Chapter 1

INTRODUCTION

1.1 About CAMPA

Forest land is generally diverted for non-forestry purpose under the relevant provisions of the Forest (Conservation) Act, 1980 for facilitating developmental activities like construction of power projects, irrigation projects, roads, railways, schools, hospitals, rural electrification, telecommunication, drinking water facilities and mining, etc.[1] Based on various parameters, the entity requiring diversion of forests has to deposit a proportionate amount with the State/U.T. In lieu of the funds collected by the States, Compensatory Afforestation Management and Planning Authority (CAMPA) was constituted by the Central government as ordered by the Hon. Supreme Court in 2002[2]. The cost of creating the compensatory forest is borne by the 'User Agency' proposing the forest diversion for its project. The user agency can be a public or private sector enterprise or a government body owning the project. Whenever land inside a Reserved Forest or a Protected Area (PA), such as a wildlife sanctuary or a national park, is to be diverted, certain levies are imposed by the government on the project proponent (the User Agency) towards compensatory afforestation (CA), additional compensatory afforestation (ACA), penal compensatory afforestation (PCA), net present value (NPV) of forestland, catchment area treatment (CAT) plan funds, etc.[3]

The CAMPA functions under the supervision of the Ministry of Environment, Forests & Climate Change (MoEF&CC). GoI and Its jurisdiction extends to the whole of India. Under CAMPA, large-scale activities have been taken up to accelerate preservation of natural forests, management of wildlife, capacity building, research & development, infrastructure development in the sector and other allied works.

The Ministry of Environment and Forests, Government of India, in their letter dated 2 July 2009 have issued the Guidelines on State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA)[4]. Based on these guidelines, the Government of Andhra Pradesh, in their G.O.Ms.No.78, E.F.S. & T (For. I) Department dated 11 September 2009 issued orders establishing the Andhra Pradesh State Compensatory Afforestation Fund Management and planning authority (A.P. State CAMPA). The main purpose enunciated in the Notification is

[2] http://envfor.nic.in/major-initiatives/compensatory-afforestation-fund-management-and-planning-authority-campa , http://envfor.nic.in/sites/default/files/CAMPA-order-dated-13.8_0.pdf
[3] CAMPA Fact Sheet: A Compromised Composition CAF Bill and PSC Report, CSE, 7p.
[4] http://envfor.nic.in/sites/default/files/Guidelines_for_Investment_Policy_and_Procedure_0_0.pdf

enhancement of forest and tree cover and conservation and management of wildlife by utilizing funds received towards CA, NPV etc. in compliance to the conditions stipulated by the Central Government while according approval under Forest (Conservation) Act, 1980 (69 of 1980) for non-forest uses of the forest lands.[5]

With the Compensatory Afforestation Fund Bill 2016 *(hereafter referred to as 'the Bill'*), the Government of India now seeks to make this corpus available to state governments to initiate necessary compensatory afforestation programmes, independent of the Supreme Court. The Bill provides for an institutional mechanism to ensure 'expeditious utilization' of the amounts collected from the diversion of forestlands till present.

1.2 Necessity of CAMPA

The necessity of CAMPA is to compensate for the loss of tangible as well as intangible benefits from the forest lands which were diverted for non-forest use compensatory afforestation is required to be done over an equivalent area of non-forest land or double the amount of degraded forest land in relation to the actual area being diverted. If clearances for diversion of forest land are granted, certain levies are imposed on the project proponents by the Government to compensate for the loss of forestlands, and this money is to be utilized for afforestation activities elsewhere. This concept is 'Compensatory Afforestation', defined as 'afforestation done in lieu of the diversion of forest land for non-forest use under the Forest (Conservation) Act, 1980 (ref. 5). In order to determine the cost of compensatory afforestation, the appropriate authority will evaluate the area of the forest area/degraded identified for compensatory afforestation. From such money, a huge corpus of over `42,000 crores have accumulated into accounts of Ad hoc CAMPA, a temporary body set up in 2006 by the Supreme Court to manage such funds. The corpus is increasing at the rate of about `6,000 crores per year. The disbursement of funds under the corpus to state governments was previously supervised by the Supreme Court to ensure effective monitoring and regulation of these funds.[6]

CAMPA fund is to be used for assisted natural regeneration (ANR), natural forest management, forest protection, biodiversity conservation, infrastructure development, wildlife protection and management, the supply of wood and other forest produce saving devices and other allied activities.

1.3 CAMPA in Telangana

[5] Manual of Guidelines and Accounting Procedure on works relating to A.P. State Compensatory Afforestation Fund Management and Planning Authority (A.P. State Campa), 38p.

[6] Text of the Supreme Court Order, dated 10 July 2009, on National and State CAMPAs.

Telangana state formed in June 2014 from the northwestern part of the State of Andhra Pradesh, has an area of 112,102 square kilometers and a population of 35,193,978.[7] The notified forest area of the State is 26903.70 square kilometers, which is 23.99% of the geographical area.[8] The Telangana State Forest Department (TSFD) is implementing CAMPA activities in the state of Telangana since 2014-15.

[3] Census of India (2011).
8 Telangana State of Forest report (2014), TSFD, 144p.

Chapter 2

WORKS TAKEN UP UNDER DIFFERENT CAMPA COMPONENTS

This chapter describes the works taken up by TSFD during 2014-2015 under different CAMPA components. Compensatory Afforestation (CA) and Net Present Value (NPV) components for which activities have been undertaken by Telangana State Forest department during 2014-2015 are shown in Fig 2.0.

Fig 2.0: Works undertaken for different CA and NPV components during 2014-2015.

Compensatory Afforestation (CA)	Net Present Value (NPV)
➢ Compensatory Afforestation ➢ Additional CA ➢ Safety Zone (SZ) ➢ Extraction of tree growth ➢ Catchment Area Treatment Plan ➢ Others miscellaneous	➢ Natural Forest Management (NFM) ➢ Forest Protection (FP) ➢ Forest Fire Management (FFM) ➢ Bio-diversity Conservation and Development (BDC) ➢ Research and Development (R&D) ➢ Capacity Building (CB) ➢ Information Communication and Technology (ICT) ➢ Monitoring and Evaluation (M&E)

2.1 Compensatory Afforestation (CA): The main mandate of Telangana State CAMPA is afforestation of the compensatory area given by the user agency in lieu of the forest areas diverted for non-forestry purposes. Under Compensatory afforestation, planting of trees is carried out on another piece of land equivalent in area to the original forestland diverted for non-forest purposes. It is mandated under the Forest (Conservation) Act, 1980 that compensatory afforestation is done over an equivalent area of non-forestland. Equivalent non-forestland identified for the purpose would subsequently be transferred to the ownership of the State Forest Department and declared as Protected Forests so that the plantation raised can be maintained permanently. Where non-forestlands are not available, compensatory afforestation may be carried out over degraded forest twice in the extent to the area diverted or to twice the difference between forestland being diverted and available non-forestland, as the case may be. The activities under CA head namely CA / Addl.CA / Safety Zone/ Extraction of tree growth from diverted areas, development of catchment area treatment plan and other miscellaneous activities are taken up by TSFD strictly as per the Government of India stipulations while granting the stage - I & II clearances of CA proposals.

In the year 2014-2015, under CA a total of 271 works were undertaken by TSFD CAMPA incurring an expenditure of `656.055 lakhs. The division wise total number of works and expenditures under CA component is shown in Table 2.1a.

Table 2.1a: Division wise total number of works undertaken and expenditure (`lakhs) incurred under CA by TSFD, CAMPA during the year 2014-2015.

Name of the Circle	Name of the Division	Total number of works undertaken	Expenditure (`lakhs)
Adilabad	Adilabad	2	8.2720
	Bellampally	25	30.1450
	Nirmal	1	0.9660
	Mancherial	5	5.255
	Circle total	**36**	**44.638**
Hyderabad	Hyderabad	1	0.8
	Mahabubnagar	46	44.606
	Nalgonda	39	216.8011
	Circle total	**86**	**262.2071**
Khammam	Khammam	23	89.649
	Kothagudem	2	0.965
	Paloncha	31	55.82564
	Bhadrachalam (N)	19	6.46915
	Bhadrachalam (S)	3	8.326
	Circle total	**78**	**161.2348**
Nizamabad	Kamareddy	2	1.261
	Medak	2	3.34247
	Circle total	**4**	**4.60347**
Warangal	Warangal (N)	36	131.2422
	Warangal (S)	1	0.62323
	Karimnagar (E)	22	39.864
	Karimnagar (W)	3	2.02715
	Circle total	**62**	**173.7565**
WLM Hyd	Nagarjunasagar	5	9.6149
	Circle total	**5**	**9.6149**
GRAND TOTAL		**273**	**656.0548**

Targets and achievements of raising plantations under CA component undertaken by TSFD CAMPA during 2014-2015 is shown in Table 2.1b.

Table 2.1b: Division wise targets and achievements of raising plantations under CA during 2014-2015.

Sl. No	Name of the Circle	Name of the Division	Target (ha)				Achievements (ha)			
			CA	Addl. CA	Safety Zone	Total	CA	Addl. CA	Safety Zone	Total
1	Adilabad	Adilabad	0	0	4.74	4.74	0	0	4.74	4.74
		Circle Total	**0**	**0**	**4.74**	**4.74**	**0**	**0**	**4.74**	**4.74**
2	Hyderabad	Hyderabad	0	2	0	2	0	2	0	2
		Mahabubnagar	67	0	0	67	67	0	0	67
		Nalgonda	91.79	0	0	91.79	91.79	0	0	91.79
		Circle Total	**158.79**	**2**	**0**	**160.79**	**158.79**	**2**	**0**	**160.79**
3	Khammam	Khammam	87.18	0	0	87.18	87.18	0	0	87.18
		Bhadrachalam (S)	14.52	0	0	14.52	14.52	0	0	14.52
		Circle Total	**101.7**	**0**	**0**	**101.7**	**101.7**	**0**	**0**	**101.7**
4	Nizamabad	Medak	2.76	1.28	0	4.04	1.76	0.88	0	2.64
		Circle Total	**2.76**	**1.28**	**0**	**4.04**	**1.76**	**0.88**	**0**	**2.64**
5	Warangal	Warangal N	291	36	0	327	177	36	0	213.27
		Karimnagar E	33	0	27	60	33	0	27	60.34
		Karimnagar W	21	0	0	21	21.043	0	0	21.043
		Circle Total	**345**	**36**	**27**	**408**	**231**	**36**	**27**	**294.65**
GRAND TOTAL			**608.25**	**39.28**	**31.74**	**679.27**	**493.293**	**38.88**	**31.74**	**564.52**

During 2014-2015, plantations under CA covered 564.52 ha, of which 493.27 ha was achieved under CA, 38.88 ha under additional CA and 31.74 ha under safety zone. The main activities under plantation works included advance work including nursery works, raising of forest plantations and maintenance of previously raised plantations. Total plantation works carried out under CA during 2014-2015 is shown in Fig 2.1a.

