map, Aspect Map, Elevation map, Soil map, LULC map, Flow direction & flow accumulation map of 1:100 scale	0.90	
4.	Instrumentation for the monitoring and evaluation of the watershed (for 18 sites) • Automatic weather station • Gauging stations (outlets and springs) • Soil moisture observatory • Water quality parameter sensors	3.70	
5.	Work station computer (02) Printer and other IT equipment and accessories	0.08	
6.	Research Associate (02) (one of GIS &RS with Soil and water conservation)	0.20	
7.	Capacity Building of Local JFMC members and Front-Line Staff including preparation of		0.25

Sl. No.	Particulars	ICFRE	TERI
	training modules, reading material etc.		
8.	Monitoring of executed work, pre and post water testing, survey of ground, mid and top flora and development of business plan		0.25
9.	Development of Web-portal	0.02	
	Total	7.30	1.70
	Grand Total	**90.00**	

The funding to associated institutes would be made by internal arrangements

B. **Execution Cost**

Sl. No.	State	Area (ha.)	Total Cost (@INR 1 lakh/ha)
1.	Jharkhand	1500	15,00,00,000
2.	Madhya Pradesh	1500	15,00,00,000
3.	Meghalaya	820	8,20,00,000
4.	Rajasthan	1500	15,00,00,000
5.	Telangana	1260	12,60,00,000
6.	Uttarakhand	1500	15,00,00,000
	Total	**8080**	**80,80,00,000**

The proposal is submitted for consideration of the Executive Committee of the National Authority under Section15 (1) (ii) of CAF Act, 2016.

Agenda Item No.14

Status of Project titled "Preparation of DPR with LiDAR Survey for One Pilot Watershed in Forest Area of Each State/ UT" implemented by WAPCOS Limited under Rule 15(1)(iii) of CAF Act and post-facto approval under Rule 15(1)(ii) of CAF Act

Detailed Agenda Note will follow

Agenda Item No.15

Any other matter with the permission of the chair.

Agenda Notes for the 13th meeting of Executive Committee of National CAMPA

on

7th June, 2021at 11.00 AM

Through video Conferencing

Continued ...

Agenda Item No. 14

Status of implementation of Project titled "Preparation of DPR with LiDAR survey for one pilot watershed in forest area of each state/ UT" implemented by WAPCOS Limited under Section 15(1)(iii) of CAF Act and post-facto approval under Section 15(1)(ii) of CAF Act

MoEF&CC, with the participation of State Forest Departments has identified one major ridge inside a forest block in 26 States/UTs with average area of 10,000 ha selected in each State for preparation of Detailed Project Reports for planning and identifying locations and structures for construction of appropriate and feasible micro soil and water conservation structures consistent with site specific geography, topography and soil characteristics and in accordance with the 'Ridge to Valley' approach of watershed management.

This is being done using LiDAR technology with which the 3-D (three dimensional) DEM (Digital Elevation Model), imagery and layers of the project areas will be prepared. This LiDAR produced data will be processed by using cutting edge tools and technologies and the DPRs will be prepared. The project has been awarded to WAPCOS, a PSU under the aegis of Ministry of Jal Shakti, Government of India on dated 16.07.2020 at a cost of Rs.18,38,00,000/- excluding GST and other applicable taxes for an area of 2400 Sq. Km. Further, it being a technical project area may vary depending on the topography of the Land and accordingly WAPCOS will submit additional proposal and after approval by the competent authority in the Ministry, the same will be taken up.

Background of the Project:

In the meeting of State Forest Ministers, held on 30.11.2019 in New Delhi, various important matters related to CAMPA were discussed. Shri Sriram Vedire, Adviser, Ministry of Jal Shakti, Ganga Rejuvenation, in his presentation explained how scientifically and meticulously designed, techno-economically viable, and sustainable interventions in upper reaches of catchment areas in "a ridge-to-valley approach" has boosted groundwater recharge in Rajasthan. He also mentioned how LiDAR technology helps at the planning, implementation and monitoring stage in undertaking soil and moisture conservation works in a micro-watershed.

ii) Thereafter, Director General of Forests & Special secretary, MOEFCC has requested vide their D.O. Letter dated 13.12.2019 addressed PCCF of all the states/UTs to identify one major ridge inside a forest block with the criteria that area selected should have average rainfall of the state, the area requires assisted natural generation which means the density of forests should be less than 0.4 or below, but should have reasonable potential to regenerate with the ANR interventions, the area should be single and contiguous watershed of at least 5,000 ha but not more than 10000 ha, and the area should be such where investment should help the three pillars of sustainability, that is ecology, economy and society.

iii) A committee was formed vide order dated 20.01.2020 of the National Authority for expeditious implementation of the work relating to preparation of Detailed Project Report (DPR) by using LiDAR technology under the chairpersonship of Shri Sriram Vedire with the members being, Representative of DG, ICFRE, Dehradun, Representative of DG, FSI, Dehradun, Dy. CEO, CAMPA, MoEFCC, IGF(SU) and IG(NAEB). Further, it was directed that IG(NAEB) will coordinate and provide logistic support to the committee.

iv) Committee held 13 meetings between 24.01.2020 and 19.06.2020 and finalized area of 261897 ha in 26 states for implementation of project and submitted the details of area along with map to the National Authority on 19.06.2020.

Project formulation:

Various meetings were held in the National Authority for finalization of terms of reference for Expression of Interest and EOI was invited for Preparation of DPR with LiDAR survey on dated 16.04.2020. WAPCOS Ltd., a PSU under the aegis of Ministry of Jal shakti, Govt. of India was finalized as agency for implementation of the project as per procedure. An agreement was signed between National Authority and WAPCOS on dated 16.07.2020 at a cost of Rs.18,38,00,000/- excluding GST and other applicable taxes for an area of 2400 Sq. Km. Further in the same agreement is mentioned that the total cost of the project may decrease or increase prorate based on the identified area of each state/UT.

Timeline: 16th July 2020 to 15th December 2020, extendable up to 15th March 2021.

Status of the Project:

i. Draft DPR of four states namely Bihar, Jharkhand, Madhya Pradesh and Chhatisgarh has been submitted.
ii. Survey of 12 states is completed.

Utilization of Fund:

So far, WAPCOS Limited has been paid Rs. 4,33,76,800/- towards 20% advance as per agreement and Rs. 1,83,94,474/- for LiDAR survey in five states.

Project approval:

Hon'ble Minister as chairman of the Governing body of National Authority has approved the proposal for the scheme under National Fund on dated 15.05.2021. Executive committee may accord post-facto approval under Section 15(1)(ii) of the CAF Act, 2016.

The proposal is placed before the 13th EC for kind consideration.

Agenda Item No.15

Any other matter with the permission of the chair

(a) A project Proposal for allotment of funds to FSI and submitted through Survey and Utilisation Division for

a) Demarcation, Survey and Geo-referencing of Forest Boundary using DGPS in Pilot Areas (Forest Divisions) for Developing Standard Operating Procedure (SOP).

b) Development of a Web portal (GIS-based) for monitoring progress of Geo-referencing of forest lands in different State forest departments in India and its maintenance initially for three year at FSI, Dehradun.

Background:

In the Hon'ble Supreme Court of India's Order passed on the 6th July 2011, (in IA Nos. 1868, 2091, 2225-2227, 2380, 2568 and 2937) in WP (C) number 202 of 1995 – the Lafarge matter, it has been directed that all types of forest land be identified and geo-referenced and district forest maps be prepared. In the background of the order, an Empowered Committee (EC) has

been constituted by MoEF&CC in 2019 to monitor the progress of field identification and geo-referencing of forest land as per the directive of the Hon'ble Supreme Court and to resolve the discrepancy between notified forest area and geo-referenced forest area. Constitution of the committee is as under:

S. No.	Name	Designation
1.	Director General of Forests & Special Secretary, MoEF&CC, New Delhi	Chairman
2.	Addl. DG Forests (FC), MoEF&CC, New Delhi	Member
3.	Director General, Forest Survey of India, Dehradun	Member
4.	Representative from Survey of India, Dehradun	Member
5.	Representative of National Remote Sensing Centre, Hyderabad	Member
6.	Shri A.K. Bansal, Ex-ADG	Member
7.	Inspector General of Forest (SU), MoEF&CC, New Delhi	Member Secretary

The EC shall provide broad guidelines and operating procedures on the following:

(i) Identification and geo-referencing of forest land boundaries and development of GIS based Decision Support System (DSS) for forest land management.
(ii) Prescriptive format for submission of surveyed area statement (original area as per notification, notification number and date, DGPS surveyed area, difference in notified forest area and surveyed area reasons for the area differences)

This will eventually feed into National Framework for preparation of Geo-referenced maps of all the forests of the country. This Standard operating procedure (SOP) is being made for adoption of similar and detail mannered technical procedure for the State Forest Departments of all States in country.

Assignment of tasks to FSI:

So far, six meetings of the Empowered Committee have been held since the first meeting, held on 5th July 2019. The last meeting was held through video

conferencing on the 23rd March 2021. In the third meeting held on 22nd October 2019, FSI has been assigned the following tasks:

i. Demarcation, Survey and Geo-referencing of Forest Boundary using DGPS in Pilot Areas (Forest Divisions) for Developing Standard Operating Procedure (SOP). FSI will carry out pilot studies in the states of Kerala & Tripura for developing SOP.
ii. Development of a Web portal (GIS-based) for monitoring progress of Geo-referencing of forest lands in different States forest departments in India and its maintenance initially for three years at FSI, Dehradun.
iii. In addition to the above, FSI has been directed to carry out field work for developing SOP in a third state in the meeting of EC held on the 23rd March 2021. Ministry vide letter no. E.F.4- 1/2020-SU (Pt.) 1st June 2021 has directed that the third state where the field work is to be done is Meghalaya.
iv. Further, as per the telephonic message from AIGF (SU) on 3rd June 2021, the Ministry has directed that the fieldwork for pilot studies is to be taken up in three more states who have already work in developing SOP, namely; Karnataka, Jharkhand & Madhya Pradesh.

Action taken so far:

FSI carried out two-bid tender process for the activities listed at S. No. (i) & (ii) above in the year 2020. After the completion of tendering formalities, the requirement of funds for a) & b) above worked out to ₹19.00 lacs & ₹35.00 lacs respectively totaling ₹54.00 lakhs. In view of the urgency of the work, the activity listed at a) above has already been completed in Kerala. Based on the **study taken up in Kerala** and inputs from documents on SOPs from the states of **Jharkhand, Karnataka & Odisha** draft SOP was submitted to the Ministry in March 2021. The SOP was discussed in the EC's meeting held on 23rd March 2021. Further progress of work has been halted due to the current COVID situation in the country and non-availability of funds. A status report in the matter has been submitted to the Ministry vide letter no.27-375/2019-FI – 876 dated 28th May 2021.

Constraints:

In the last financial year 2020 – 21, the budget of FSI in the Revised Estimate (RE) was cut down to ₹26.00 Crores from ₹35.00 Crores, which was approved earlier in the Budget Estimate (BE) for the FY 2020 - 21. For the financial year 2021 - 22 also FSI has been allocated only ₹30.00 crores in the BE of regular budget against the submitted requirement of ₹43.00 crores. About 60% of the funds available is in the Salary component and with the remaining funds, the mandated activities have to be carried out throughout

the FY 2021-22. As such, funds are not available in the regular budget of FSI to carry out these activities.

Alternative source of funding:

In the 5th meeting of the Empowered Committee held on 27th January 2021 through video conferencing, it was decided that the SU Division will explore with the Budget Division, alternative budget head for pilot study for SOP. If not available, proposal be submitted to National CAMPA immediately to provide funds to the tune of ₹54.00 lacs.

Proposal for allotment of funds:

In view of the facts stated above, the following revised financial proposal for allotment of ₹94.00 lacs is being submitted for the kind consideration of the Ministry. There is an increase of ₹40.00 lacs from the earlier requirement of ₹54.00 lacs, as a provision of additional ₹40.00 lacs have been kept for the field work to be taken up in four more states viz Jharkhand, Karnataka, Madhya Pradesh & Meghalaya as per the directions of the Ministry.

In view of the above facts, it is requested that proposal for allotment of funds amounting to ₹94.00 lacs to FSI, may kindly be placed before the National CAMPA to carry out the activities listed below.

S. No.	Item of Work	Amount in Lakhs	Remarks
1.	To carry out pilot study for Demarcation, Survey and Geo-referencing of Forest Boundary using DGPS in Pilot Areas (Forest Divisions) for Developing Standard Operating Procedure (SOP) in the states of: a. **Kerala** b. **Tripura**	₹19.00	This amount is as per the financial bid of the L-1 firm after completion of tender formalities for field work in two states. After opening the financial bid in October 2020, the work order was issued to the firm on 23rd October 2020.

S. No.	Item of Work	Amount in Lakhs	Remarks
2.	To carry out field work for pilot study in the State of **Meghalaya** as directed vide Ministry's letter no. E.F.4-1/2020-SU (Pt.) 1st June 2021. As per the directions received from the Ministry to carry out fieldwork for the pilot studies to be undertaken in the States of: a. **Jharkhand** b. **Karnataka** c. **Madhya Pradesh**	₹40.00	This is the tentative expected expenditure for carrying out study in four states @ ₹10.00 lac per state. This amount is based on the financial bid of S. No. 1 above and is subject to change as per the actual financial bid of the fresh tender.
3.	Development of a Web portal (GIS-based) for monitoring progress of Geo-referencing of forest lands in different States forest departments in India and its maintenance initially for three years at FSI, Dehradun	₹35.00	This amount is as per the financial bid of the L-1 firm after completion of tender formalities and is subject to change as retendering is required to be done. The financial bid was opened in 2nd November 2020 and was valid for 180 days.
	TOTAL	**₹94.00**	

The proposal is placed before the 13th EC for kind consideration.

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Agenda Item No.15

(b) APO for the year 2021-22 of Arunachal Pradesh State Authority

File No.NA-15/36/2020-NA

The Principal Chief Conservator of Forests (RE) and Chief Executive Officer, Arunachal Pradesh State CAMPA, Itanagar vide letter no. FOR./20/State Authority/2020/2240 dated 04.06.2021 has submitted the Annual Plan of Operation for the Financial Year 2021-22. The APO has been approved by the 3rd Steering Committee of Arunachal Pradesh State Authority

in its meeting 03.06.2021. The outlay of various forestry and wildlife activities in APO 2021-22 is for Rs.246.05 crore.

2. As per the APO provided by the Arunachal Pradesh State Authority following activities have been proposed for the financial year 2021-22.

CAF Rules	**Activity**	**Physical Target (in ha.)**	**Financial Target (Rs. in Crore)**	**Remarks**
1.	**Site Specific Activities**			
Mandatory Activities	**Compensatory Afforestation (CA)**			
	(i) Advance Nursery work (1st year operation)	4793.16	10.24	As per approved site specific works (Plantation watcher - 977 Nos. & Plantation Supervisor – 132 Nos.)
	(ii) Entry Point Activity	15 projects	1.07	
	(iii) Creation of Plantation including 1st year maintenance and other related works etc.	12193.93	76.63	
	(iv) Maintenance of old plantation and wages of plantation watcher/supervisor	13009.86	17.24	
	(v) Monitoring, supervision (POL, maint. Of vehicles i/s TE etc.)(12% on Rs.53.23 crore of total cost of CA plantations except Entry Point Activities & vehicles)		15.78	
	Total CA	**29,994.95**	**120.96**	
As per approved plan	**(II) Catchment Area Treatment Plan (CAT)**			
	Pare HEP-110 MW			
	(i) Afforestation-1600 per ha. Tending operation	226.10 ha	0.23	
	(ii) Afforestation-800 per ha. Tending operation	1397.00 Ha.	1.43	
	(iii) Social Forestry – Tending operation	342 Ha	0.35	
	Kameng HEP			
	(iv) Afforestation – Creation including nursery	5000 Ha.	12.80	
	(v) Enrichment of Plantation - Creation including nursery	1000 Ha.	1.43	
	(vi) Fuelwood Plantation	1000 Ha.	0.33	

CAF Rules	Activity	Physical Target (in ha.)	Financial Target (Rs. in Crore)	Remarks
	(vii) Social Forestry- Distribution of seedling	500 ha.	0.50	
	(viii) Alternative land use programme (Horticulture strip/plantation)	1442 Nos.	2.00	
	(ix) Salary/ wages (Engagement of supervisor -31 Nos.)	31 Nos.	0.65	
	(x) Construction of staff quarters- residential/non-residential buildings	15 Nos.	5.09	
	(xi) Treatment of pilot area (i. Intensive afforestation/reforestation-123.60 ha., ii. Enrichment planting 134.94 ha.)		0.10	
	(xii) Training Programme	5 courses	0.70	
	(xiii) Project Implementation and Management etc. (Monitoring & Evaluation)	LS	0.13	
	Total CAT		**25.74**	
As per approved plan	**(III) Wildlife Management Plan (WLMP)**			
	(i) C/o Check Gate with hut	8 Nos	0.45	
	(ii) Patrolling squad/wages	36 Nos	0.43	
	(iii) Erection of night vision vinyl signage with Ms angle iron post @ 1 no/km.	215Nos	0.23	
	(iv) Purchase of LMV	6 Nos.	0.57	
	(v) Rescue & treatment	LS	0.02	
	(vi) POL & Maintenance of vehicle	LS	0.06	
	(vii) Training & creation of rescue facilities	LS	0.12	
	(viii) Awareness camp in school.	LS	0.02	
	(ix) Monitoring & Evaluation	LS	0.04	
	(x) Other works as per approved Plan	LS	0.27	
	Total (WLMP)		**2.21**	
	Subtotal Site Specific Activities		**148.91**	
2.	**Proposed Activities as per Rule 5(2) under 80%**			

CAF Rules	Activity	Physical Target (in ha.)	Financial Target (Rs. in Crore)	Remarks
5(2)(a)	(i) Assisted Natural Regeneration – Creation of plantations	1658.80 Ha.	3.10	
	(ii) Maint. Of ANR plantations	1223.00 Ha.	1.08	
5(2)(b)	(iii) Artificial Regeneration Creation	5191.90 Ha	33.90	
5(2)(b)	(iv) Artificial Regeneration Maintenance	1310.50 Ha.	2.37	
5(2)(c)	(v) Silviculture operations in forests.	LS	0.35	
5(2)(d)	(vi) Protection of plantations and forests.	Ls	2.49	
5(2)(e)	(vii) Pest & Disease control in forest	LS	0.06	
5(2)(f)	(viii) Forest fire prevention and control operations	LS	0.24	
5(2)(g)	(ix) Soil and moisture conservation works in the forests	LS	12.60	
5(2)(i)	(x) Improvement of wildlife habitat Creation works	51712 Ha./Nos.	3.06	
	(xi) Improvement of wildlife habitat Maintenance works	334.00 Ha./Nos.	0.30	
5(2)(k)	(xii) Establishment, operation and maintenance of animal rescue centre and veterinary treatment facilities.	LS	0.07	
5(2)(l)	(xiii) Supply of wood-saving cooking appliances and other forest produce saving devices.	4304 Nos/HH	2.25	
5(2)(m)	(xiv) Management of biological diversity and biological resource.	LS	10.21	
	Total Rule 5 (2)		**72.08**	
3.	**Proposed Activities as per Rule 5 (3) under 20%**			
5(3)(a)	(i) Establishment of modern nurseries and Botanical garden.	10 Nos.	3.08	
	(ii) Maintenance of modern	11 Nos.	0.71	

CAF Rules	Activity	Physical Target (in ha.)	Financial Target (Rs. in Crore)	Remarks
	nurseries & Botanical garden			
5(3)(b)	(iii) Promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats etc.	LS	0.28	
5(3)(c)	(iv) Purchase and maintenance of equipment or devices used for communications and information technology.	LS	1.81	
5(3)(d)	(v) Construction of check gate, watch tower, up-gradation and maintenance of inspection paths, forests roads in forests area, fire lines etc.			
	Check gate	13 Nos.	1.08	
	Maint. Of Check gate	26 Nos.	0.13	
	Inspection path & fire line cutting	1200 km	0.77	
	Maint of Patrolling/Inspection Path	627 km	0.39	
	Watch tower	15 Nos.	0.60	
5(3)(e)	(vi) Construction of residential and official building in forests for front line staffs deployed for protection of forest and wildlife	42 Nos.	6.81	
	(vii) Maint. Of buildings of frontline staff	100 Nos.	0.70	
5(3)(f)	(viii) Casual engagement of local people or labours for protection of forest and wildlife undertaken from State Fund	274 Nos.	2.19	
5(3)(g)	(ix) Survey and mapping of forest areas for forest fire control, CA works, soil conservation, catchment area treatment	Ls	0.11	

CAF Rules	Activity	Physical Target (in ha.)	Financial Target (Rs. in Crore)	Remarks
	etc.			
5(3)(h)	(x) Independent concurrent monitoring and evaluation and third party monitoring of various works undertaken from State Fund.	Ls	0.81	
	Total Rule 5(3)		**19.47**	
	Subtotal NPV		**91.55**	
4.	**Proposed Activities as per Rule 6 (a)**			
6(a)(iv)	Salary & wages of staff of State Authority	LS	0.68	
6(a)(iv)	Operationalization branches of State Authority.	48 Nos.	0.72	
6(a)(vi)	Professional fee for CA, Audit etc.	LS	0.10	
6(a)(v)	Disbursement of sitting fees and allowances to the nominated Executive members/ steering members of St. Authority etc.	LS	0.05	
6(a)(vi)	Miscellaneous unforeseen activities of State Authority	LS	0.05	
6(a)(vi)	Electrical appliances including maintenance of building for frontline staff	100 Nos.	0.95	
6(a)(vi)	Construction of buildings	3 Nos.	1.30	
	Total Rule 6 (a)		**3.85**	
5.	**Proposed Activities as per Rule 6 (b)**			
6(b)(i)	Management of office establishment and other administrative expenses.	LS	0.50	
6(b)(vi)	POL &Maint. Of vehicles for protection of forest and wildlife for State Authority	LS	0.30	
6(b)(iii)	Purchase of LMV	8 Nos.	0.84	
6(b)(vi)	Third Party Monitoring	LS	0.10	
	Total Rule 6 (b)		**1.74**	
	Subtotal Interest Component		**5.59**	
	Grand Total		**246.05**	

The APO of Arunachal Pradesh State Authority for 2021-22 is placed for consideration in 13th meeting of the Executive Committee of National Authority.

Proposal for the Establishment of

Centre of Excellence on Forest Fire (CoEFF)

Submitted to

Forest Protection Division
Ministry of Environment, Forest and Climate Change
Government of India
New Delhi-110003

by

Forest Research Institute
Indian Council of Forestry Research & Education
P.O. New Forest, Dehradun - 248006
April, 2021

Forest Research Institute

Proposal for the Establishment of Centre of Excellence on Forest Fire (CoEFF)

BACKGROUND

Forest fires have become an issue of global concern. In many other countries, wildfires are burning larger areas, and fire seasons are growing longer due to a warming climate. With growing populations in and around the edges of forests, more lives and property are now at risk from fire. Despite the staggered research done in the management of forest fires in India, field-verified data on the extent and severity of fires are lacking and understanding of the longer-term impacts of forest fires on the health of India's forests remains weak.

A joint report was submitted by the Ministry of Environment, Forest and Climate Change, Government of India, and the World Bank in June 2018 on the subject of 'STRENGTHENING FOREST FIRE MANAGEMENT IN INDIA'. The aim of the study was to strengthen knowledge on forest fires by documenting current management systems, identifying gaps in implementation, and making recommendations on how these systems can be improved. Consequent to the recommendations of the joint report, MoEF&CC & World Bank (2018) recognized ICFRE in coordination with FSI as lead implementer for National Centre of Excellence on Forest Fire.

According to joint report by MoEF&CC & World Bank (2018) there is no dearth of excellent research organizations in India that have been working on various aspects of Forest Fire Prevention and Management (FFPM). The Forest Survey of India (FSI) and Indian Council of Forestry Research and Education (ICFRE), both headquartered in Dehradun, Uttarakhand, stand out as potential host institutions for a centre of excellence that can provide guidance to SFDs and develop new methods for preventing and managing forest fires. Stronger collaboration of the SFDs with research entities would enable the states to conduct experiments and provide data to these institutes for

further developing and refining their research in the field, ultimately leading to better fire management outcomes on the ground. Indeed, FSI and FRI are already active in providing training and technical support to the state forest departments.

Research organizations and others are also important sources of knowledge on the long-term impacts of fire, which can help inform and guide the FFPM planning process in the country. Strengthening the collaboration between forest departments and researchers working on FFPM is critical for efficiently addressing the challenge of frequent, unwanted fires in India's forests, especially in the context of a changing climate. The opportunities for training forest officials must also be tapped into for improving FFPM outcomes on the ground (MoEF&CC & World Bank, 2018).

Following activities are envisaged under the proposed Centre of Excellence on Forest Fire-

a. Improvement in research and development facilities:
    i. Procurement of Goods (equipment & software), components, sub systems and minor infrastructure for improvement in research and development facilities.
    ii. Engagement of experts & part-time consultants.
    iii. Testing and Prototype development of upgraded and modern firefighting equipment.
    iv. Data collection, dissemination and documentation.
b. Coordinated work with other research institutes in India,
c. Capacity building of stakeholders, managers, team leaders etc.
d. Seminars, conferences workshops, and IEC activities (information, education and communication),
e. Project grant: Project grant to researchers to venture into new directions within the specified theme.

Joint report by MoEF&CC & World Bank (2018) highlighted that the creation of a Centre of Excellence should advance policy relevant research with a focus on FFPM. Such a centre should bring together other agencies and institutes with a stake in FFPM and disaster management, including FSI and NDMA. ICFRE, with data and technology support from FSI, could develop such a centre of excellence.

This document proposes establishment of ***Centre of Excellence on Forest Fire*** at the ***Forest Research Institute, Dehradun***. The mandate for this unit, outlined in this Proposal, has been developed through a collaborative process during the past few

months, including meeting with the major partner organisations such as Forest Survey of India, Dehradun & Directorate of Forestry Education, MoEF&CC. This document provides the rationale for establishment of the Centre as an important enabling mechanism for achieving the goals outlined in the National Action Plan on Forest Fire (NAPFF) to undertake data collection and analysis, frontline research in all aspects of forest fires, and development of fire-fighting equipment and tools. It outlines the Centre's functions in the context of institutional priorities and its substantial experience with the research & training activities in this field, combined with the collaboration potential in terms of intra- and inter-institutional connections.

INTRODUCTION

Fire has been a part of India's landscape since time immemorial and can play a vital role in healthy forests, recycling nutrients, helping tree species regenerate, removing invasive weeds and pathogens, and maintaining habitat for some wildlife. Occasional fires can also keep down fuel loads that feed larger, more destructive conflagrations. But as population and demands on forest resources have grown, the cycle of fire has spun out of balance. Large areas of degraded forest are now subjected to burning on an annual or semi-annual basis. As these fires are no longer beneficial to forest health, India is increasingly wrestling with how to improve the prevention and management of unwanted forest fires (MoEF&CC & World Bank, 2018).

In India, one estimate shows that nearly 49,000 square kilometer of forests - an area larger than the size of Haryana – were burned in 2014 alone (a mild year compared to others in the recent past). Apart from the damage, forest fires pose a serious threat to India's ability to expand its forest and tree cover by 2030 to create an additional carbon sink of 2.5 to 3 billion tons of CO_2 equivalent, in keeping with the country's Nationally Determined Contribution (INDC). Indeed, India's Ministry of Environment, Forest and Climate Change (MoEF&CC) has identified forest fires as a major driver of forest degradation, and noted that the lack of a comprehensive assessment of what drives forest fires, and the best way to manage them, hinders effective action (MoEF&CC & World Bank, 2018).

According to joint report by MoEF&CC & World Bank (2018) post-fire management is not being treated as part of the FFPM process and is probably the weakest link. Post-fire data collection is an essential part of the fire management process and crucial to producing informed FFPM plans and policies. However, this part of the management process is given little priority and is often performed solely for the sake of fulfilling administrative requirements. Field reporting and the investigation of fire

causes may be hindered by insufficient field staff, difficult terrain, and a lack of communication infrastructure in more remote areas. A lack of standard protocols for collecting and reporting information on fires, including their causes, has made it impossible to aggregate data across states. The greater issue, though, are the institutional disincentives for accurate and complete reporting. Fires larger than a few hectares trigger extra work for field staff to report and investigate offenses, and the department and its officers may be held responsible for reported monetary damages due to fires. The states will need help from MoEF&CC and the research community in developing standard methods and protocols for assessing ecological impacts and economic damages from fire.

The NRSC scientists have also found evidence of fires affecting forests in areas of significant ecological value, especially for biodiversity conservation (Reddy et al. 2017a). Between 2006 and 2015, the authors report that forest fires were detected in just under half (281 of 614) of the protected areas in India. In the year 2014, fires burned about 8.6 percent of forest cover in protected areas.

State forestry policies recognize that fires are taking a toll on forests. The Assam Forest Policy (2004) points to forest fires as a cause of considerable damage in plantation and regeneration areas, and the State Afforestation Policy of Tripura also mentions that plantations and natural forests are severely damaged by forest fires. The Himachal Pradesh Forest Sector Policy (2005) recognizes that forest fires cause irreparable damage to forests, biodiversity, wildlife, water resources, forest-based livelihoods and well being. The Andhra Pradesh State Forest Policy (2002) also notes the deleterious impact of forest fires, especially on the young plantations.

According to the Fifth Assessment Report of the Inter-Governmental Panel on Climate Change, exposure to smoke from landscape fires (including forest fires) is estimated to cause 260,000 to 600,000 premature deaths annually world-wide.

RESEARCH/ KNOWLEDGE GAPS

According to the joint report by MoEF&CC and World Bank (2018) the long-term impacts of the current pattern of forest fires on India's forest ecology and the wider economy are still poorly understood; however, the available scientific evidence supports that fires are having a degrading effect. Repeated fires in short succession are reducing species richness and harming natural regeneration, in combination with other pressures such as intense grazing and browsing. Reductions in biomass, species

diversity, and natural regeneration due to fire may pose a risk to policy goals for enhancing India's forest carbon sinks.

Current estimates of the economic costs of forest fires in India, at around INR 1,101 crore (US$ 164 million, 2016 prices) per year, are almost certainly under estimates. Monetary damages due to forest fires are generally assessed only for the loss of standing trees (natural or planted) in terms of their timber value, which are usually minimal in the event of low intensity surface fires such as those that commonly occur in India. Estimates could be improved by including the direct and indirect impacts on other sectors including e.g. transportation, infrastructure, loss of environmental services, etc. Without credible empirically based estimates of the costs of forest fires, it is unlikely that Forest Fire Prevention and Management (FFPM) will be made more of a policy priority (MoEF&CC & World Bank, 2018).

There is limited literature on impacts of forest fire in India, as assessed through field research. As the National Forest Commission noted in 2006: "The nature and severity of damage depends on the type of forest, availability of fuel and climatic factors. However, the damage to forest ecosystem due to fire has not been scientifically studied" (NFC 2006: 94-95). Much of the existing research has focused on seasonally dry tropical forests (including dry and moist deciduous forests) in Central and Southern India and subtropical pine or mixed-broadleaf forests in the hill states of the Western Himalayas.

NEED FOR FOREST FIRE DISASTER MANAGEMENT

The incidence of forest fires in the country is on the rise and burnt areas are increasing each year. There has been a piecemeal approach to the problem, so far. Gradually the national focus is shifting towards holistic approach to control this hazard. At present, the technical resources required for sustaining a systematic forest fire management programme are lacking in the country in large. Taking into consideration the serious nature of the problem, it is necessary to make some major improvements in the forest fire management strategy for the country. The Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India, has prepared a National Master Plan for Forest Fire Control. This Plan proposes to introduce a well-coordinated and integrated fire-management programme that includes the following components:

- Prevention of human-caused fires through education and environmental modification. It will include Silvicultural activities, engineering works, people's

participation, and education & enforcement. It is proposed that more emphasis be given to people participation through Joint Forest Management for fire prevention.

- Prompt detection of fires through a well-coordinated network of observation points, efficient ground patrolling, and communication networks. Remote sensing technology is to be given due importance in fire detection. For successful fire management and administration, a National Fire Danger Rating System (NFDRS) and Fire Forecasting System are to be developed in the country.
- Fast initial control measures and follow up action.
- Introducing a forest fuel modification system at strategic points.
- Strengthening and augmentation of fire-fighting resources.