Division wise total number of plantation works under CA for the year 2014-2015 is shown in Table 2.1a.

Fig 2.1a: Total number of different plantation activities under CA in 2014-2015.

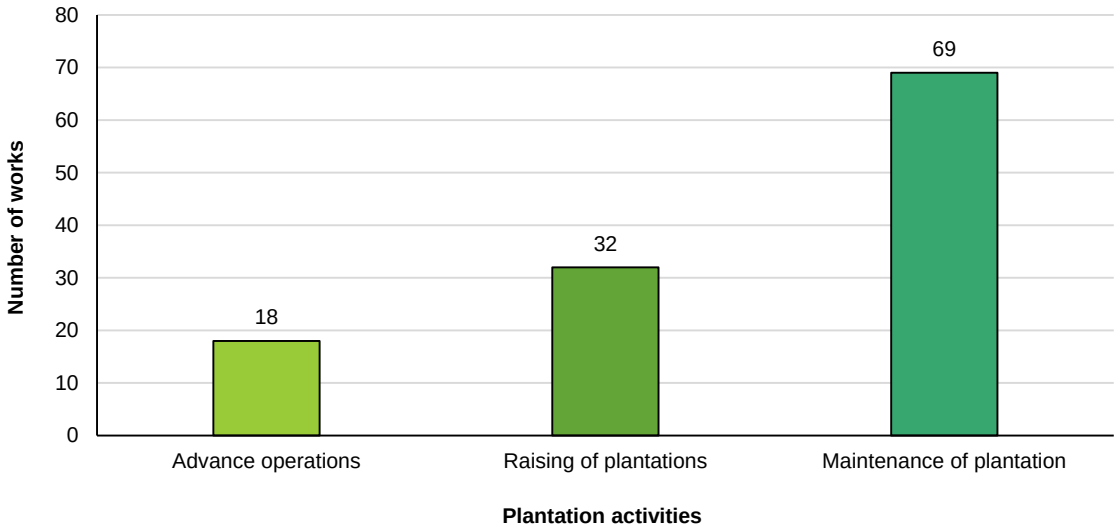


Table 2.1c: Division wise total plantation activities under CA by TSFD, CAMPA during 2014-2015.

Name of the circle	Name of the forest divisions	Advance operations	Raising of plantations	Maintenance of raised plantations	Total works
Adilabad	Adilabad	-	-	5	5
	Mancherial	-	1	-	1
	Nirmal	-	-	1	1
	Circle total	**-**	**1**	**6**	7
Khammam	Khammam	-	3	4	7
	Bhadrachalam (N)	-	-	16	16
	Bhadrachalam (S)	-	1	2	3
	Circle total	**-**	**4**	**22**	**26**
Hyderabad	Hyderabad	-	1	-	1
	Mahabubnagar	1	1	1	3
	Nalgonda	3	7	8	18
	Circle total	**4**	**9**	**9**	**22**
Warangal	Warangal (N)	9	6	-	15
	Karimnagar (E)	3	6	2	11
	Karimnagar West	-	1	1	2
	Circle total	**12**	**13**	**3**	**28**
Nizamabad	Kothagudem	-	-	2	2
	Paloncha	2	-	18	20
	Kamareddy	-	-	2	2
	Medak	-	4	4	8
	Circle total	**2**	**4**	**26**	**32**
FDPT Srisailam	Nagarjunasagar	-	1	3	4
	Circle total	-	1	-	1
GRAND TOTAL		**18**	**32**	**69**	**119**

2.2 Net Present Value (NPV): The components of NPV include natural forest management, forest protection, forest fire management, biodiversity conservation and development, research and development, capacity building, information communication and technology, monitoring and evaluation and office support. Each of the NPV components is described in the following sub-sections.

2.2.1 Natural Forest Management (NFM): The purpose of natural forest management treatments undertaken by TSFD CAMPA during 2014-2015 was to improve the overall stockings of the natural forests, restoration of degraded forest areas and improve the productivity of the forests on a

sustained yield basis by using appropriate silvicultural and management practices. Under the natural forest treatments, activities were proposed to improve the stockings of natural bamboo in the forests, improve the stockings of teak in the teak bearing Telangana forests and cover the barren hills with indigenous tree species. Management and silvicultural prescriptions were in accordance with the overall prescriptions of the working plan for the given division. To increase the overall stocking of the natural forests, TSFD CAMPA under NFM component incurred an expenditure of `2,497.356 lakhs on five treatment models namely teak plantation, barren hill afforestation, bamboo and miscellaneous species plantation, bamboo with eucalyptus plantation and non-teak semi hardwood species plantation for improving the productivity of the natural forests during 2014-2015.

Targets and achievements of different types of plantation for the year 2014-2015 under NFM component are shown in table 2.2.1a.

Table 2.2.1a: Division wise targets and achievements of plantations area (ha) undertaken under NFM component for the year 2014-2015.

Name of the circle	Name of the division	Teak	BHA	Bam. Misc.	Bam. + EP	NTSH	Total	Teak	BHA	Bam. Misc.	Bam. + EP	NTSH	Total
Adilabad	Adilabad	20	20	10	0	100	150	20	20	10	0	85	135
	Nirmal	20	20	10	0	50	100	20	20	10	0	50	100
	Bellampally	20	20	10	0	100	150	20	20	10	0	100	150
	Mancherial	20	20	10	0	100	150	20	20	10	0	100	150
	Kagaznagar	20	20	10	0	100	150	20	20	10	0	95	145
	Circle Total	**100**	**100**	**50**	**0**	**450**	**700**	**100**	**100**	**50**	**0**	**430**	**680**
Hyderabad	Hyderabad	0	30	0	0	6	36	0	45	0	0	6	51
	Mahabubnagar	0	40	0	0	0	40	0	40	0	0	0	40
	Nalgonda	0	30	0	0	0	30	0	30	0	0	0	30
	Circle Total	**0**	**100**	**0**	**0**	**6**	**106**	**0**	**115**	**0**	**0**	**6**	**121**
Khammam	Khammam	0	0	30	75	54	159	0	0	30	75	54	159
	Kothagudem	25	0	0		100	125	25	0	0	0	100	125
	Paloncha	25	0	0	25	150	200	25	0	0	25	150	200
	Bhadrachalam (N)	25	0	0	20	55	100	25	0	0	20	55	100
	Bhadrachalam (S)	0	0	0	25	0	25	0	0	0	25	0	25
	Circle Total	**75**	**0**	**30**	**145**	**359**	**609**	**75**	**0**	**30**	**145**	**359**	**609**
Nizamabad	Nizamabad	50	0	0	0	80	130	50	0	0	0	80	130
	Kamareddy	61	0	0	0	45	106	45	0	0	0	50	95
	Medak	20	0	0	0	200	220	20	0	0	0	200	220
	Circle Total	**131**	**0**	**0**	**0**	**325**	**456**	**115**	**0**	**0**	**0**	**330**	**445**
Warangal	Warangal (N)	75	0	0	0	200	275	46	0	0	0	133	179
	Warangal (S)	75	0	0	0	300	375	28	0	0	0	197	225
	Karimnagar (E)	150	0	0	0	100	250	110	0	0	0	100	210
	Karimnagar (W)	100	0	0	0	102	202	80	0	0	0	98	178
	Circle Total	**400**	**0**	**0**	**0**	**702**	**1102**	**264**	**0**	**0**	**0**	**528**	**792**
WLM Hyderabad	Achampet	0	0	0	0	115	115	0	0	0	0	47.68	47.68
	Circle Total	**0**	**0**	**0**	**0**	**115**	**115**	**0**	**0**	**0**	**0**	**47.68**	**47.68**
GRAND TOTAL		**706**	**200**	**80**	**145**	**1957**	**3088**	**554**	**215**	**80**	**145**	**1701**	**2695**

Division wise total number of plantation works under NFM for the year 2014-2015 is given in Table 2.2.1b.

Table 2.2.1b: Total plantation works undertaken under NFM by TSFD, CAMPA during 2014-2015.

Name of circle	Name of division	Advance operations	Raising of plantations	Plantation maintenance	Total
Adilabad	Adilabad	6	19	32	**57**
	Bellampally	14	9	47	**70**
	Kagaznagar	7	8	30	**45**
	Nirmal	9	17	68	**94**
	Mancherial	13	7	47	**67**
	Circle total	**49**	**60**	**224**	**333**
Hyderabad	Hyderabad	2	5	44	**51**
	Mahabubnagar		4	28	**32**
	Nalgonda	4	1	19	**24**
	Circle total	**6**	**10**	**91**	**107**
Khammam	Khammam	23	9	31	**63**
	Kothagudem	26	14	25	**65**
	Paloncha	15	13	30	**58**
	Bhadrachalam (N)	7	5	33	**45**
	Bhadrachalam (S)	-	2	5	**7**
	Circle total	71	43	124	238
Nizamabad	Nizamabad	8	13	20	**41**
	Kamareddy	9	9	24	**42**
	Medak	1	21	68	**90**
	Circle total	**18**	**43**	**112**	**173**
Warangal	Warangal (N)	3	10	18	**31**
	Warangal (S)	25	20	28	**73**
	Karimnagar (E)	4	17	50	**71**
	Karimnagar (W)	10	18	25	**53**
	FG Warrangal	3	1	32	**36**
	Circle total	**45**	**66**	**153**	**264**
WLM Hyderabad	Achampet	8	3	2	**13**
	Nagarjunasagar	-	-	2	**2**
	Circle total	**8**	**3**	**4**	**15**
TOTAL		**197**	**225**	**708**	**1130**

Table 2.2.1: Division wise abstract of physical works (no's) and expenditure (` lakhs) under NFM, 2014-2015.

Name of the circle	Name of the division	Target		Achievement	
		Physical (no's)	Financial (`lakh)	Physical (no's)	Financial (`lakh)
Adilabad	Adilabad	71	155.801	71	85.058
	Nirmal	95	120.506	95	96.469
	Mancherial	103	217.468	103	189.716
	Bellampally	95	176.566	95	155.11
	Kagaznagar	66	167.375	66	128.137
	Circle total	**430**	**837.716**	**430**	**654.49**
Hyderabad	Hyderabad	53	115.11	53	90.265
	Mahabubnagar	39	41.28	39	32.361
	Nalgonda	39	33.682	39	37.6534
	Circle total	**131**	**190.072**	**131**	**160.2794**
Khammam	Khammam	142	174.659	142	186.891
	Kothagudem	100	97.505	100	176.984
	Paloncha	101	194.47	101	256.99693
	Bhadrachalam (N)	46	191.681	46	115.67378
	Bhadrachalam (S)	12	29.86	12	13.108
	WL Paloncha	6	0.686	6	22.599
	Circle total	**407**	**688.861**	**407**	**772.25271**
Nizamabad	Nizamabad	58	128.89	58	96.463
	Kamareddy	70	125.59	70	73.075
	Medak	145	333.163	145	281.31921
	Circle total	**273**	**587.643**	**273**	**450.85721**
Warangal	Warangal (N)	42	231.429	42	88.23901
	Warangal (S)	115	269.354	115	136.62157
	Karimnagar (E)	82	218.671	82	89.02466
	Karimnagar (W)	92	146.428	92	85.3733
	Circle total	**331**	**865.882**	**331**	**399.25854**
WLM Hyd	Achampet	15	28.162	15	59.383
	N.Sagar	2	1.49	2	0.83547
	Circle total	**17**	**29.652**	**17**	**60.21847**
Grand total		**1589**	**3199.826**	**1589**	**2497.356**

2.2.2 Forest Protection (FP): Protection of forests is one of the vital responsibility of the forest department. The size of forest beats, sections and ranges have remained unchanged in the state and do not conform to national standards of forest beat, section and range sizes. To supplement the frontline field staffs in their protection efforts it was proposed to continue the existing and establish fresh base camps, strike forces, check posts and police parties. Various initiatives like maintenance and construction of quarters, forest boundaries pillars, providing arms to the frontline staff were proposed for improving the protection of the existing forests. An amount of `2609.2582 lakh was spent for completing the proposed interventions under FP component by TSFD, CAMPA including spillovers from the year 2014-2015. Activities carried out under FP during 2014-2015 include the following[9]:

- Base Camps (125 nos.). Total number of base camps in each circle are as follows, Adilabad circle (47 nos.), Hyderabad (1 nos.), WLM Hyderabad (24 nos.), Khammam (21 nos.), Nizamabad (9 nos.), Warangal (23 nos.) and WLM Hyderabad (24).
- Forest Strike Forces (56 no's) activities towards establishment and maintenance. Circle wise number of strike forces include Adilabad circle (17 nos.), Hyderabad (6 nos.), Khammam (12 nos.), Nizamabad (6 nos.), Warrangal (11 nos.) and WLM Hyderabad (4 no's).
- Check posts (50 no's). Circle wise number of strike forces include Adilabad circle (20 nos.), Khammam (10 nos.), Nizamabad (5 nos.) and Warrangal (12 nos.) and WLM Hyderabad (3 nos.).
- Two control rooms with (3) protection watchers for each control room.
- Four seizures safeguarding / feeding of accused works.
- Translation, scanning, and documentation of Reserve Forest Blocks notifications.
- Construction of boundary pillars (2591 nos.).
- Construction of protection wall in urban forest blocks spillover (5.15 km) and fresh 1 km.
- Construction of quarters for protection staffs. Spillover works (26 nos.) and fresh work (1 no.).
- Improvement of the communication network and mobility for patrolling duty to frontline forest staff.
- Providing arms and ammunition to the frontline staffs.
- Legal assistance charges.

Division wise targets and achievements under FP for the year 2014-2015 is shown in Table 2.2.2.

[9]Reconciled March MPR 2015 excel, TSFD data.

Table 2.2.2: Division wise abstract of physical works (nos.) and expenditure (`lakhs) under FP, 2014-2015.

Name of the circle	Name of the division	Target		Achievement	
		Physical (no's)	Financial (`lakh)	Physical (no's)	Financial (`lakh)
Adilabad	Adilabad	38	138.665	38	93.966
	Nirmal	45	139.798	45	105.642
	WL Jannaram	37	137.389	37	119.959
	Mancherial	41	117.004	41	106.184
	Bellampally	22	94.984	22	90.103
	Kagaznagar	29	98.977	29	76.401
	Circle total	**212**	726.82	**212**	**592.255**
Hyderabad	Hyderabad	55	912.897	55	416.184
	Mahabubnagar	31	75.642	31	92.316
	Nalgonda	14	91.547	14	90.4347
	Circle total	**100**	1080.09	**100**	**598.9347**
Khammam	Khammam	26	100.801	26	100.115
	Kothagudem	56	103.129	56	108.306
	Paloncha	33	79.745	33	68.91234
	Bhadrachalam (N)	56	154.437	56	136.61127
	Bhadrachalam (S)	83	123.059	83	56.928
	WL Paloncha	31	61.682	31	60.70224
	Circle total	**285**	622.85	**285**	**531.57485**
Nizamabad	Nizamabad	45	142.235	45	74.799
	Kamareddy	80	100.970	80	87.749
	Medak	36	73.158	36	69.41585
	WL Medak	11	32.272	11	26.662
	Circle total	**172**	348.64	**172**	**258.62585**
Warangal	Warangal (N)	38	115.224	38	99.49051
	Warangal (S)	48	120.512	48	109.20961
	WL Warangal	18	47.550	18	41.9241
	Karimnagar (E)	45	95.890	45	75.95
	Karimnagar (W)	24	79.190	24	69.97217
	Circle total	**173**	458.366	**173**	**396.54639**
WLM Hyd	CNP	4	11.515	4	8.036
	D.F.O.	5	14.575	5	10.969
	Achampet	55	214.700	55	183.012
	Nagarjunasagar	24	25.171	24	23.65544
	Circle total	**88**	265.96	**88**	**225.67244**
Zoo Park	NZP Hyderabad	3	9.000	3	5.64893
	Circle total	**3**	**3**	**3**	**5.64893**
GRAND TOTAL		**1033**	**3508.1375**	**1033**	**2609.2582**

2.2.3 Forest Fire Management (FFM): The forest areas in Telangana are subjected to damages due to annual ground fires in the summer season. The protection of regeneration of forest areas from fire damage is essential for improving the stocking in the forests and for providing fodder for the wild herbivores. An amount of `165.780 lakh was spent on interventions under this component. Major activities under FFM during 2014-2015 include:

- Creation of fire lines (40 km).
- Fire Watchers for maintaining the 565 km fire lines and control burning along extraction / bridle paths (*for 5 months in fire season i.e. April and May in 2014 and January, February and March in 2015*) 214 watchers.
- In highly vulnerable areas to fire risk 9 fire watch towers. It (2 in Nirmal, 4 in WLM Jannaram, 1 in Hyderabad, 2 in WLM Medak and 1 in Karimnagar (W)).

Division wise targets and achievements under FFM for the year 2014-2015 is shown in Table 2.2.3.

Table 2.2.3: Division wise abstract of physical works (nos.) and expenditure (`lakhs) under FFM, 2014-2015.

Name of circle	Name of division	Target		Achievement	
		Physical (nos.)	Financial (`lakh)	Physical (nos.)	Financial (`lakh)
Adilabad	Adilabad	3	16.725	3	5.924
	Nirmal	15	24.1755	15	23.389
	WL Jannaram	6	16.375	6	16.27
	Mancherial	7	7.35	7	3.216
	Bellampally	7	5.675	7	5.675
	Kagaznagar	2	8	2	8
	Circle total	**40**	**78.3005**	**40**	**62.474**
Hyderabad	Hyderabad	14	13.908	14	12.135
	Mahabubnagar	4	2.952	4	2.79
	Nalgonda	2	2.712	2	2.702
	Circle total	**20**	**19.572**	**20**	**17.627**
Khammam	Khammam	2	3.452	2	0.851
	Kothagudem	1	1.072	1	0.536
	Paloncha	1	2.68	1	0.134
	Bhadrachalam (N)	1	2.68	1	1.34
	WL Paloncha	9	5.832	9	5.296
	Circle total	**13**	**15.716**	**13**	**8.157**
Nizamabad	Nizamabad	11	2.68	11	4.8759
	Kamareddy	40	2.68	40	6.293
	Medak	37	4.02	37	6.705
	WL Medak	4	10.465	4	10.049
	Circle total	**92**	**19.845**	**92**	**27.9229**
Warangal	Warangal (N)	7	16.375	7	1.9259
	Warangal (S)	3	10.025	3	0.23953
	WL Warangal	7	17.375	7	4.488
	Karimnagar (E)	6	10.025	6	5.81
	Karimnagar (W)	21	10.025	21	7.105
	Circle total	**44**	**63.825**	**44**	**19.56843**
WLM Hyd	CNP	2	4.02	2	4.02
	D.F.O	2	1.34	2	0.938
	Achampet	12	24.166	12	19.244
	N.Sagar	15	7.287	15	5.82887
	Circle total	**31**	**36.813**	**31**	**30.03087**
GRAND TOTAL		**240**	**234.0715**	**240**	**165.7802**

2.2.4 Biodiversity Conservation (BDC): The Telangana state is endowed with rich flora and fauna with more than 3000 plant species, 400 bird species, 80 mammalian species and more than 50 reptilian species. Under this component during the year 2014 - 2015 an expenditure of `1187.824 lakhs was incurred by TSFD, CAMPA. Biodiversity conservation and development works in the National Parks and Protected Areas undertaken by TSFD, CAMPA during 2014-2015 are listed below[10]:

- Wildlife habitat improvement (*boundary demarcation / protection / chain-link fence*) was carried out in 39.5 ha. Of which, 7.5 ha in WL Jannaram, and 32 ha in DFO, WLM Hyderabad.
- Wildlife habitat improvement (*removal of weed growth*) was carried out in 310 ha. Of which, 200 ha in Nirmal, and 110 ha in CNP.
- In Nirmal, 10 ha of wildlife habitat was improved through development and improvement of fodder plots.
- In CNP, improvement of roads and pathways was carried out covering 3.5 ha.
- Twenty animal trekkers were engaged in CNP for habitat protection.