Southern India have found that repeated fires over short intervals are having a deleterious effect on forest composition, structure, and species diversity. In the Nilgiri Biosphere Reserve in the Western Ghats, Kondandapani et al. (2009) find fires "drastically altered" species structure and diversity and reduced seedling density in areas of dry deciduous forest with the shortest fire return intervals compared to forest patches with lower fire frequency. Jhariya et al. (2014) observe a similar pattern in the dry deciduous forests of the Bhoramdeo Wildlife Sanctuary in Chhattisgarh. Damage to Sal seedlings from low-intensity surface fires and negative effects on regeneration of trees forming the top canopy layer has also been observed in the Plain's forests of Uttarakhand by Maithani et al. (1986).

Singh et al. (1984) commented that oak forests in Uttarakhand are gradually being converted into pine forest because of human pressures such as fire, lopping, grazing, and leaf litter collection; fires promote the expansion of pine forests dominated by Chir. According to Chandra and Bhardwaj (2015) higher-intensity fires can severely deplete soils and strip them of organic matter and nutrients.

Forest fires contribute to climate change by releasing carbon stored in trees, undergrowth, litter, and soils into the atmosphere. Forest fires also emit heat trapping gases such as N_2O and other aerosols that influence the regional and global climate (MoEF&CC & World Bank, 2018).

Scientific research on the contribution of forest fires to climate change in India has so far been limited to estimates of direct emissions from the burning of above-ground biomass and have not considered the impact on regeneration. Nation-wide estimates have ranged from 6.34 million tons (Mt) CO_2 per year to as much as 123.84 Mt

CO_2 per year. The wide range of estimates reflect not only the inter-annual variability in fires, but also significant differences in assumed parameters (Badarinath and Vadrevu, 2011).

JUSTIFICATION FOR THE PROPOSED CENTRE

Sustainable development of natural vegetation systems, land-use systems and rural populations in the country are at risk due to forest fires that devastate valuable vegetation resources (*forests and other natural ecosystems, farmlands, pastures, plantations, etc.*), in both the short-term (*disruption of ecosystem processes, economic losses, humanitarian problems due to destruction of crops and other values at risk, including human health due to impacts of smoke*) and the long-term (*degradation of stability and productivity of ecosystems and land-use systems*). These fires often occur as a consequence of extreme weather situations and inter-annual climatic variability, e.g. droughts caused by El Niño during which land-use fires escape control, or after precipitation-rich periods (e.g. La Niña) that result in rich growth of vegetation and an increased availability of fuels (combustible material). The underlying causes of damaging wildfires and excessive application of fire in land-use systems are deeply rooted in the problems of rural societies that are undergoing rapid demographic changes and are experiencing the loss of traditional knowledge and skills due to globalization, and confrontation with external pressure on limited vegetation resources. Secondary effects of destructive wildfires include the loss of vegetation that protects the soil. As a consequence, the fire-affected sites are often degraded by high winds and rainfall. Increased surface runoff also leads to disastrous floods and landslides, affecting drinking water availability and quality, or even leading to siltation of reservoirs.

Apart from other natural hazards like landslides and earthquakes, forest fire is one of the major disasters in diverse forests of India, particularly in the Himalayas and North-East India. However, the comprehensive vital information to establish forest fire linkages with human habitation, road network, drainage network, distance to fire station, forest composition and density, slope, aspect, altitude, fuel type etc. is lacking. Hence, to bridge this knowledge gap it is imperative to establish *Centre of Excellence on Forest Fire* to address the issues and to develop research based strategies to combat forest fires. The proposed *Centre of Excellence on Forest Fire* will generate knowledge and carry out capacity building to minimize the devastating impact of forest fires.

WORK DONE BY THE FOREST RESEARCH INSTITUTE, DEHRADUN ON FOREST FIRE MANAGEMENT

The importance of taking up systematic research in the field of forest fire protection was realized as early as in 1956 when the first Expert Committee of FRI headed by Prof. Champion made very specific recommendations regarding the need to study and monitor forest fires in the country. Accordingly, a scheme was formulated in 1959 but it could not be sanctioned. Moreover, the ninth and tenth Silviculture Conferences held in 1956 and 1961 at FRI, Dehradun, recommended that FRI should take up research and development studies to strengthen knowledge related to forest fire management in India.

The Forest Research Institute, a Centre of Excellence with multi-disciplinary strength has played significant role in conservation and management of forests throughout the spatial extent of the country. Additionally, FRI has carried out several activities with respect to forest fire management and some of the major initiatives are summarized below: -

(i) Capacity Building of Forest Department(s) and other Stakeholders: As an important mandate, FRI has been conducting several workshops and imparting trainings to enhance capacity of the Forest Department(s) for science based management of forests and conservation of biodiversity. These training programmes have appropriate modules with respect to forest fire mitigation. Furthermore, training programmes on "Forest Fire Disaster Mitigation" for Forest officials of various States/ UTs, officers of paramilitary forces were organized by the Forest Research Institute, Dehradun, for last 8 to 9 years in collaboration with the National Institute of Disaster Management, New Delhi.

(ii) Research and Development for Better Management of Forests While Combating Forest Fires: FRI has taken up several projects/ studies covering different thematic areas to enhance knowledge about the different ecological processes, forest management issues and developed technologies for better management of forest resources of the country. FRI has also carried out few specific studies related to forest fire ecology and fire management. The institute has experience in developing tools and techniques to combat forest fires etc. The Institute has developed an in-house forest fire extinguishing kit which has been given to Forest Department personnel for controlling forest fires in difficult terrains. The Institute has capability to develop such types of technologies and is in the process to acquire advanced scientific and modern techniques.

VISION

The Centre will strive to provide leadership for deriving global solutions to issues related to forest fires across the world. The Centre aims to excel in Prevention, Detection & Suppression and Post Fire management including assessment of losses & restoration by providing leadership, best practices, research and support. The Centre will serve as "think tank" for MOEF&CC, Government of India and play advocacy role, provide inputs on technical knowledge on different aspects of Forest Fires in the country to improve the strategy for forest fire prevention and management through Research and Development initiatives.

MISSION

The Centre will work towards generating a Knowledge Management System so as to develop models for forecasting the forest fires; and to develop Standard Operating Procedures for combating forest fire in different landscapes. In this endeavour, mission of the Centre is:

1. To arrange global cooperation towards prevention of forest fires and to build a network of continuous information exchange with global partners in the arena of forest fire fighting; and for use of updated latest modern technology for monitoring the detection, suppression and mitigation activities in the country.
2. To strengthen the forest fire prevention, detection, suppression and mitigation activities in the country.
3. To undertake research projects on forest fire research issues.
4. To provide inputs to the State Forest Departments (SFDs) for better management of forest fire in the country.
5. To augment the capacity building of forest managers and stakeholders with latest techniques and tools for better management of forest fire.

OBJECTIVES

The broad objectives can be summed up as below-

- ✓ To develop long term international cooperation in designing strategies for preventing, and managing the forest fires so as to tackle the forest fires in the most effective manner for reducing the ecological losses due to forest fires in the long run.
- ✓ **Development of National Web Portal for Database Management and Knowledge Dissemination:** To strengthen and manage knowledge with respect to forest fires in India, a web-based portal will be developed at the Centre. The online portal will provide scientific information on forest fire

management issues, baseline information, scientific publications, other publications for dissemination and awareness creation. It will also provide a dashboard for the SFDs for reporting of management activities undertaken on forest fire with complete loop for reporting forest fire. It will also provide linkages with district level agencies involved in rapid response in case of emergency situation of forest fire to enable better coordination and clarity of chain of command in case of such eventualities. It will enhance responsiveness through workflows automation and availability of real time information. It will provide a platform for public access and helps for maintaining better transparency and efficiency in the working environment and minimizing the processing delay. Additionally, the web based portal will host training modules and webinars. It will also provide list of different stakeholders such as forest management agencies, NGOs, societies, scientific institutions, forestry resources, and subject experts on forest fire ecology and forest fire management.

- ✓ To carry out Research & Development activities on ecological aspects of forest fires and to develop forecasting models for forest fire prediction based on variable parameters such as fuel load, distance from habitation, temperature, rainfall, relative humidity etc.
- ✓ To meet the operational needs of the forest managers across the country in following areas –

▪ Forest Fire Monitoring	▪ Fire Safety Tools & Equipment
▪ Fire Danger Rating System	▪ Post Fire Damage Assessment
▪ Fire Combat Training	▪ Rehabilitation/ Reclamation Strategy
▪ Incident Command/ Response System	▪ Annual Calendar of Activities
▪ Any other	

- ✓ To carry out Research & Development activities for improving the Forest Fire Fighting Tools and Equipment *(including the Fire Uniform)* being used by forest departments as well as communities and to make them more user friendly.
- ✓ To develop SOPs to prevent or combat fire; provide technical support to SFDs on Forest fire management; capacity building for different levels of field functionaries. identify best practices & upscale them.
- ✓ To identify the need for policy interventions for better management of forest fire, wildlife habitat and other natural resources in the country affected by fire; and also conduct research on the same through collaborative research projects.
- ✓ To provide the appropriate tools and resources to the various forest departments for involving and empowering the local communities in the

prevention, suppression of forest fires and the restoration of fire affected areas.

- ✓ To develop the Centre of Excellence as 'State of the Art' resource centre having complete database of information on forest fire and best practices adopted across the globe for its efficient handling and effective management.

Composition of CoEFF: -

The Centre will be created at ICFRE whereas; all the administrative setup will be in Forest Research Institute, Dehradun with Forest Survey of India and Directorate of Forestry Education as two major partner institutes. The Director, FRI will act as Head of the Centre. Head Silviculture will act as member secretary of advisory board and will facilitate the meetings and coordination for the forest fire research undertaken by the Centre with the assistance of scientists, Officers working in the institute and other administrative staff.

For field visit and research/ administrative assistance staff will be hired on contract basis depending on the work load.

The Centre will have an **Advisory board** headed by the Director General, ICFRE Dehradun and comprising of the following: -

i.	Director General, ICFRE Dehradun	-Chairperson
ii.	Fulltime members	
	a) Director, Forest Research Institute, Dehradun	-Head of the Centre
	b) DG, Forest Survey of India, Dehradun	-Member
	c) Director, Directorate of Forestry Education, Dehradun	-Member
	d) PCCF & HoFF, States/ UTs / Nodal officers of SFDs	-Members
	e) Directors, ICFRE Institutes	-Members
	f) Head, Silviculture& Forest Management Division, Forest Research Institute, Dehradun	-Member Secretary
iii.	Experts and Specialists from other organisations working in the field of Forest Fire (NIDM, NDMA, IIRS/ISRO, IMD etc.)	-nominated members
iv.	Subject experts from leading Universities	-nominated members

The term of members nominated by the chairperson will be for two years.

The terms of reference for the advisory board are given below: -

i. To prioritize, approve/ outline the Annual Plan of Operation for each year for carrying out the activities to achieve the objectives of the Centre of Excellence.

ii. The board will meet twice in a year (once during & Pre fire season and once Post fire season) to review the activities & provide feedback on the R&D initiatives giving suggestions for improving and sharing of knowledge.
iii. The board will also review the progress of the projects periodically.

The board will support the Centre's leadership team in strategic planning, expanding to new initiatives, and in collaborating with other units across country for finding the problem areas in the relevant field for undertaking focussed research to arrive at practical solutions in the matter.

In its inaugural year, the board will be required to:

i. Finalize basic infrastructure required & activities for initiation of the Centre of Excellence
ii. Work out the permanent and temporary staff requirement for the roles assigned for works proposed by partner institutes/ organisations.
iii. Develop a Road map for the next 5 years by prioritising the research needs.
iv. Proposing funds for different activities for the 5 Year Plan period and for working out the annual requirement also.
v. Recommend the financial assistance required for operationalising the Centre of Excellence for a minimum period of 5 years to begin with.

In addition to above, the Centre will also have **Experts/Working Groups** of National and international Organisations/ Institutes/ Universities/Experts who will be sharing their technical expertise for guiding policy interventions for better management of forest fire, wildlife habitat and other natural resources in the country affected by fire.

The Composition of Working Group will include National and International Institutes/Organisations/ Universities of repute having expertise and experience in the field of forest fire management. The National and International members of the Working Group are proposed in **Annexure-I & II** respectively.The members of the Group will also be individual collaborating partners for the implementation of the research needs in identified thrust areas based on their area of expertise.The working group will consist of domain experts in the thrust areas such as Real Time Detection and monitoring of Forest Fire; Early warning system; Forest Fire vulnerability and

Climate Change; Economic and Ecological impact of Forest Fire; Post-fire restoration and rehabilitation etc.

The Working Group will be providing technical direction to the research needs placed before it so as to propose appropriate action for taking it forward. The suggestions of the Working Group will be placed before the Advisory Board for according necessary approvals for taking up research on the specified topics in project mode. The recommendations of the Working Group may also form a basis for advocating amendments to existing policy framework.

Activities of CoEFF: -

The activities of the Centre may be categorized into 'Pre-Fire, During-Fire and Post-Fire management' in forest areas. In this endeavor Centre will take up the following activities.

I. Activities to be undertaken by FSI, Dehradun

As per the role defined by MoEF&CC in National Action Plan on Forest Fires para 8.1 (i) FSI may develop a national level database on burnt area assessment on a yearly basis. There are many activities which are part of mandate of FSI, which will continue to be done by FSI, however Centre will coordinate with FSI for sharing information and providing assistance to FSI as and when required. Following activities will be done by FSI: -

PRE-FIRE ACTIVITIES

A. Near Real Time monitoring of Forest Fire and alert system

Forest Survey of India has been using spatial information (MODIS and SNPPVIIRS) to find and report forest fires in the nascent stage and provide quick and reliable signals to SFDs and general public to initiate preventive measures at their end. It has been undertaking activities *viz.* Large Forest Fire Monitoring Programme, forest fire 'Geo-portal', use of Novel platforms such as Drones, thermal imagery etc. and continuous R&D to enhance the robustness of system.

B. Development of national level database on forest fire

The Centre will work in close coordination with FSI (*in association with IMD)* for developing national database network on-

- ✓ Information about climate, weather, etc.

- ✓ Historical documentation of forest fires, including location, type of vegetation, history, causes and other details.
- ✓ Number of forest fires, the area burnt and other adverse impact on type of vegetation burnt, the flora and fauna of the area.
- ✓ Resources, including human resource available with the state govt. to detect and combat forest fire,
- ✓ Other area specific relevant information.

The database will also capture information on fire lines, controlled burning, watch towers, fire-fighting assets (and their locations), and communications infrastructure. Such a database will be instrumental for assessing longer-term trends across states and regions and for planning fireprevention and response. As noted by the National Forest Commission (2006), creating a database would include establishing a mechanism for ensuring data quality and cross-checking figures reported by local field staff. Field-level officers in the state-level forest departments should have access to the database as well.

C. Identification of fire vulnerable landscape across country based on ecological models

Centre will give input to FSI in identification and mapping of Fire vulnerable areas using historical fire data along with following parameters:

Climatic: Temperature, precipitation, microclimatic parameters, Aridity Index, Evapo-transpiration
Topographical: Slope, aspect, Elevation, drainage
Anthropogenic: Distance to habitation, Road etc.
Socioeconomic factors/aspects/status: Cattle population, fodder dependency
Fuel Characteristics: Fuel type, moisture, depth, load
Forest characteristics: Forest type, canopy density

D. Mapping and monitoring of fuel load at country level

The Centre will work with FSI to carry out this activity. Fuel load varies across forest types, density, composition, and structure. Fuel load map of country will be developed using National Forest Inventory (NFI) data and field survey. This map will be used to calculate the threshold level of fuel load in different forest types. Additionally, moisture content, fineness, depth, compactness, and orientation (vertical or horizontal) of these fuels will be studied and monitored as Fire potential and behaviour is affected by these factors.

E. Development and deployment of Fire Danger Rating System (FDRS)

The Centre will work with FSI to carry out this activity. Fire Danger Rating Systems (FDRS) warn of short-term fire potential and allow fire agencies to quantify different aspects of fire behaviour, for example, how fast fires are likely to spread, how intensely they may burn under current conditions, and how difficult they may be to control. FDRS are intended to inform fire managers and other responsible agencies about hazardous fire weather conditions so that they can ensure an appropriate state of readiness, alert the public of the danger, and take actions to prevent or mitigate damaging fires (e.g., by putting in place restrictions on the use of fire). As a decision-support tool, FDRS may enable fire managers to allocate their resources for FFPM in a more efficient and cost-effective way (Taylor and Alexander 2006). It will be developed by international cooperation with scientists from Canada, US or other European countries.

F. Establishment of experimental lab for fire behaviour and spread study

This proposed lab is aimed to understand the fire behaviour, particularly the ignition, mechanisms of flame propagation, spreading, flame front velocity and fuel consumption rates in different forest types, fuel types and topography. Impacts of surface fires on crown fuels will also be studied together with the effects of winds, humidity, environmental temperature and fuel moisture content. This lab will be established with the collaboration of expert agencies in other countries such as Fire Sciences Laboratory of US Forest Service (USFS), Australia, South Korea etc.

POST-FIRE ACTIVITIES

G. Survey and mapping of fire affected areas (Burnt Area Assessment)

Burnt area assessment using Remote Sensing (RS) and Geographic Information System (GIS) techniques and classification of damage level based on the intensity of forest fire in association with State Forest Departments (SFDs) will be carried out by FSI. It will facilitate to assess the ecological and economic losses due to forest fire. Standard reporting protocols, and standard methods for assessing burnt area will also facilitate the creation of a national forest fire information database incorporating field reported data.

II. Activities to be undertaken by FRI, Dehradun

There are many activities which are part of mandate of FRI, those activities will continue to be done by FRI. In view of the expertise the following activities will be done by FRI: -

PRE-FIRE ACTIVITIES

A. Development of National Web Portal for Database Management and Knowledge Dissemination

To strengthen and manage knowledge with respect to forest fires in India, a web based portal will be developed at the Centre. The online portal will provide scientific information on forest fire management issues, baseline information, scientific publications, other publications for dissemination and awareness creation. It will also provide a dashboard for the forest officers for reporting of management activities undertaken on forest fire with complete loop for reporting forest fire. It will enhance responsiveness through workflows automation and availability of real time information.It will provide a platform for public access and helps for maintaining better transparency and efficiency in the working environment and minimizing the processing delay. Additionally, the web based portal will host training modules and webinars. It will also provide list of different stakeholders such as forest management agencies, NGOs, societies, scientific institutions, forestry resources, and subject experts on forest fire ecology and forest fire management.

B. Development of forest fire knowledge network

The centre will strive to become nodal for **South/ SE Asia and West/ East Africa**. It will act as an umbrella to establish regional forest fire knowledge networks through different/ individual origins and their mandates. It will work on reducing the negative impacts of landscape fires on the environment and humanity. The centre will advance the knowledge and application of the ecologically and environmentally benign role of natural fire in fire-dependent ecosystems, and sustainable application of fire in land-use systems.

The broad structure for executing this activity will be headed by Board of Governors, which will consist of one representative from each of South/ SE Asia and West/East African countries and independent members will be nominated by the chairperson advisory board (DG, ICFRE) in consultation with MoEF&CC based on their recognized professional expertise and experience.

REGIONAL BOARD MEMBERS		
i.	**Secretary/ DGF&SS, MoEF&CC**	**Overall governance**
ii.	Director General, ICFRE Dehradun	Permanent Members
iii	Director, Forest Research Institute, Dehradun	
iv	DG, Forest Survey of India, Dehradun	
v.	Director, Directorate of Forestry Education, Dehradun	
vi.	Representative from South Asia (6 countries)	Nepal, Bhutan, Sri Lanka, Maldives, Bangladesh, Afghanistan
vii.	Representative from South East Asia (11 countries)	Cambodia, Brunei, Vietnam, Thailand, Indonesia, Laos, Malaysia, Philippines, Singapore, Myanmar, Timor Leste
viii.	Representative from West Africa (14 countries)	Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Mali, Niger, Senegal, Togo, Liberia
ix.	Representative from East Africa (19 countries)	Burundi, Botswana, Dijibouti, Ertrea Ethiopia, Kenya, Malawi, Mauritius, Rawanda, Seychelles, Swaziland, Somalia, Madagascar, Mozambique, Sudan, Tanzania, Uganda, Zambia and Zimbabwe
x.	Nominated independent members	National/ International experts

The Centre will work also in close coordination with FRI for developing national forest fire knowledge network.

A national forest fire knowledge network will be established to cover all dimensions of forest fire in the country. Such network will be tuned to the felt need of all stakeholders, including forest fire managers, policy makers and planners, decision makers, community etc.

Necessary steps to be taken in this regard will include -

- ✓ Knowledge scattered in research institutions, universities etc. related to fire management must be compiled and form part of the network.
- ✓ Projects will be sanctioned to universities/research institutesto enrich the forest fire knowledge.
- ✓ Networking of knowledge on all spheres of forest fire management withnational and international organisations.

C. Development of Standard Operating Procedures (SOPs)

The Centre will develop SOPs. Issuing a SOP is a standard management practice and an effective method of communicating the objectives, principles, and actions for FFPM to field staff in the state forest departments. The SOPs also provide a medium for the states to consolidate the various orders, instructions, and letters they have issued from timeto time on different aspects of FFPM. Based on the findings of study and feedback from SFDs. SOPs will be developed for different fire vulnerable landscape.

D. Study on impact of future Climate change scenario on Forest Fire vulnerability

The Regional Climate Projections (RCPs) data released by Intergovernmental Panel on Climate Change (IPCC) in its Fifth Assessment Report (AR5) will be used to study the impact of future climate change scenario on forest fire vulnerability. In the future, under a warmer climate, we expect more severe fire weather, more area burned, more ignitions and a longer fire season. Although there will be large spatial and temporal variation in the fire activity response to climate change. This field of research allows us to better understand the interactions and feedbacks between fire, climate, vegetation and humans and to identify vulnerable regions. The projections of fire activity for this century can be used to explore options for mitigation and adaptation.

DURING-FIRE ACTIVITIES

As per the role defined by MoEF&CC in National Action Plan on Forest Fires para 7.2 (iii) The ICFRE should focus on development of user-friendly fire fighting equipment, tools and protective clothing suitable for various regions of the country.

E. Strengthening of SFDs and communities by Fire suppression tools and techniques

Development of protective clothing and equipment and modification of existing hand tools developed by FRI & their improvement

Fire-fighters' personal protective clothing is the only source of protection for fire-fighters during fire-fighting. The protective clothing should provide adequate protection as well as should be comfortable to wear. The protection and comfort requirements are always the contradicting fact in several protective clothing including fire-fighters'. Appropriate material selection, clothing design and final

evaluation of the results play a critical role in predicting the clothing performance and comfort.

Forest Fire Fighting Tools developed by Forest Research Institute, Dehradun which are being used by the frontline staff of various forest departments of the country. Forest departments sent feedback to FRI in difficulties of using the hand tools in the field. Therefore, hand tools will be modified in collaboration with DRDO, IIT and CSIR keeping in view of the comments received from the state forest departments and communities.

POST-FIRE ACTIVITIES

As per the role defined by MoEF&CC in National Action Plan on Forest Fires para 8.1 (ii) MoEF&CC may assign ICFRE the responsibility of developing and standardizing methodologies for assessing losses due to forest fire including loss of intangibles such as ecosystem services & (iii) Based on standardized methodologies, the ICFRE may further standardize protocols for estimating area affected and losses due to forest fire and reporting the same at successive levels.

F. Assessment of damage and economic losses due to forest fire

The forest fire losses (i.e., tangible and intangible) will be identified using Ecosystem Services (ES) framework following the Economics of Ecosystems and Biodiversity Approach of Millennium Ecosystem Assessment (TEEB, 2010*). The forest fire loss estimation is essentially an exercise in estimating the potential damage or losses caused and thus the methodology will consist of collection and use of simple and uniform physical indictors to assess ecosystem services in terms of provisioning (Floral part / timber/ wood, Food, fibre, fuel wood and non-wood products etc. Faunal part /including trade (NWFP), regeneration), Supporting (Soil, Hydrology, erosion, sediment etc. for protection, Faunal Habitat, IUCN – critical biodiversity, Flora, Fauna), Regulating (hydrological regulation, Carbon stock/ and sequestration) and cultural (recreation and ecotourism etc. forest dependency on forest flora, fauna, water and other) for the damage assessment due to forest fire.

G. Post fire restoration and rehabilitation strategy in fire affected areas

Forest restoration is necessary to re-establish structure and function; protect and restore critical habitat, riparian areas, watersheds and many other attributes. Restoration and rehabilitation strategy for different forest types and burnt severity will be developed to recover the burnt area. Silvicultural interventions to be

***TEEB (2010):** The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB.

developed to restore the area and also reduce erosion by moisture conservation, by growing fire hardy species, reducing fuel load by thinning operations.

H. Community based Forest Fire management

Community based forest fire management approaches can play a significant role in fire management, especially in most parts of the world where human-based ignitions are the primary source of wildfires that affect livelihood, health and security of people. They include planning and supervision of activities, joint action for prescribed fire and fire monitoring and response, applying sanctions, and providing support to individuals to enhance their fire management tasks. Community based Fire management will include activities such as: early warning, detection, mobilization and suppression of unwanted fires; in addition also restoration and rehabilitation of burned areas.

III. Activities to be undertaken by DFE, Dehradun

As per the role defined by MoEF&CC in National Action Plan on Forest Fires para 7.1 (i) A modern and standardized training curriculum should be developed by the SFDs with the guidance of Directorate of Forest Education (DFE). DFE will facilitate the following capacity building activities to disseminate the knowledge available with the Centre to different stakeholders: -

A. Training of trainers (ToTs) and capacity building of forestry personnel, JFMCs, EDCs and other stakeholders (Training in fire suppression, prevention, detection, and post-fire reporting for field staff)

A number of Training of Trainers (ToTs) and training workshops will be organised in consultation with the State Forest Department on various themes related to forest fire for different target groups. The trainings programs will be attended by trainers/mentors/faculty members representing State Forest Training Institutes (SFTIs), NDRF, NIDM, University scientists/ academicians and School Teachers. The Centre will also provide financial support for conducting training programs by the partner organizations besides SFTIs in states. The Centre will develop training modules which will be provided to the participants.

Thrust Areas for Forest Fire Research: -

An indicative list of thrust areas for forest fire Research are as given below: -

1. **Real time Detection and monitoring of Forest Fire**
2. **Early warning system**
3. **Forest Fire vulnerability and Climate Change**
4. **Economic and Ecological impact of Forest Fire**
5. **Forest fire and biodiversity**
6. **Forest fire and weed**
7. **Forest fire and livelihood**
8. **Post-fire restoration and rehabilitation**
9. **Training and capacity building**

Apart from the above suggested thrust areas, the Advisory board may recommend any other issue for forest fire Research arising in future.

Key Institutions for the Collaboration: -

The Centre will closely work with Forest Survey of India, Dehradun as it is the nodal Institute on Forest Fire monitoring and collection, compilation, storage and dissemination of spatial database on forest firein the country. It also intends to work closely with other subordinate organizations of MoEF&CC, such as, Directorate of Forestry Education, Dehradun and Wildlife Institute of India.

The Centre will also utilize the expertise of national and international Institutes/ Organizations/ Universitiesmentioned in **Annexure-I & II**, which will be associated with the Centre in the form of experts/Working Groups. The members of the Group will act as individual collaborating partners of the Centre and will provide technical guidance.

In addition to the above, the Centre will also work in unison with State Governments, State Forest Departments and their research wings, NGOs/Civil Societies Organizations, Practitioners, Experts, etc. to understand the different perspectives in having different fire management prescriptions in different forest types.

Modalities of Working and Source of Funding

The Centre will take up research studies/ invite project proposals in the identified thrust areas. Depending on the thrust area of research, the Centre will identify experts

having adequate experience and expertise in dealing with the research issues and preparation of project document, execution of research work and finalization of report. Outside domain experts/consultants will be engaged as per the standard procedures/guidelines of GOI for the engagement of consultants.The data/ information generated by the Centre will be shared with stakeholders & others, on request, for general purpose.

The research studies will be taken up in project mode primarily depending upon the requirement of the stakeholders/ ministries/departments/organizations. In this regard, the Centre will require basic permanent setup of research labs and other technical infrastructure for which an initial amount will be required. The studies will be undertaken from the funds received under Grant-in-aid from MoEF&CC or through other funding agencies.

ANNEXURE-I

PROPOSED LIST OF NATIONAL INSTITUTES/ UNIVERSITIES FOR COLLABORATION WITH CENTRE OF EXCELLENCE ON FOREST FIRE

S. N.	Name & Address	Email
1.	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Tal. Dapoli, Dist. Ratnagiri Maharashtra- 415712	**vcdbskkv-mh@gov.in**
2.	Kerala Agricultural University KAU Main Campus P.O., Vellanikkara, Thrissur, Kerala - 680656	**vc@kau.in**
3.	Dr. Panjabrao Deshmukh Krishi Vidyapeeth P.O. Krishi Nagar Akola- 444104 Maharashtra	**vc@pdkv.ac.in**
4.	Tamil Nadu Agricultural University, Lawley Road, Coimbatore- 641003	**tpo@tnau.ac.in**
5.	University of Agricultural Sciences, Dharwad Dharwad- 580005 Karnataka	**vc_uasd@rediffmail.com**
6.	Dr. Y. S. Parmar University of Horticulture & Forestry, Nauni, Solan- 173230, Himachal Pradesh	**vcuhf@yspuniversity.ac.in**
7.	H.N.B. Garhwal University Srinagar – 246174 Dist. Garhwal (Uttarakhand)	**hnbguvc@gmail.com**
8.	University of Petroleum and Energy Studies (UPES) Energy Acres, UPES, Bidholi, via, Prem Nagar, Dehradun, Uttarakhand 248007	**chancellor@upes.ac.in**
9.	North Eastern Regional Institute of Science and Technology (NERIST) Nirjuli, Itanagar- 791109 Arunachal Pradesh	director@nerist.ac.in
10.	G.B. Pant National Institute of Himalayan Environment Kosi-Katarmal, Almora- 263643, Uttarakhand	psdir@gbpihed.nic.in
11.	Indian Institute of Science CV Raman Road, Bengaluru, Karnataka 560012	office.director@iisc.ac.in
12.	India Meteorological Department, MausamBhawan, Lodhi Road New Delhi - 110003	m.mohapatra@imd.gov.in
13.	Indian Space Research Organisation Antariksh Bhavan, New BEL Road Bengaluru - 560231	chairman@isro.gov.in
14.	National Institute of Hydrology Roorkee - 247667 Uttarakhand	tyagi.nihr@gov.in
15.	Wildlife Institute of India, Post Box # 18, Chandrabani Dehradun - 248001 Uttarakhand	dwii@wii.gov.in
16.	Centre for Fire, Explosive & Environment Safety (CFEES) DRDO Ministry of Defence Brig. S.K. Mazumdar Marg, Timarpur, Delhi-110054	director@cfees.drdo.in

S. N.	Name & Address	Email
17.	The Institute of Indian Foundrymen 67, Tughlakabad Institutional Area, New Delhi - 110 062	fic@indianfoundry.org
18.	National Institute of Foundry and Forge Technology (NIFFT), Near Kanchnatoli, Hatia, Ranchi (Jharkhand), Pin No - 834 003	director.nifft@gov.in
19.	Indian Institute of Forest Management PO Box 357, Nehru Nagar Bhopal- 462003, Madhya Pradesh	director@iifm.ac.in
20.	Indian Institute of Metals (IIM) "Metal House" Plot 13/4,Block AQ,Sector V, Salt Lake, Kolkata-700091	secretarygeneral.iim@gmail.com
21.	Indian Institute of Technology Roorkee Roorkee, Uttarakhand India - 247667	director@iitr.ac.in
22.	Indian Academy of fire and safety (IAFS) 2nd floor sheo mansion Next SBI bank, opp. Jatra hotel, Sagar Village, Nashik, Maharashtra 422003	info@iafsindia.com
23.	MSME Tool Room (Indo-Danish Tool Room) Ministry of MSME, Govt. of India Society M-4 (Part), Phase VI Tata Kandra Road, Gamharia Jamshedpur 832 108	reach@idtr.gov.in
24.	National Academy of Fire and Safety Engineering (NAFS) NAFS House, P. N. 101, Near Sakkardara Flyover, Reshimbagh Layout, Reshimbagh, Nagpur- 440024 (MH)	info@nafsindia.com
25.	National Disaster Management Authority NDMA Bhawan, A-1, Safdarjung Enclave New Delhi - 110029	secretary@ndma.gov.in
26.	National Institute of Disaster Management, (Ministry of Home Affairs, Government of India), A-wing, 4th floor, NDCC-II Building, Jai Singh Road, New Delhi - 110001	**Already in MoU with FRI**
27.	National Institute of Fire & Safety Engineering (NIFSE) Mecosabagh Methodist Church, Kadbichowk, Mecosabagh, Nagpur-440004	nifsengp@gmail.com

ANNEXURE-II

PROPOSED LIST OF INTERNATIONAL INSTITUTES/ UNIVERSITIES FOR COLLABORATION WITH CENTRE OF EXCELLENCE ON FOREST FIRE

S. N.	Name & Address/ Email
1.	**University of British Columbia (UBC)** 2424 Main Mall, Vancouver, BC, V6T 1Z4 Canada Tel: +1 604-822-2807 Fax: +1 604-822-8645 Email: jorma.neuvonen@ubc.ca
2.	**Swedish University of Agricultural Sciences (SLU)** Phone: +46 222 34953, mobile: +46 70 373 43 40 Email: esbjorn.andersson@slu.se
3.	**University of Montana** Office of the President University Hall 109 Missoula, Montana 59812 Phone: (406) 243-2311 Fax: (406) 243-2797 Email:thepresident@umontana.edu
4.	**Korea Forest Service** GOVERNMENT COMPLEX-DAEJEON BLDG. 1, 189 CHEONGSA-RO, SEO-GU, DAEJEON, REPUBLIC OF KOREA Email: globalkfs@korea.kr TEL +82-42-481-4080
5.	**Global fire Monitoring Centre (GFMC)** Fire Ecology Research Group Max Planck Institute for Chemistry and Freiburg University Georges-Köhler-Allee 75 79110 Freiburg Tel: +49-761-808011, Fax: +49-761-808012 Email: fire@fire.uni-freiburg.de
6.	**Fire Centre** Fire Centre Research Hub, The University of Tasmania, Private Bag 55 Hobart TAS 7001, Australia, Email: contact@firecentre.org.au
7.	**United State Forest Service (USFS)** 1 Thomas Circle, NW Suite 400, Washington D.C., 20005, U.S.A. Tel: 1-202-644-4600, Fax:1-202-644-4603 Email: val.mezainis@usda.gov
8.	**Canadian Forest Service** 580 Booth Street Ottawa, Ontario, K1A 0E4 Tel.: (343) 292-8555 beth.macneil2@canada.ca

9.	**The Center for Fire Research and Outreach at Berkeley Forests** 2200 Bancroft Way Berkeley, CA 94720-4204 University of California, Berkeley Email: sstephens@berkeley.edu Tel :(510) 642-7304
10.	**Stanford University** 450 Jane Stanford Way, Building 10 Stanford University Stanford, CA 94305 **Phone:** (650) 723-2481 **Fax:** (650) 725-6847 **Email:** president@stanford.edu

ACTION PLAN for Establishment of CoEFF

To undertake research, capacity building activities, development of national guidelines for forest fire management, development of the national level awareness campaign on forest fires, a team of scientific and management personnel need to be engaged at the proposed Centre. The overall activities of the Centre will be supervised by the team leader and Director of the Centre (Director, FRI, Dehradun).The Director will be supported by the Coordinator (Head, Silviculture Division) who in turn will be supported by a Scientist (Consultant) - Forest Fire Ecology and management on a full time basis. For the smooth conduct of the activities the proposed Centre will be supported by one Office Manager (Administrative and Finance) and two MTS personnel.

Proposed budget for centre of excellence on Forest Fire (FRI component) (Rupees in Lakhs)

	Type of Expenses	FY 2021-22		FY 2022-23		FY 2023-24		FY 2024-25		Timeline
		Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	
Establishment Cost of Centre (Basic Infrastructure)										
Scientist/ Forest Officer (Serving/ Retired) @90,000 per month	R	1	0	1	0	1	0	1	0	The total amount of **Rs. 86.4 lakhs** towards salary of Scientist/ Forest Officer/ Office Manager/ MTS will be met from FRI on completion of recruitment & posting of adequate regular manpower at FRI.
Office manager (Administrative and Finance) @40,000 per month (Consolidated)	R	1	0	1	0	1	0	1	0	
MTS @25,000 per month (Consolidated)	R	2	0	2	0	2	0	2	0	
Basic Infrastructure (Renovation, Furnishing, Office set-up) at FRI campus	NR	LS	40	LS	5	LS	5	LS	3	
Vehicle	NR	1	18	0	0	0	0	0	0	
Vehicle maintainance	R	0	0	LS	1	LS	1	LS	1.5	
Miscellaneous expenditure	NR	LS	4	LS	2	LS	2	LS	2	
Sub-Total			**62**		**8**		**8**		**6.5**	**84.5**
A. Development of National Web Portal for Database Management and Knowledge Dissemination										
Database Manager @50,000+HRA per month	R	1	6.96	1	6.96	1	6.96	1	6.96	1. Three months for development of website homepage. 2. Annual updation with database generation. 3. Maintainance will be continuous.
Maintanence Cost	R	LS	2	LS	1	LS	1	LS	1	
Web Portal Development	NR	LS	3	LS	0	LS	0	LS	0	
Purchase of Server for Database	NR	LS	8	LS	1	LS	1	LS	1	
Infrastructure Development	NR	LS	5	LS	0.5	LS	0.5	LS	0.5	
Sub-Total			**24.96**		**9.46**		**9.46**		**9.46**	**53.34**
B. Development of national forest fire knowledge network										
Project Scientist @78,000+HRA per month	R	1	10.86	1	10.86	1	10.86	1	10.86	5 years to cover the entire country based on the availabilty of Forest Fire knowledge with the states/ national and international sources like Universities/ Institutes/ NGOs
JRF @35000+ HRA per month	R	1	4.87	1	4.87	1	4.87	1	4.87	
International Collaboration/ Travel	R	LS	15	LS	20	LS	20	LS	20	
Travel Cost (within country)	R	LS	5	LS	5	LS	5	LS	5	
Webinar/ Training/ Meeting	R	2	10	2	10	2	10	2	10	
Special Project Grant	NR	LS	10	LS	10	LS	10	LS	10	
Sub-Total			**55.73**		**60.73**		**60.73**		**60.73**	**237.92**
C. Development of Standard Operating Procedures (SOPs)										
Brainstorming meeting/ consultation/ workshop	R	0	0	2	12	2	12	2	12	5 Years to develop SOPs covering the entire landscape in the country
Field visits	R	LS	10	LS	10	LS	7.5	LS	7.5	
Publication Cost	R	LS	5	LS	5	LS	5	LS	5	
Sub-Total			**15**		**27**		**24.5**		**24.5**	**91**
D. Study on impact of future Climate change scenario on Forest Fire vulnerability										
Project Scientist @78,000+HRA per month	R	1	10.86	1	10.86	1	10.86	1	10.86	This will be done on annual project basis for fire vulnerable landscapes on pilot basis
JRF @35000+ HRA per month	R	1	4.87	1	4.87	1	4.87	1	4.87	
Publication Cost	R	LS	5	LS	5	LS	5	LS	5	
Field Visits	R	LS	10	LS	10	LS	10	LS	10	
Hardware Cost (Workstation, IT equipment)	NR	LS	20	LS	15	LS	10	LS	5	
Software Cost (GIS software)	NR	LS	15	LS	5	LS	2	LS	1	
Sub-Total			**65.73**		**50.73**		**42.73**		**36.73**	**195.92**

Proposed budget for centre of excellence on Forest Fire (FRI component) (Rupees in Lakhs)										
	Type of Expenses	FY 2021-22		FY 2022-23		FY 2023-24		FY 2024-25		Timeline
		Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	
E. Strengthening of SFDs by Fire suppression tools and techniques										
This activity is being undertaken through AICRP-14 Forest Fire Research and Knowledge Management (2020-25)										
F. Assessment of damage and economic losses due to forest fire										
This activity is being undertaken through AICRP-14 Forest Fire Research and Knowledge Management (2020-25) on pilot basis in 5 forest types and 15 states for 8 parameters only (Timber, Fuelwood, Fodder, NTFP, Biodiversity (floral), Carbon storage. carbon sequestration, soil nutrients)										
G. Post fire restoration and rehabilitation strategy in fire affected areas										
Project Scientist @78,000+HRA per month	R	1	10.86	1	10.86	1	10.86	1	10.86	This will be done on annual project basis in fire affected landscapes on pilot basis
RA @50,000 + HRA per month		1	6.96	1	6.96	1	6.96	1	6.96	
JRF @35000+ HRA per month		1	4.87	1	4.87	1	4.87	1	4.87	
Field Assistant @20.000 per month		2	4.8	2	4.8	2	4.8	2	4.8	
FRE		LS	10	LS	10	LS	10	LS	10	
TRAVEL		LS	15	LS	15	LS	15	LS	15	
Sub-Total			52.49		52.49		52.49		52.49	**209.96**
Total FRI Component			**275.91**		**208.41**		**197.91**		**190.41**	**872.64**
	R		**152.91**		**169.91**		**167.41**		**167.91**	
	NR		**123**		**38.5**		**30.5**		**22.5**	
		FY 2021-22		**FY 2022-23**		**FY 2023-24**		**FY 2024-25**		
FY TOTAL		**275.91**		**208.41**		**197.91**		**190.41**		
Total (A)		**872.64**								
Proposed budget for centre of excellence on Forest Fire DEF component) (Rupees in Lakhs)										
H. CAPACITY BUILDING AND TRAINING										
Training to frontline staff	**R**	10	20	10	20	10	20	10	20	
Training to ACF/ RFOs	**R**	3	6.15	3	6.15	3	6.15	3	6.15	
Sub-Total			**26.15**		**26.15**		**26.15**		**26.15**	
Total (B)		**104.6**								
Proposed budget for centre of excellence on Forest Fire (FSI component) (Rupees in Lakhs)										
	Type of Expenses	**FY 2021-2022**		**FY 2022-2023**		**FY 2023-2024**		**FY 2024-2025**		**Remarks**
		Quantity	**Amount**	**Quantity**	**Amount**	**Quantity**	**Amount**	**Quantity**	**Amount**	
Manpower										
Project Scientist @ Rs 78,000+HRA per month	**R**	2	21.72	2	21.72	2	21.72	2	21.72	Technical Manpower will be engaged as per DST guideline approved for FSI
Sr. Project Associate/RA @ Rs 50,000+HRA per month	**R**	3	20.88	3	20.88	3	20.88	3	20.88	
TA/STA @ Rs 35,000+HRA per month	**R**	5	24.36	5	24.36	5	24.36	5	24.36	
Infrastructure										
Construction of Forest Fire Monitoring RS/GIS Lab	**NR**	LS	150	-	-	-	-	-	-	Setting up of lab for forest fire studies
Maintenance of Lab	**R**	-	-	LS	20	LS	20	LS	20	Maintenance of Lab
Procurement of Hardware, Software, other equipments, etc.	**NR**	LS	100	-	-	-	-	-	-	Procurement of high end workstations, softwares,servers and AMC, etc.
Maintenance of Hardware, Software and other equipments	**R**	-	-	LS	10	LS	10	LS	10	AMC of Hardware, Software and other equipments
Novel Studies Procurement of Drones, applications software etc	**NR**	2	35	-	-	-	-	-	-	Procurement of Drone, Software, etc.
Maintenance of Drone, software etc	**R**	-	-	LS	5	LS	5	LS	5	AMC of Drone, software etc
Data Acquisition	**R**	LS	30	LS	25	LS	25	LS	25	Satellite data procurment from NRSC
Special Studies on Forest Fire (lumpsum)	**NR**	LS	15	LS	15	LS	15	LS	15	Special studies on different aspects of forest fire will be undertaken in collaboration with academic institutions/ research organization such as IIT
Procurement of Vehicle (@ 9 lakh) and maintenance	**NR**	2	18	-	-	-	-	-	-	Procurement of vehicle for field work including ground truthing
Maintenance of Vehicle	**R**	-	-	LS	5	LS	5	LS	5	Maintenance of Vehicle

Proposed budget for centre of excellence on Forest Fire (FRI component) (Rupees in Lakhs)										
	Type of Expenses	FY 2021-22		FY 2022-23		FY 2023-24		FY 2024-25		Timeline
		Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	
Miscellaneous (Travel, Ground Truthing, Report Printing, Consultancy fee, honorarium etc.)	**R**	LS	17	LS	15	LS	15	LS	15	
Contigency Charges (10%)	**R**		43.196		16.196		16.196		16.196	
Sub-Total	**R**		**157.156**		**163.156**		**163.156**		**163.156**	
	NR		**318**		**15**		**15**		**15**	
FY TOTAL			**475.156**		**178.156**		**178.156**		**178.156**	
Total (C)	**1009.624**									
Forest Fire Risk Zonation mapping										
Manpower										
Technical Associate @ 31000+HRA per month	**R**	8	34.52	8	34.52					Technical Manpower will be engaged as per DST guideline approved for FSI
Procurement of Hardware and Software										
Procurement of one server and seven Workstation & Maintenance	**NR**	LS	32	LS	2	LS	2			Procurement of high end workstations, remote sensing & GIS Softwares, Satellite and meteorological data & AMC, etc.
Procurement of eight digital image processing/GIS Software licenses & maintenance		LS	80	LS	2	LS	2			
Procurement of satellite data, Meteorological data		LS	5	LS	10	LS	2			
Mobile application development		LS	8	-						
Miscellaneous										
Ground truthing, report printing, honorarium,expert consultation, travel etc.	**R**	LS	0.5	LS	4	LS	4			
Contingencies charges (10%)	R		**16**		**5.25**		**1**			
Sub-Total	**R**		**51.02**		**43.77**		**5**			
	NR		**125**		**14**		**6**			
FY TOTAL			**176.02**		**57.77**		**11**			
Total (D)	**244.79**									**TOTAL**
Grand Total (A+B+C+D)	**R**		**387.236**		**402.986**		**361.716**		**357.216**	**1509.154**
	NR		**566**		**67.5**		**51.5**		**37.5**	**722.5**
	TOTAL		**953.24**		**470.49**		**413.22**		**394.72**	**2231.654**

R= RECURRING, NR= NON RECURRING, LS= LUMPSUM

Abstract of Action Plan						
S. N.	Activity	Financial Requirement (Rs. In Lakhs)				Total
	FOREST RESEARCH INSTITUTE	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	
1	Establishment Cost of Centre (Basic Infrastructure)	62	8	8	6.5	**84.5**
2	A. Development of National Web Portal for Database Management and Knowledge Dissemination	24.96	9.46	9.46	9.46	**53.34**
3	B. Development of national forest fire knowledge network	55.73	60.73	60.73	60.73	**237.92**
4	C. Development of Standard Operating Procedures (SOPs)	15	27	24.5	24.5	**91**
5	D. Study on impact of future Climate change scenario on Forest Fire vulnerability	65.73	50.73	42.73	36.73	**195.92**
6	E. Strengthening of SFDs and communities by Fire suppression tools and techniques	This activity is being undertaken through AICRP-14 Forest Fire Research and Knowledge Management (2020-25)				
7	F. Assessment of damage and economic losses due to forest fire	This activity is being undertaken through AICRP-14 Forest Fire Research and Knowledge Management (2020-25) on pilot basis in 5 forest types and 15 states for 8 parameters only (Timber, Fuelwood, Fodder, NTFP, Biodiversity (floral), Carbon storage. carbon sequestration, soil nutrients)				
8	G. Post fire restoration and rehabilitation strategy in fire affected areas	52.49	52.49	52.49	52.49	**209.96**
9	H. Community based Forest Fire management	NIL	NIL	NIL	NIL	
	TOTAL (FRI COMPONENT)	**275.91**	**208.41**	**197.91**	**190.41**	**872.64**

S. N.	Activity	Financial Requirement (Rs. In Lakhs)				Total
	DIRECTORATE OF FORESTRY EDUCATION	**FY 2021-22**	**FY 2022-23**	**FY 2023-24**	**FY 2024-25**	
10	A. Training of trainers (ToTs) and capacity building of forestry personnel, JFMCs, EDCs and other stakeholders (Training in fire suppression, prevention, detection, and post-fire reporting for field staff)	26.15	26.15	26.15	26.15	**104.6**
	TOTAL (DFE COMPONENT)	**26.15**	**26.15**	**26.15**	**26.15**	**104.6**
	FOREST SURVEY OF INDIA					
11	Establishment of lab	150	20	20	20	**210**
12	Procurement of hardware, software and other equipment	100	10	10	10	**130**
13	Novel studies, data acquisition and special studies	80	45	45	45	**215**
14	Procurement and maintenance of vehicle, HR support	84.96	71.96	71.96	71.96	**300.84**
15	Travel, GT, Report printing and contingency charges	60.196	31.196	31.196	31.196	**153.784**
	Sub-Total	**475.156**	**178.156**	**178.156**	**178.156**	**1009.624**
16	Forest Fire Risk Zonation Mapping	176.02	57.77	11	NIL	**244.79**
	TOTAL (FSI COMPONENT)	**651.176**	**235.926**	**189.156**	**178.156**	**1254.414**
	GRAND TOTAL (FRI, DFE, FSI)	***953.236***	***470.486***	***413.216***	***394.716***	***2231.654***

Annexure B

Forest for Food Security and Nutrition

A Project Proposal

Submitted to Ministry of Environment Forests & Climate Change

A Project Proposal to MoEFCC, Govt. of India

Forest for Food Security and Nutrition

Prepared By:

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Acronyms & Abbreviations

ACF	Assistant Conservator of Forest
APO	Annual Plan of Operation
AWPB	Annual Work Plan and Budget
BPL	Below Poverty Line
CAMPA	Compensatory Afforestation Managaement and Planning Auth
CBO	Community-based Organization
CCD	Conservation-cum-Development Plan
CIG	Common Interest Group
DFO	Divisional Forest Officer
DMU	Divisional management Unit
DRDA	District Rural Development Agency
EC	Executive Committee
FFS	Farmers Field School
FFSN	Forest for Food and Nutrition security
FRA	Forests Rights Act
GoI	Government of India
GoJ	Government of Jharkhand
GoM	Government of MP
GoO	Government of Odisha
GP	Gram Panchayat
ICDS	Integrated child development scheme
IGA	Income generating activity
INR	Indian Rupee
ITDA	Integrated tribal development agency
JFMC	Joint Forest Management Committee
LB Check Dam	Loose boulder check dam
M&E	Monitoring & Evaluation
MIS	Management Information System
NGO	Non-Governmental Organization
NHM	National Horticulture Mission
NRHM	National Rural Health Mission
NRLM	National Rural Livelihoods Mission
NTFP	Non-Timber Forest Produce
OMBADC	Odisha mineral bearing area development corporation
ORMAS	Orissa Rural Marketing Society
PCCF &HOFF	Principal CCF and Head of Forest
PMC	Project Mnagement Committee
PoA	Plan of Activity
PRA	Participatory Rural Appraisal
PRI	Panchayati Raj Institutions such as Palli Sabha, Gram Sabha
PVTG	Particularly Vulnerable Tribal Groups
QPM	Qulaity planting material
RCC check Dar	Reinforced cement concrete
RMS	Rural Marketing society
SC	Scheduled Castes
SFD	State Forest Department
SFDA	State Forest Development Agency
SHG	Self Help Group
SMC	Soil and moisture conservation measure
SOE	Statement of Expenditure
ST	Scheduled Tribes
TC	Tissue culture
TDCC	Tribal Development Coperative Corporation
TRIFED	Tribal Marketing Federation of India
TRIFED	Tribal coperative marketing federation
VSS	Vana Saramkhyan Samiti

A. Executive Summary

Background: The proposed new project titled Forest for Food Security and Nutrition (FFSN) is formulated under Ministry of Environment of Forests, Govt. of India programmes to build on the experiences of scientific management of forests ecosystem for developing thirty three percent of forest cover while meeting the National commitment on climate change adaptation. Government of India's policy of afforesting non forest lands in lieu of forests diverted for developmental purposes has led to creation of the State and National Campa Fund and has augmented efforts and resources in conserving forests in India. With notification of CAMPA Act, 2016 and CAMAPA Rules, 2018, the process of revitalizing natural capitals has received new impetus. It has paved the way for managing forests for environmental and social goods.

MoEFCC in utilizing resources from National CAMPA Fund plans for innovative approach to support food security of forest dependent community by adapting forest improvement practices under the project. It aims to implement forest habitat improvement programs and ancillary activities in 3 states of India on a pilot scale with a target of scaling up in the long run. The FFSN project has received committed support from WFP and assurances from Ministry of Agriculture, Ministry of Tribal Development, Govt. of India for partnership and convergence of best practices towards addressing hunger and poverty.

Poverty and Foestrty Context: Rural poverty in India has a distinct regional and occupational characteristic; the Scheduled Tribes (STs) are among the poorest, followed by the Scheduled Castes (SCs). Among the STs, the PTGs are the poorest and most vulnerable. Occupationally, marginal and small farmers and artisans, and forest-dwellers are the poorest. Due to the burgeoning population, both agriculture and forest resources are strained. Urbanization, changing land-use pattern, climate change, air and water pollution make the situation more complex. Forests in India sustain the livelihood of more than 300 million people, many of whom are landless. India's forest cover is way below the target of 33%, which means that not only the existing forest have to be conserved but more area needs to be brought under tree cover. Because, trees and forests can address the above challenges of food security, nutrition, economic opportunities, and ecosystem services. Trees can provide timber, non-timber products besides being the most effective in removing carbon dioxide, tackling climate crisis, and building disaster risk resilience.

Rationale: The programs and practices in Forestry sector has so far, focused on biodiversity conservation or managing the forest lands for goods such as timber and fuelwood. Recognition of ecosystem services such as clean air, water, soil, food and nutrition from forests has been gaining ground and payment models have been well demonstrated even for intangible ecological benefits. A reorientation of forest management principle and investment priorities, if not a paradigm shift in India has been therefore voiced from many quarters. Valuation of forests for its contribution to India"s GDP could be well supported by making forests accessible and veritable resource of food and nutrition for forest dependent population. The rich forest diversity of India warrants verifiable models and field

testing of new pathways to meet conservation and development need where people share ownership and responsibility to manage common goods.

Approach: FFSN has been designed to follow the successful bottom-up planning approach of Joint Forest Management. Success in FFSN would be attributed to the fact that the implementation process was planned and followed by forest management communities who were empowered to make the resources a sustainable community asset. Putting community institutions (such as SHGs and VSSs) in the driving seat targets that the investment is made in a transparent, need based, and participatory way for transformational change. The programme adopts an integrated approach, involving support for improved access to natural resources, agricultural technologies, markets, productive and social infrastructure, and essential social services. Given the project objective, the design proposes to pilot an approach of mainstreaming "food and nutrition sensitive" forest and allied activities across all the proposed project components.

Programme Area and Target Groups**:** FFSN interventions will be carried out in three districts of Odisha, M.P and Jharkhand to be implemented by3 Forest Developed Agency (Forest Divisions) of the respective states, i.e., *Keonjhar, East Chindwara, Porahat*. The project will make intervention in about 50-60 villages which are inhabited by primitive and vulnerable tribal groups, namely Munda, Ho, Juang, Bhuinya, Bhil, and Gonds. Overall, the program will treat 6000 ha. of high forests in the dry deciduous forest zone and would benefit approx. 600 households directly and about 2500 households indirectly.

Ownership and Alignment: The State Forest Departments of MP, Odisha, Jharkhand are actively involved with MoEFCC and WFP in the formulation and appraisal of FFSN. The proposed project is built on the past success of state CAMPA and forestry programs as well as the lessons learned from other externally funded forestry Projects in India. FFSN is aligned with the Green India Mission strategy and compatible and supportive of other Government initiatives. It is also in line with strategies and policies for development of tribal and vulnerable communities of the Governments of India. The programme goal and objective are in alignment with the SDG objective of climate resilient and participatory conservation way for addressing food need and hunger.

Programme Goal and Objectives**:** The overall goal of FFSN is to achieve 'Improved food and nutrition security, climate resilience through enhanced forest resources" of the target group households. This is sought to be achieved through realizing the development objective of enabling improved livelihoods and food and nutrition security primarily for tribal households and other poor households. This in turn will be achieved via enhancing stock enrichment, building the capacity of the target households, securing them their entitlements over forest, improving their agro-forestry practices, promoting income-generating (forest food plant) micro-enterprises for alternate livelihoods and ensuring access to other services and improving community institution.

Components and Sub-components**:** FFSN Project will have 4 major components (i) Community Empowerment and improved access to social protection (ii) Forest Management for Ecosystem Services (iii) Tree based Livelihood Enhancement (iv) On- farm, off farm Livelihood support.

Component 1: Community Empowerment**:** This component will have two sub-components: (i) promotion of Vana Samrakhyan Samiti (VSS), SHGs for the planning and execution of forest-based

activities of the community, community-based food, health, hygiene and nutrition services; and (ii) Mapping and profiling of Forest Food plants measuring its contribution in socio-economic life of tribal.

Component 2: NRM and Livelihoods Enhancement**:** This component will have three sub-components: (i) Increasing Food source through forest stock enrichment, (ii) Improving productivity through habitat nurturing, (iii) Enhanced water and moisture retention. This component will also have facilities for vocational training for the PTG youth and promoting PTG culture and values.

Component 3: Tree based Food security**:** The support under this component will promote (i) Fruit, and other forest food tree planting on village commons, fallow land, and farm lands by engaging community and individual farmers on Agri-Horti, Mixed Block plant modules, (ii) Homestead fruit garden for nutritional diversity

Component 4: Livelihood enhancement through Food products and forest food Value addition**:** Three way livelihood promotion will be adopted by (i) improving agricultural practices, (ii) Forest Food and NTFP based production and processing units, (iii) technical and financial services for non-farm household IGAs. Interventions under this component will include inter alia: building critical infrastructure, storage structures along with drying yards, threshing floors, provision of weighing scales, household storage bins for promoting value-addition and fair trade in villages, small market yards and aggregation centres, facilities for food and NTFP processing units.

Lessons Learned from State CAMPA programmes: Key lessons from the on-going CAMPA programs, and Forest plus projects (ESIP- MP; OFSDP- Odisha; TDP- Bihar) include the following: (i) Forest health and diversity can be improved by range of plantation activities intensive cultural operation coupled with soil and moisture conservation on degraded sites, (ii) community protection of forest needs incentivization to sustain; (iii) fruit trees planting can meet food requirement of tribal and wild life as well (iv) Forest department resources can be effectively converged with other resources to have a multiplying effect and increased impacts; (v) there is a need for a quality planting material to ensure better survival and growth; (vi) smooth flow of funds is essential for effective implementation; and (vii) a dedicated project management unit with continuity of leadership contributes to success. These lessons have been incorporated in the FFSN programme design.

Programme costs and financing**:** Estimated total Programme costs for the three and half-year programme is INR 455.50 million. This is inclusive of all contribution of INR 37 million as convergence funding from the Ministry of Agriculture, and Ministry of Tribal Affairs, GoI. WFP has agreed to commit financial resources to the tune of INR 15 million and provide technical support during implementation.

Benefits and beneficiaries: A total of 3000 households (comprising mostly PTGs) would directly benefit from the programme. The programme investments yield an overall positive Internal Rate of Return with an anticipated net wood value of INR 2400 million over 20 yr rotation and a benefit cost ratio of 2.4:1. The programme remains viable if costs increased and/or benefits decreased by 15%. Farm model analysis shows perceptible increase in food production per household and net incomes increasing over the existing levels.

Organisation and Management**:** The Ministry of Environment and Forests (MoEFCC) at the National level is the nodal agency and the SFDA (State Forest Development Agency) at the state level becomes the Lead Programme Agency responsible for the functions relating to planning, funds flow, monitoring and evaluation, gender mainstreaming and knowledge management through the FDA (DMU) as described above. A programme steering committee under the DG, Forests will provide overall policy guidance to FFSN. WFP, India will assist in designing PIG (Program Implementation Guidelines) and Activity Modules, process and technical oversight to the program implementation.

Planning**:** The Programme will follow the community centric planning process undertaken by the respective FDAs (DMU) but with specific modifications to reflect the objectives and purposes of FFSN. A draft Annual Work Plan and Budget will be drawn up by the DMU by consolidating all micro-plans in consultation with the respective FMUs and Animators.

Monitoring and Evaluation: The M&E system will aim at measuring progress and performance, and be a learning tool to critically reflect on programme strategies and operations. WFP will design and facilitate adoption of an M&E system which will support progress monitoring by programme field implementation units and partner community groups. Mapping and base line survey, Impact evaluation will be taken up by WFP under the project cost.

Learning and Knowledge Management: Information generated by the programme will be disseminated through SFD websites, newsletters, and thematic reports and at learning events. The programme will develop a Knowledge Management strategy and appropriate action plans. This will include internal learning through regular progress review meetings and the generation of knowledge products, such as newsletters (in local languages), briefs, training materials, technical manuals, booklets, posters, videos, etc.

Risks: There are a few risks associated with the programme. The goal level risk is reduced by government's commitment in continuing the tribal development programmes and enhancing investments. The development objective level risks are addressed by promoting and supporting local governments and community institutions to build a coalition in favour of stability and economic growth. The risk of the complex challenging institutional setting involving 50-60 villages will be reduced by additional, qualified staffing and staff incentives. Other risk mitigation measures include: (i) promotion of interventions that are acceptable for the tribals; (ii) enhancing communication links for better access to markets and services; and (iii) ensuring community participation in programme planning and implementation to ensure community support for the project, and insulation from the left-wing insurgency in Jharkhand.

B. Project Rationale & Goal

B.1 Country and rural development context

1. India has a population of over 1.2 billion, composed of several ethnic groups, in more than 5,400 castes and tribes and follow five major religions. India has an area of 3.28 million km^2 covering 20 different agro-ecological zones. Poverty remains a major issue, with 42% of the population living on less than USD1.25 per day. In 2014, the Human Development Index of the United Nations Development Programme (UNDP)[1] ranked India 131st out of 189 UN member states(2020). India's economy is the tenth-largest in the world by nominal GDP and the third-largest by its purchasing power parity (PPP). After decades of limited growth, during the last 10 years its economic growth has taken off, with an average GDP growth of 9% from 2002/03 to 2007/08, mainly led by the service sector. Growth has slowed in recent years, and dropped to 5% for 2013-18. Inflation is a major economic challenge for the country, and has a bearing on rural poverty and growth in the rural sector.

2. Distribution of the benefits of growth to poor rural people has been limited by inadequate physical and social infrastructure; poor access to services; low investment; a highly stratified and hierarchical social structure, characterized by inequalities in assets, status and power; and ineffective, inefficient implementation of pro-poor programmes, owing to governance failures. There is now a genuine and widespread recognition that, without inclusive growth, the social and political consequences of rising inequalities could be very adverse.

3. About 69% of India's population live in rural areas, with over half employed in the agriculture sector which contributes 16% of GDP. Although production of food grains reached a total of 303 million tons [2] in 2020-21, growth in output is falling behind the 1.4% growth in population. India has 33 per cent of the world's poor, as poverty has not fallen at the pace of economic growth. Nutritional levels are unacceptably low, with 42.5% of children underweight for age, being one of the highest rates globally. Malnutrition is linked to half of the child deaths and a quarter of cases of diseases. On the Global Hunger Index of the IFPRI [3], India is ranked 63rd out of 78 countries studied. With a score of 21.3, India remains in the orange category tagged 'alarming' level of hunger. Prevailing social inequality and the low nutritional, educational, and social status of women are considered as key factors contributing to high prevalence of malnutrition in children below the age of five.

4. Agricultural wage earners, smallholder farmers and casual workers in the non-farm sector constitute the bulk of poor rural people. Within these categories, women and tribal communities are the most deprived. In terms of gender deficit, India is ranked 112 among 153 countries by the World Economic Forum Global Gender Gap Index 2020 [4]. About 300 million young people (in 13 and 35 age group) live in rural areas, most of them being forced to migrate seasonally or permanently, without the skills and competencies required by the modern economy. Large bodies of research shows that forests provide an essential contribution to income of both rural and urban communities with studies suggesting that forests may contribute from a fifth, to more than a quarter, of the incomes of households living near forests. However, substantially less is known about how forests can serve as a pathway to prosperity through sustainable and substantial income streams, and the conditions under which these income streams can generate durable and/or productive assets. In India, forest-related practices, programs and

policies, has so far focused on the conservation, increased tree cover, with little thrust and investment on providing pathway out of poverty or addressing hunger, especially tribal mostly living in the fringes of forests.

B.2 Policies and programs for Forest dependent Tribal

5. India's tribal population is officially registered according to their distinct cultural and ethnic features called "Scheduled Tribes (STs)" with a population of 104.3 million as per 2011 Census constitutes approximately 8.6% of India's population. Unlike the Scheduled Castes (SCs) who are dispersed throughout the country, STs have traditionally been concentrated in about 15% of the country's geographical areas, characterised mainly with forests, hills, and undulating inaccessible areas.