[10]Reconciled excel sheet, 2014-2015, TSFD data sources.

- Five percolation tanks were developed in Nirmal.
- Maintenance of three check dams. Two in Nirmal and 1 in Mahbubnagar.
- Maintenance of four water holes at WLM Jannaram.
- Maintenance of two saucer pits at WL Warangal.
- Wildlife protection and anti-poaching activities (16 nos.).
- Man-animal conflict 19 numbers.
- Rescue of wild animals, 1 at WL Jannaram and 1 at WL Medak.
- Fringe area development (40 ha).
- Awareness creation on solar pumps (106 no's).
- Maintenance of old hoardings /construction of store rooms (15 no's).
- Improvement / Maintenance of EECs (total 6 no's), 2 in WL Jannaram, 2 in Medak, 1 in Achampet and 1 in Karimnagar (W).
- 9 no's of local training to staff & NGOs. These training were conducted in Adilabad (4 nos.), WL Jannaram (4 nos.), and 1 in WL Medak.
- Fourteen numbers of exhibition and nature camps were conducted. 11 in Mahabubnagar and 3 in WL Medak.

Division wise targets and achievements under BDC for the year 2014-2015 is shown in Table 2.2.4.

Table 2.2.4: Division wise abstract of physical works (nos.) and expenditure (`lakhs) under BDC, 2014-2015.

Name of the circle	Name of the division	Target		Achievement	
		Physical (nos.)	Financial (`lakh)	Physical (nos.)	Financial (`lakh)
Adilabad	Adilabad	8	0	8	9.247
	Nirmal	50	15.432	50	20.087
	WL Jannaram	28	135.488	28	108.168
	Bellampally	4	0	4	0.435
	Kagaznagar	9	0	9	6.24
	Circle total	**99**	**150.92**	**99**	**144.177**
Hyderabad	Hyderabad	19	83.35	19	17.848
	Mahabubnagar	30	26.718	30	29.295
	Circle total	**49**	**110.068**	**49**	**47.143**
Khammam	WL Paloncha	45	99.244	45	97.02906
	Circle total	**45**	**99.244**	**45**	**97.02906**
Nizamabad	Nizamabad	5	0	5	2.21
	Kamareddy	75	0	75	13.069
	Medak	16	0	16	4.67787
	WL Medak	93	99.995	93	81.012
	Circle total	**189**	**99.995**	**189**	**100.96887**
Warangal	WL Warangal	128	113.429	128	105.78733
	Karimnagar (W)	7	25.75	7	22.16406
	Circle total	**135**	**139.179**	**135**	**127.95139**
WLM Hyd	CNP	84	497.658	84	597.724
	D.F.O	15	25.475	15	30.468
	Achampet	52	33.96	52	26.791
	Nagarjunasagar	32	9.648	32	10.98072
	Circle total	**183**	**566.741**	**183**	**665.96372**
Zoo Park	NZP Hyd	10	2.5	10	4.5906
	Circle total	**10**	**2.5**	**10**	**4.5906**
GRAND TOTAL		**710**	**1168.65**	**710**	**1187.8236**

2.2.5 Research and Development (R&D): The forest department has undertaken applied forestry research in a number of fields for improving the growing stock of forests species and development of genetically superior and high yielding variety of various species. A total amount of `156.85 lakhs

was incurred to undertake activities under R&D component during 2014-2015. Interventions undertaken during the year are as follows:

- Maintenance of FRS, boundary fence, inspection paths, lab buildings, lath house, organic compost shed, mist chamber, poly propagators, Low cost sand bed CMA units, seed godown, of FRS
- Strengthening of existing infrastructure of FRS,
- Procurement of machinery and equipment – soil testing equipment, tractor,
- Maintenance of lab equipment, bio fertilizer units, electric motors, pump sets etc.
- Documentation and strengthening of library - Books, periodicals, CDs, films etc., publications.
- Tree breeding activities - short rotation forestry species / *Pterocarpus marsupium*.
- Services of research assistants for tree breeding activities.
- Development of macro propagation protocol (*reservoir grafting, rejuvenation and rooting in low-cost Sand-bed CMA unit*).
- Clonal Forestry Research - Clonal testing of species.
- Domestication of Indigenous fast growing species - Establishment of Demo / Trial plots.
- Seed Technology - Standardization of germination methods, maintenance of seed technology labs, creation of improved seed stands of NTFP species, collection/Grading, testing, storage and packaging of seed, establishment of forest seed sale counter, services of lab assistants / research assistants.
- Bio-fertilizer & bio-pesticide Production - production.
- Improvement of Nursery Technology - maintenance of nursery - irrigation system, production of QPM NTSH species, production of QPM of *Melia dubia* & *Mitragyna parviflora*.
- Improvement of Nursery Technology - Maintenance works in nursery.
- Impact of clump management.
- Conservation of Eastern Ghats - collection and preparation, maintenance & expansion of Arboretum / Assistance of a field assistant to the research.
- Special Research Topics - Analysis of MLCT Plots/Reclamation of recalcitrant, growth data documentation of LRHT Plots/development of thinning models, development of shelterwood / development of suitable models, maintenance of research plots, chemicals and glassware, contingencies.

Division wise targets and achievements under R&D for the year 2014-2015 is shown in Table 2.2.5.

Table 2.2.5: Division wise abstract of physical works (nos.) and expenditure (`lakhs) under R&D, 2014-2015.

Name of the Circle	Name of the Division	Sanctioned Cost		Expenditure	
		Physical (no's)	Financial (`lakhs)	Physical (no's)	Financial (`lakhs)
R&D	SS Hyd	88	70.13	88	70.46
	FG WGL	142	83.75	142	86.39
Grand total		**230**	**153.88**	**230**	**156.85**

2.2.6 Capacity Building (CB): The Forest Academy, Dullapally is the premier institute selected by the Government of India for imparting training to range officer trainees of the country. It also trains the in-service FBOs and FSOs to discharge their duties effectively. An amount of `203.68 lakhs is provided under the component for the following activities:

- New infrastructure hostel building, quarters at TSFA, Dullapally.
- Trainings, Workshops, Study tours & Publications Proposed - Off campus programmes - Effective Forest Protection and Management, personality development, BHA; In campus programmes - Silviculture techniques & treatment practices, modern nursery management, Accounts & Office procedures, effective forest protection, enhancing conviction rate in court cases,
- Refresher Training course to newly recruited FSOs / FBOs / ABOs
- Conducting specialized training on GIS & GPS, weapon training, jeep driving,
- Organizing workshops/trainings and study tours for frontline staff, other forest officers.
- Maintenance of existing infrastructure.

Division wise targets and achievements under CB for the year 2014-2015 is shown in Table 2.2.6.

Table 2.2.6: Division wise abstract of physical works (nos.) and expenditure (`lakhs) under CB, 2014-2015.

Name of the circle	Name of the division	Target		Achievement	
		Physical (nos.)	Financial (`lakh)	Physical (no's)	Financial (`lakhs)
TSFD Dulapally	Dulapally	108	437.02	108	203.68
Grand total		**108**	**437.02**	**108**	**203.68**

2.2.7 Information Communication and Technology (IC&T): TSFD is the pioneer in obtaining satellite data, analyzing and interpreting it and creating a database for monitoring and improving the forest cover. The information obtained from the satellite imageries are analyzed and areas prone to fire damages have been categorized as high risk and moderate zones. This base information has been utilized for laying and maintaining the fire lines in the forests. CAMPA MIS is also being developed to capture and monitor the implementation of the activities under CAMPA. An amount of `278.6583 lakhs has been spent in this component. Division wise targets and achievements are shown in Table 2.2.7. Major interventions under ICT component during 2014-2015 include:

- Vegetation Cover mapping & monitoring - Cost of satellite data, ground Truthing,
- Vegetation Canopy Density mapping & monitoring,
- Assessment of Trees Outside Forests - Cost of field inventory / Cost of printing of ToF report,

- Updation of Vector layers including datum conversion from Indian Bangladesh to WGS 84,
- Miscellaneous - DGPS Surveys, RoFR claims, Plan inputs, Site Selections and their monitoring etc.,
- GIS-MIS Integration and Green watch ICCEMS data updation,
- Development of Web enabled FMIS Package including Website Development for GIS-MIS Integration – Development and maintenance of FMIS Modules; Arc GIS Server and Skyline Globe Customization; Trainings on APFMIS Modules,
- Improvement of Infrastructure and communication for FMIS and e-Green Watch - Improving Communication Infrastructure - Internet connection for O/o PCCF (HoFF); 3 Nos HP Plotters + HP CLJ A3 Printer + 1 Xerox,
- Wages to project Scientist I, Electronic equipment maintenance operators,
- Survey of notified forest blocks and FCA areas (*outsourcing*).

Table 2.2.7: Division wise abstract of physical works (nos.) and expenditure (`lakhs) under ICT, 2014-2015.