6. The fact that most of them live in isolated groups in relatively remote areas has meant that they have suffered from reduced access to basic services and fewer opportunities for economic development. Out of the total ST population, approximately 2.6 million (2.5 per cent) belong to "Particularly Vulnerable Tribal Groups" (PTGs). This classification is reserved for the most disadvantages of all the ST communities. There are 75 identified PTGs spread across 17 States and Union Territories in India[5].

7. The Planning Commission, Government of India (GoI) has reiterated various challenges and persistent gaps in tribal development in India. Because of the remoteness of location of most ST populations, the extent to which they can benefit from general development programmes of the government has remained grossly limited. Hence there is an urgent need for special efforts to ensure adequate flow of services and benefits to the STs including provisions from forestry sector.

8. One of the key factors has been persistent poor implementation of existing schemes in the tribal regions, in turn contributing to exceptionally high levels of poverty among ST population. The decline in poverty rate is much slower among ST populations than for the general population. The critical aspect is that the poverty gap has been steadily rising among ST populations with the result that between 1993-94 and 2004-05, the share of ST population amongst the poor in the country increased from 15.8 to 20.5% [6]. Further the tribal community is one of the most malnourished group.

9. While there has been substantial evidence and arguments in favour of forests-tribal harmonious interdependence, forest laws and policies have adopted a centralized institutional approach alienating traditional tenurial rights of tribals over forests and forest products. FCA, 1980, Biodiversity Act, EC Act, State NTFP Rules etc have in many ways limited their access both in term of extraction of forest produce, settlements, ownership and traditional rights, as more and more forest lands got reserved and brough under biodiversity conservation and wildlife management. Forest governance has adversely impacted the resource access of tribal influencing their food and nutrition base.

B.3 Forests, Tribal and Poverty in Odisha, MP and Jharkhand

10. Odisha is geographically the eighth largest State and the 11th most populous among Indian States. Situated in a sub-tropical region, Odisha has varied topography and a complex ecology and is fifth largest in terms of forest area, with 31% of the State's geographical area classified as forests. In spite of its rich natural resource endowment Odisha continues to be one of the poorest States in India with high incidence of poverty and low indices of human development.

11. At 33%, the head count poverty in Odisha in 2011-12 was fourth highest in India. Poverty rates for rural populations are double those of their urban counterparts. STs are among the poorest, followed by SCs. Poverty also has a regional imprint, with the hilly districts encompassing the Eastern

Ghats, the Northern Plateaus and the Central Table lands, together home to over 92% of Odisha's STs, being poorest compared to the fertile coastal districts.

12. Odisha is home to 62 STs including 13 PTGs. The PTGs are concentrated in the Eastern Ghats and the Northern Plateau; these two regions together are home to almost three-fourths of the State's ST population. Both these regions are characterized by rugged hilly terrain and high rainfall and together account for most of the State's area demarcated as forests. The PTGs gather non-timber forest produce (NTFPs) both for consumption and selling and this occupies a significant space in their livelihood basket. Some of the PTGs, such as the Birhor, Mankirdia and Hill-Kharia are still largely dependent on hunting and gathering of NTFP/forest food while the Bondo, Didayi, Juang, Dongaria Kandha, Kutia Kandha, Lanjia Saora and Paudi Bhuiyan depend upon shifting cultivation (*podu cultivation)*. The Saora and Lanjia Saora are engaged in terrace cultivation besides shifting cultivation and the Lodha and Chuktia Bhunjia have also taken to settled cultivation. Overall, PTG agriculture is characterized by a combination of *shifting cultivation* and some settled farming, including homestead cultivation. The main crops cultivated include maize, a wide variety of millets, *goda dhaan* (short duration, rain-fed upland paddy), other varieties of rain-fed paddy, beans and pulses (local variety of pigeon pea), Niger, mustard, sesame, and tubers.

13. Jharkhand as the 14th most populous state in India is home to 33 million people, out of which 13 million people are poor (The World Bank, 2016). More than 70 per cent of people in this state live in rural areas (Government of Jharkhand, 2017a: 57), and around 37 per cent of the state's population are classified as living below the poverty line (BPL). Poverty, higher in the southern and eastern districts of Jharkhand is overwhelmingly a rural phenomenon.

14. Overall, Jharkhand remains among the most poverty-stricken states of India, with wide regional and inter-district disparities. Political instability and unplanned exploitation of mineral wealth without benefitting the local, largely tribal, population indicate deficits of good governance well-planned development, resulting in pockets of severe poverty in some parts of the state. The ongoing Naxalite problem puts further obstacles in the path of sustainable development but is itself also a consequence of underdevelopment. The state of Jharkhand has a unique relation with forest since ancient times. The word 'Jharkhand' connotes 'area of land covered with forests'. Therefore, literally as well as symbolically, Jharkhand is associated with forests. Various ethnic groups such as Munda, Oraon, Ho, Santhal, Paharia, Chero, Birjea, Asura and other have influenced their ecosystems by varying practices of agro-pastoralism over the years. Traditionally, these indigenous people have symbiotic relations with forests. Local festivals like Sarhul and Karma are customarily related with worshipping of trees.

15. Jharkhand with a geographical area of 79,714 km² constitutes 2.42% of the country's area. The total recorded forest area of the state is 23,605 km² which is 29.61% of the geographical area of the state. Of the total recorded forest area, Reserved Forests constitute 18.58%, Protected Forests 81.28%, and Unclassed Forests 0.14%. As per India State of Forest Report, 2017 published by Forest Survey of India, forest cover in the state is 23, 553 km² which is 29.54% of the state's geographical area. The total forest and tree cover put together, it constitutes about 33.21% of the geographical area of the state.

16.The state of Madhya Pradesh covers a geographical area of 3,08,252 square kilometer. It lies mainly on the central Indian plateau with altitudes ranging from 200 to about 1400 meter above sea level. The total population of the state is 72.63 million as per the Census of 2011. The decadal population growth rate between 2001 and 2011 was 2.03 percent. The average population density in Madhya Pradesh is 236 persons per square kilometer, though; this is much higher in districts with a large urban population. Of the total population, 52.6 million, or 72.4 percent live in 52,000 villages located in the rural areas. Of these, 15609 villages are located within or close to the forest areas. All these villages have Joint Forest

Management Committees as per the provisions of the state Government. Consequently, about 21 million people live in villages located in forest or forest fringe areas. There are 824 forest villages in the state located on the notified forestland.

17. The tribal population in the state is 15.3 million, which is about 21.1 percent of the total population of the state. There are 35 different tribes, but only two, the Bhils and the Gonds together account for 72 percent of the tribal population. Tribal people live in all of the 52 administrative districts of the state, but they are concentrated in the well-forested areas in the east and south of the state. There are 89 tribal blocks in the state having more than 50 percent tribal population, spread over 20 districts of the state.

18. 9.47 million ha of legally designated forestlands are under the control of the Madhya Pradesh Forest Department (MPFD). Of this total, 6.19 million ha are classified as "Reserved Forest", 3.11 million ha as "Protected Forest" and 0.17 million ha as "Unclassified". Forest vegetation types vary with agro-climatic zones and include dry thorn, dry and moist deciduous and sub-tropical semi-evergreen forest. As per India's State of the Forest Report 2019, very dense forest having more than 0.7 canopy density is 0.67 million ha, moderately dense forest having 0.4 to 0.7 canopy density is 3.43 million ha and open forest having less than 0.4 canopy density is 3.65 million ha. The livelihoods of local communities are significantly dependent on the forest; therefore, there is immense biotic pressure on the forest.

B.4 Problem Statement: Can Forests and Tree-based Systems Contribute to Food Security and Nutrition (FSN)

19. As population estimates for 2050 reach over 9 billion, the resources will be severely constrained and issues of food security and nutrition will become critical and need to dominate the policy debates. Number of people who are undernourished worldwide, shows uptick as per SOFI (2020) and one of the key drivers is climate change. Malnutrition – defined as either under-5 stunting, anemia among women of reproductive age or adult obesity – affects nearly every country on the planet (IFPRI, 2014)[8]. Despite impressive productivity increases, there is growing evidence that conventional agricultural strategies fall short of eliminating global hunger, result in unbalanced diets that lack nutritional diversity, enhance exposure of the most vulnerable groups to volatile food prices. (FAO, 2013; FAO et al., 2013)[9].

20. Zero Hunger was adopted as one of seventeen Sustainable Development Goals at the United Nations Sustainable Development Summit in September 2015, setting the global Agenda for Sustainable Development until 2030. Fulfilling these goals requires not just providing universal and year-round access to food for the world's growing population, but doing so in a nutritionally-balanced way, while enhancing *livelihood* security for smallholders, reducing waste from consumption and production systems and also ensuring that these systems are sustainable. Enhancing global production of food through farm productivity have found to be not ensuring that those who are hungry have the means to increase their intake of food. The resource poor, in particular, may not have the means by which to purchase the increased output of food that these new technologies promise, and may continue to rely on more locally-appropriate and accessible means of fulfilling their nutritional needs [10]. Production is also constrained by the lack of equitable access to land, technology and capital, which typically remain unavailable to the large majority of smallholder farmers and vulnerable populations such as tribal communities.

21. On the other hand, there is considerable evidence that suggests that forests and tree-based systems can play an important role in complementing agricultural production in providing better and more nutritionally-balanced diets [11]; wood fuel for cooking; greater control over food consumption choices, particularly during lean seasons and periods of vulnerability (especially for marginalized groups); and deliver a broad set of ecosystem services which enhance and support crop production

22. Forests and trees contribute to FSN through four main channels: direct provision of food; provision of energy, especially for cooking; income generation and employment; and provision of ecosystem services that are essential for FSN, human health and well-being. Although forest foods have been estimated to represent only 0.6 percent of global food energy supply, they make a considerable contribution to dietary quality and diversity and play a critical role for the FSN of forest-dependent communities, tribal in particular. Forest foods, by reaching local, national and even international markets, also contribute to diverse and balanced diets for people living far from forests. Forests and trees are also used as a source of fodder by farmers and pastoralists in traditional extensive systems and in more intensive silvopastoral systems[12].

23. Forests and trees directly support food production at farm, landscape and broader levels by delivering numerous non-provisioning ecosystem services that are essential for FSN and sustainable development in the long term (such as water regulation, soil protection, nutrient circulation, pest control and pollination). Forests, tree-based agricultural systems and forestry impact human health in a diversity of ways, including: provisioning of food, medicinal plants, fuelwood, clean water and income. Forests and trees can play a crucial role to improve resilience, defined as the capacity to prevent, mitigate or cope with risk, and recover from shocks, at landscape, community and household levels. They thus make a significant contribution to stability, the fourth dimension of FSN, by playing a major role as a safety net during drought or lean seasons as well as during periods of crises and conflicts. The formal and informal forestry sectors are also important sources of employment and income, often underestimated given the importance of the informal sector.

24. It has been estimated that approximately 1.2-1.5 billion people (just under 20 percent of the global population) are forest dependent. World Bank, 2002 estimates include about 60 million indigenous people who are almost wholly dependent on forests. In India 270 million are considered forest dependent.

B.5 Challenges in managing forests for food security

24. While there has been serious recognition across the globe about role of forests, the conversion of forest lands is impairing the opportunity to manage it for overall social welfare. Changes in forest cover, forest types and management have considerable impacts on the contributions of forests and trees to FSN at different spatial and temporal scales. These changes, as well as their drivers, enable the identification of some of the challenges and opportunities for sustainable forestry to contribute to FSN. The loss and degradation of forests exacerbate the problem of food insecurity both directly and indirectly: directly, by affecting the availability of fruits and other forest-and tree-based food products, and indirectly by modifying ecological factors relevant for crop and livestock and thereby affecting the availability of food [14].

25. Deforestation and forest degradation threaten income, livelihoods and ways of life of forest-dependent populations, and compromise the provision of ecosystem services that are essential to FSN and sustainable development in the long term. Deforestation for agricultural expansion is sometimes considered to offer greater opportunities for welfare improvement. However, those immediate benefits can result in depletion of natural resources, simplified diets and compromised livelihoods and ways of life in the long term. These trends intensify the competition for land. They also intensify the competition

between forest uses, for environmental preservation, for timber and wood production, and for food and other NWFPs, each of which impacts FSN. Addressing the issue of competition for land while taking into account agricultural and forests demands on the one hand, environmental and climate concerns on the other hand, calls for tackling consistently the trade-offs at and between different scales, from local to global.

26. These increasing demands on land, forests and trees create new challenges and opportunities for their contributions to FSN. They can threaten some of the contributions of forests to FSN, particularly when such contributions are less visible or concern marginalized and most vulnerable groups. On the other hand, they can create additional reasons to protect and invest in forests and generate new jobs and opportunities for sustainable development. This calls for a better understanding of the drivers of change, and of the dynamics at play in evolving landscapes such as secondary forests, landscape mosaics, agroforestry systems and their impact for FSN and sustainable development, and for a better support for the forest restoration of areas that qualify as other wooded land.

27. Paradigms for forest and tree management have evolved considerably in the last fifty years, away from a state-controlled, production-centric approach to more collaborative systems which prioritise the needs of local people, and also value the roles of forests in providing critical ecosystem services, especially habitats for biodiversity, pollination, soil protection, water and climate regulation (Mace, 2014). Decentralized management systems now better reflect local demands, especially for woodfuel, fodder and small timber (Larson et al., 2010).

28. While there is growing recognition that forests and tree-based systems complement agriculture in providing food security and nutrition, responsibility for managing these diverse elements of the productive landscape is typically fragmented across different government departments and administrative jurisdictions in most countries. The complex, overlapping and interconnecting processes which link tree products and services to food security and nutrition are currently not adequately represented in forestry, agriculture, food or nutrition-related strategies at global and national levels, though their importance is often well known at more local scales by consumers, forest producers and farmers.

29. There are numerous international treaties and standards that have an influence on the way forests are managed. Among them some focus on the environmental dimensions of forest management, such as the three Rio Conventions, the United Nations Framework Convention on 30. Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Diversification (UNCCD). Other treaties relate to international human rights, in particular to the right to adequate food and nutrition. There is also increasing interest in market-based instruments to recognize and valorize the different contributions of forests, especially related to environmental issues. Examples include carbon credits and other payments for environmental services, certification and green procurement. Forest certification plays an important role in assessing and monitoring the sustainable management of forests in an independent way. While such instruments can link forestry management to people who consume forest products from a distance, they do not always fully integrate FSN concerns and the needs of local forest-dependent people and communities.

Table Challenges in Managing Forests for Food security in India

1	***Lack of information on Wild edibles*** gathered by Forest fringe community, dietary share, seasonality and volume of production
2	***Lack of forest inventory*** of flora and fauna providing food, drinks, medicine etc in Range and Divisional level
3	***Loss of food tree diversity and density*** due to degradation, climatic effect, overexploitation. No species specific or habitat specific assessment of such loos
4	***Reduced natural regeneration of food trees***, shrubs, herbs due to unsustainable harvesting, anthropogenic pressure
5	***No policy directives, intervention focus*** of Forest management towards improving resources for food generation from forest landscape
6	***Soil degradation and increase run off*** from forests impact the farm productivity downstream which is not accounted in forest management principle and practice
7	***Little institutional support***, financing of fruit tree planting on forest land
8	***Traditional Agricultural program*** and practices of Govt. has ignored forest as resources for generating food supplements
9	***Forest nurseries c***ater to mostly timber, fuel and mixed species and free distribution of seedlings rarely supply food plants to subsistence farmers, forest dependent population
10	***No technology infusion*** in production of food species QPM, Monitoring of tree growth, fruit, seed outturn
11	***Ownership sharing of forest*** land it usufruct is ambiguous and non-transparent with respect to product harvest from forest reducing community interests in conservation and sustainable extraction
12	Value addition, aggregation and productization are rare or non existent.
13	***Absence of technical knowhow*** with forest staff on market support, nursery technique value addition of species valuable for food security.
14	***Lack of market demand*** for forest borne wild edibles
15	***Agroforestry uptake in*** village commons or farm land has ignored the food focus

31. Sustainable Forest Management for FSN thus requires integrated, innovative and inclusive governance systems across sectors at different spatial and temporal scales, ensuring the full and effective participation of all concerned stakeholders and affected groups, particularly of women, as well as vulnerable and marginalized groups, including indigenous peoples and forest-dependent communities. In particular, appropriate arrangements must be designed at the landscape level where the challenges are to optimize the concrete cohabitation among cities, agriculture, forests and other natural areas, and to better integrate FSN concerns in forest management

B.6 Knowledge Gaps in Understanding of Tree based FSN

32. While the evidence base for the role of forests and tree-based systems for food security and nutrition is growing there remain many gaps in our understanding of this relationship and its potential contribution to reducing global hunger and malnutrition. In these contexts, food from forests and tree-based systems is likely to continue to form an essential part of household strategies to eliminate hunger and achieve nutritionally balanced diets. Unfortunately, there is little current appreciation of the diverse ways in which these tree-based landscapes can supplement agricultural production systems in achieving global food security amongst the international and national decision-making communities. Many forms of traditional *forest management* for food including the creation of multi-storied agroforests,

the planting of diverse forest gardens or, the management of *swidden*-fallows for food, have remained, either invisible to researchers and planners or not adopted as an integral forest management policy by governments. Even the many contributions that woodlands make to agricultural production outside of forests have been largely overlooked.

33. Despite large quantum of resources allocated to the development of people in the forest fringes and plethora of programmes, the impact to raise their standard of living has been limited. The malnutrition rates as well are higher among these communities often trapped in the inter-generational cycle. The policies so far have not paid enough attention to forest as an additional source of nutrition for these population and how that can be brought-in the mainstream. Forests in different areas with varieties of flora and fauna have potential to provide different kinds of nutrition rich food that can supplement the community needs. Non-consumptions of such nutritious resources from forest could be various aspects including lack of knowledge, priority to earn incomes by selling them rather than consuming themselves or restrictions due to rules/regulations or cultural practices. Additionally, the livelihood options are limited and do not help generate adequate incomes. The communities as such may or may not have access to government social protection schemes, and many a times these schemes do not specifically cater to their specific requirements. During agriculture lean seasons, these communities are totally dependent on such schemes- if they are covered- or face dire food or nutritional insecurity if forests do not come to their rescue.

34. Despite the huge potential of forest and tree foods to contribute to diets, knowledge on many forest foods, especially wild foods, is rapidly being lost due to social change and modernization. Lack of knowledge in the community might be exacerbated by the effects of migration and movement. There is a need to explore the forest-food nexus in much more detail, particularly in relation to the integrated management of multi-functional landscapes, and the multi-scalar and cross-sectoral *governance* approaches that are required for the equitable delivery of these benefits. What is needed is recognition of the ways in which people command access to food, how this varies by season, and how the inter-personal dynamics and biases (especially due to gender) of intra-household food allocation result in differential nutritional outcomes within families.

B.7 A Pilot on Forest for Food and Nutrition Security: Establishing evidence for scale-up

35.Programs and practices in Forestry sector has been founded on the principle of biodiversity conservation or managing it mostly for goods as Timber and fuelwood. In recent times, the climate debate has prompted many countries to realign forestry practices and investment for incorporating climate justice in the intervention frameworks. Recognition of ecosystem services from forests has been gaining ground and payment models for participants have been well demonstrated in several landscapes advancing arguments for reorientation of forestry management principle and investment priorities. Valuing forests in term of GDP contribution will be well supported by making it as a direct source of food and nutrition for forestry dependent and forest fringe population which necessitates verifiable models and testing of suitable approaches. This proposed project will be a unique one bringing the SDG-2 and SDG-13 together for improved results. The innovative FFSN project aims at testing the following hypothesis;

- If, systematic inventory and mapping of forest food plants, their nutrition relevance and forest regions producing subsistence edibles is made with participation of forest dependent population, they will be aware of its true value and actively support forest conservation.
- If, sylvicultural operations, forests improvement activities, soil and water conservation measures etc, are specifically tailored to improve the production of edibles from forest plants, then it will serve the dual objective of forest growth, water recharging, enhanced forest food production and bring dietary diversity.
- That, the stock enrichment by way of establishing Forest Food Plantation Blocks and sharing of the usufructs will lead to enhanced wild edibles for primary collectors, sustainable harvest of products, increased biodiversity and reduced damage to forests in the long run
- That, with handholding and community empowerment, raising awareness on food and nutrition issues, potential of using this as a means of improving incomes,, exploring NTFP enterprise to unlock income opportunity for forest dependence community.
- The food and nutrition security of forest dependent tribal population can be ensured if they are supported to take benefit of food safety net schemes, and their on-farm agri practices are improved and off farm livelihood activities are strengthened with technical support and rural financial services system

The result of the project in terms of what works and how, will help creating a replicable model that can be scaled-up in other geographies across India, with relevant customization.

B.8 Project Objective & Outcome

36. Forests For Food Security & Nutrition project will aim at bringing a sustainable change in the lives of most vulnerable populations in forest fringes through increased access to diversified food, resilient livelihoods leveraging Forest based ecosystem services and agroforesty. It will also w ork towards creating an enabling environment through increased awareness, access and uptake of government policies and services on food and nutrition.

37. The overall goal the project is to enable improved livelihoods and food and nutrition security primarily for about 3000 households, most of them being tribal households in the forest fringes using forest as resource. This in turn will be achieved through objectives of building the capacity of the target households, securing them their access to over forest, improving their agricultural productivity by way of improving water supply from forests, promoting income-generating micro-enterprises for alternate livelihoods and ensuring access to food safety net of on-going schemes of line department. To achieve the objective of empowerment, the programme will promote women's SHGs, strengthen JFMC/VSS at village and Palli /Gram Sabhas for planning and implementation of programme interventions and will train community resource persons (CRPs) to provide necessary services for production and marketing.

The key results of the project include;

1. Increased productivity of forest for food/nutrition for the local communities and establishment a system of sustainable harvest

2. Improved forest management for concomitant improvement in flow of ecological services (water and nutrients) from forests to the nearby agricultural / fish farms to improve farm and fish productivity

3. Sustainable Environment with forest-based ecosystem services for vulnerable forest dependent communities;

4. Empowered communities, with improved physical and economic access of food through Non-Timber Based Forest Products

5. Increase in household food surplus and consumption through alternative forest produce and farm productivity based on innovative forest management practices

38. The objectives will be attained through four prong strategy, i.e., a) Community empowerment through strengthening CBO; Community based institutions, and improved access to social protection schemes b) Natural resource management for improved ecosystem services, c) Tree based livelihood enhancement programs, d) Supporting off farm and non farm livelihood and food security activities.

Alignment of Proposed Project to National Targets:

39. The planned activity would aim to deliver project objectives as ensuring sustainable food production systems and implement resilient agricultural practices increasing productivity and production, while maintaining ecosystems, that strengthen capacity for adaptation to climate change, and reduce distress **(SDG 2.4**). Conservation of wild relatives and edibles to improve genetic resources for local use is an added benefit of the planned deliverables which align with **SDG 2.5**. Sustainable management of terrestrial ecosystem as Forests, arresting land degradation and biodiversity enshrined in **SDG 15** is a major element being tested through the pilot project. The pathway followed is community centric and targeted through empowerment of VSS, SHG follows the principle of **SDG 13.3.**

40. India's NDC Goal of creating additional carbon sink through additional forest and tree cover is addressed by way of stock enrichment models and agroforestry planned in the project areas. Climate change vulnerability by way of food production loss by enhancing investment in development programmes in particularly agriculture, water resources is included as a hypothesis to be tested also meets the NDC commitment.

B.9 Rationale for Investment

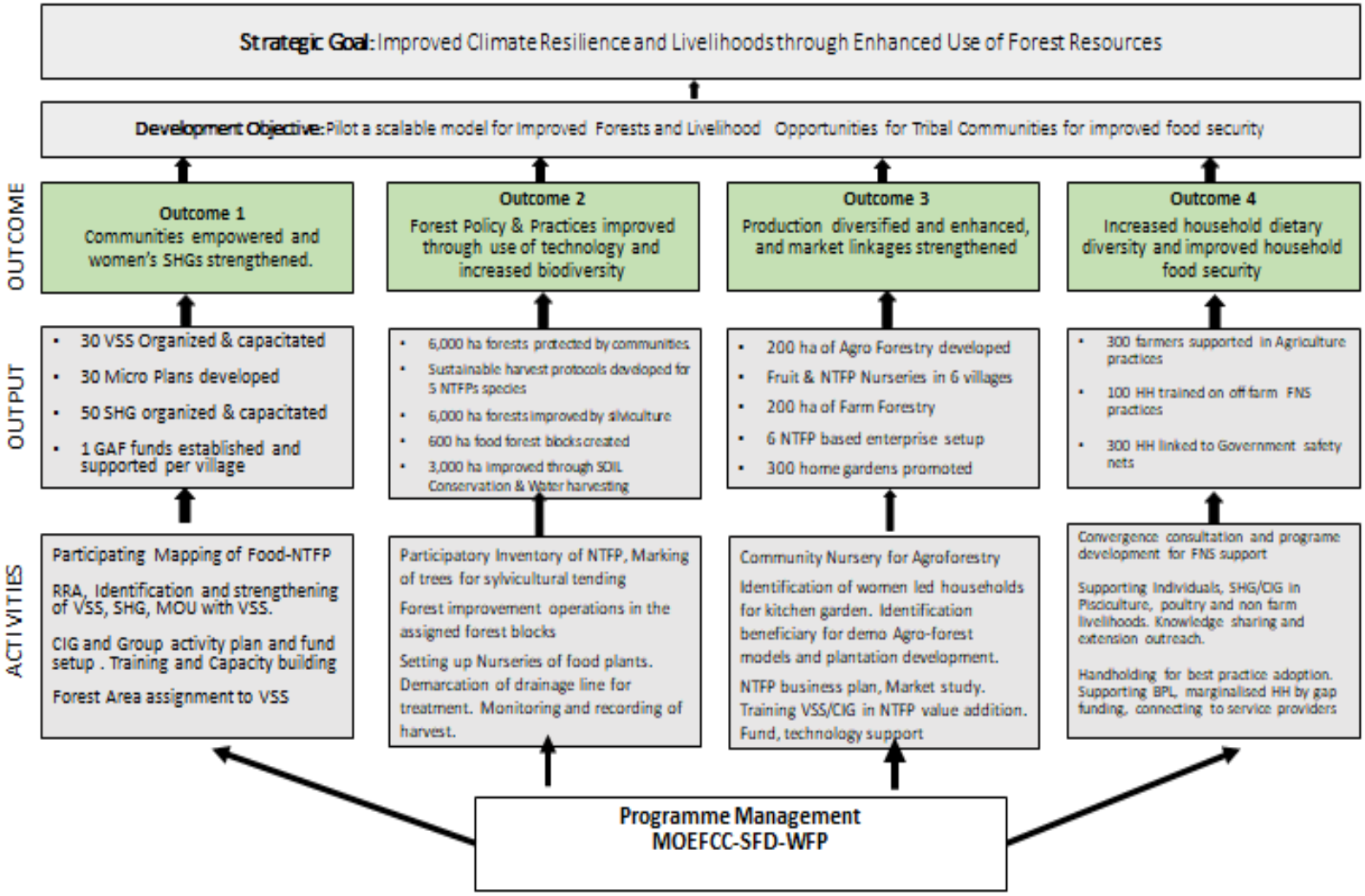
41. There are a number of factors which combine to provide a solid rationale for investing in this proposed project: "Forests For Food Security & Nutrition" (FFSN). These include: (i) the extreme poverty and malnutrition that characterises the PTG population in Odisha, MP and Jharkhand; (ii) the availability of a NR based livelihood models for integrated tribal development in all these three states (IFAD, JBIC, WB supported) a, ready for adaptation and scaling-up to PTG areas; (iii) the availability of an existing institutional structure in Tribal areas to implement the project; (iv) the close alignment with Government priorities, the ownership of the Government (in designing the concept for this new project),

42. The tribal population, more specifically the PTGs among the STs remain the most disadvantaged in the State. They fare poorly on all development indicators such as food and nutrition security, literacy and health. Given their high dependence on an ecologically complex natural resource base, they are

also highly vulnerable to variability in weather and climate shocks. The livelihoods of PTGs are overwhelmingly dependent on natural resources. They derive their livelihood from shifting cultivation, rain-fed agriculture and gathering of forest foods. their farming practices are primitive, with rain-fed paddy and millets being the main crops. Given the ecological complexity of their terrains, poor farming systems and lack of focus for the development of rain-fed areas, the PTG areas have been suffering widespread land degradation. Efforts are therefore needed to reverse this downward spiral of low productivity and declining resource base.

43. Experience learnt from various multilateral projects concerning tribal and forests development over the years have successfully demonstrated an integrated development could be achieved through involving tribal groups in planning and implementation of various development initiatives, especially the development of natural resources. A large number of women's SHGs have been promoted under Mission shakti who could be the flag bearers to leverage nature based solutions for removing hunger and generating income, provided due guidance and investment is done. Forest department has over the years institutionalized the PFM concept by creating VSS/JFMC who have forged meaningful partnership to conserve forests. However, what has been lacking is a consolidated high intensity integrated programme of support, targeted through these existing institutions, with clear targets and time frames. The proposed programme would seek to deliver this by capitalizing on the institutional development that has already taken place, and would seek to deliver a range of services to the PTGs especially to supplement nutrition through appropriate development initiatives. It is also in line with GoI/GoO's strategies and policies for development of tribal and vulnerable communities and inclusive growth.

PROPOSED LOGFRAME FOR THE PILOT PROJECT



C. Programme description

C.1 Project Approach

1. Project intervention will be designed to follow the successful bottom-up planning approach. It will be a community driven, departmentally guided process. Success in the programme would be attributed to the fact that the implementation process was owned by forest dependent community. Putting tribal grass-roots institutions (SHGs and VSSs) in the driving seat is to ensure the project is trusted by the target groups. With forest fringes communities at the heart of the project, the new design focuses on future scaling-up activities and successful approaches tested and proven in the pilot areas. The project adopts an integrated approach, involving support for improved access to forest land, natural resources, agroforestry technologies, for improved food and nutrition securities. Finally, the design is also aligned with major State Government development programmes to ensure local communities receive maximum benefits from convergence funding.

2. Another major element of the project approach is gender mainstreaming. In relation to the forest land and water resource development activities, women will be given priority trainings on food security, in the setting up of tree nurseries for any plantation activities and will be involved in livelihood activities. Soil and moisture conservation development activities will prioritize woman headed households and those who do not have sources of irrigation of any kind. Backyard fruit tree, forage trees planting would target women groups. Women would play a critical role in developing community forests, nursery activities and also to raise forage and firewood trees. Priority would be given to plant local fast growing food, and forage trees to enhance availability of fruits, and forage near villages with a view to reducing drudgery to women. Emphasis would be given in setting up of demonstration plots to households that are provided land *pattas* under FRA. Women keen to pursue income generation activity will be formed into new SHGs, or the existing SHGs will be strengthened to undertake additional activities under forest for food and nutrition project.

3. An important element of the project approach relates to nutrition. Given the severe malnutrition situation in forest fringe villages usually witnessed, the design will mainstream "nutrition sensitive agriculture and agroforestry" activities across the pilot villages. First the programme will implement activities related to nutrition education which include training on various nutrition rich local food items, training on processing and storage and introduction of seed bank, storage yards on the lines of grain bank. Second, the programme will implement interventions that promote nutrition-sensitive forestry by promoting tree food, tree oil seeds and wild vegetables. Third, the programme will promote nutrition-dense livelihood activities by promoting, kitchen garden and linking with vegetable farming through NHM

4. The approach to programme implementation includes: (i) awareness generation; (ii) facilitating grass-roots institutional development; (iii) supporting grassroots planning and implementation; (iv) ensuring flow of resources to the communities through their institutions; and (v) involving local partners in capacity building and awareness creation and also for the delivery of services as key service providers. The implementation will be on the basis of inclusive approach and this would mean that all

communities and households residing within selected villages will form the target groups but special emphasis will be given to the development of Tribal.

5. The programme will adopt a flexible, evidence-based, participatory process-oriented approach to enable the primary stakeholders to determine the scope of program activities, and their timing, pace and sequencing. The program will mobilize and nurture capacity of community-based organizations in each of the program village to prepare and implement a Microplan. A gradual and phased approach will be adopted to ensure capacity building of the tribal to take over implementation of activities. Necessary systems and processes will be built to allow for handholding, supervision and evaluation of performance.