Concerned circle	Name of the division	Sanctioned Cost		Expenditure	
		Physical (nos.)	Financial (`lakh)	Physical (nos.)	Financial (`lakh)
I&TC	Adilabad	8	11.025	8	9.093
	Nirmal	8	11.175	8	9.245
	WL Jannaram	8	6.3	8	4.798
	Mancherial	3	9.525	3	7.536
	Bellampally	6	9.45	6	7.846
	Kagaznagar	7	7.875	7	6.527
	Hyderabad	5	15.685	5	15.534
	Mahabubnagar	12	7.875	12	7.353
	Nalgonda	5	7.686	5	7.4886
	Khammam	8	8.16	8	7.537
	Kothagudem	8	11.025	8	10.617
	Paloncha	5	9.45	5	7.51304
	Bhadrachalam (N)	3	7.95	3	7.5358
	Bhadrachalam (S)	4	9.45	4	7.709
	WL Paloncha	5	3.15	5	2.78207
	Nizamabad	8	7.95	8	6.408
	Kamareddy	21	9.431	21	9.266
	Medak	10	12.6	10	10.79712
	WL Medak	2	1.575	2	1.371
	Warangal (N)	16	16.275	16	11.09915
	Warangal (S)	8	14.125	8	9.88876
	WL Warangal	5	4.725	5	3.526
	Karimnagar (E)	16	13.78	16	9.471
	Karimnagar (W)	14	17.52	14	14.31222
	CNP	3	3.126	3	2.541
	D.F.O.	2	1.61	2	1.548
	Achampet	9	11.025	9	9.443
	Nagarjunasagar	5	3.15	5	2.73407
	SS Hyd	1	0.075	1	0
	FG WGL	1	0.075	1	0
	I&TC	13	83.473	13	67.139
GRAND TOTAL		**229**	**336.296**	**229**	**278.65883**

2.2.8 Monitoring and Evaluation (M&E): CAMPA is being implemented in the state since 2009 and there is a need to monitor the implementation of the programme in the field level besides the regular supervision by the Forest Range Officers/ DFOs /Circle heads and Senior Officers from the Head Office. An amount of `35.47 lakhs has been spent by TSFDA CAMPA under monitoring

and evaluation component during 2014-2015. Division wise targets and achievements under M&E for the year 2014-2015 is shown in Table 2.10. Major M&E activities during 2014-2015 include:

- CA audit fees for external audit.
- Office support for monitoring CAMPA.
- Bank charges incurred.

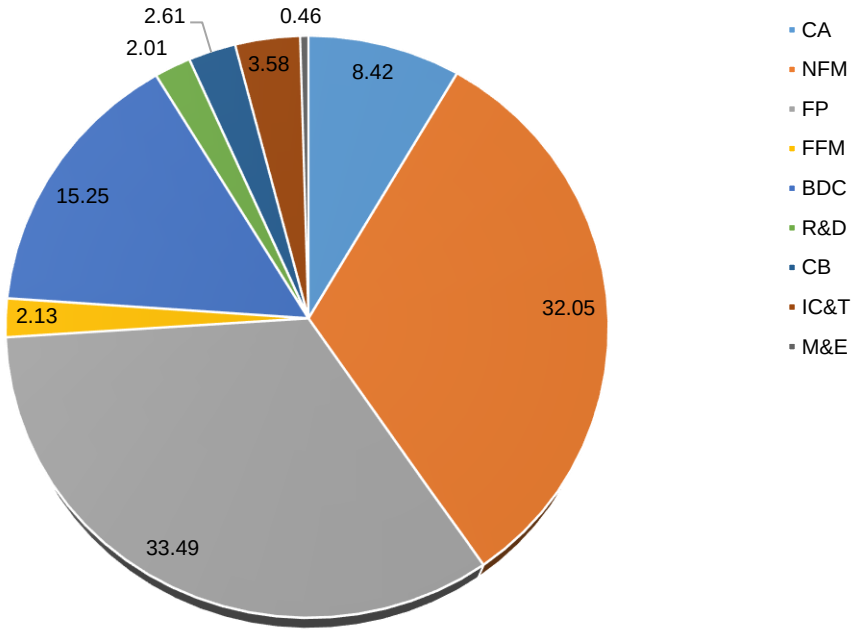
Table 2.2.8: Division wise abstract of physical works (nos.) and expenditure (lakhs) under M&E, 2014-2015.

Name of the circle	Name of the division	Sanctioned Cost		Expenditure	
		Physical (nos.)	Financial (`lakh)	Physical (nos.)	Financial (`lakh)
Adilabad	Adilabad	6	3.25	6	3.20001
	Nirmal	3	0.5	3	0.47304
	WL Jannaram	3	0.5	3	1.8885
	Mancherial	3	0.5	3	0.47694
	Bellampally	2	0.5	2	1.108
	Kagaznagar	1	0.5	1	0.47641
	Circle total	**18**	**5.75**	**18**	**7.6229**
Hyderabad	Hyderabad	5	1.75	5	2.512
	Mahabubnagar	5	0.8	5	0.253
	Nalgonda	1	0.8	1	0.253
	Circle total	**11**	**3.35**	**11**	**3.018**
Khammam	Khammam	8	6.5	8	6.705
	Kothagudem	8	0	8	2.25534
	Paloncha	1	0	1	0.75281
	Bhadrachalam (N)	1	0	1	1.25781
	Bhadrachalam (S)	1	0	1	0.253
	WL Paloncha	3	0	3	0.67082
	Circle total	**22**	**6.5**	**22**	**11.89478**
Nizamabad	Nizamabad	4	2	4	3.627
	Kamareddy	3	1	3	1.44225
	Medak	1	1	1	0.97488
	WL Medak	2	0.5	2	0.50758
	Circle total	**10**	**4.5**	**10**	**6.55171**
Warangal	Warangal (N)	4	2.25	4	1.933
	Warangal (S)	2	0.65	2	0.39005
	WL Warangal	3	0.65	3	0.6555
	Karimnagar (E)	1	0.65	1	0.135
	Karimnagar (W)	5	0.65	5	0.635
	Circle total	**15**	**4.85**	**15**	**3.74855**
WLM Hyd	CNP	2	0	2	0.503
	D.F.O	3	2	3	0.46
	Achampet	1	1.75	1	0
	N.Sagar	2	0	2	0.30079
	Circle total	**8**	**3.75**	**8**	**1.26379**
R&D	SS Hyd	1	1.325	1	0.24023
	FG WGL	1	1.175	1	0
	Circle total	**2**	**2.5**	**2**	**0.24023**
Zoo Park	NZP Hyd	1	1.35	1	1.12977
	Circle total	**1**	**1.35**	**1**	**1.12977**
Head Office	Head Office	5	16.925	5	0
	Circle total	**5**	**16.925**	**5**	**0**
GRAND TOTAL		**92**	**49.475**	**92**	**35.46973**

2.3 Targets and Achievements of CAMPA components during 2014-2015:

The Government of India, Ministry of Environment and Forests communicated guidelines that prescribe the preparation of an annual plan of operations for utilizing funds received towards Compensatory Afforestation, Net Present Value etc., currently available with the Ad-hoc CAMPA. Accordingly, keeping in view the GOI guidelines, an Annual Plan of Operation (APO) for utilization of amounts realized under Compensatory Afforestation (CA) and Net Present Value (NPV) have been prepared by the TSFD for the year 2014-15 under A.P. State CAMPA, as Telangana state was a part of AP state in 2014-2015. Component wise summary of targets and achievements of CAMPA components during 2014-2015 are shown in table 2.3. Percent expenditure of funds under different components are shown in Figure 2.3.

Fig:2.3 Percent expenditure under different CAMPA components in 2014-2015



The target through APO was prepared to keep in view the following broad objectives:

(a) Compensatory Afforestation in lieu of diverted forest areas,

(b) Conservation, protection, regeneration, and management of existing natural forests,

(c) Biodiversity Conservation and management of Protected forest areas and wildlife habitats,

(d) Research, training and capacity building.

Table 2.3: Summary of targets and achievements of TSFD, CAMPA components during 2014-2015.

CAMPA Components	Targets		Achievements	
	Physical (Nos)	Financial (`lakhs)	Physical (Nos)	Financial (`lakhs)
Compensatory Afforestation (CA)	273	908.245	273	656.0548
Natural Forest Management (NFM)	1589	3199.826	1589	2497.3563
Forest Protection (FP)	1033	3508.1375	1033	2609.2582
Forest Fire Management (FFM)	240	234.0715	240	165.7802
Biodiversity Conservation and Development (BDC)	710	1168.647	710	1187.8236

CAMPA Components	Targets		Achievements	
	Physical (Nos)	Financial (` lakhs)	Physical (Nos)	Financial (` lakhs)
Research & Development (R&D)	230	153.88	230	156.85
Capacity Building (CB)	108	437.02	108	203.68
Information & Communication Technology (IC&T)	229	336.296	229	278.65883
Monitoring & Evaluation (M&E)	92	49.475	92	35.46973
TOTAL	**4504**	**9995.598**	**4504**	**7790.932**

2.4 Implementing mechanism: The TSFD was the implementing agency. The works were executed through the departmental personnel. In activities like nursery raising, raising of plantations, maintenance of plantations, SMC works, creation and maintenance of fire lines and other activities with wage component, the programme was implemented following the guidelines of NREGA scheme by employing the rural unemployed people with job cards, maintenance of muster rolls and payment of wages into the bank account of job card holders.[11]

[11]AP State CAMPA, APO for the year 2014-2015, pp 9.

Chapter 3

EVALUATION SCOPE AND OBJECTIVES

As Telangana State Forest Department (TSFD) is implementing CAMPA activities in the state of Telangana since 2009-2010, there is a felt need to technically evaluate these ongoing efforts, and based on the learnings, plan the way forward. Also, the State CAMPA guidelines stipulate that an evaluation methodology of the works implemented has to be evolved and implemented to ensure effective and proper utilization of the fund for which funds are also earmarked. In this regard, IORA Ecological Solutions Pvt. Ltd. is engaged as the 'Third party' to evaluate and monitor CAMPA works implemented in the State of Telangana yearly for the period 2009-10 to 2015-16. Evaluation of activities under all the CAMPA components was conducted. Two-stage random sampling strategy has been adopted.[12] Of all the activities, firstly 10% of works for each year were randomly sampled. For plantations activities, the basis for selecting 10% of the samples is adhering the National Evaluation Manual for CAMPA Projects when the survival percentage for different plantation sites is not available. Secondly, from the selected plantation sites, randomly a plot of 0.1 ha was laid for field enumeration adhering NWPC-2014[13] guidelines. For other activities, works carried out were randomly sampled and 10% of the activities were selected every year. Records maintained for the activities was checked and in the case where civil or other physical works were carried out, the inspection was conducted during the evaluation process to check from variation as reported in the records and that exists on the field. It was ensured that the random sample covers maximum forest divisions of the state.

3.1 Evaluation scope

IORA Ecological Solutions Pvt. Ltd. has been assigned to conduct 3rd party evaluation of CAMPA works implemented in the State of Telangana.

3.2 Objectives of the study

1. To physically monitor and document the status of plantations of the selected sample from the plantation carried out under the CAMPA Scheme in Telangana State Forest department for the year 2014-2015.
2. To evaluate the survival and health of plantations carried out under the CAMPA Scheme in Telangana State Forest department for the year 2014-2015 with photographic evidence.
3. To evaluate the other activities carried out by Telangana State Forest Department for the year 2014-2015 with photographic evidence.

[12]National Evaluation Manual for CAMPA Projects (2016) CEAMT, IIFM Bhopal, 25 pages
[13]National Working Plan Code – For Sustainable Management of Forests & Biodiversity in India (2014), MoEFCC, 91p.

Chapter 4

EVALUATION APPROACH AND METHODS

4.1 Evaluation Methodology

The process flow that was adopted during the third party CAMPA evaluation exercise is shown through a flowchart in Fig 4.1. The evaluation methodology was conducted in five stages. Each of these stages is elaborated in this chapter under five sub-sections.

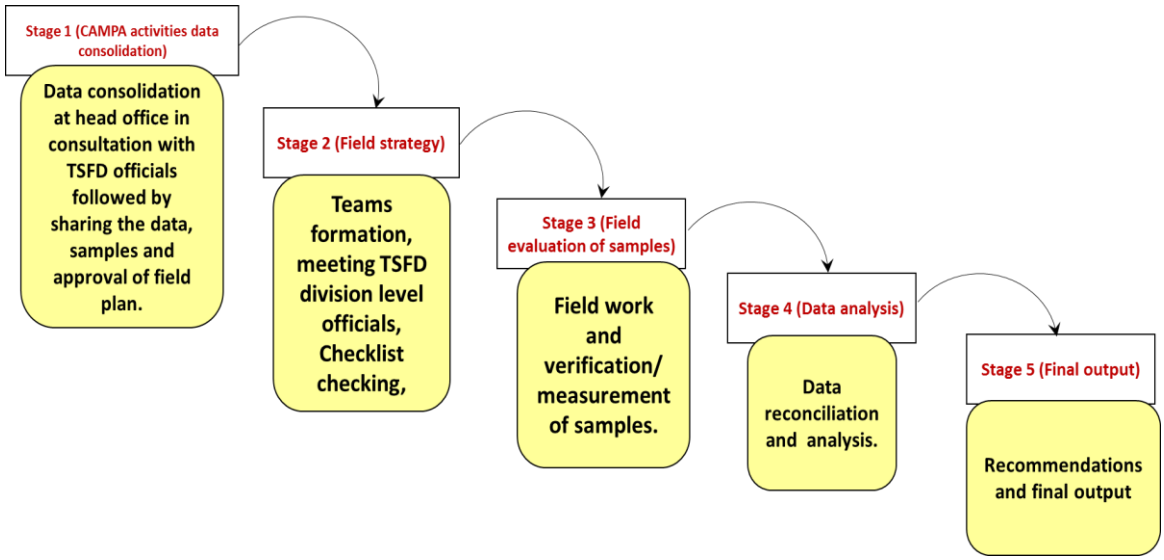


Fig 4.1: Process flow of third party CAMPA evaluation.

4.1.1 Stage 1 - CAMPA activities data consolidation: The first stage i.e. CAMPA Activities Data Consolidation (*see Fig 4.1.1*) consisted of four major activities namely data collection, sampling, field planning and issuance of field visit permission from APCCF (CAMPA).

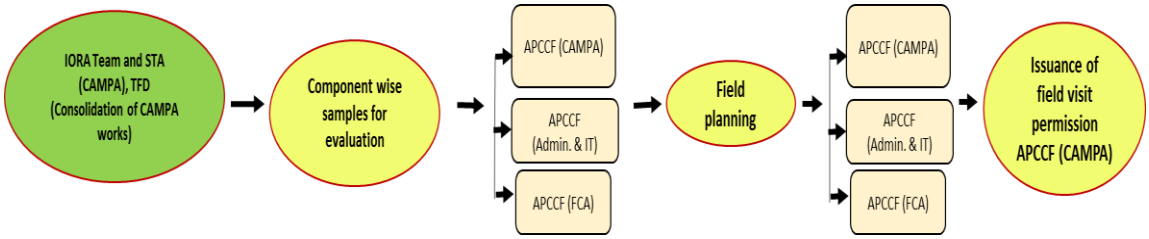


Fig 4.1.1: Flow chart of Stage 1 - CAMPA activities data consolidation.

TSFD officials were contacted at the TSFD, Head Office, Hyderabad to collect the total list of works under different CAMPA components undertaken by TSFD CAMPA for the year 2014-2015. The list of data sources reviewed for consolidation of CAMPA list of works for 2014-2015 is shown in List 4.1.1.

List 4.1.1: List of data sources for third-party CAMPA evaluation.

(A) TSFD Data sources (files, excels) reviewed with support from STA CAMPA

1) TSFD circles, divisions together with AP order
2) TSFD circles, divisions before bifurcation list
3) TSFD circles, divisions after reconciliation list
4) CAMPA Annual Plan report 2014-2015
5) List of works 2014-2015 excel

(B) Information on GIS with support from DCF (FCA) and RFO (Geomatics)

1) List of divisions
2) List of ranges

4.1.1.1 Component wise samples for evaluation: The consolidated list of CAMPA works under different CAMPA components undertaken by TSFD, CAMPA for the year 2014-2015 was collected. A total of 4487 works (*Part B*) were undertaken in the state of Telangana under CAMPA during 2014-2015. The total list of CAMPA works was sorted into two categories i.e. Plantation Activities and Other Activities. The list of samples prepared was presented to the CAMPA Monitoring Committee (CMC) consisting of the APCCF (CAMPA), APCCF (Admin & IT) and APCCF (FCA) through an inception workshop. Suggestions received from the CMC during the inception workshop was incorporated and the final inception report submitted to TSFD for approval. Detail sampling design adopted is described under the following two sub-sections.

4.1.1.1.1 Sampling of plantation activities: For direct field evaluation of plantation, the two-stage random sampling strategy was applied.

The list of plantation activities namely advance works, raising of forest plantations, maintenance of plantations and raising of planting stocks undertaken under CA and NPV was sorted for the year 2014-2015. The sorted list was then ably formatted using MS Excel software and the file was converted to a comma separated values (CSV) to plot them into the geo-spatial domain. The CSV values were plotted geo-spatially in ArcGIS Version 10.3 software and segregated into plantations undertaken under CA and NFM. Sampling design tool, an add-on of ArcGIS 10.3 software was run to generate random samples keeping sampling intensity of 10%.

Of all the total plantation taken up by TSFD, firstly 10% of plantations were randomly sampled. The basis for selecting 10% of the sample is adhering the National Evaluation Manual for CAMPA Projects when the survival percentage for different plantation sites is not available[14]. Secondly, an iterative method was used to get the appropriate distribution of samples in the divisions. Telangana forest division boundary was taken as a sample frame to decide the extent of samples. From the

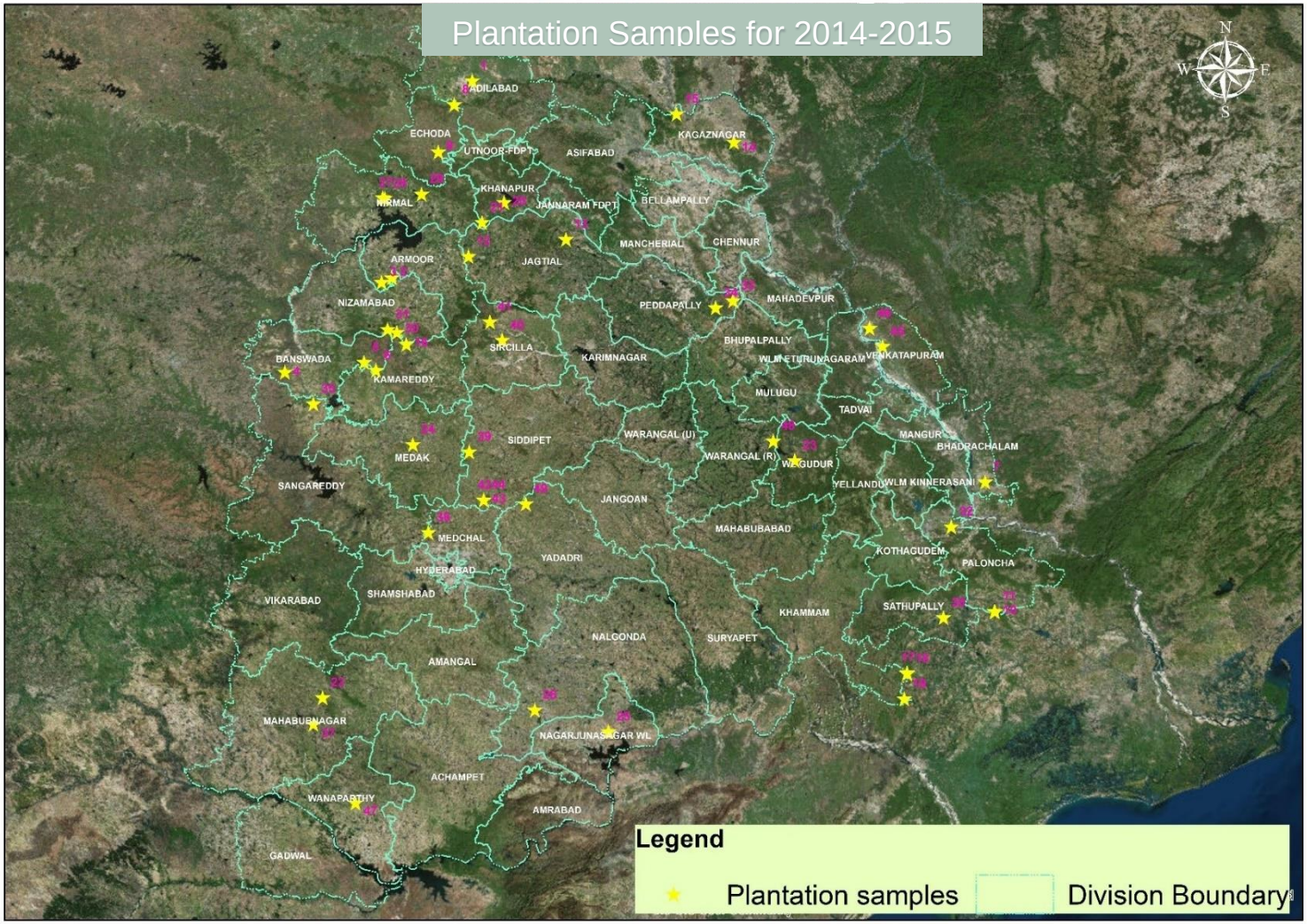
[14]National Evaluation Manual for CAMPA Projects (2016) CEAMT, IIFM Bhopal, 25 pages

selected plantation sites, a random point was generated to lay plot for direct field enumeration adhering NWPC-2014 guidelines. The detail sample list (159 no's) of plantation activities is given in Annexure IV. Division wise number of plantation samples for evaluation under CA and NPV is shown in table 4.1.1a and Map 4.1.1.