C.2 Project area and target group

6. Three states, having high tribal population, higher forest coverage and poverty level i.e., Madhya Pradesh, Jharkhand, and Odisha are selected for pilot testing the planned activities. 3 forest divisions, one each from the selected states (Keonjhar in Odisha, East Chindwara from MP and Porahat Forest Division of Jharkhand are selected in consultation with SFDs which possess high diversity of Forest Foods, substantial tribal population, significant dependence on Forest for consumption and livelihood, prevalent malnutrition and deprivation, and wide spread subsistence agriculture.

7. In each forest division, 3 Forest Ranges are selected having high forest density and canopy cover. One forest block in each of the forest range (with a minimum of 2000 ha.) was identified for implementation of Forest Food, food plant augmentation, cultural operation, water conservation and ecosystem improvement activities inside forests and on community land on the forest fringes. In total, 3 forest blocks over an approx. area of 6000 ha. will be covered under conservation assessment and intensification of forest management to support livelihood and unlock income opportunity relating Forest Foods. It is planned to cover a cluster of 5-6 villages around each forest blocks totaling about 30 villages village communities would directly participate in the Plan of Activities and draw direct income and wage employment in short run, connecting with the program period and deriving long term benefit of food, forage, pasture thereafter.

Selection of Villages:

8. Criteria used for selection of villages would be:

1. Forest Degradation
2. Size of Forest Land on which people are traditionally depending
3. Situation on the Catchment of any drainage system
4. Distance of the village from the adjoining forests
5. Prevalence of ST/SC Population
6. Poverty in terms of BPL families
7. Approachability (Distance to all season Motorable road)
8. Water Availability
9. Forest Food collection
10. Functioning VSS

C.3 Targeting

9. Geographic targeting: As described above, the programme would work in a pre-defined number of Ranges in selected forest divisions. The geographical targeting is made keeping view of the program objective to achieve goal of the Project. Interventions would necessarily benefit 100% of the population living in these Gram Panchayats (for example village development planning and associated village institutions, and infrastructure such as water harvesting, water channel, stream management). Special efforts would be made to ensure that all members of the community, and in particular the most vulnerable groups, are able to participate effectively in these village planning events and in village institutions.

10.Targeting specific groups: In addition to geographic targeting, the programme would also target specific categories of population (Tribal, women, youth, etc), and each component would have a specific strategy. The SHG formation approach would follow NRLM norms. About 60% of SHG members will be from the Tribal households and the remaining members would come from other ST households. The land allocation component would be targeted primarily to Tribals.

Table. FFSN Program Area

State	Forest Division	Range	Forest Block	Area	Village	Tribals Group
Odisha	Keonjhar	Telkoi	Kalapat	21488.35	Ahigola, Bena, Popdanga, Ranki, Kuladera Sinduria, Patakholi, Padiaposi, Balijodi	Juang, Bhuinya
Jharkhand	Porahat	Songra	Rogod	3124.5	Rogod,Halmad Shankra,Kotagara, Kontari, Dighi, Ladauli Itibirda, Kerabasa	Munda,Ho
MadhyaPradesh	East Chindwara	West Batakhapa	Batkagarh	19997.30	Teepakheda Moyakuhi, Kamthi Ankhawari Batkagarh, Digdhar Madhi, Kamtha Karaghat, Balusar	Gonds, Bahariya

11.**Tribals** will be the major beneficiaries of land treatment works, irrigation development and other NRM related activities. The forest food extraction and nutrition related activities would be targeted to all households. Tribal population and forest gatherers will be the priority target group to receive support for fruit and spice crop development on degraded land. Interventions like kitchen gardens, farm bund planting would be targeted to interested households. Livelihood interventions such as processing of forest food produce, clusters and producer collectives will be supported in response to expressed interest from the village households and other poor communities in order to facilitate

creation of required economies of scale and marketing support. Vocational training programmes would be targeted exclusively to CIG (Common interest group).

12. Women will be focused as priority group as they play a pivotal role in the well-being of their families and the household income, and yet they are particularly disadvantaged. Through collectivization as SHGs and capacity strengthening, awareness about rights, and entitlements, better livelihood opportunities, and access to health, fiancial and education services will be provided.

C.4 Program implementation

13. The FFSN project will be community driven programme and the plan of activities will follow a bottom-up approach of implementation. The *Primary Stakeholder* are the members of Vana Surakshya Samiti (VSSs), Self Help Group, Common Interest Group, Vulnerable Households etc., whereas, *Secondary Stakeholders* are MoEFCC, SFD, WFP, ICFRE, TFRI, RPRC, Govt. departments, Research Institutes, Agriculture University etc.

14.Two broad principles will govern the management and coordination structure for FFSN project: (i) strengthen the capacity of existing systems and institution at field and community level (ex, VSS/JFMC) rather than create alternative systems; and (ii) recognise that extreme remoteness has a bearing on the availability of staff with requisite qualifications and experience and, therefore, adopt a flexible approach in staffing. The programme management has been designed on lessons from various Nature based livelihood projects and CAMPA program of operations of various states.

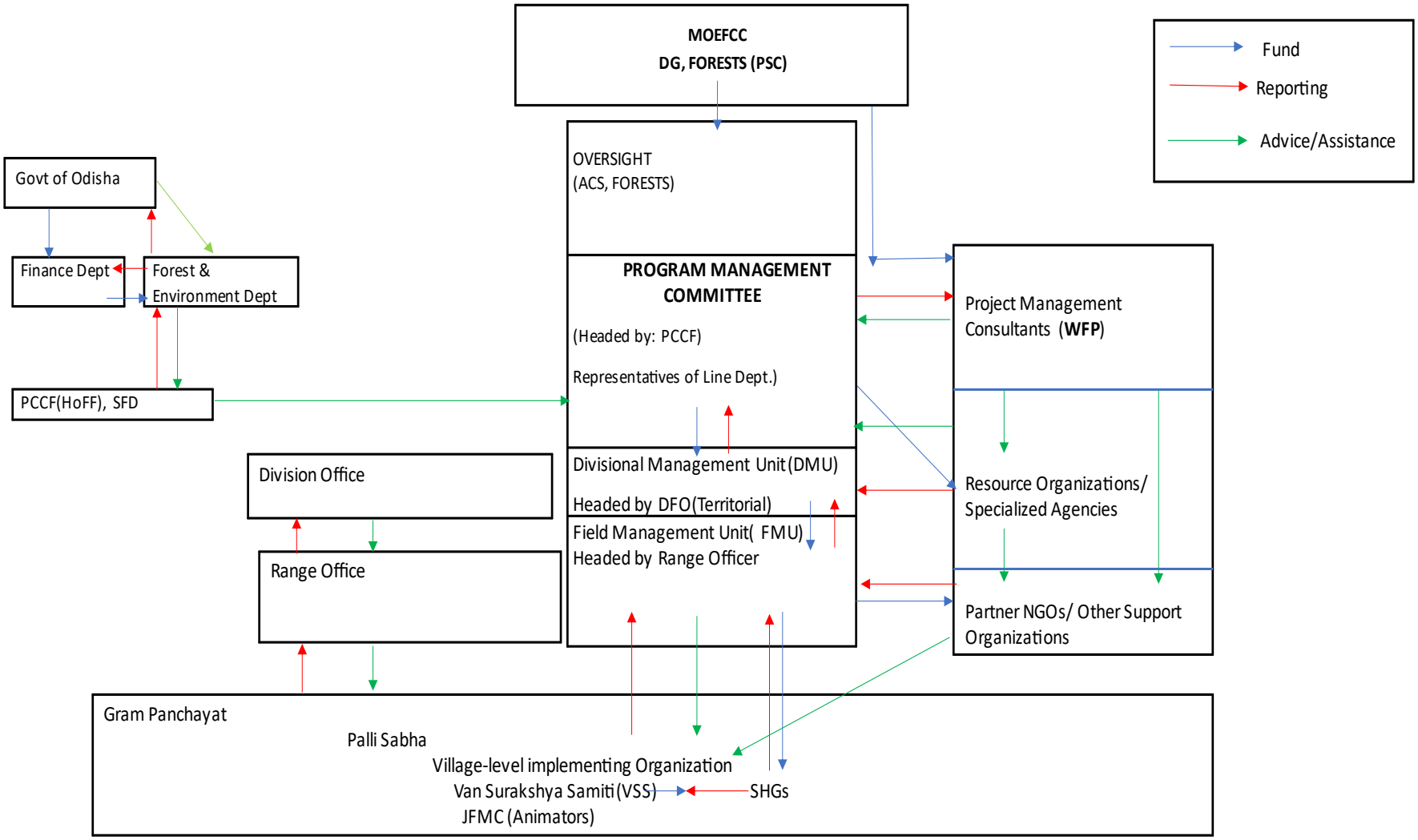
C.5 Programme Management

15.At national level the Ministry of Forest, Environment and Climate Change, GoI will be the nodal agency for this program. The program will be supervised and monitored by MoEFCC who will accord approval to the entire project at a go, while providing strategic guidance and direction from time to time to the implementing states and ensuring fund flow. The World Food Program (WFP), New Delhi Office, will provide oversight and technical inputs while bringing global best practices to the project.

16.FFSN will be reviewed at the highest level by the Programme Steering Committee (PSC) at MoEFCC once a year and the Programme Management Committee (PMC) at state level least twice a year. The Annual Review Meetings at New Delhi will be attended by WFP, state representatives and DMU.

17.At the state level, the PCCF &HOFF, Forest &Environment will be the Lead Programme Agency responsible for the functions relating to overall planning, funds flow, coordination and project supervision. The program annual plan of activities will be implemented by DFO, Territorial Forest Divisions of the respective states. The Divisional Forest Office will have overall responsibility for the implementation and day-to-day management of the Programme with technical support from WFP. The Forest Range Office will implement the activities in collaboration with VSS/JFMC, which will be supported by one local agencies recruited to facilitate program implementation. The recruited local partner agency will have necessary competence and previous work experience in the region.

18. **The Organization management framework of program implementation is shown in Fig. below:**


MOEFCC
DG, FORESTS (PSC)
Fund
Reporting
Advice/Assistance
OVERSIGHT
(ACS, FORESTS)
Govt of Odisha
Finance Dept
Forest & Environment Dept
PCCF(HoFF), SFD
PROGRAM MANAGEMENT COMMITTEE
(Headed by: PCCF)
Representatives of Line Dept.)
Project Management Consultants (WFP)
Division Office
Divisional Management Unit (DMU)
Headed by DFO(Territorial)
Range Office
Field Management Unit(FMU)
Headed by Range Officer
Resource Organizations/ Specialized Agencies
Partner NGOs/ Other Support Organizations
Gram Panchayat
Palli Sabha
Village-level implementing Organization
Van Surakshya Samiti (VSS)
SHGs
JFMC (Animators)

C.6 Roles, Responsibility of Executing Agencies

19. The program would necessitate well defined responsibility for involved agencies to discharge their roles efficiently and timely to attain project objective.

20. Programme Steering Committee (PSC) will be established under the chairmanship of the DG (Forests), with representations from MoEFCC and WFP for effective governance and to provide overall policy and strategic guidance to the programme. The PSC will review the progress of the activities and ensure that its activities are coordinated with other development efforts in the state, especially with the key line departments (Forest, Women and Child Development, Rural Development, Agriculture etc).

21. Project Management Committee (State Level): the existing arrangement of SFDA (State Forest Development Agency0 will be the main co-ordinator at state level. SFDA will consider including Senior Officials/Domain Expert of CAMPA/Special projects/ Externally aided project, Mineral bearing Area Authority will be the members of the PMC to gain from cross-learning and facilitate convergence, specifically to discuss the pilot project and its progress. The members will include representative of Panchayati Raj, Rural Development, Women and Child Development and TRIFED, state marketing agencies like ORMAS, and mission shakti. The PMC will meet half yearly and be responsible for all management decisions for effective programme implementation, including approving the Annual Work Plan and Budget.

22. Notification on establishment of DMUs (Divisional Management Unit) and FMUs (Field Management Units) are to be issued for implementation of the proposed Project in the respective States. The State Forest Department (preferably the CAMPA Cell) to take lead in establishing the Project Management Unit by designating the Dy. Conservator of Forest as in charge of DMU. One ACF will be deputed to DMU for supervising the Project.

23. The PMC will also issue guiding Circulars to define the Role of RCCF in monitoring & supervising the project interventions, to designate one ACF from each DMU and one Dy. Range Officer of each FMU to look after the project interventions. And also to get communication issued from State Govt. to all other departments to augment required support in implementing various schemes / projects through Inter-sectoral convergence for holistic community development.

24. At the District level, a **Project Convergence Committee (PCC)** will be set up under the Chairmanship of the Collector with representation from ITDA, DRDA, Forestry Department, and NGOs, for deliberation on APO and facilitate coordination with schemes of line departments.

25. Divisional Management Unit (District level): The existing DFO Office will be designated as Divisional Management Unit (DMU). The DFO will oversee the implementation of project, whereas, one ACF may be exclusively given responsibility to supervise the day to day implementation of project. Services of one MIS person will be made available to assist the DMU in reporting, monitoring of the program activities.

26. Field Management Unit (Range Level): The Range Office will be designated as Field Management Unit (FMU) for implementation of project at VSS level. The Range Officer will oversee the overall

implementation of project, whereas a Dy. Ranger / Senior Forester shall be made responsible for day to day implementation of project at VSSs level. One Partner Team with two junior level professionals namely 1. Food, Nutrition & livelihood, 2. Capacity Building & Documentation may be hired to facilitate the implementation of project interventions for all VSSs covered in 2-3 Ranges.

WFP (Program Technical Support & Guidance)

The WFP has partnered with MoEFCC to design the project and has committed to share a portion of project financing. They are firmly committed to provide services of Technical consultant for providing regular guidance on various field practices, i.e., planting module, sylvicultural practices, VSS fund management, reporting schedules and developing implementation guidelines and work packages with costing, etc as and when required at the DMU level. The consultant will also coordinate with SFD, MoEFCC and WFP. The resources of Delhi and State offices of WFP will also be spared for furtherance of program goal.

27. Formulation of Implementation Framework: During the preparatory phase (within 12 months of inception of project), PM shall prepare a detailed (broad) plan of action for five years, which will be the indicative implementation framework for the Divisions during preparation of comprehensive VSS wise Micro Plan.

a) **Mapping of Forest resources and formulation of detailed implementation plan:** During the preparatory phase WFP will undertake mapping of forest resources and their nutritional relevance, and a base line on the status of the target population vis-à-vis food and nutrition, consumption patterns and current livelihoods (within 12 months of inception of Project). WFP will support formulation of annual detailed implementation plans at various levels based on the mapping and baseline findings.

b) **Formulation of Training Need Assessment (TNA)**: Broad training Need Assessment is to be prepared by the WFP, who have prior experience & expertise on the subject being dealt under the project. This is to be completed within 12 months of the inception of Project.

c) **Orientation to Field functionaries**: WFP to take lead in guiding the DMU for orienting the field functionaries hired / deputed for implementation of the project. Initial orientation contributes significantly for common understanding on the project goal, objectives, expected outcomes and possible action points.

d) **Formulation of Guidelines**: Formulation of important guidelines, operational manual etc. brining-in the global expertise and best practices.

e) **Formulation of Monitoring Framework**: Develop Monitoring Framework, support Govt in establishing MIS & GIS Systems for concurrent monitoring.

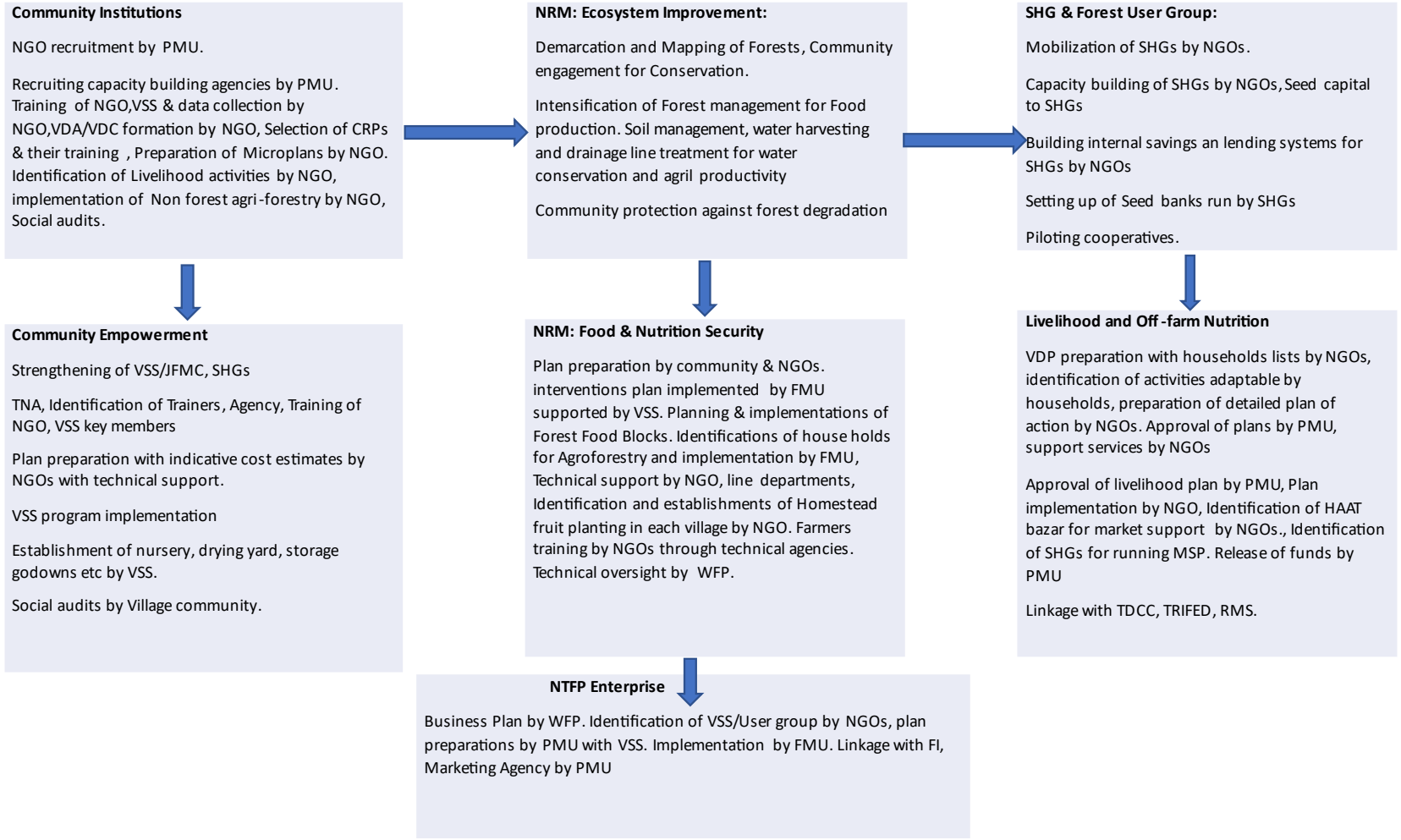
f) **Selection criteria for VSSs engagement**: DMU to prepare the criteria for selection of VSSs to be taken under project fold. DMUs to be oriented the criteria and to submit the list of potential VSSs for selection and finalization.

g) **Research & Design**: Required R&D work are to be taken up by Project Management Unit.

h) **Support to Scale**-up: WFP will undertake the best practice documentation, assessment of the project success through end evaluation and formulation of a scale-up plan

The Details of roles and responsibilities of DMU, FMU and other units is provided in Annex 3

Fig. Implementation Matrix



C.7 Planning process

32. Planning at the Village Level: The planning process will be initiated with the community at the village with the support of partner and respective VSS under the guidance of FMU (Range). Following the community mobilisation and institution building (VSS/JFMC/SHG) and their adequate capacity building, and using participatory assessment methodology, a microplan detailing activities to be implemented in side forests, community waste land adjoining forests, and farmers field the will be made. Each microplan would be for five years period divided into annual plans of operation. The Microplan will have plan for livelihoods, community forest resource management, community infrastructures, IGAs, etc. as per the project component. The Microplan after review at the *Range* will be sent to DMU for approval. The preparation of Microplan would be ideally concluded within six months of Project inception. On the basis of the perspective plan, the village-level AWPB will be prepared each year by October-November and sent to respective DMU for approval.

33. Planning at the FMU level: The planning process at FMU level will be to consolidate the AWPBs from all the Villages under its jurisdiction and forwarding thereafter to DMU after due diligence and review The Forester would be responsible for coordinating the AWPB preparation. This exercise should ideally be completed by second half of December every year.

34. Planning at the DMU level: The DMU will consolidate the AWPBs from all the Project Villages preferably by December of each year. DMU will add other project management cost including budget for M&E and KM related activities and then will request PCCF, HOFF to release to make budgetary provisions for the project based on the estimates. The AWPB would be approved by PMC of PCCF& HOFF would be used for reviewing performance and progress of the project.

Operational Strategy

35. Program Co-ordination and Convergence: DMU will work closely with a number of State Government departments and agencies such as Agriculture, Horticulture, Women and Child Development, Rural Development etc. The programme will facilitate convergence activities of various departments at the level of SHG, Village level workers, VSSs. In view of the importance of nutrition, the Department of Women and Child Development will provide guidance and strategic alliance for implementing nutrition related activities. Provisions can be made for the DMU to bring on board technical experts to work in the field in particular such as microfinance and value addition to the forest food produce and business.

36. Capacity building: Under the project, capacity will be built for community members in the following ways: (i) day-to-day contact with programme staff, partner staff, and, technical service providers; (ii) day-to-day contact and mentoring by Social Mobilisers; (iii) contact with other government service providers (ICDS); (iv) viewing of videos produced for knowledge sharing; (v) participation in knowledge sharing and review meetings at the village and district levels; and, (vi) utilization of mobile-phone based information systems; etc. Additional capacity building will be provided for programme

staff via: (i) contact with other staff, especially technical experts of DMU; (ii) contact with other agencies, especially GoO line departments; (iii) contact with agencies in other states and countries -

37. Community empowerment component: The activities related to VSS mobilization, VSS formation, SHG mobilization and capacity building of SHGs will be undertaken by the programme engaged agencies. Staff capacity at the level of partnerss will be strengthened with the trainers' training programmes. Partner agencies will engage one forestry coordinator and one livelihood coordinator for the cluster of five villages.

38. Promoting SHGs and Rural Finance: SDF and partner organizations will be responsible for sub component implementation including group formation and strengthening, revival/mobilisation of SHGs, training of SHG members, facilitating SHGs to implement social sector activities, facilitating flow of fund from project to take up nurseries. Training institutions, Expert of Mission Shakti will be engaged for providing the training of women group. Local CBOs will facilitate setting up of accounting and loan monitoring systems for each SHG. The FMU will be responsible for all work related to SHGs and rural finance.

39. Natural Resources Management: Planning and implementation of NRM activities will be carried out by the Range/ VSS with technical support from the community based organization. All plans will be prepared with full participation of the households benefiting from specific NRM activities. The local partner will assist the VSS and Range in procuring inputs and materials to be procured from outside. VSSs and SHGs are the main implementation partners to implement natural resource management, nutrition, and income generating activities. VSSs will facilitate identification of the beneficiary households and lead person to receive training and support. Funding for implementation will flow to the Range/communities based on the approved AWPB. The forest staff with help of local partner and VSS will prepare a microplan through RRA which will guide in preparing AWPO during the project implementation period.

40. Livelihoods improvement sub-component: The local partner will select lead members for training in agriculture, poultry and IG related activities. Once they are trained, field animators will facilitate establishment of demonstration units with these key members. Homestead level interventions mostly suffer from lack of provision of support services. For example, in respect of both livestock poultry, the issues related to universal vaccination and better management practices have not received adequate attention. The AWPB will make provision for these food and nutrition support activities. Thereafter, the selected households will be trained in the demonstration units.

41. Value addition to Forest Food : Linkage will be established with VanDhan center of the region to explore value addition and marketing of products. TDCC and TRIFED will be contacted for the marketing support intervention. TDCC will also set up a system of procurement of MFP from these SHGs by establishing a procurement unit within the haat bazaar. Partner will implement activities related to vocational training with support from outsourced agency/Govt institutions

42. Forest and Community infrastructure: FMU will be the main implementing agency. FMUs will implement water and soil conservation construction works both in forest and non forest lands. The

value addition to forest food produce may require construction of storage house, drying yard, small oil expellers, and equipment which will be procured and supplied to the SHG/VSS/ NTFP collector group.

43. Research Support: The programme will support an Action Research and Extension component to be taken up by Regional Plant Resource Center, Bhubaneswar to develop vegetative and TC method of QPM production and nursery protocol standardization in respect of selected tree species. The PMC will sign a MoU with the institute for a five year period for this purpose. **An indicative responsibility matrix is attached at Annex 4**

C.8 Oversight and support

44. WFP will field an annual Oversight Mission in which various experts and the representatives of MoEFCC and SFD will also participate. Normally the duration of the Oversight Mission will be for about 10-15 days. The mission will be led by WFP Staff and/or its consultants. At the end of the visit, the mission will brief the GoI and SFD on the implementation progress. It is assumed that the initial years of implementation requires more intensive support to set up systems and to establish the vision and goal of the programme. As part of this, WFP will also field "implementation support missions" for a shorter duration of about 2 days for each state to address specific issues. The programme may request WFP to arrange for specific technical inputs during the implementation support missions. The M&E components will be designed, supervised and guided by WFP. The agreed actions with timelines agreed with the programme authorities and the Government will have to be complied within the time frame that was agreed. The Principal Secretary/ACS in charge of SFD will review and provide convergence with line department and policy directives, on request from PMC.

C.9 Risk identification and mitigation

45. The programme faces several risks which include the lack of resources with the target groups to invest in farm land and horticulture development in particular for the purchase of inputs for timely use despite receiving the programme support in initial years. Other key risks associated with the programme are identified in the logframe. These relate to external factors such as economic growth, market prices, climate change etc. and the responses of the target group households to opportunities for development. These risks and risks mitigation measures are summarised in Table below;

46. One of the risks is that the delay in flow of land titles to the Range and VSS/JFMCs results in delayed implementation of program and discontinuity of interests. The risk of delayed programe implementation could also be due to lack of timely mapping of resources and development of microplan etc. The risk will be reduced by engaging the services of the highly capable partner organization, for facilitating the processes of survey and forest block identification for program implementation. Another risk is that inadequate extension and handholding support to the VSSs/JFMC will limit the sustainability of FFSN interventions. This will be reduced by (i) promotion of FFS and training through demonstrations; (ii) support to producers' collectives in aggregation and marketing and also in facilitating the supply of critical inputs; and (iii) associating dedicated resource person through WFP in imparting training to the trainers. Another risk is the possible use of top down approaches by the SFD and this will need to be monitored closely by the PMC and by WFP supervision

missions. There is also a risk that participatory JFMC-led interventions may not take off in a timely manner and this risk is reduced by intensive training and capacity building to the participating communities on continuing basis by the DMU and partner organizations at local levels.

C.10 Sustainability

47. The FFSN project will build on the need, urgency, and momentum of the GoI's effort to create viable and sustainable mechanisms for the expansion of Forest. Three key sustainability strategies would be followed in implementation of programme, (i) **empowering** local actors for continuance and strengthening of efforts, (ii) establishing **economically** viable models for the market action, and (iii) mainstreaming within existing policies and schemes for wider and scaled uptake of ecological security. The FFSN project aims to establish a framework for selecting the most viable approach for expansion of green cover, ensuring economic, ecological and climate resilience. It will take a bespoke approach of addressing the ground level gaps and challenges with the help of demonstration pilots and bridging the policy and market gaps through the development of models and market-based solutions.

48. There are strong elements in the project approach that would enhance the likelihood of the sustainability of the benefits for the target groups. The most significant investment of the programme is in improving the access and availability of food plants both inside the forests and forest fringe landscape. This is expected to trigger sustained improvements in food diversity. The quality of the produce would be ensured through the provision of quality seeds and seedlings by the programme and capacity building. Marketing could be a constraint in the initial years but would be overcome with the operations of producers' collectives and the provision of market infrastructure as there are increasing demands for the produce from the programme area. There is shortage of quality planting material and these would be overcome with the provision of FFS and strengthening them through capacity building and demonstrations. The increased capacity of the target groups to undertake agroforestry and other small enterprises through programme support would enhance the sustainability of their livelihoods.

49. There are other measures built into programme design which are expected to contribute to institutional sustainability at the grassroots level. The organisation and strengthening of VSS and SHGs are expected to enable them to continue their provision of services to its members. As SHGs are promoted as member-owned institutions; they will continue to receive institutional development support from other line departments. The programme will provide seed capital and market support for forest food processing and value addition which will hasten capital formation and grounding on income generation activities. The community would receive support from on-going forestry schemes and investment which will ensure financial sustainability of Fruit Tree farming.

50. The programme would contribute to environmental and natural resource management sustainability in several ways. The planting of fruit trees in the current shifting cultivation/degraded areas would help to protect soils and improve productivity. The fruit trees and spices crops would provide the Tribals and other STs a regular and more reliable source of incomes and reduce the

temptation of encroaching on forest lands. Besides, they would be provided technical training on good agriculture practices, improved soil fertility and soil health management, eco-restoration techniques, planning along contour lines to prevent erosion, organic farming etc.

The project success will be documented and integrated in forest management for scale-up across the country to impact food and nutrition linkage with forest as part of policies and programmes.

D. Program Components and Plan of Activities (PoA)

1. FFSN Project will have 4 major components (i) Community Empowerment and improved access to social protection (ii) Forest Management for Ecosystem Services (iii) Tree based Livelihood Enhancement (iv) On- farm, off farm Livelihood support. A description of the program components and activities sequencing plan is described below.

D.1 Project period and phasing

1. Preparatory Phase: 0-6 Months
    a) Setting up of Project Management Units at State, Division, Ranges
    b) Inventory / Mapping of forest food and other resources for their nutrition relevance
    c) Community Planning
    d) Training Plan & Modules
    e) Establishment of Monitoring Framework. Preparing guidelines of operation etc
    f) Demarcation of forest area, treatment areas, map generation of intervention sites

2. Implementation Phase: 6 months-3 years
    a) Implementation of Project Interventions in forest blocks, project villages
    b) Capacity Building of Primary Stakeholders & Others associates
    c) Research & Development on Food Securities and Nutrition of forest fringe villages
    d) Strengthening livelihood opportunities through inter-sectoral convergence with Govt. Project & Schemes
    e) Formulation of protocol and framework on Community driven Eco-system (Forest) Management, Sustainable harvest.
    f) Gender Mainstreaming & Inclusive Growth
    g) Concurrent Monitoring: MIS & GIS Based Monitoring
    h) Documentation & Knowledge Management

3.Consolidation Phase: 4th year:
    a) Implementation of Project Interventions in forest blocks, project villages
    b) Establishment of linkages of communities with Govt. Schemes & Project, CSR Port-folio of Mines/Industries
    c) Establishment of Participatory Management of Forests & Community Resources
    d) Undertaking endline evaluation and best practice documentation, scale-up plan

4. Maintenance Phase: 5th Year

D.2 Preparatory Works

Project Inception

2. A Project inception one-day workshop will be held at Bhopal, Madhya Pradesh after selection of partner is completed, where representatives of participating SFD, Line Departments (Agril/PanchyatiRaj/W&CD, Watershed Mission, ORMAS, TDCC/TRIFED) etc will participate for an understanding of the project goal and identify area of convergence and cooperation

Constitution of PMC, DMU and FMU

3. As soon as the programe inception workshop is complete, required notification will be made by SFD/PCCF& HOFF for staff deployment to DMU (Division), FMU (Range) to strengthen the offices to carry additional responsibility and performing tasks envisaged under the program.

Deployment of Local Partner /field animator for community engagement

4. Each state will engage one agency for supporting community for implementing various activities. They will work in close collaboration with FMU and work for ensuring institutional strengthening, coordinating with line department and sustainability of VSS. The partner will be engaged for 3/5 years period. The agency will provide a team of 3 personnel comprised of Team leader, Community development coordinator, Forestry coordinator who will report to FMU head (Range Officer).

Orientation for DMU/FMU/Local partner

5.The orientation for the DMU, FMU staff shall be conducted in order to establish a shared understanding of the project objectives and approaches of FFSNP. An overview of the implementation, monitoring, and reporting modalities, financial arrangement, M&E design will be provided to the stakeholders

Survey and Demarcation

6. Survey and demarcation of the forest boundaries of the area to be treated under the project will be completed and ground marking by pillar posting is to be done. Drainage line to be treated are to be identified and marked on toposheet in 1:50000 scale. The VSS wise area can also be delineated for community protection, conservation and usufructs sharing. Land use, forest resources mapping can be taken up by use of satellite imagery interpretation and preparation and mapping of treatment maps. The areas under intervention both inside forest lands and village commons are georeferenced with GPS.