Table 4.1.1a: Division wise number of plantation samples for different CAMPA components (2014-2015) for 3rd party evaluation.

Row Labels	Raising	Advance Operation	Maintenance	Nursery	Grand Total
Achampet	-	1	-	-	1
Adilabad	-	-	2	-	2
Amrabad	1	-	-	1	2
Armoor	1	-	2	-	3
Armoor	-	-	1	-	1
Asifabad	-	-	-	1	1
Banswada	-	1	4	-	5
Bellampally	1	1	-	1	3
Bhadrachalam	2	-	1	1	4
Bhupalpally	2	-	3	1	6
Bhupalpally	-	2	-	-	2
Boath	-	1	-	-	1
Echoda	-	-	5	-	5
FG Warangal (U)	-	-	1	-	1
FG Warangal(U)	2	-	5	-	7
Jagitial	-	-	4	-	4
Jannaram	-	-	1	-	1
Kagaznagar	-	1	4	-	5
Kamareddy	-	-	2	-	2
Khammam	-	1	1	-	2
Khanapur	1	-	1	-	2
Kothagudem	-	2	1	-	3
Mahabubnagar	-	-	2	-	2
Mahbubabad	5	1	2	1	9
Manuguru	-	-	-	1	1
Medak	-	-	4	-	4
Nagarjunasagar WLM	-	-	1	-	1
Nalgonda	-	-	3	3	6
Nirmal	-	-	4	1	5
Nizamabad	-	1	4	-	5
Paloncha		1	1	1	3
Peddapally	2	1	3	-	6
Sangareddy		1	5	-	6
Sathupally		1	2	-	3
Siddipet	2	-	3	-	5
Sircilla	2	1	3	-	6
Sircilla	-	-	2	-	2
SS Hyderabad	-	-	7	-	7
Utnoor FDPT	-	1	3	-	4
Venkatapuram	1	1	2	-	4
Wanaparthy	-	1	2	-	3
Warangal Rural	2	1	1	-	4
WLM Hyderabad	-	1	-	-	1
Yadadri	-	-	4	-	4
Yallandu	-	1	1	-	2
Yellandu	2	-	-	1	3
Grand Total	**26**	**23**	**97**	**13**	**159**

Map 4.1.1a: Map showing plantation activities samples evaluated for 3rd party evaluation.

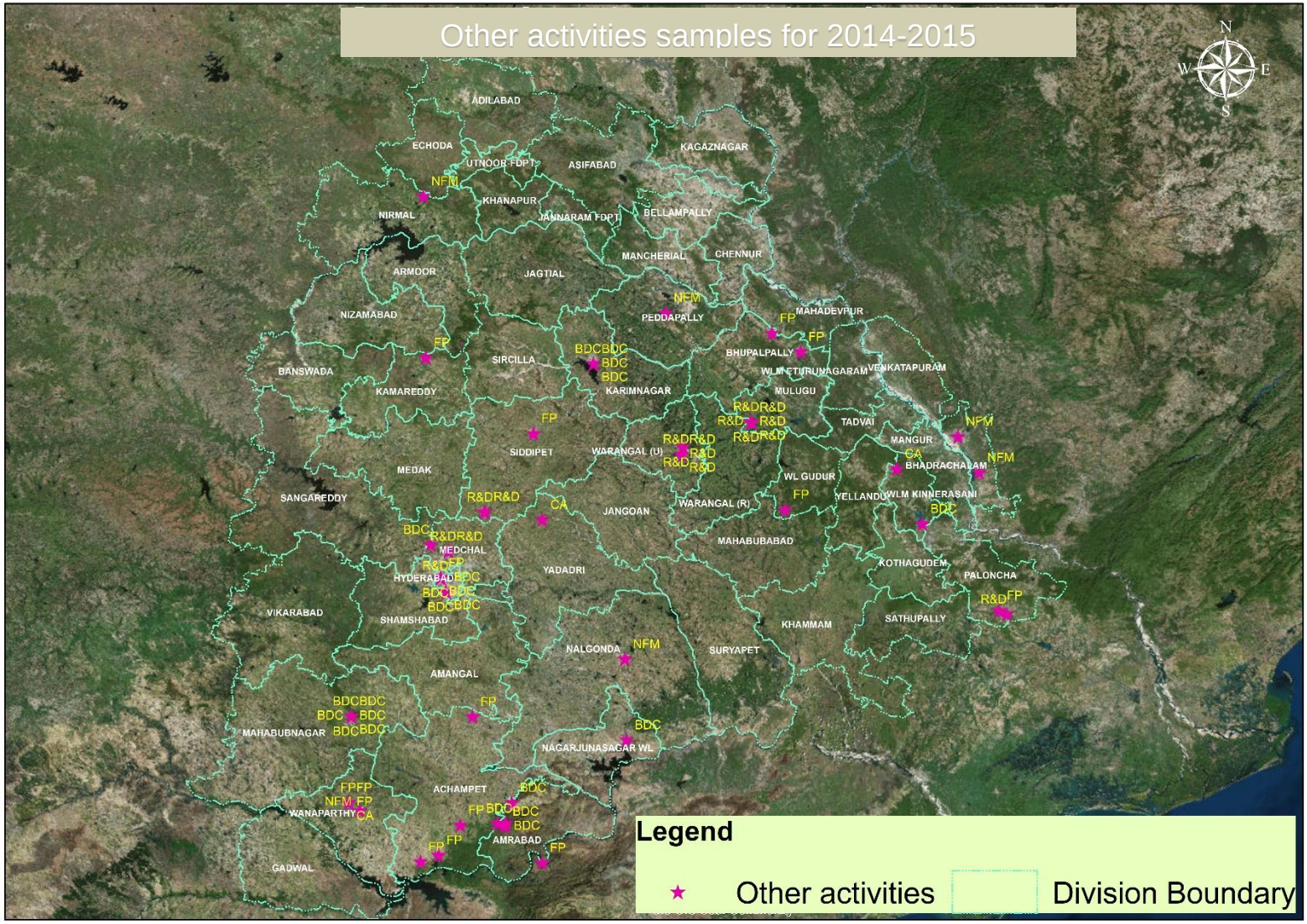


4.1.1.1.2 Sampling of other activities: For sampling other activities, the consolidated list of works of all the other activities undertaken by TSFD CAMPA during the year 2014-2015 was sorted. Sampling design tool, an add-on of ArcGIS 10.3 software was run to generate random samples keeping sampling intensity of 10%. An iterative method was used to get the appropriate distribution of samples in the divisions. The detail sample list (296 no's) of other activities is given in Annexure V. Division wise number of samples of other activities under different CAMPA components namely, CA, NFM, FP, FFM, BDC, CB, ICT, M&E and R&D is shown in table 4.1.1b and map 4.1.1.b.

Table 4.1.1b: Division wise number of samples for 3rd party evaluation of other activities under different CAMPA components for the year 2014-2015.