D.3 Component 1. Community Empowerment

1.1 Identification and strengthening of VSS and SHG

7.The project will be implemented through Community participation following the Joint Forest Management Mode of Forest Department. The existing VSS shall be strengthen, capacitated for implementing the project. Other community institutions such as Self Help Group, Common Interest Group (CIG) etc., based on suitability and requirement will be involved in implementation of project interventions.

8.VSS identification, selection shall be carried out within each FMU based on the selection criteria defined in sectionXXXX. The DMU will approve the list of VSS and SHG identified for project support. A cluster of VSS around the selected forest blocks will be identified for the project support. The Projcct will make an entry to VSS and proper briefing will be done to the members on the project activities. Records and registers to be maintained by VSS will be discussed with office bearers.

9.Women SHG in the selected VSS will be identified for the women empowerment and nutrition support related activities. Taking advantage of the wholistic micro plan/ annual plan, women SHG will also work on the health, nutrition, and cater for the strategic and practical needs along with the income generation activities. By converging with other department including Women and child development and the Health Department, these activities can be implemented as per the requirements of the villages. The identified Women SHG will also be associated Kitchen Garden Planting, NTFP enterprise etc

1.2 Microplanning

10. Microplanning is to be an empowering process, which would help communities to evolve as a responsible institution and understand the problems and challenges in sustainable management of resources, intersectoral convergence, livelihood development options. The participatory development of Microplan will build build a foundation of collaboration, community support and ownership in the long run. This will be a simplified planning exercise which will provide guidance for community to act and sustain the programme even after project withdrawal. The Microplan will focus on the beneficiary to be supported, forest area protection and management, quantum and nature of works to be implemented by VSS, resources to be generated within village, to be sourced from Project and line department etc, implementation priorities etc.

1.3 Community Mobilization & Capacity Building

11. Adequate capacity Building programme, sensitization programme, community awareness programme etc. will be incorporated in the project for effective implementation of project interventions in a sustainable mode. Capacity Buildings will be planned appropriately for all stakeholders, who are associated in implementation of project with a focus to primary stakeholders. The CB will include

a) Relating to implementation of Project Interventions
b) Sensitization on importance of nutrition and food security
c) Importance of supplementary nutrition for different age group and other vulnerable individuals
d) Means to improve the supplementary nutrition
e) Sensitization on Right Perspective entitlement relating to Nutrition & Food security

1.4 Training Plan

12. For systematically undertaking capacity development of the key stakeholder and the project staff, a comprehensive training the master plan will developed during the preparatory stage of the project. Rapid Training Need Assessment exercise will be undertaken across all the key stakeholder categories and based on the finding of TNA, a comprehensive Training Master Plan will follow a well-defined capacity development strategy to achieve project objective.

13.Actual Training Calendar will be developed by DMU and would be included as the plan of the Operation for the annual training calendar made by DMU. The topics of the training identified in the Training Master Plan would be developed during project implementation as per the emerging needs identified through various feedback, assessment reports, stakeholders meeting. Broadly customized training programme will be made for VSS and SHG, DMU, FMU Staff, Field Animators , NTFP Processors

1.5 Forest Food Plants and Mapping of Nutrition relavance

14.Mapping of forest resources and their nutritional relevance and undertaking an assessment of dependence of people living in forest fringe villages on forests will be the cornerstone of project planning. Access and availability of wild edibles from forests, village commons, farm lands will also lead to expansion of the same on a landscape level. It is important to make the community aware and also to gather ITK on forest resources specifically about prevalence, availability of food plants in particular along with other forest food tree, shrubs and herbs of the region.

a) Mapping of forest food- flora, fauna, medicinal plants in the selected forest blocks for nutrition relevance through RRA, Transect walk, FGD etc., field survey
b) Identify all Plants used for consumption, collection and harvesting of forest food products, and mark all trees on site. Field assessment of product availability, volume, seasonality, consumption pattern and quantity of surplus produce etc.
c) Scoping study for marketing of surplus produces at remunerative price, Opportunity for value addition, market linkage etc. for specified product
d) Assessment on availability of Forest food and Food Security, particularly in lean period.
e) Identify and measure wild edibles gathered from forest fringe, community land

1.6 Social Safety-net Scheme based Food & Nutrition Security

21. All safety-net schemes of Govt., which are linked to food security aspects of poor households at rural pockets will be ensured to all eligible beneficiaries through optimal coordination with the concerned departments. These include

a) Services of ICDS, MDM, TPDS, MGNREGS and other relevant schemes
b) Potential linkage with forestry and agriculture schemes
c) Linkage with health and sanitation related schemes
d) Old age pension / widow pension and other financial servics etc.

D.4 Component 2. Natural resource management for Ecosystem services

2.1 Common resource management and conservation plan for Forest Food

a) Promotion of Community driven Protection & Management of assigned forest to VSSs under Joint Forest Management Mode of respective State Govt.
b) Establishment and promotion of sustainable harvest management protocol for Forest Food

c) Recording and monitoring of conservation and improved management impact on tree growth, regeneration, fruits, flowers, seeds production

2.2 Ecosystem Services Improvement

2.2.1 Improved production through Stock Enrichment

a) Block Plantation of Food Trees inside Forests, Community land with 2 yr old seedling
b) Gap planting of Food Trees in selected blocks, (Single species, Mixed planting),
c) Introduction of selected food plants for diversity

(Species to be planted: ***Mango, Litchi, Jamun, Chironji, Sitafala, Tamarind, Bael (Aegel marmelos), Baer (Zizyphus mauritiana), Wood apple (Limonia acidissima), Elephant apple (Dillenia indica) Kendu (Diospyros), Kusum, Mahua, Nara koli (Phyllantus acidus), Amla (Embelia officinalis), and other species of nutritional relevance.***

2.2.2 ***Water and Nutrient inflow to farm*** (Through convergence of State Campa Fund)

a) Drainage line treatment from Ridge to Valley approach,
b) SMC measures as Gully plugging, LB Check Dam, RCC check Dams, Stone bunding, Staggard trenches, Percolation Pits,
c) Water harvesting structure on forest fringes; Gravity stream piping;

This can be implemented through regular forestry improvement plan of F&E Department under funding from CAMPA through Convergence.

2.2.3 Sylvicultural Operation

15. Microplan for forest food, Food plants conservation measures; Identification of Mother Trees, Sylvicultural operation of Forest blocks, *i.e*, Climber, Fire and weed control, Marking of Food plants, Soil working, watering and cultural operation around marked forest food trees in all forest blocks. This can be implemented through both Project funding and regular forestry improvement plan of F&E Department through Convergence.

D.5 Component 3. Tree based Livelihood Enhancement

3.1 Promotion of Agroforestry:

16. Farm Forestry will be proposed in the un-used / partially used up-land of the farmers (Patta Land), which has potential not only to produce food items every year also have some timber value in long run. More over systematic inter-cropping on farm land would add to food security and nutritional aspects for the forest fringe people.

Proposed PoA

Promotion of Farm Forestry Interventions of different Food & nutrition models

a) NTFP & Horti Model
b) Mixed Model (Agri-horti & Timber Model)
c) Bund-dyke Model

Inter-Cropping Mechanism:

a) Suitable crops will be raised through inter-cropping mechanism in the farm Forestry land during initial years.

The project will supply 2 year old seedlings free of cost to identified beneficiary and would incentivise the adoption by way of reimbursement of fixed planting cost after 2 years on survival.

3.2 Establishing convergence with nurseries for Forestry & Agroforestry plantation

a) Facilitate in establishing nurseries at community level for production of quality planting materials (Fruit, and other forest foods, Medicinal seedlings etc.) Species include *Chironji, Bahera, Amla, Kaitha, Jamun, Bael, Tamarind, Phylanthus, Sitafala e*tc).
b) Free distribution and Forest & Farm Forestry planting materials to the beneficiaries.

3.3 Promotion of Home Garden for Food & Nutrition

17. Back yard *"Kitchen Garden"* will be promoted to ensure availability of micro-nutrient in the food basket of the forest fringe villages round the year. The beneficiaries, shall be linked with Govt. Schemes for availing the required input materials for kitchen garden, in addition to providing them with fruit seedlings (*Mango, Litchi, Guava, Drumsticks, Jamun, Lemon, Amla*) from Project Nurseries. Adequate capacity building programme will be taken up for promotion of kitchen garden with least water supply system.

a) Identification of beneficiaries, who are willing to take up kitchen garden initiatives under project interventions.
b) Provision of inputs for kitchen garden
c) Sharing knowledge on optimal use of locally available inputs for organic way of farming.
d) Capacity Building programme for raising of kitchen garden

3.4 Collectivization and community engagement for up-scaling production, quality control

Proposed PoA

a) Solar drying of Leaf, fruits, seed, flower, Bagging, Quality control, Storage.
b) Funding and training for Forest food, Forest Food based micro-enterprise

- Assessment of market systems for forest food

a) Feasibility studies; Value chain analysis for selected products, product improvement plan,
b) Linking SHG, VSS with ORMAS, TDCC, TRIFED

- Business incubation support

a) Supporting producer collectives, Infrastructure and technical support,
b) Seed financing of forest food Business start-ups (eg., *Jamun syrup, Amla juice, Dried Amla, Bahra, Hara powder, Leaf plates cup, Grass ropes, Certified forest seed units, Lac, Tree seed oil units etc*)

D.6 Component 4. Support On-Farm, Off-farm Food and Nutrition improvement

4.1 Agri-based Food Security

18. Existing agri-based farming practices, if any, will be supported across the project villages with improved inputs and technical know-how. Traditional know-how on farming practices, irrigation, improvising soil fertility, seed selection, organic way of cultivation, which are time tested and beneficial will be documented. Learnings of such traditional know-how will be shared in the project villages, across the state for information and up scalation, subject to applicability. Convergence with Agriculture department program will be made for operationalising the component.

a) Mapping of Agricultural Practices (Type, practices, facilities, Yield, consumption pattern, marketing pattern etc.)
b) Improvisation of existing agricultural practices, if required. These include timely supply of agricultural inputs, improved irrigation facility, assured insurance provision etc.
c) Documentation of Traditional know-how and best practices.
d) Provision of storage of agri-produces and linking with market for sale at remunerative price.

4.2 Off farm based Food & Nutrition Security (Pisci-Culture, Api-culture, Poultry etc.):

19. Off farm based Food & Nutrition Initiatives such as Pisci-culture, Poultry, Api-culture, Mushroom Cultivation etc. will be promoted at community level, subject its suitability and willingness of the beneficiaries. Such initiative would be a means for alternate livelihood for the forest fringes households.

Moreover, this would add nutrition to the food plate of the villagers.

a) Mapping of potential beneficiaries and availability of resources for off farm based interventions.
b) Linking with Govt. Schemes & Programmes with the beneficiaries for long term promotion of off-farm based livelihood interventions.
c) Initial supply of required inputs to the beneficiaries assuring adequate beneficiary contribution (preferably through SHG / CIG mode).
d) Insurance Provisions
e) Provision of Revolving Fund at Community level
f) Capacity Building Programme

4.3 Non-Farm based Food security: Promotion of sustainable livelihood:

20. Along the implementation of different interventions to address the Food and Nutritional security of the forest fringe villagers, it is highly essential to plan & facilitate for long term livelihood options for the villagers. Increase in household level economic condition contributes significantly in improving quality of life. Such sustainable means of alternate livelihood would also ensure improvement in food & nutrition of the target beneficiaries under the project interventions.

a) Organising Camps at community level on the benefit of employment linked skill development programme.
b) Identification of local youths interested to be enrolled for employment linked skill development programme.

c) Coordinating with different employment schemes for enrolment of local youths (both boys and girls) for training.
d) Ensuring employment linkages of trained youths and facilitate for self employment.

Micro-Enterprise Development & Business Planning

22. Using the result of market research prepared by WFP, the field agencies will assist the FMU in preparing plan for different microenterprise development as indicated in Table…. This will include review of results in local context, identification of possible IGA, assessing financial and technical feasibility in the local context, preparation of business plan in consultation with producer group/SHG/VSS. Identified persons from village will be provided training for running the machinery conducting value addition etc through Field functionaries/animators with assistance from other agencies, TDCC, TRIFED, KVIC, RMS.

23. Based on the IGA plan, the DMU will provide fund to SHG/Producer group to meet the cost of product development, aggregation, purchase of equipment, establishment cost etc. PMU will also establish linkage with financial institutions for upscaling and sustain the microenterprises in the long run.

Cross cutting Issues:

a) Cross cutting issues such as access to food and nutrition security due to disparity on gender are to be addressed through optimal sensitization programme.
b) Addressing "Inclusive Growth" through equity approach ensuring the poorest of poor and vulnerable households are adequately covered under food and nutrition programme.

D.7 Research and Documentation

24. Developing Tissue culture, Clonal propagation protocols for selected Forest Food Plants; Nursery protocol standardisation, Standardisation of Planting design, spacing, fertilising models by outsourcing to RPRC, Agril. University.

a) Field guide on Forest food plant propagation and management; Agroforestry models (Tree-crop-Livestock)
b) Book on Forest Food Plants of India.

Table Forest Foods based Enterprise Promotion (Indicative)

SL NO.	Forest Food	Key issues to be addressed	Interventions	Partner Agency
1.	Covered under MNP Tamarind, Honey, Karanj, Karaya, Lac, Mahua flower and Mahua seed,	• Lack of adequate Primary Procuring Agencies • Poor awareness among the	• Preparation of a procurement plan-annual. • Negotiation for timely price fixation (MSP) based on the prevailing market price. • Mass awareness campaign to create awareness among the primary collectors.	TDCC, TRIFED, SFDC, RMS

	Chironjee , myrobalans	primary collectors • Poor procurement	• Strengthening the district level structure and efforts for implementation of MSP scheme. • Formation of PPAs at the village as well as the cluster level (wherever cluster organisations are there). • Strengthening of PPAs- procurement arrangements, arranging revolving fund, quality control etc. • Monitoring the procurement procedures and payment to the primary collectors and also to the PPAs. • Market research and promotion.	
2.	Kendu Leaf	• Declining quality of leaves • Declining production in VSS areas	• Preparation of overall strategy and work plan for improving the quality of kendu leaf and also to enhance the production from the VSS areas through the project VSSs. • Building capacity of the VSSs to oversee o Bush cutting o Leaf collection o Phadi management o Other operations • Sensitization of pluckers. • Building the capacity of pluckers in sorting, grading, drying, binding/bundling etc.	• SFDC
3.	Lac	• Declining production • Transit restriction even from the private land • Lack of availability of brood lac	• Identification of suitable areas and VSSs. • Promotion lac farming through VSS- both in the forests and private land- training and other inputs. • Creation of facilities for storage of brood lac. • Smoothening the process of obtaining transmit permit • Market promotion.	• TDCC, TRIFED
4.	Bamboo	• Declining production • Poor management of bamboo areas	• Analysis of factors causing degradation of bamboo areas-bamboo production. Important factor may be production of Karadi- bamboo shoots- which is a prohibited activity. Need silvicultural interventions to facilitate bamboo shoots production from selected area. • Developing overall strategy for scientific management of bamboo in forest area, VSS area and private land.	• SFDC and SBDA

			• Working with VSS for scientific management of bamboo in VSS area as well as grown on the private land. • Enhancing the production of bamboo and ensuring better returns to the VSSs as well as private growers.	
5.	Siali Leaf	• Lack of organised production • Declining quality of leaf and availability of raw materials	• Work with VSS for productivity enhancement operations within the VSS area to ensure increased availability of good quality siali leaves. • Action research with the Forest Department on the silvicultural prescriptions for production enhancement. • Mass awareness campaign on sustainable harvesting of siali leaf. • Setting up processing facilities and capacity building of producers to enhance production, quality control etc. • Market promotion.	• RMAS
6.	Hill broom	• Lack of access to better markets • Poor quality of brooms	• Mass awareness campaign on sustainable harvesting of broom grass. • Promotion of cultivation of broom grass both in VSS areas as well as on the private land, wherever feasible. • Training of primary collections on sustainable harvesting. • Capacitating VSSs to monitor the sustainable harvesting of broom grass from the forest areas. • Setting up processing facilities and training of producers to run the facility. • Consistence market research and accordingly improvements in design and quality of products. • Marketing and ensuring higher returns to the producers.	• RMS

E. Financial Management, Procurement and Governance

E.1 Financing of the Programme

1. The Programme will be funded mainly through National CAMPA Fund. It is expected that the Ministry of Agriculture and Ministry of Tribal Development would also provide a part of the project cost for converging various activities supported by the respective ministry. Possibility of State counterpart financing from State budgetary resources, funds from Special Central Assistance to Tribal Sub-Plan, funds from the State Mineral Bearing Area Fund (eg., OMBADC in Odisha) etc will also be explored as the program goes underway. The resources from State Govt. (including funding from the GoI) will be clubbed together as counterpart funding at the programme level, though the programme will track each of the components of the counterpart funding separately for reporting purpose.

Programme implementation

2. The programme will be implemented in 30 villages covering 3 districts of the selected States. The Range will function as FMU (Programe Implementation Unit) under whose supervision programe activities will be carried out in collaboration with VSS/JFMC and SHGs. The Division office will function as DMU and DFO will be in charge of overall administration of budget guide and supervise the activities to be carried out by Range, Field Animators, VSS. Activities to be undertaken by Village Institutions will be made and governed by their respective Memorandum of Association made between Range and Village bodies. The Financial reporting formats will be approved by state PMC.

Subsidiary Agreement

3. As the Government funds and WFP financing are transferred to the implementing agencies, through PMC of SFD, the will enter into a Subsidiary Agreement with each of the DMUs. Among other things, the provisions of the Subsidiary Agreement should include (i) The DMUs declare its commitment to the goal and objective of the Programme and, in furtherance of such goal and objective, they shall undertake to carry out the Programme in accordance with the Financing Agreement and with the

Programme Agreement; (ii) preparation of annual plan and fund flow arrangements (iii) physical and financial reporting requirements (iv) auditing and submission of Programme Financial Statements (v) adherence to State Procurement Guidelines and approved Procurement Plan; (vi) using bank interest earned for eligible expenditures

Staffing

4. The DMU and FMU will provided person with financial accounting experience from existing staff of the department, or through outsourcing as per the approval of PMC. All positions will have clear job descriptions outlining duties and responsibilities.

Budgeting

5. During the programme implementation, the DMU will consolidate the annual work plan and budget including the annual action plan of the Micro Plans and submit the consolidated AWPB to the PMC for approval. After PMC approval and PSC"s (MoEFCC) concurrence, SFD will incorporate the budget and other funds from the State in its budget for legislative sanction. SFD will also submit the AWPB for the funds from the GoI to the MoEFCC for accessing the funds at least 3 months before the start of the programme year. The funds will be transferred to the on non-lapsable basis and the funds for implementation of planned activities will be transferred to the Range as Grant-in-Aid. While transferring the Grant, details of the share of each of the funds to be specified, for effective tracking of utilisation. SFD will adopt sound fund management practices so that adequate funding is available to the Ranges for each quarter.

E.2 Disbursement Arrangement and Flow of Funds

6. The PMC of SFD will be responsible for approving the AWPB for the programme submitted by DMU by consolidating the AWPBs of all village clusters. Funds will flow from the MoEFCC to the State Forest Development Agency (SFDA) as non-lapsable funds in one or two tranches for the entire project period. The funds from SFD will be transferred to Range (s) as Grant-in-Aid through DMU (Division Office).

7. For funds flow arrangements at the DMU will open a separate bank account in a bank for undertaking programme activities. Each Range will open a separate bank account, in any bank mutually acceptable to PMC, to receive the funds from PMC and to meet all eligible expenditures. The bank account will be operated by RO as per the FDA guideline.

E.3 Internal controls

8. Procedures and record maintenance at the Range have to be significantly strengthened by addressing the issues of non-availability of skilled finance staff, setting up of internal controls, setting up of effective monitoring and review, introduction of accounting software, with guidance notes and above all capacity building of the finance staff. The system of joint signatory for operating the bank accounts

or appropriate authorization processes will be introduced. Detailed procedures for recording, management and safeguard of programme fixed assets will be as per the record manual of SFD.

9. The financial accounting of the FFSNP will be done through computerised accounting software (like Tally) at all levels, which will be customised to generate financial reports for the SFD and MoEFCC specific reporting. Each FMU will submit the Monthly Progress Report to the DMU electronically. For the communication and data transfer purposes, FMU will be strengthened and staff trained on the reporting and recording in digital MIS system developed by WFP. Financial reporting standards used for financial statements preparation will be accrual, the ones used by the GoI.

Internal Audit

10. The auditing of programe expenditure will follow the conventional SFD auditing route to effect monitoring and review of the financial systems and procedures. It would be a good practice to brief the appointed auditors on the programme components, methods of implementation, monitoring arrangements, etc so that they could deliver the reports effectively. The Internal Auditor will report directly to the DFO and state machinery.

External Audit

11. The external auditing arrangements for FFSN will be established in two tiers
(i) Independent External Auditor, (ii) Compliance and Performance Audit of the Office of Comptroller & Auditor General (C&AG). As the DMU is a part of the SFD, Office of the C&AGl will undertake Compliance and Performance Audit of the Department. However, due to heavy work load of C&AG the timeline for submission of audit report to IFAD may not be ensured. In view of this, the financial statements of the programme will be audited by an independent auditor (Chartered Accountant firms) using ISA or Indian National Auditing Standards. The independent auditor will review and follow-up on the recommendations/remedial measures prescribed by the previous Audit/C&AG audit. The audit of the programme will be done as per the CAMPA Guidelines in force. The audit report along with the Programme Financial Statements and other opinions of the Auditor should be submitted to MoEFCC within 6 months of the end of the financial year.

E.4 Procurement Arrangements

12. Procurement of goods, works and services under FFSN financed from resources provided by MoEFCC will be undertaken in accordance with SFDs Procurement Guidelines and rules of business. National Competitive Bidding, Shopping and Direct Contracting etc will follow the procedures and processes defined in the SFD financial manual. The DMU shall also follow Quality and Cost Based in case of consultancies and services. All procurement for goods, works and services financed from resources funded require bidding documents and the contracts to include a provision requiring suppliers, contractors and consultants ensure compliance with MoEFCC zero tolerance to anticorruption policy and to have them audited by Independent auditors.

13. Procurement involving community participation. Communities would be empowered to undertake procurement as a service provider or an implementing unit through Village Development Committees or as a SHG under a legal framework or through a Social Agreement for procurement. The operational and implementation arrangement would be defined in the Project Implementation Manual which shall include implementation, administration, financial management and procurement related activities supported by the clearly define the roles and responsibilities of the intermediaries who will assist the VDC/SHG in performing the activities. GoO will issue an order permitting procurement involving community participation.

E.5 Governance

14. FFSN would include a integrated framework for good governance appended to the project Report. This framework is to ensure: (i) transparency, with information in the public domain; (ii) accountability in the use of resources; and (iii) participation with the people having a voice in decisions that may affect them. The involvement of affected communities in all stages of programme implementation can simultaneously improve development of outcomes and reduce the scope for fraud and corruption. Key features of this Governance Framework are a strong framework for mitigating corrupt and fraudulent practices in the under the programme which include:

15. The DMU will maintain Branch Management functionalities along with comprehensive functionalities such as Accounting, Finance, Inventory, Purchase, Payroll and Branch (Range) Management. This will enable and improve operational transparency and efficiency and management of the Project. Decentralised and participatory planning, monitoring and decision making processes through Local Government and grassroots level participation in planning, monitoring and decision making improves the governance process.

16. Transparency will be maintained by way of Regular Annual Outcome Surveys with programme outputs both in terms of coverage and quality. Reporting of results to respective RCCF, PMC, PSC, WFP, MoEFCC and with key information published on a programme website will ensure responsive governance

E.5 Project Cost

PROJECT TOTAL COST (INR 45.55 Crore)	
COST SHARING OF THE PROJECT	
Agency	**Cost(in Lakh)**
MOEFCC	**4035**
MINISTRY OF AGRICULTURE	**220**
MINISTRY OF TRIBAL AFFAIRS	**150**
WFP, India	**150**

Total	**4555**

Total cost of the project for the three states by various planned activities is provided in the matrix below:

	OUTPUT/ OUTCOME	ACTIVITIES	BUDGET(in INR LAKHS)	SOURCE OF FUNDING
1	Forest Food Plants and Habitat Assesment			
	1.1	Identification of Sites, Villages	6	CAMPA
	1.2	Food Plants Resource Mapping, & SE Baseline	30	CAMPA
	1.3	Survey and Demarcation of Area	15	CAMPA
	1.4	Business Plan for Food Plant products	30	CAMPA
2	Community Conservation of Forest Food Plants			
	2.1	Community mobilisation for sustainable harvesting	15	CAMPA
	2.2	Community protection, tending	185	CAMPA
3	Engaging, Strengthening of VSS/JFMC			
	3.1	Preparation of Microplan	10	CAMPA
	3.2	Plant product Collectivisation	40	CAMPA
	3.3	Value addition to Forest food products	50	CAMPA
4	Forest Improvement			
	4.1	Establishment of Food Plant Blocks	1900	CAMPA
5	Improving Food Plant Productivity through Sylicultural Tending			
	5.1	Identification, marking of food trees, shrubs for treatment	35	CAMPA
	5.2	Climber cutting	70	CAMPA
	5.3	Fire line tracing	70	CAMPA
	5.4	Soil working around food plant	14	CAMPA
	5.5	Watering of Food plants	15	CAMPA
6	Improving Food Plant Productivity through Soil& Moisture			
	6.1	Gully Plugging, Drainage line treatment	320	CAMPA
	6.2	Water Recharging	250	CAMPA
7	Fruit Tree Farming on Crop, Wasteland, Backyrad			
	7.1	Nursery and QPM	100	MoA
	7.2	Agroforest of Crop-Food Plants	82	MoA
	7.3	Homestead Food Forest	38	MoA
8	Microenterprise establishment of Forest Food and NTFP products			
	8.1	Equipment, Infrastructure, Processing, Marketing, Branding for 6 products	150	MOTA (TRIFED)
9	Research on Forest Food Plants Bioprospecting, Propagation			
	9.1	Vegetative &TC Propagation	150	CAMPA
	9.2	Nutrient&Biochemical Analysis	100	CAMPA
9	Documentation of Best Practice			
	9.1	Documentation	70	CAMPA
	9.2	Workshop, Disemination	50	CAMPA
10	M&I System			CAMPA
	9.1	MIS System Design, installation, M&E support, Monitoring, Impact Asssment&End Line survey	150	CAMPA
	9.2	Auditing	30	CAMPA
11	Capacity Building for Food and Nutrition Imrovement			CAMPA
		Support for improved nutrition consumption and food improvement	30	WFP
		Support for Nonfarm-based food improvement	90	WFP
		Support for Food Nutrition-Safety Net Program	30	WFP
12	Training of Stakeholders			CAMPA
		Orienetation to Field Functionary, NGO	10	CAMPA
		Training Need Assesment	20	CAMPA
		Training of VSS, SHG,	25	CAMPA
		Training of staff	15	CAMPA
13	Project Management			
		DMU/FDA strengthening (Equipment,communication)	60	CAMPA
		FMU strengthening (Equipment, Communication)	90	CAMPA
		Support Staff cost	90	CAMPA
		Field Animator cost (3 Teams)	120	CAMPA
		TOTAL COST	4555	

F. M&E and Knowledge Management

1. Primary challenges for this project is to achieve the goals and the objectives with the constraints in the terms of the scope, time and the budget. M&E is important management function to track project progress and support the decision-making processes at all level. Sound of M&E systems can support project management to attain the project goal while engaging the stakeholders in the project progress and achievement, learning from mistakes, and to introduce corrective measures for improving the overall strategy and operation. The key purpose of good M&E is to obtain accurate information that will be used by decision makers in the project to improve and ensure proper use of resources as well as to maximize the results and benefits achieved from these resources. A system is therefore need to be established for the data collection from the lowest level of project implementation, for the analysis to provide continuing inputs to the management and implementers. The M&E system of the FFSNP will be expected to perform and achieve four essential objectives: (a) to monitor and manage project progress; (b) asses project outcomes and impact; (c) capture and disseminate lessons learned and good practices; and (d) build local capacities for M&E (e) facilitate cross-learning between the three states.

F.1 Focus and Assumption

2. The focus of the project will be M&E system will be on

a) To track project activities, progress and process
b) Identifying on what the project is working well and what is not, and thus help management for decision making and apply corrective measures during the course of implementation.
c) Evaluate the performance of activities and various institution
d) Estimate project impacts and result on the ground and document lessons learned that could be used in future project implementation

The key Assumptions that are made while suggesting the M&E plan are

a) The present project design would be adopted with little or no changes
b) State Government and the forest department/ DMU would work in facilitation and capacity building
c) DMU will be made fully responsible for involvement and plays the key role in planning and implementing of activities
d) Target group/ stakeholders will be actively involved and key role in planning and implementing and O&M of the project intervention
e) Institutional arrangements will be in place to provide mobilization, planning, capacity building to support target groups

F.2 M&E Framework for FFSNP

3. The monitoring and evaluation framework is developed considering the project objectives and the goals focused on improving the Forest ecosystem of selected Forest Divisions in Odisha, MP and Jharkhand to the extent possible being addressed by improving availability and accessibility to forest fruits, seeds, flowers and livelihood opportunities of forest dependent population. The framework would help to measure implementation performance in three ways:

a) Progress monitoring
b) Process Monitoring
c) Results monitoring

4. Evaluation will build on monitoring the data and would be utilized to assess following aspects which will be done during Phase Out time; It will be done midway and end term. The end of project evaluation will bring-out the success stories, good practices for replications and learnings and will feed-in to develop a scale-up plan

5. Efficiency: To what extent has the project has involved the targeted community institutions and local stakeholders in participation and ownership; To what extent the Forest improvement and livelihood promotion has been efficiently managed

6. Effectiveness: To what extent has the project been effective in helping restoring food plant stocks in the forests and forest fringe landscape, to what extent it has improved food diversity and to what extent it has improved water availability to forest fringe farms, and to what extent did the project achieve its mandate of strengthening community institutions and actions to improved livelihood through Forest food value addition and marketing; what are the factors of achievement/ non achievements.

7. Relevance: To what extent is the project relevant response to the multidimensional aspects of enriching forest with food plants stock, strengthening community action for improved forest management, livelihood opportunities for weaker sections, women and tribal; what real difference it has made to the beneficiary/ target group socio-economic scenario

8. Sustainability: To what extent did the benefits of the project is likely to continue after funding period; to what extent the SFD/JFMC has owned and adopted the project, to what extent the convergence with other schemes has achieved and indicate sustainability of all/some program; Reason of non sustainability and factors

F.3 M&E Implementation arrangement

9. DMU will regularly monitor and keep record of the physical and financial inputs and output of project activities. To facilities this, DMU will engage a full-time forest officer (ACF) having relevant experience in MIS and GIS system. For data base management and recording, reporting etc, DMU strengthen existing GIS/MIS cell of the Division and may engage contractual IT skilled person during the project implementation. such data would be utilized for generating various project report's purpose. The DMU will coordinate with all units in monitoring the program on a day-to-day basis. In the process it will coordinate with FMU, Local organizations, VSS to keep track of the activities to gather data and analyse for reporting, evaluation purposes etc. As far as practicable local organizations and JFMC/VSS would also be involved in monitoring the input-outcome dynamics of the program implementation. Representatives of the involved institutions/agency will be suitably trained for the purpose, data collection use of appropriate tools etc.

10. The DMU will adopt standard accounting software for fund management and project accounting and would utilize standard computerized SOEs at all operational levels viz, DMU, FMU,s. DMU may modify existing web enabled MIS in use by the SFD and can customize and tailor it to meet the requirements of FFSNP. The modified MIS will be utilized to consolidate and mange primary data reported by field units.

11. Specialists of WFP will design, guide and assist DMUs to prepare M&E strategy, formats, and system to be adopted in gathering of data, analysis and reporting design, schedule etc.

F.4 Reporting Requirement

12. DMU will prepare reports on prescribed reporting structure and timely furnish to PCCF&HOFF, WFP to apprise the implementation process. DMU will also publish annual report at completion of each fiscal year. The project will be available both in print form and as well in digital form and shared by way of publications and project website to facilitate further information dissemination.

13. The reporting template will be developed by WFP in consultation with PMC/DMU during first year of project operation. The report will include a) physical progress and financial expenditure by components/sub components, photographs, table, graphs, to support claimed achievements, b) project operation status, effect indicators, c) problems/constraint encountered during the reporting period

14. APO (Annual Plan of Operation) will be made for each fiscal year. DMU will get it approved from PMC by March every year and would share with WFP, MoEFCC. For this DMU need to regularly follow up with all stakeholders to get required information. Necessary training to project staff, NGO, VSS can be imparted by DMU in this respects.

15. Monthly Progress Reports (MPR) will be prepared from the project MIS developed to generate information at the Village/VDC/Palli Sabha and local levels for reporting to the DMU. Information in the report will contain component/sub-component wise physical and financial progress against annual targets. This report will form the basis for monthly progress reviews at DMU levels.

16. Quarterly Progress Reports (QPR). Besides reporting physical and financial progress this report will contain information on challenges encountered in implementation and corrective actions and solutions to address constraints as well as community's response to project-initiated activities. For this purpose, the indicators to be monitored, reported should be harmonized to the extent possible with project logframe. The QPR will be shared by DMU with PMC, WFP, MoEFCC.

Table Annual M&E Activities Calendar

Key activities	APRIL	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MARCH
M&E Activities at the DMU/MPA/partner agencies												
Annual progress performance review & partner agency performance review												
AWPB preparation and submission												
Annual progress report												
Half-yearly progress report												
Annual outcome survey report submission												
Quarterly results report preparation (outputs/1st level results)												
Quarterly review meetings at DMU & MPA												
Focus groups and key informants interviews (Theme or output based)												
Data collection for physical & financial progress by MPA and Partner agencies												
M&E Activities specifically at Village/VSS level												
VSS/ level for PME meetings												
SHG meetings and data recording												
Data recording by producer groups, VSS												

17. Annual Progress Reports will be prepared from information compiled by the DMU on component/sub-component wise physical and financial progress. The information will be generated via the project MIS and could contain summarised information and data from villages and Ranges, and also findings from Evaluation and annual outcome surveys, showing progress towards development objectives, usefulness of training, benefits from component/sub-component interventions, gender issues and knowledge management. The reports could be dovetailed with case studies of successful interventions.

18. Annual Outcome Survey (AOS) Report: The first AOS will be done in the second year of project implementation after completing a full first year of project implementation. AOS in FFSNP will be for a calendar year (January to December).

19. Mid-Term Review Report (MTR): WFP in cooperation with the Government would undertake a mid-term review by the 2nd year of the project lifecycle to review project achievements and implementation constraints including issues relating to fund administration and financial management. Any corrective measure would be addressed at MTR. A mutually agreed action plan will be prepared based on the MTR findings for phase out activities and to draw sustainability plan.

20. Project Completion Report (PCR): As the project reaches completion point, the DMU would prepare a draft Project Completion Report based on WFPs Guidelines for Project Completion. A review workshop will be held for presentation of completion report and project takeaways.

21. Case studies on project innovations and success stories: WFP will undertake case studies of project innovations and success stories on selected themes for its wider dissemination through publications, WFP Country Newsletters.

F.5 Information Flow

22. A transparent and effective communication flow between all operational units is a prerequisite for program implementation and sharing of ideas and interests of stakeholders. Clear role and responsibility to maintain the information flow is also essential for steering activities by program managers. The FMU (Range), local partner and DMU are the major players in the FFSNP. The M&E programe can be put under overall responsibility of ACF deployed to the division. Paper based reporting can be adopted for information from VSS/JFMC. But agency onwards, it can be through computerized MIS. Data compilation and reporting of VSS level data and information is to be facilitated by partner organization. DMU would support FMU to ensure connectivity and requisite infrastructure using project fund. The information from lowest operational level to the DMU will be utilized to generate reports indicated in previous section.

F.6 M&E System for FFSNP

23. Following the M&E framework, activities for tracking project progress and performance will be systematic carried out during the project implementation. The methods are detailed in the Table below.

Monitoring

Concurrent Monitoring and periodic reviews

24. It involves field visits, periodic reviews, reporting, assessment of feedbacks etc. which mostly would be an in house routine affair. Standard checklist, semi structured questionnaire and set of indicators would be developed by DMU for concurrent monitoring. The planned activities would be monitored against Annual Plan of operation. DMU would create system for undertaking of field visits by SFD officials at regular intervals and feedback the project managents by way of "tour notes". Concurrent monitoring and periodical reviews will be effected by different agencies as FMU, DMU, Regional CCF, PCCF, WFP etc.

Table: Frequency of Monitoring & Review Meetings

Frequency	Stakeholder/Agency
Fortnightly	Field animators, VSS/JFMC/SHG
Monthly	Range (FMU)
Quarterly	DMU
Six-monthly	Regional CCF/PCCF &HOFF
Annually	PMC/WFP/ MoEFCC

Intersectoral coordination meeting

25. Intersectoral coordination and convergence meetings will be conducted as per the necessity both at the district and state level. These meetings would provide opportunity to share the programe activities with line departments and scope for convergence with the existing resources, and delivery of sectoral services in alignment with project objectives. At the district level Collector will be requested by DFO to chair such meetings and at the state level, ACS Forest can take up coordination meeting for integration of

Computerised MIS & GIS

26. Web-enabled MIS would be utilized for capturing the progress and achievements on day-to-day basis. MIS will be planned till range-level from where the data would get integrated upwards. This would be done in phased manner. Paper-based formats would be used to capture information at VSS/EDC and SHG level. The output reports generated by the MIS would give status of project performance.

27. The existing MIS software will be modified by DMU within first year of the project initiation. In-house capacities of the DMU built during implementation of project would be utilized to design or modify MIS modules as per the MoEFCC requirements considering the project logical framework and proposed M&E system. Later PMC would also guide on to strengthen the MIS reporting. Training manual would also be developed by WFP for the MIS and capacity building and will be used to train the project staff at all level of operation.

Computerised Accounting system

28. Computerised accounting system based standard accounting software would be utilized for maintaining financial record till range level for real time reporting. The accounting software would be customized and adopted for financial management, tracking disbursement as per annual plans and compiling statements of expenditures (SOE) for submission to PMC, WFP, MoEFCC etc. DMU and FMU would be supported with additional human resources, equipments etc. Suitable training will be organized by DMU to acquaint them with the necessary process and use of the software, generation of reports.

GIS Applications

29. All the project sites and treatment areas would be geocoded and would be translated on to digital maps for planning and analysis. It would be also important to record GPS locations of all assets created under the project (Infrastructure, Plantations, Soil -Water conservation, forest food processing center etc) for close monitoring and work progress tracking. For impact assessment studies and quantification of ecosystem services, technology based monitoring tool and techniques (eg., Imagery assessment) shall be used during phase out period.

Annual Strategy planning and Review workshop

30. The annual strategy planning and review meeting would be organised at state level at the state headquarter for consultation and discussion between DMU, PMC and WFP. This will be aligned with the timing of WFP support mission visit to states. And at project level, annual review and consultation workshop will be held at New Delhi where representatives of SFD, DMUs, MOEFCC, WFP, invited experts will participate. All will be one day event. Learning, synthesis will be complied by WFP and circulated to all for follow up.

F.7 Assessments of Results

Annual Outcome Assessment

31. AOA would focus on outcomes in context of the project outputs achieved by the project. Framework of the AOA would be developed by following logical framework of the project.- will be part of the oversight mission. The AOA would also review the Annual plan of operation, quarterly reports and other reports produces during the financial year and financial performance and target achievement by all stakeholders. WFP would prepare the AOA by outsourcing it to local Govt. Agency/ institutions. It

will be effected from completion of 2nd year onwards as preparatory activities will be taken up mostly in year 1.

Baseline & End line Survey

32. The overall base line would be created prior to initiation of project intervention, viz., a) Socio-economic, b) physical situations of the project areas, c) mapping of resource use, d) level of food insecurity etc. Base line data of each VSS shall be useful in making Microplan for individual village/ cluster of villages. Information will be gathered by the selected credible agency from representative target groups and project areas on identified parameters and variables to be designed and supervised by WFP. Baseline, and end term surveys would be helpful in measuring impact of the intervention in quantitative and qualitative ways. Sampling design, methodology, project sites, targeted individuals/groups for survey etc will be decided by WFP in consultation with DMU. Baseline will capture scenarios in control villages/sites and data will be utilized as reference for making comparisons during evaluation exercise. Use of GIS technologies could also be adopted as feasible for strengthening physical assessment of forest sites, farmers plot, community land, etc.

Thematic Studies

33. To have a better understanding of community-forest dependence, flow of natural resources across ecosystem, response of the nature-based solution etc, in-depth analysis of human-nature interactions in a project context would be inevitable. It is likely to reveal factors responsible and reasons of non-satisfactory outcomes through defined process as envisaged. It may so happen that some areas, or and some factors could be innovative and performing exceptionally well, which need thorough study for adoption, expansion, replication and dissemination of contributing elements. Measurement of biodiversity, ecosystem services, sustainable harvesting and its effect on availability and food diversity etc, are some the thematic area for examination.

F.8 Audits

Social Audit

34. To empower the VSS/JFMC member and community in decentralized planning and decision making and to bring in transparency in the process, a six-monthly social audits would be in place. This one-day event would give an opportunity to all members to know about the project activities and raise voice, if concerns are identified, records, achievement, expenditure, wage payments etc are placed before community. The local organizations, Panchayat members, field staff would be associated with the event. DMU will develop guideline to conduct the exercise. Proceedings of the social audits will be compiled by Forester with help of partner agencies for reporting to DMU.

Financial Audits

35. Project would provide support to undertake annual statutory financial audits of the fund provided to implementing agency during the financial year. Separate bank accounts will be opened by DMU, FMU and would be annually audited by qualified CA firm.

F.9 Learning & Knowledge Management

36. The project will endeavor developing various knowledge products depending on the target audience and information needs. The knowledge products could be in the forms of publications, documented case stories, photo documentation, videos, charts, manuals, etc. The M&E unit in WFP will take lead in knowledge products development and dissemination by involving all subject matter specialists in the project including providing capacity training on knowledge management as appropriate. For meaningful learning and knowledge sharing, knowledge products should be of quality with clearly identified audience and purpose.

CATEGORY	ACTIVITIES
Knowledge Management	Project Operation and Accounting manual, Guidelines, Manuals, Handbooks, Flip charts, Posters, Brochure/Leaflet, Books, Activity Calendar/Plans, Process Document and cross-learning/sharingetc.

Internal Communication

37. It is to take adequate measures to support and efficient flow of information within, and keep the stakeholders updated. Following activities would be planned under the sub-component.

CATEGORY	ACTIVITIES
Internal Communication	Procurement of equipment and publicity aids, Project Office Orders, Proceedings, Review and Tour Notes. Emails, Bulk SMS.

38. DMU is further strengthened with communication and publicity aids, and adequately supported with equipment, gadgets to photo documentation and creation of video clips that could be utilized both as knowledge material as well as for dissemination for best practices. Further, allocations are made for utilizing services of bulk emails and SMSs for sharing information and messages with the stakeholders at all level of operation.

External Communication

CATEGORY	ACTIVITIES
External Communication	Print media, Electronic media (Radio/TV)-jingles, spots, talks, etc., Newsletter/Magazine, Short films, Workshop/seminars, Publications-

	Papers/Articles, Success stories, Annual reports, assessment reports etc., Project website.

39. It is to make sure that outputs, results, and best practices are shared outside as well as with the stakeholders and disseminated to all in an effective manner. Following activities would be planned under the sub-component.

40. Print media could be utilized for sharing events and messages including announcing of tenders and recruitment notices, in addition, Electronic media (Radio and Television) should be utilized for spots, jingles, talks and messages on various aspects of the project. Forest Department Newsletter will be provided with relevant output and outcome by M&E Unit for publication. Short films/documentaries could also be prepared during the course of implementation to feature successes key thematic processes of the project.

41. DMU would be responsible for identification and showcasing successful business models, and also encouraging women SHGs for product development and sales. At several stages during project implementation, it would be necessary to have consultations on various generic issues and areas where project may require views, collaborations and for sharing successes as well which can be achieved by participation in workshop/seminar in India. Publications would be useful to document knowledge material and progress/results of the project. Some of the period and regular publications would be Annual Report, Annual plan of Operations, Quarterly Reports, Successful Cases and stories, paper/articles etc.

Bibliography:

1. Human Development Report 2014, UNDP, New York,
2. Country Economic Survey 2014
3. 2013 Global Hunger Index IFPRI, Washington DC
4. Global Gender Gap Report 2013: World Economic Forum, Geneva
5. Twelfth Five Year Plan (2012-2017): Social Sectors: Volume III. Planning Commission, Government of India, New Delhi, 2012
6. India Human Development Report 2011: Towards Social Inclusion Planning Commission, Government of India, New Delhi.
7. FAO, 2013. The State of Food and Agriculture. Better Food Systems for Better Nutrition. Rome: FAO. http://www.fao.org/docrep/018/i3300e/i3300e00.htm
8. FAO, 2014a. Towards Stronger Family Farms. Rome: FAO. http://www.fao.org/3/a-i4171e.pdf
9. FAO, 2014b. Food and Nutrition in Numbers. Rome: FAO. http://www.fao.org/3/a-i4175e.pdf
10. IFPRI, 2014. Global Nutrition Report. Actions and Accountability to Accelerate the World's Progress on Nutrition. Washington DC: IFPRI. http://dx.doi.org/10.2499/9780896295643
11. Pinstrup-Andersen, P., 2009. Food Security: Definition and measurement. Food Security 1(1): 5-7. http://dx.doi.org/10.1007/s12571-008-0002-y
12. Vinceti, B., Ickowitz, A., Powell, P., Kehlenbeck, K., Termote, C., Cogill, B. and Hunter, D., 2013. The contributions of forest foods to sustainable diets. Unasylva 64(241): 54-64. http://dx.doi. org/10.3390/su5114797
13. Sustainable forestry and food security and nutrition. Technical Report · June 2017. Terry SunderlandFernande Abanda Ronnie V. de Camino Peter H. May. 2017
14. Van Noordwijk, M., Bizard, V., Wangpakapattanawong, P., Tata, H.L., Villamor, G.B. and Leimona, B., 2014. Tree cover transitions and food security in Southeast Asia. Global Food Security 3: 200-208. http://dx.doi.org/10.1016/j.gfs.2014.10.005
15. Larson, A.M., Barry, D., Dahal, G.R. and Colfer, C.P. (eds.), 2010. Forests for People: Community Rights and Forest Tenure Reform. London: Earthscan. http://dx.doi.org/10.4324/9781849774765

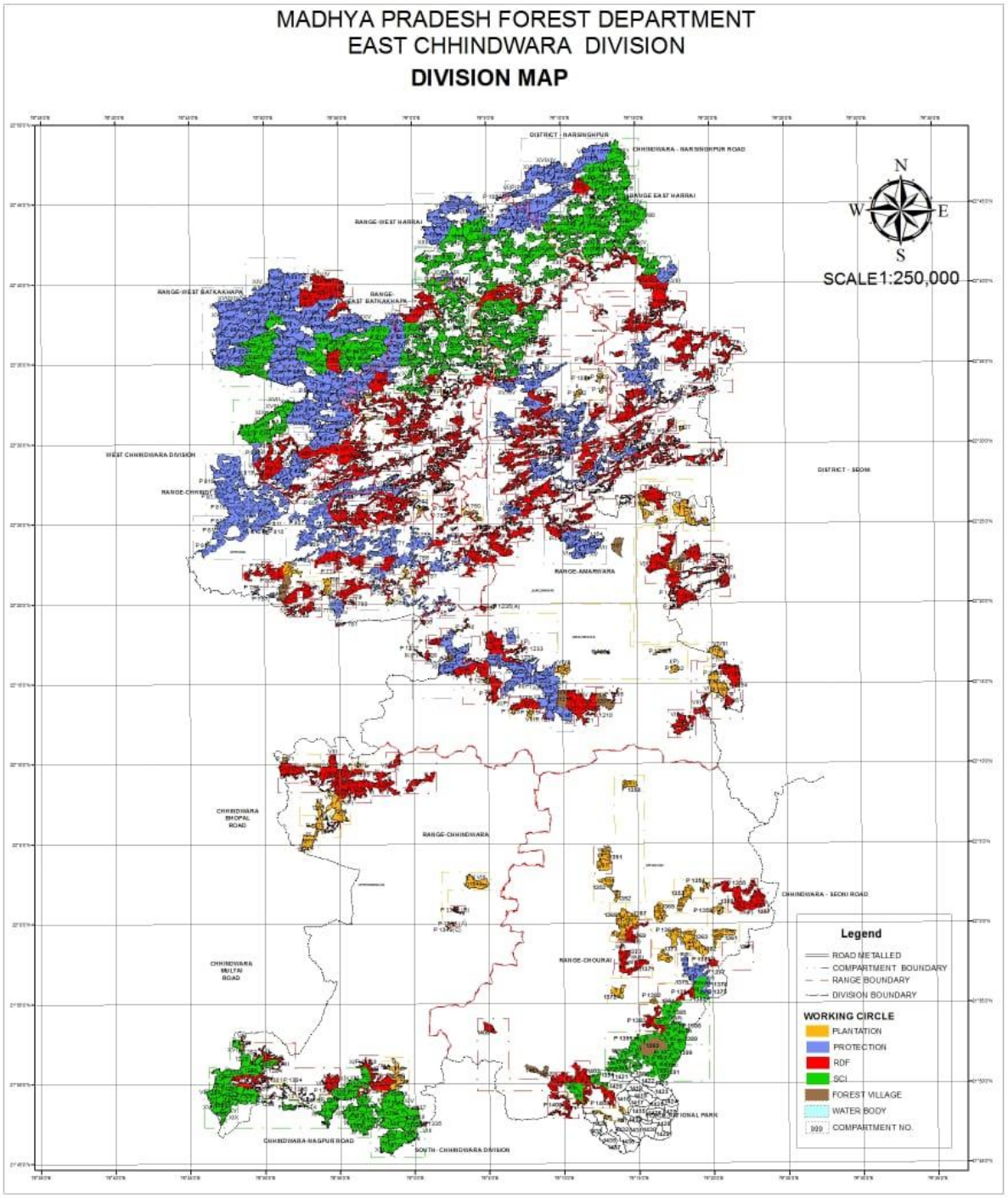
Annex 1: Detailed Time Plan

Activities	0 YR	FIRST YEAR				SECOND YEAR				THIRD YEAR			
	6mnth	1ST QR	2ND QR	3RD QR	4TH QR	1ST QR	2ND QR	3RD QR	4TH QR	1ST QR	2ND QR	3RD QR	4TH QR
Strengthening of DMU & FMU													
Constitution of PMC													
Issues of important Circulars													
Formulation of Implementation Framework													
Formulation of Training Need Assessment (TNA)													
Formulation of Guidelines													
Formulation of Monitoring Framework													
Orientation to Field functionaries													
Engagement of NGO													
Selection of VSSs													
Research & Design													
Finalization of VSS and Commencing field work													
Concurrent Monitoring													
Reporting to Govt													
Orientation to field staff													
Selection of VSSs													
Re-constitution of Ex. Committee of selected VSS													
Community Mobilization													
Preparation of VSS level Micro Plan													
Implementation of Project Interventions at FMU/VSS level													
1. Sustainable Forest Management													
2. NTFP Based Food Security & Nutrition													
3. Farm Forestry													
4. Water & Nutrient Infow to farm													
5. Agri based Food & Nutrition Security													
6. Kitchen Garden based Food & Nutrition Security													
7. Off farm based Food & Nutrition Security													
8. Non-farm based Food & Nutrition Security													
9. Social Safety-net Scheme based Food & Nutrition Security													
Coordination with line Department													
Review and Monitor the NGO Work													

	0 YR(6m	1ST QR	2ND QR	3RD QR	4TH QR	1ST QR	2ND QR	3RD QR	4TH QR	1ST QR	2ND QR	3RD QR	4TH QR
Monitoring of Project Interventions													
Documentation													
Release of funds to VSSs													
Capacity Building of all Stakeholders													
Functioning of VSSs:													
VSS Meeting													
Executive Body Meeting													
Record Maintenance													
Preparation Micro Plan													
Coordination with line Dept for Convergence													
Implementation of Project through JFM Mode													
Audit of Financial Transaction													
Social Audit													

Annex 2: Project location Maps

Fig. Project Location Map


MADHYA PRADESH FOREST DEPARTMENT
EAST CHHINDWARA DIVISION
DIVISION MAP
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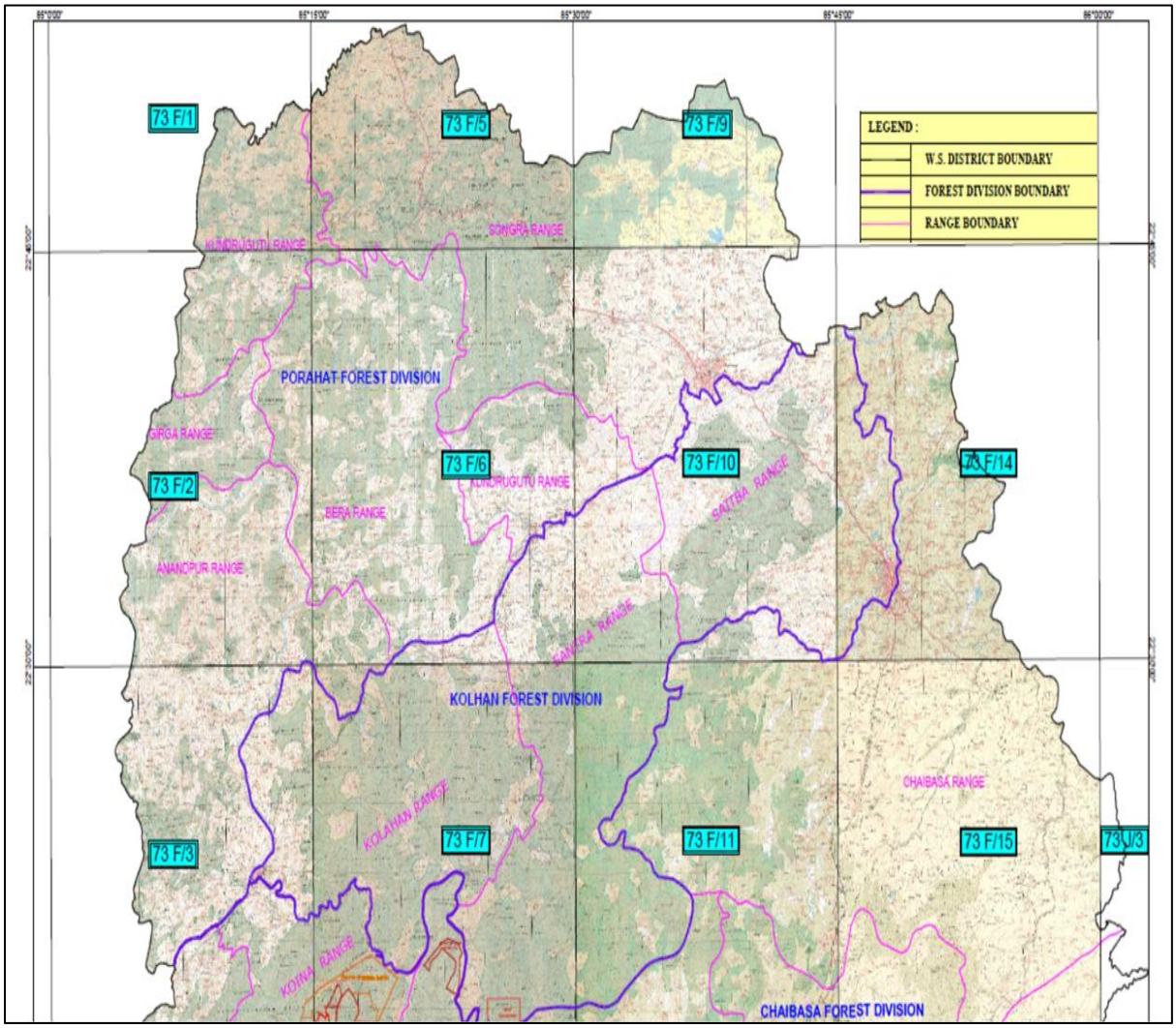
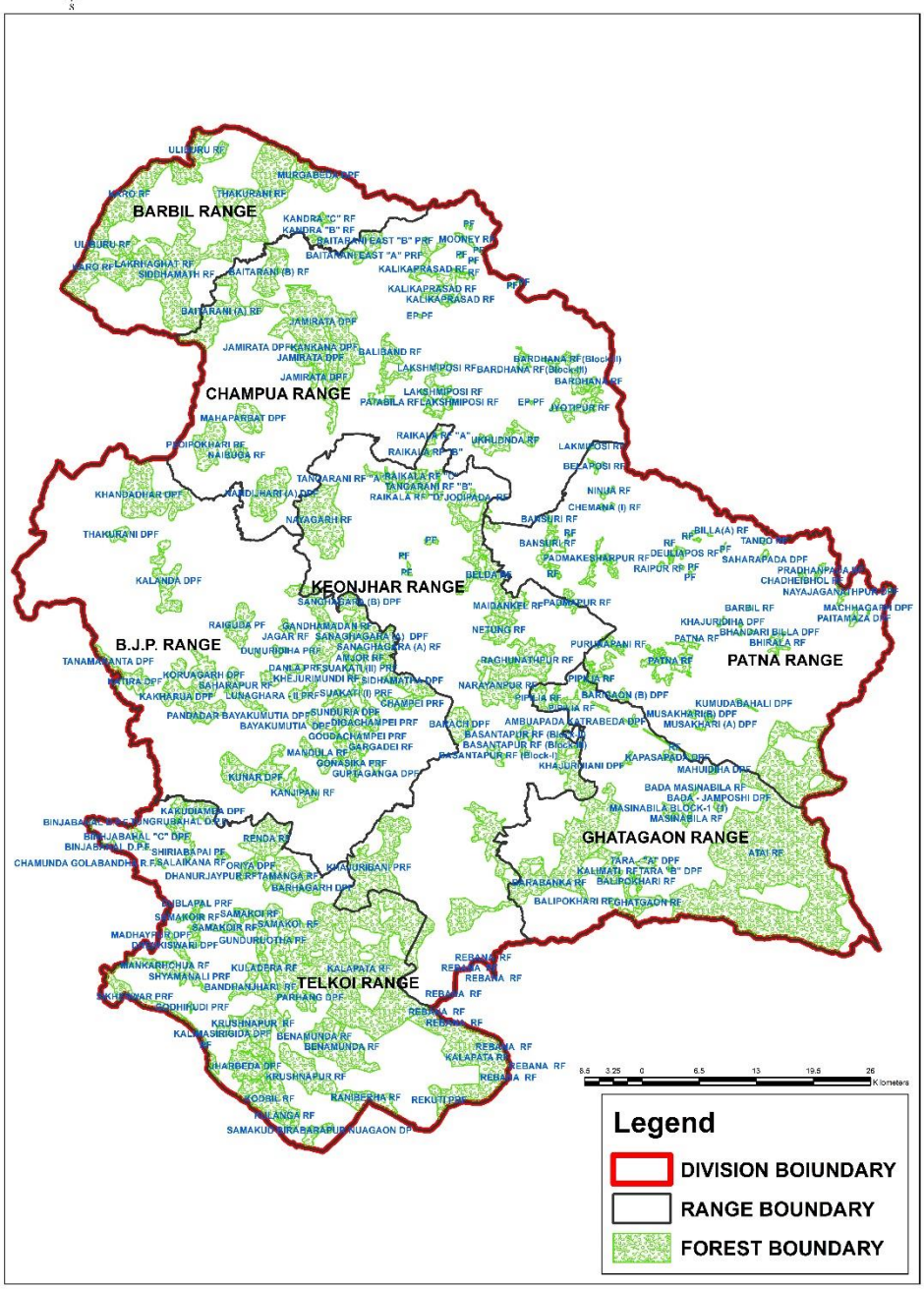
COMPARTMENT BOUNDARY
RANGE BOUNDARY
DIVISION BOUNDARY
WORKING CIRCLE
PLANTATION
PROTECTION
RDF
SCL
FOREST VILLAGE
WATER BODY
COMPARTMENT NO.

MAP OF PORAHAT FOREST DIVISION, JHARKHAND



MAP OF KEONJHAR DIVISION



Annex 3: Details of Roles and Responsibilities of Management Units at Divisional, Field and village level

28.Divisional Management Unit:

a) Orientation to field staff: Field staff particularly the VSS Member Secretaries, partnerTeam, FMU Staff are to be oriented regularly on different themes.

b) **Selection of VSSs:** VSSs are to be graded following the approved criteria and list of VSSs with details of score obtained in the line of criteria is to be shared with DMU for selection of finalization.

c) **Implementation of Project Interventions:** Ensure implementation of project interventions through the FMU and VSS.

d) **Preparation of VSS level Micro Plan**: DMU to guide FMUs to prepare the VSS level micro plans in through community participation.

e) **Coordination with line Department:** DMU to take lead role in ensuring inter-sectoral convergence at community level to address the comprehensive community development and particularly addressing the Food Security and Nutrition aspects of project.

f) **Engagement of Local Partner**: The selection of partner Team shall be finalised at DMU level and the DMUs are to be informed to sign agreement with the selected agencys for positioning the Team at respective FMU level. WFP will guide the DMU in recruitment.

g) **Release of funds to VSSs**: Timely release of funds to the FMUs and VSSs as per the Annual Plan for implementation of project.

h) **Release of Fund**: DMU to ensure formulation of Annual Plan and Budget every year and to release corresponding budget to each FMU for implementation of project interventions.

i) **Review and Monitor the Work**: Functioning of team is to be monitored on bi-monthly basis at Division level and to facilitate for planning of for subsequent months.

i) **Audit of Project Expenses**: DMU to ensure audit of project expenses at FMU & DMU level.

j) **Monitoring of Project Interventions**: DMU to monitor the project interventions on and report back to PMU on monthly basis.

k) **Documentation**: Success and lessons learnt are to be documented both digitally and textually for record and future reference.

29. Field Management Unit:

Ensure Implementation of project interventions: FMU to ensure implementation of project interventions at VSS level as per the approved plan**.**

Community Mobilization:

a) Community Members are to be sensitized on project goal, objectives and expected outcome. Moreover, they are to be appraised on their roles and responsibilities in achieving the Project Goal.

b) Executive Committee Members are to oriented on their roles and responsibility in grounding the project at respective VSSs level. They are also to be oriented on different thematic issues such as Micro Planning, Gender Mainstreaming, Inclusive Growth, Concurrent Monitoring, Social Audit etc.

c) **Preparation Micro Plan: The** Executive Committee Members are to be oriented for preparation of participatory Comprehensive Micro Plan and to get it approved at respective Gram Sabha before execution. The Micro Plan should include plan for forest conservation and management, food security & nutrition, community development, livelihood promotion etc.

d) **Capacity Building:** Required Capacity Building programmes such as orientation, training, exposures etc. for the primary stakeholders are to be organized by the FMU with the approval of DMU.

e) Coordination with line Department: To coordinate with the field functionaries of line department to facilitate implementation of Govt. schemes and programme in the project villages as per the need identified in the respective Micro plans. Monthly / bi-monthly meeting may be convened at block level under the Chairmanship of BDO to facilitate implementation of planned interventions. The Range Officer to be Members Convenor.

f) **Monitoring of partner:** The functioning of partner Team is to be regularly monitored at FMU level on monthly basis. Moreover, the Team members shall be facilitated and guided to formulate monthly activity plan, based on the VSS level micro plan to facilitate the implementation of project interventions at field level. Proceedings of the meetings to be recorded and shared with DMU for information.

g) **Concurrent Monitoring of project interventions at VSSs level:** The FMU Chief and his team to monitor the field level interventions vis-a-vis the plan on regular basis. Proigress made are to be uploaded in the MIS System. Moreover, bi-monthly progress report against the work plan shall be submitted to DMU for information.

30. Vana Surakshya Samiti (VSS)

At village level, the existing VSS/JFMC will be strengthened and trained to implement field level activities in collaboration with FMU. In some cases, 2-3 small villages may have to form a joint VFC in the event these villages have fewer or inadequate number of households to organise themselves in to a JFMC/VSS. The JFMC/VSS will be associated in implementation of natural resource management and livelihoods related activities. This CBO would be associated right from problem identification, microplanning through implementation of various demonstrative models.

a) **VSS Meeting**: VSS level meetings to be convened not less then once in every six months to apprise the VSS members on progress of work viv-a-vis the approved plan of action. Moreover the feedback of VSS members are to be recorded for further course of action.

b) **Executive Body Meeting**: Monthly executive Body Meeting to be convened at VSS level to facilitate implementation of project interventions.

c) **Record Maintenance**: All records such as resolution of EC Meetings, VSS Meetings, Cash book, Bank Book etc. are to be maintained at VSS level.

d) **Preparation Micro Plan:** The Executive Committee Members is responsible for preparation of Comprehensive Micro Plan through Community Participation and to get it approved in at Gram Sabha before execution.

e) **Implementation of Project through JFM Mode**: Interventions at field level will be executed following the Joint Forest Management Mode. Funds will be channelized to the VSSs for execution of approved interventions identified during preparation of Micro Plan.

f) **Audit of Financial Transaction**: VSS to cooperate the FMU/ DMU to undertake audit of the financial transaction taken up at VSS level on annual basis.

g) **Social Audit:** The villagers will be facilitated to conduct Social Audit, once in every year, such initiative will ensure timely implementation of project interventions ensuring optimal quality aspects. Moreover, convening of social audit enhance the credibility of the project and empower the communities to own the project.

31. Field Animator

Three Field Animators for each Range will be engaged on contract for the project duration to assist FMU in community mobilisation, awareness and establishing partnership with stakeholders. One of the persons will function as the team leader to support FMU in field level implementation. The role and responsibilities of the Field Animators will be spelled out in the PI guideline to be developed by WFP.

Annex 4: Indicative Responsibility Matrix

Components	Major Activities	Implementing Agency	Facilitating Agency	Supervising Agnecy
Programe Management	Program Approval and Funding	MoEFCC	WFP	MoEFCC
	Notification of PMC, PMU, PIU	SFD	PCCF&HOFF	MoEFCC
	Deployment of Staff	PCCF&HOFF	DMU	SFD
	Engagement of NGO	DMU	FMU	WFP
Preparatory Operation	Identification of Sites, Villages	FMU	FMU	DMU
	Selection of Beneficary	NGO	FMU	DMU
	Survey Demarcation Mapping of site	FMU	NGO	DMU
	NTFP Resource Mapping	WFP	DMU	WFP
	Prpearation of operation guideline in local language	DMU	WFP	WFP
Community Empowerment, Capacity Building	Orienetation to Field Functionary, NGO	FMU	DMU	WFP
	Training Need Assesment	WFP	FMU	DMU
	Engagement of training agency	DMU	PCCF&HOFF	WFP
	Training of VSS, SHG,	FMU	WFP	DMU
	Training of staff	DMU	FMU	DMU
	Community mobilisation (VSS, SHG)	NGO	FMU	DMU
	Preparation of APO	FMU	DMU	PMC
	Approval of Plan Budget	FMU	DMU	PMC
VSS Functioning	Preparation of Microplan	NGO	FMU	DMU
	Executive body	NGO	FMU	DMU
	Implementation under JFM mode	NGO	FMU	DMU
	Record Keeping	NGO	FMU	DMU
Forest Management & Ecosystem Improvement	Inventory, Conservation	FMU	DMU	WFP/PMC
	Sylvicultural operation	FMU	DMU	WFP/PMC
	Demonstrative Food plant Blocks	FMU	DMU	WFP/PMC
	Farm Forestry	FMU	DMU	WFP/PMC
Food and Livelihood security	Water & Nutrient Infow to farm	FMU	DMU	WFP/PMC
	Agri based Food & Nutrition Security	FMU	DMU	WFP/PMC
	Kitchen Garden based Food & Nutrition Security	FMU	DMU	WFP/PMC
	Non-farm based Food & Nutrition Security	FMU	DMU	WFP/PMC
	Social Safety-net Scheme based Food & Nutrition Sec	FMU	DMU	WFP/PMC
NTFP enterprise	Market Study, Business model	WFP	DMU	WFP
	Seed money grant for value addition	FMU	DMU	PMC
	Training, Equipment, Infrastructure development	FMU	DMU	WFP
	Collectivisation, FPO formation	NGO	FMU	DMU
M&E, Knowledge Management, Convergence	Finalising M&E Framework, reporting structure	WFP	DMU	WFP
	Reporting	FMU/DMU	DMU	PMC/DMU
	Concurrent Monitoring	FMU/DMU	DMU	WFP/PMC
	Impact Assesmsent	WFP	DMU	WFP
	Evaluation	DMU/WFP	PMC	WFP
	Documentation	DMU/WFP	FMU/NGO	WFP
	Cordination with Line department	FMU	DMU	PMC/DMU
	Dissemination, Workshop	DMU/WFP	PMC	WFP
	Review and Monitor NGO	FMU	DMU	DMU
	Auditing	DMU	FMU	PMC
Research Support	Developing protocol for veg propagation	RPRC	DMU	WFP
	Nursery trial	FMU	PMC	PMC/WFP

Annexure C

Project Proposal

Enhancement of water yield and water quality through soil moisture conservation measures

Submitted to

Ministry of Environment, Forest & Climate Change

Submitted by

Forest Research Institute
(Indian Council of Forestry Research and Education)
PO: New Forest, Dehradun - 248 006, Uttarakhand

in collaboration with

The Energy and Resource Institute (TERI)
Darbari Seth Block, IHC Complex, Lodhi Road
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Content

Enhancement of water yield and water quality through soil moisture conservation measures

1. Background

Ecosystems provide many of the basic services that make life possible for people on Earth. Plants clean air and filter water, bacteria decompose wastes, bees pollinate flowers, and tree roots hold soil in place to prevent erosion. All these processes work together to make ecosystems clean, sustainable, functional, and resilient to change. Common International Classification of Ecosystem Services (CICES), classifies ecosystem services into three groups: Provisioning, Regulating/Maintenance and Cultural services. A regulating service is the benefit provided by ecosystem processes that moderate natural phenomena. Regulating services include pollination, decomposition, water purification, erosion, flood, control, carbon storage and climate regulation. These services are often invisible and therefore mostly taken for granted. There are isolated studies on various ecosystem services provided by different forest species including hydrological behaviour. In their study Pathak *et al*. (1985)[1]suggested that water availability is different in the different villages of the watersheds and seem to be associated with the type of forest species in the surroundings. Water and forests both cover large portions of Earth and water resources are highly dependent on forests. Forests cover about 30% of the land, yet this 30% forested land generates 60% of total stream discharge. In other words, most of our drinking water supplies originate from forested areas. Forested watersheds provide an estimated 75% of the world's accessible freshwater resources for agricultural, domestic, industrial and environmental uses, with 90 % of the world's cities relying on forested watersheds for their water supply. Forests have long been seen as important sources of clean drinking water (FAO, 2011[2]; Chang, 2013[3]).

Forests minimize erosion through stabilization of soil and hence reduce the impairment of water quality due to sedimentation. Woodlands protect water bodies and watercourses by trapping sediments and pollutants from other up-slope land use and activities. At the same time, forests may influence the timing of water delivery by maintaining and improving soil infiltration and the soil's water-storage capacity. Riparian vegetation has an important role in

[1]Pathak, P.C., Pandey, A.N. and Singh, J.S. (1985) Apportionment of rainfall in Central Himalayan forests (India). J. of Hydrology. 76: 319-332

[2]FAO (2011) The state of the world's land and water resources for food and agriculture (SOLAW) – Managing system at risk. Food and Agriculture Organization of the United Nations, Rome

[3]Chang, M. (2013) Forest Hydrology: An introduction to water and forests (3rd Edition), CRC press, New York.

filtering sediment and pollutants. Bamboo is sometimes planted in tropical riparian areas to conserve soil and water. However, in a study it was found that bamboo was less effective for this purpose than native grass and they recommend a grass strip alongside bamboo stands to enhance the trapping of sediments. Annually, forests reduce 61% delivery of sediment load in dense forested watershed. Forest and forest plant roots prevent run-off from heavy rains and with it soil erosion. Forests reduce about 34% of total runoff in dense forested watershed than degraded micro-watershed.

World Health Organization reports that about 80 % of the world's people live in places where the only available water is unsafe. As the world's population increases with time the extent of utilization of all-natural resources also increase manifold. Our country with 2.3% of the world's land supports more than 16% of the world's population with only 4% of world's freshwater resource. Water resource problems are problems of water quantity, quality, and timing. Some regions may have too much water (flooding), while others may have too little water (drought). Water may not occur at the right time and in the right place (timing), or water may not be clean enough for drinking and other uses (water pollution) (FAO, 2011).

1.1 Study conducted by Forest Research Institute on Forest Hydrology

In recent past, Forest Research Institute, Dehradun has undertaken a study on forest hydrology with aim to establish relationship amongst the hydro-geological, and vegetation characteristics to assess the impact of forest on hydrological behaviour. Soil moisture is an integral component of the hydrologic cycle that affects various processes, including evapotranspiration, infiltration, and runoff. Thus, efforts were made through this study to understand the influence of forest cover on soil moisture regime, rainfall-runoff relationship and soil erosion rate, in two micro-watersheds i.e. Arnigad with Dense Oak Forest (83% forest cover) and Bansigad with Degraded Oak Forest in the Mussoorie Forest Division. Annual rainfall in Mussoorie is approximately 2100 mm of which 70%–85% is received during monsoon season (June to September). The runoff response was not only influenced by rainfall amount but also by other factors such as rainfall intensity, rainfall duration, soil properties, soil moisture condition and vegetation. During Monsoon, dense forested micro-watershed reduced 34% more total runoff than the degraded micro-watershed. Annual mean runoff from forested micro-watershed was less (13%) as compared to the degraded micro-watershed. Stream discharge of the dense forested micro-watershed (Arnigad) declined slowly during post monsoon and 55% of the average annual precipitation reached the stream as either base flow

(38%) or direct runoff (17%). Annual base flow, direct runoff and total flow was 19%, 45% and 13% more in dense forested micro-watershed respectively, than the degraded micro watershed. Annual Suspended Sediment Load was 61% less in dense forested micro-watershed than the degraded one indicating the immense impact that forest has on controlling suspended sediment load. The average annual total sediment load was approximately two times lesser in dense forested micro-watershed than degraded micro-watershed emphasising role of forest in erosion regulation. Soil moisture in dense forested watershed was found 3% higher than the degraded forest during all the seasons.

Overall, the study showed that the forest cover may be considered as key factor for variations in soil moisture regime, infiltration rate, runoff, sediment load and other hydrological parameters of micro-watersheds. The study suggests that dense forested micro-watershed plays significant role by regulating several hydrological parameters as compared to degraded micro-watershed.

A project on *Forest Hydrology* is being executed with the overall objective to assess the hydrological services of the Kempty watershed having area is 870 ha. Hydrological and meteorological parameters are being monitored to assess impact of forest cover and other changing land uses on a long-term basis as part of ecological monitoring. Stream discharge is being recorded hourly by H-Flume (03) equipped with automatic water level recorder along with sediment load. Meteorological parameters of the watershed are being recorded on daily basis. Physico-chemical properties of water and soil samples are being recorded periodically. Also, assessing the static and dynamic hydrologic characteristics for planning of catchment area treatment. Total runoff generated from the Kempty watershed was measured for the year 2020. With an annual rainfall of 2577mm the total runoff was 770 mm (30%) which was either direct runoff 538 mm (21%) or base flow 232 mm (9%) during the year 2020. The maximum runoff (465.59 mm) was recorded during the monsoon season which was 60% of the total runoff whereas minimum runoff (135.31mm) was recorded during the summer season which was 18% of the total runoff. Base flow and direct runoff contribution in the stream discharge were observed 31% and 69% respectively during monsoon. Maximum (43%) direct runoff was measured during month of August and maximum 27% base flow was observed in the month of September. The result revealed that there is a reduction of base flow (17%) and direct runoff (54%) during summer season and increment (31%) was observed in base flow and direct flow (69%) during monsoon season respectively. Physico-chemical properties of water were observed by collecting the water samples at fortnightly intervals during April 2020 to March

2021. The pH was varied from 7.7 to 8.5, EC ranged from 390 to 435µS cm^{-1}, TDS varied from 262 to 305 ppm, DO ranged from 8 to 11.5 turbidity ranged from 0.4 to 11.5 NTU, sodium ranged from 1.5 to 0.8 ppm, potassium ranged from 0.5 to 2.7 ppm and calcium ranged from 9.8 to 38.5 ppm. All quality parameter showed ideal condition of water from the watershed as per BIS and WHO standard. Overall, the good quality of water has been receiving from the forested watersheds and it is one of the most important services

Apart from this, nine check dams were constructed by Uttarakhand Forest Department during recent past at 3rd stream order at intervals of 200-400 m within the micro watershed. The total length and slope of the stream is 2.3 km and 7^0 respectively. The maximum (538 mg/l) suspended sediment concentration (SSC) was measured in 2017 and it was minimum (253 mg/l) during 2018. Abrupt decline in SSC was observed in 2018 and afterward it showed an increasing trend despite of the SSC was observed within permissible limit

1.2 Multi Criteria Analysis (MCA): Tools and techniques for prioritizing of watersheds with respect to interventions of soil moisture conservation measure

In order to conserve any watershed, there is a need to identify and prioritize the regions which are in need of conservation. Planning and identification of watersheds becomes important when it comes to the protection and conservation of any region which are facing degradation. Identification of regions which are more prone compared to other within a watershed can be performed by a method known as Multi Criteria Analysis (MCA) which is a type of multi criteria decision methods. Many researchers across the world have used this method (Javed et al., 2009[4]; Altaf et al., 2014[5]) for prioritizing watersheds for their susceptibility towards soil erosion. This multi-criteria analysis method can be used because of its flexibility of input parameter and is performed by using *Compound Value* method for prioritizing the sub watersheds within a watershed. This approach is based on the principles of knowledge-driven modelling (Todorovski and Dzeroski, 2006[6]) and converts the qualitative understanding of a phenomenon based on scientific knowledge into a quantitative estimation.

[4] Javed, A., Khanday, M. Y., and Ahmed, R. (2009). Prioritization of subwatersheds based on morphometric and land-use analysis using remote sensing and GIS techniques. Journal of the Indian Society of Remote Sensing, 37, 261–274.

[5] Altaf, S., Meraj, G., and Romshoo, S.A. (2014). Morphometry and land cover based multi-criteria analysis for assessing the soil erosion susceptibility of the western Himalayan watershed. Environment Monitoring Assessment.

[6] Todorovski, L., and Dzeroski, S. (2006). Integrating knowledge driven and data-driven approaches to modeling. Ecological Modelling, 194(1), 3–13.

However, some inherent drawbacks come with this method such as it assigns a lumped value for a parameter of an entity as well as it can only be used in a comparative study (Pandey *et al*., 2018[7]). Further, it also imparts same weight to all the parameters involved, which in some cases can exaggerate the final output. However, this method relies on detailed estimation and parameterization of the processes involved and that is why it becomes one of the best approaches to compare process in watershed. For analysing susceptibility of a watershed, parameters like morphometry, hypsometry, land use and land cover can be used as criteria with different number of variables in each criterion. In order to make it more accurate, parameter like soil quality can also be added depending upon the data availability.

2. Project context: definition of the Problem

The scientific management of watershed started early in the past century under the soil and moisture conversion to increase the water yield and water quality over a period of years. The watershed approach enables planners to harmonize the use of soil, water and vegetation in a way that conserves these resources and maximize their productivity. Adoption of proper soil moisture conservation measures and maintaining optimum canopy cover using right choice of species on the basis of hydrological characteristics of a particular watershed may enhance the water yield and its quality (with respect to BIS prescription for drinkable water) significantly.

3. Justification of the Work

Humans and other living beings depend on water for life and health. Yet the World Health Organization reports that about 80 % of the world's people live in places where the only available water is unsafe. Water-related problems such as overuse, scarcity, pollution, floods and drought are an increasingly important challenge to sustainable development.

The maximum discharge of the stream is generated during rainy season due to maximum rainfall and there is low availability of water in stream /river of the watershed or becomes dry during summer session. However, the soil moisture conservation works helps to retain the rain water during rainy seasons and it will support diversity and growth of plants by maintaining and improving soil infiltration and the soil's water-storage capacity. Soil moisture conservation measures such as vegetative measures (i.e., vegetative cover, plant cover and

[7] Pandey, S., Kumar, P., and Panwar, V.P. (2018)."Remote sensing for assessing soil erosion susceptibility of the lesser Himalayan watershed by Multi Criteria Analysis (MCA) of morphometry, hypsometry and land cover," Proc. SPIE 10783, Remote Sensing for Agriculture, Ecosystems, and Hydrology XX, 1078327 (10 October 2018); doi: 10.1117/12.2325313

Gully plugging etc.) and engineering measures (check dams, percolation tank and contour trenching etc) enhance the water yield and water quality. Moreover, the availability of water will increase over a period of time and also quality will be improved by trapping silt during dry seasons.

4.Goal and Objectives

Enhance the hydrological services (i.e water yield and water quality) of degraded watershed in Uttarakhand, Rajasthan, Madhya Pradesh, Jharkhand, Telangana and Meghalaya through a set of objectives as given below.

1. To quantify the morphometric characteristics and prioritization of watershed
2. To restore the degraded watershed by intervening soil and water conservation measures
3. To enhance water yield and water quality (surface and ground water)
4. To minimize the sediment concentration and sediment load in streams/runoff /river water

5. Activities:

1. Selection of watershed
    - Watersheds has been selected/suggested by the State Forest Departments of respective States for implementation of the project work (***List attached***).
2. Detailed topographical survey of the watershed
    - To prepare a watershed management plan a detailed survey by using DGPS and drone will be conducted for high resolution topographical data with maximum accuracy.
    - The data from the survey will be used for morphometric analysis which helps to understand the hydrological behavior of the watershed.
3. Prioritization of the watershed for implementation of protection and conservation measures through multi criteria analysis.
4. Preparation of detail plan of interventions
5. Social acceptance & approval of plan by society
6. Implementation of the soil and water conservation measures
7. Capacity Building
8. Dissemination of watershed management information through web-portal
9. Monitoring and Evaluation

- Recording of hydro-meteorological parameters using Automatic Weather Stations.
- Measure soil moisture fluxes using soil moisture observatories.
- Assessment of overland flow and sediment yield.
- Assessment of water yield and water quality (surface and ground water) from each of the watersheds.

6. Effectiveness of the project

The effectiveness of the project will be achieved through monitoring and periodic appraisal of the data generated from the watersheds.

- One of the identified approaches is **Hydrological and sediment monitoring** in the selected watersheds.
- This will help for understanding the effectiveness of the treatment given to the watershed and give idea for further follow up action including the maintenance.

7. METHODOLOGY

Study Site

Study will be conducted in six states (Uttarakhand, Rajasthan, Madhya Pradesh, Jharkhand, Telangana and Meghalaya) covering three watersheds from each state. Assessment of the water yield and water quality requires the estimation of hydro-meteorological variables and a comprehensive quantification of other hydrological processes occurring in the catchment.

Topographical Survey

High resolution (1:100) data will be required for planning with high accuracy and it will be possible by survey using drone and DGPS.

Prioritization of the watershed

The watershed will be divided into sub watershed on the basis of stream order for prioritization of the sub-watershed. Different kind of tools and techniques (i.e. MCA, Hierarchical model, ANN, PCA and other suitable/appropriate tools and techniques) will be used for prioritization of the sub-watershed and further implementation of protection and conservation measures will be executed.

Capacity Building Plan

This section will provide the list of identified training groups such as the forest department and local stakeholders including JFMCs of whom the capacity must be developed for conducting the project activities in a successful manner.

During the course of the project, several capacity building programs are planned to be carried. Multiple activities associated with the watershed improvement such as maintenance of vegetative barriers and cover, terracing, counters trenching etc will be the basis for the delivering the training. Capacity building of stakeholders (including local institutions, State Forest Department) shall assist in conducting implementation of the project activities, monitoring and measuring indicators would ensure that even in future appropriate measurements keep taking place. Further, in terms of commercializing the water from the forests, capacity building of identified members of the local institutions would ensure that proper upkeep of products and services is maintained.

Monitoring and evaluation of the project:

- The hydro-meteorological parameters will be observed using Automatic Weather Stations (AWS) capable of monitoring ambient temperature (T_a), relative humidity (RH), wind speed and direction, solar radiation flux, atmospheric pressure (p_{atm}) and precipitation data, which will be installed at appropriate place in each watershed.
- The water yield from each of the watersheds will be monitored at its primary outlets using flumes or by installing stilling wells to develop the rating curves. High resolution pressure transducers will be employed complemented with staff gages to cross check pressure transducer data.
- The water quality from each of the watersheds will be monitored at its primary outlets using automatic sensors installed in the stream.
- Physico-chemical analysis of soil and water: The data on physico-chemical properties of soil and water would be collected at regular intervals to see the response of soil and plants as well as water quality and plants to different kinds of soil improvement and plantation techniques.

Periodic monitoring and evaluation

A database for all these trials will be maintained in order to monitor success in terms of growth and survival of plant species. Based on the performance of different combinations of species including ground, mid and top flora, the protocols will be standardized. The indicators for monitoring would include:

Tree species

- No. of individuals of various planted species
- Survival percentage for each species
- Height in meter for each individual
- Girth in centimeter of trees

- No. of individual plants replaced of various species
- No. of branches, no. of leaves and crown diameter of each species

Grass and shrub species

- No. of species of grass/ shrub sown
- No. of surviving species
- Density of grass/ shrub species
- Relative percentage vegetation cover

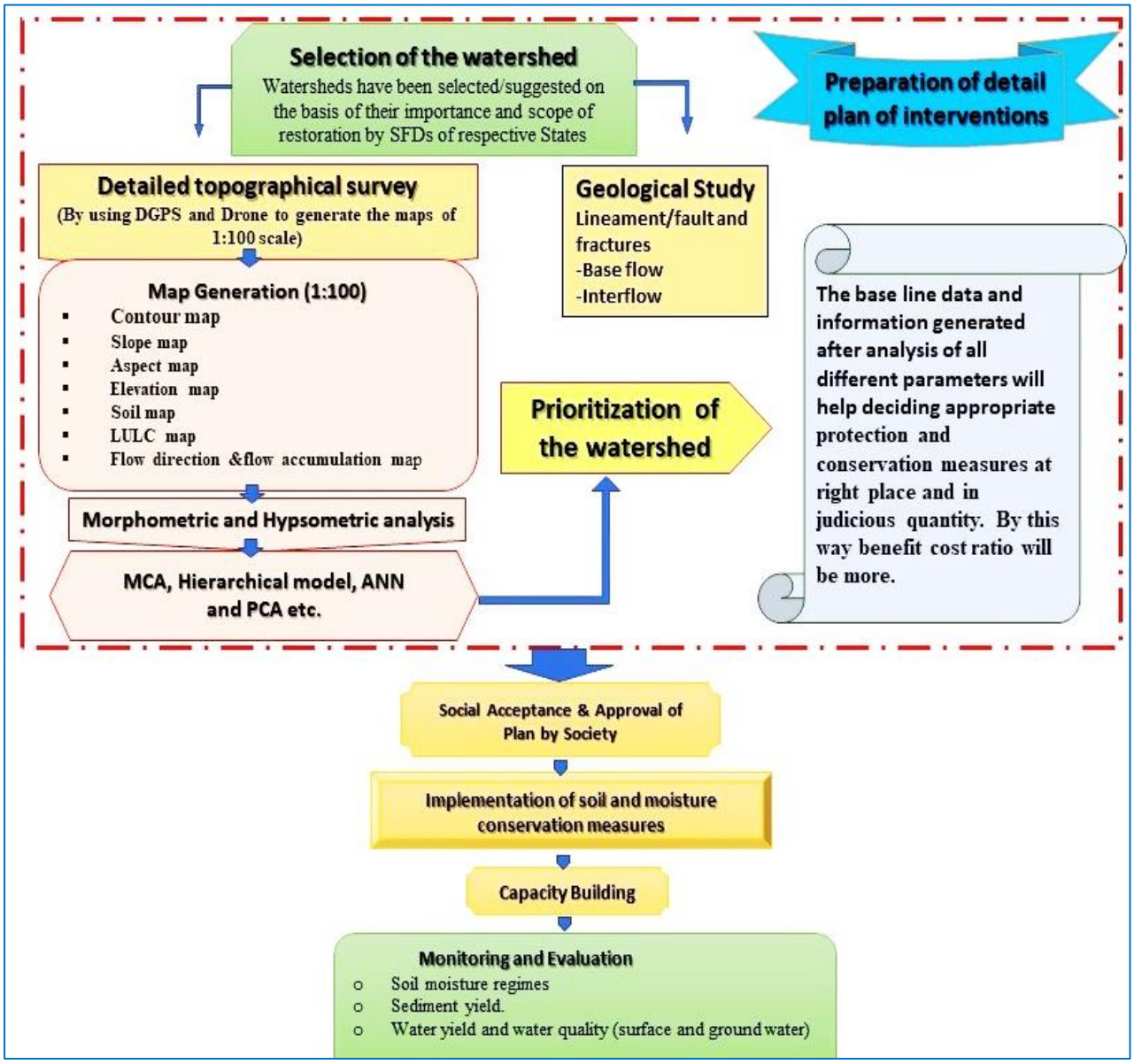
Unmanned Arial Vehicle (Drone) Applications in Watershed management

1. **Digital Elevation Model prepared using UAV**
   a) Contour Generation
   b) Basin Boundary
   c) Flow Direction and Accumulation
   d) Drainage Networks and Drainage Basins
   e) Slope
   f) Aspect
   g) Curvature of Slope
   h) Maximum Submergence Area
   i) Water Flow Length
   j) Requirement of any dam structure using Contour, later designing can also be done using the same contours.
   k) Drone data provides master plan for flood control.
   l) Drone surveying and mapping help for accurate water table prediction, runoff estimation, and disaster mitigation.
   m) Hydrological channel routing for better prediction of downstream supply.

2. **High Resolution Aerial Imagery prepared by UAV**
   a) Land Use Land Cover generation
   b) Forest Cover
   c) Calculation of Vegetative Cover
   d) Real time watershed conditions
   e) Natural Disaster investigation like landslides, soil erosion, etc
   f) Identification of water resources issues like pollution, erosion, invasive species, failure of water resources infrastructure etc.
   g) Degradation of River valley surroundings
      i. Delineation of Fire burnt area
      ii. Pointing out Illegal deforestation
      iii. Grass land mismanagement/ High Grazing
      iv. Mining and Quarrying
      v. Improper construction activities
      vi. Improper farming and water usage practices (like flood irrigation), etc

In addition, we get a real time orthomosaic of the area for reference and overall management of Watershed to further plan all the activities accurately.

Flow chart of the approaches and methodology for execution of the project



Timeline of the Activities

Proposed activities	Year wise time frame			
	1st Year	2nd Year	3rd Year	4th Year
Detailed topographical survey (by using DGPS and Drone to generate the maps *i.e*. Contour Map, Slope Map, Aspect Map, Elevation map, Soil map, LULC map, Flow direction &flow accumulation map of 1:100 scale)				
Morphometric analysis (By using maps generated and photometric data with help of Arc GIS and RS)				
Geological Study (Lineament/fault and fractures)				
Prioritization of the watershed (By using different kind of tools and techniques (i.e. MCA, Hierarchical model, ANN, PCA and other suitable/appropriate tools and techniques for implementation of protection and conservation measures)				
Preparation of detailed management plan and designing implementation activities specific to each catchment				
Social Acceptance & Approval of Plan by Society				
Implementation of the project activities in the catchment areas				
Capacity Building				
Maintenance, monitoring and evaluation and data collection				
Monitoring & evaluation, data analysis and report preparation				
Demonstration of the commercialization/business plan for the clean and mineral rich bottled water				
Dissemination of watershed management information through web-portal				

8. Anticipated results and outcome

The project will facilitate the enhancement of water yield and water quality of the watershed. Information collected from this study will be helpful to understand and analyze the relative contribution of these land uses towards important ecosystem services. This will aid decision making and devising state wide mitigation strategies towards soil, water and vegetation conservation for tangible and intangible benefits in the watershed. The project work is also expected to produce quality research publications and extension materials.

9. Collaboration/Association: TERI, New Delhi.

10. Duration : 4 year

Financial Proposal

A. Details of Proposed Project Cost

S. No	Particulars	ICFRE (INR)	TERI (INR)
1.	Professional Cost (for four years)	**2,00,00,000**	**1,00,00,000**
2.	Direct Expenses for Boarding and Lodging (for four years)	**40,00,000**	**20,00,000**
3.	Detailed topographical survey (by using DGPS and Drone to generate the geospatial data and maps i.e., Contour Map, Slope Map, Aspect Map, Elevation map, Soil map, LULC map, Flow direction &flow accumulation map of 1:100 scale	**90,00,000**	**-**
4.	Instrumentation for the monitoring and evaluation of the watershed (for 18 sites) • Automatic weather station • Gauging stations (outlets and springs) • Soil moisture observatory • water quality parameter sensors	**3,70,00,000**	**-**
5.	Work station computer (02) Printer and other IT equipment and accessories	**8, 00,000**	
6.	Research Associate (02) (one of GIS&RS with Soil and water conservation)	**20,00,000**	
7.	Capacity Building of Local JFMC members and Front-Line Staff including preparation of training modules, reading material etc	**-**	**25,00,000**
8.	Monitoring of executed work, pre and post water testing, survey of ground, mid and top flora and development of business plan	**-**	**25,00,000**
9.	Development of Web-portal	**2, 00,000**	**-**
	Total	**7,30,00,000**	**1,70,00,000**
	Grand Total	**9,00,00,000**	

#The fund for all associated institute will be made by internal arrangements

B. Execution Cost

Sl. No.	State	Area (ha)	Total Cost (@ INR 1 lakh/ha)
1.	**Jharkhand**	1500	15,00,00,000
2.	**Madhya Pradesh**	1500	15,00,00,000
3.	**Meghalaya**	820	8,20,00,000
4.	**Rajasthan**	1500	15,00,00,000
5.	**Telangana**	1260	12,60,00,000
6.	**Uttarakhand**	1500	15,00,00,000
Total		**8080**	**80,80,00,000**

Project Team of the ICFRE

Name & Designation	Activity and Responsibility
Sh. N Bala, Scientist – G, FRI, Dehradun	Overall coordination of the project
Dr. Parmanand, Scientist – C, FRI, Dehradun	Interpretations of survey data and analysis, GIS and RS related works, Map generation, prioritization of watershed and other inputs related to SMC works
Dr. Nibedita Guru, Scientist-B, FRI, Dehradun	
Dr. Manoj Kumar, Scientist-C, FRI, Dehradun	GIS and RS related works, liaison with states and execution of the project.
Dr. G. Singh, Scientist-G, AFRI, Jodhpur	Overall activity as nodal officer of Rajasthan state and Advisor on execution of the project.
Mr. Dheeraj Gupta, Scientist-C, TFRI, Jabalpur	Overall activity as nodal officer of Madhya Pradesh state and GIS and RS related works and other inputs related to Hydrology
Dr. Krishna Giri, Scientist-D, RFRI, Jorhat	Overall activity as nodal officer of Meghalaya state
Dr. S Pattanaik, Scientist-F, IFB, Hyderabad	Overall activity as nodal officer of Telangana state
Dr. Sanjeev Kumar, Scientist-E, IFP, Ranchi	Overall activity as nodal officer of Jharkhand state

Project Team of the TERI

S. No.	Name	Position in TERI	Role
1	Dr J. V. Sharma, IFS Rtd	Director, Land Resources Division	Sustainable Forest Management Expert
2	Dr Yogesh Gokhale	Area Convener and Senior Fellow	Ecologist
3	Dr Syed Arif Wali	Area Convener and Senior Fellow	Nursery and plant breeding expert
4	Mr Siddharh Edeke	Area Convener and Fellow	Biodiversity Experts
5	Dr Aparna Tyagi	Associate Fellow	Social Science Expert
6	Ms Priya Sharma	Research Associate	Data Annalist
7	Mr. B.S. Negi	Consultant	Field Surveyors
8	Mr Kapil Kumar	Field Coordinator	Field Surveyors

List of watersheds for implementation of the project

State	Watershed	Location	Area (ha)
Jharkhand	Sondiha	Chatra District	500
	Darikuria	Pakur District	500
	Jatakhunti	Dhanbad District	500
Madhya Pradesh	South Sagar	South Sagar Forest Division	500
	Damoh	Damoh Forest Division	500
	North Panna	North Panna Forest Division	500
Meghalaya	Umiam	Ri- Bhoi District	220
	Umphung	Jaintia Hills District	500
	Patharlyndan	West Khasi Hills District	100
Rajasthan	Sambharlake	Nagaur	500
	Bhavatra Jod	Jalore	500
	Khava	Dausa	500
Telangana	Naryanapet	Naryanapet Forest Division	500
	Nalgonda	Nalgonda Forest Division	395
	Amanagal	Amanagal Forest Division	365
Uttarakhand	Bandal	Dehradun	500
	Gagas	Almora	500
	Ghargaon	Tehri	500
Total Area (ha)			**8080**