Division	CA	NFM	FP	FFM	BDC	CB	ICT	M&E	R&D	Grand Total
Achampet	-	-	3	-	-	-	-	-	-	3
Adilabad	-	1	6	1	-	-	1	-	-	9
Amrabad	-	1	4	2	6	-	1	-	-	14
Asifabad	3	-	3	-	1	-	-	-	-	7
Banswada	-	-	-	1	-	-	-	-	-	1
Bellampally	-	2	5	-	1	-	1	2	-	11
Bhadrachalam	-	1	9	-	-	-	-	-	-	10
Bhupalpally	1	-	4	1	-	-	1	-	-	7
Chennur	-	-	1	-	-	-	-	-	-	1
Chilkur	-	-	-	-	4	-	-	-	-	4
CNP	-	-	-	-	5	-	-	-	-	5
Echoda	-	-	5	1	-	-	-	-	-	6
FG Warrangal	-	-	-	-	-	-	-	-	19	19
Hyderabad	-	-	-	1	-	-	2	2	-	5
Jagtial	-	-	4	2	-	-	1	1	-	8
Jannaram	-	-	6	2	9	-	1	-	-	18
Kagaznagar	-	-	5	-	2	-	-	-	-	7
Kamareddy	-	-	3	1	1	-	-	-	-	5
Karimnagar	-	-	-	-	1	-	-	-	-	1
KBR National Park	-	-	1	-	7	-	1	-	-	9
Khammam	-	-	1	-	-	-	-	-	-	1
Khanapur	-	-	3	1	-	-	1	-	-	5
Kinnersani WLM	-	-	-	1	-	-	-	-	-	1
Kothagudem	-	-	8	-	-	-	-	2	-	10
Mahabubnagar	-	-	-	-	1	-	-	-	-	1
Mahbubabad	-	1	1	-	1	-	1	1	-	5
Mancherial	-	-	6	-	-	-	-	-	-	6
Manuguru	-	3	2	-	-	-	-	-	-	5
Medak	-	1	2	-	1	-	-	-	-	4
N. Sagar WLM	-	-	4	2	6	-	2	-	-	14
Nalgonda	-	3	-	1	-	-	2	-	-	6
Nirmal	-	3	-	-	-	-	-	-	-	3
Nizamabad	-	2	1	-	-	-	-	-	-	3
NZP, Hyderabad	-	-	-	-	7	-	-	-	-	7
Paloncha	-	1	2	1	-	-	-	1	-	5
Pedapally	2	-	1	-	-	-	1	-	-	4
Sangareddy	-	-	-	-	-	-	1	-	-	1
Sathupally	-	-	6	-	-	-	-	-	-	6
Siddipet	-	-	2	-	-	-	1	-	-	3
Sircilla	-	-	1	2	-	-	1	-	-	4
SS Hyderabad	-	-	-	-	-	-	-	-	4	4
TSFA, Dullapally	-	-	-	-	-	11	-	-	-	11
Utnoor	-	-	1	1	1	-	1	-	-	4
Venkatapuram	-	2	1	-	-	-	-	-	-	3
Wanaparthy	2	-	-	1	-	-	1	-	-	4
Warrangal	1	-	-	-	-	-	-	-	-	1
WLM Eturunagaram	-	-	-	-	1	-	-	-	-	1
WLM Kinnersani	-	-	-	-	7	-	-	-	-	7
WLM Medak	-	-	-	-	2	-	-	-	-	2
WLM Paloncha	-	-	-	-	1	-	-	-	-	1
WLM Warrangal	-	-	-	-	6	-	-	-	-	6
Yadadri Bhuvangiri	-	-	1	1	-	-	1	-	-	3
Yellandu	1	1	1	1	-	-	1	-	-	5
Grand Total	10	22	103	24	71	11	23	9	23	296

Map 4.1.1b: Map showing plantation activities samples evaluated for 3rd party evaluation.



4.1.1.3 Field plan: Proposed field visit dates was prepared in consultation with DFO, Hyderabad and shared with CMC for comments. Suggestions received were incorporated and the draft field plan was submitted to APCCF (CAMPA) for its approval. The division-wise details of field visits are given in Annexure I.

4.1.1.4 Issuance of field permission: Proposed field visit dates, records and other information to be furnished were circulated from the O/o PCCF & HoFF, TSFD to all DFO/FDO of the territorial and wildlife forest divisions of Telangana state (*Annexure II*). Field staff of the forest divisions to be visited were requested to be present during evaluation along with Measurement Book, Plantation Journal, CAMPA works register, and other information to facilitate smooth completion of the evaluation. As per the Rc.No.3037/2017/CAMPA dated 30.05.2017 issued by PCCF, TSFD the DFOs/FDOs (*Annexure III*) shall ensure concern field staff should be present and show the plantation site or other works taken up for CAMPA. The plantation journal, measurement books, estimate, list of works in Division/Range should be made available to the evaluation team.

4.1.2 Stage 2 - Field Strategy: In the second stage (*see Fig 4.1.2 for the flow chart*) of third-party field evaluation field strategy was developed. This stage started with the formation of evaluation teams, team visits to fifty-four forest divisions team visits.

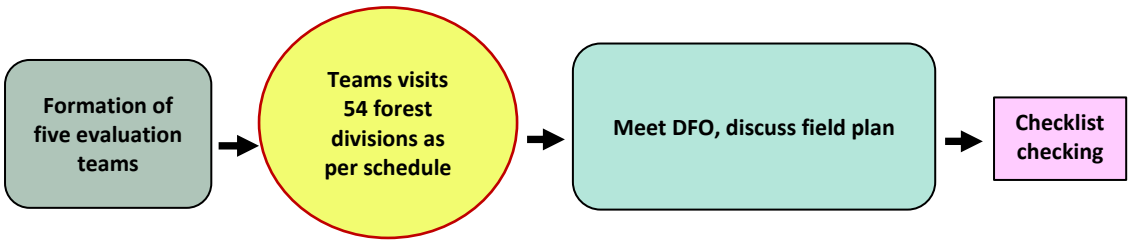


Fig 4.1.2: Flow chart of Stage 2 - Field strategy.

This stage started with the formation of five evaluation teams, each team comprising of Field lead, field associate, and back support analyst. Names and qualifications of the team members are shown in Annexure III.

As per the field visit schedule, each team met DFO and discussed field plan with DFO, FDO, and RFO. The following checklist was checked: a) CAMPA Works Register, b) Confirmation of Samples, c) Plantation Sites, d) Measurement Books, e) Plantation Journals and f) Vouchers, were requested from the forest division/range visited for conducting site verification.

4.1.3 Stage 3 - Field evaluation of samples: Field evaluation of samples was conducted by first checking CAMPA works register in the division to reconfirm plantation activities samples drawn under CA and NPV and after confirmation based on the geo coordinate the evaluation team visited the sites with the TSFD division level officials and data was collected adhering the forms (*Appendix I*).

4.1.3.1 Meeting TSFD officials

1) Met DFO followed by a meeting with FDO, RFO and FBOs in each division/ranges visited.
2) Collected list of works carried out under TSFD, CAMPA.
3) Matched each sample with the CAMPA works register list.
4) After confirmation ensured a forest department officials presence in each of the samples locations.
5) Physical verification and geotagging. This is elaborated under sub-section 4.2.

4.1.3.2 Build capacity: During field evaluation efforts was laid also to build the capacity of the front line TSFD officials present during evaluation on how to lay sample plots and use, hands-on different forest inventory instruments like GPS, compass, densitometer, Hypsometer.

4.1.4 Stage 4 - Data analysis: This stage consisted of activities (see Fig 4.1.4) pertaining to data digitization, data reconciliation, and data analysis data analysis.

Fig 4.1.4: Flow chart of Stage 4 – Data Analysis.

4.1.4.1 Data digitization: The primary activities conducted for digitizing the data are as follows:

a) Allocation of a place at Aranya Bhavan.

b) Data of plantation activities and other activities were digitized through MS Excel.

c) Data consolidated at the division level.

4.1.4.2 Data reconciliation

a) Reconciliation of the field data with the spending records.

b) Verified works with audited reports and FA 9 for each CAMPA activities at Aranya Bhavan with support from STA CAMPA. The verified CAMPA works list as per the audited reports was used.

c) Collation of Field data collated.

4.1.4.3 Data analysis: Data analysis as per the methodologies approved in the inception workshop using MS Excel. For the purpose of reporting, the survival percent was weighted by net area planted in the same model. The percentage was reported separately for plantation type, plantation method, protection status of the plantation and different species.

4.1.5 Stage 5 - Final output: The final stage of evaluation constituted tabulation of results and production of outputs (*see fig 4.1.5*).

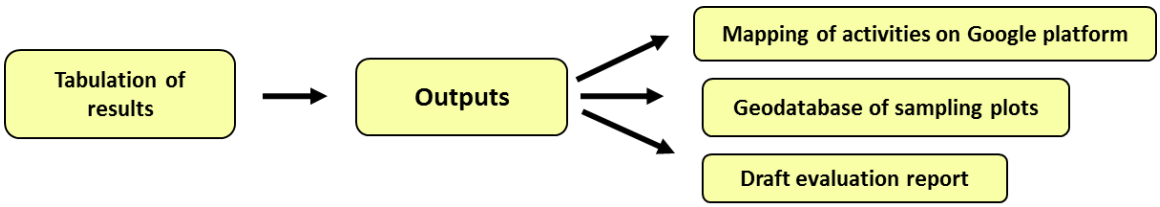


Fig 4.1.5: Flow chart of Stage 5 – Final output.

4.1.5.1 Tabulation of results

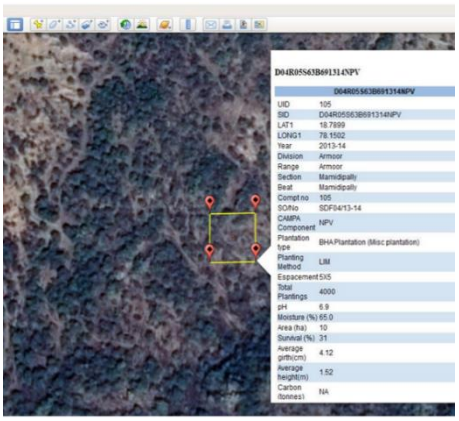
a) Analyzed results were tabulated separately for divisions, species, plantation types, activities.

b) Matched field data collected and data digitized.

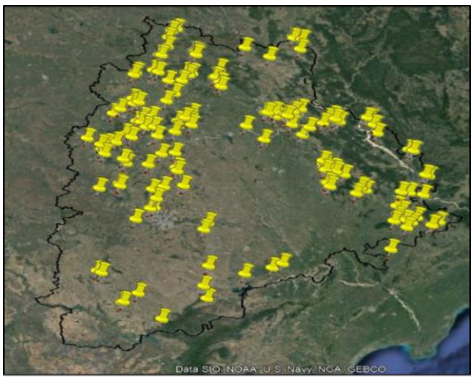
c) Field data digitization and consolidated at the division level for 2014-2015.

4.1.5.2 Outputs

a) Geodatabase created of all sampled plantation plots (*file CAMPA_2014_2015_field_plantation_samples.kmz*)



b) All activities mapped using Arc GIS and exported to Google earth platform (*file CAMPA other activities samples_2014-2015.kmz*)



c) Development of draft evaluation report.

4.2 Field evaluation and data collection

(A) Plantation activities:

1) Based on the measurement books (MB), where all the works executed and amounts paid written by officer executing the work, check measured by R.O. and test checked by DFO/Sub DFO or any other higher authority are maintained, physical verification of MB, collection of GPS coordinates from registers and other records available in the concerned forest offices followed by field visit to the project area for its field verification. For evaluation plantation (raising) samples, sample plots were laid. Evaluation of other plantation activities namely, advance operations including nursery works of planting stocks; maintenance (1st year, 2nd year and 3rd year) was based on scrutinization of information available on measurement books/plantation journals/expenditure vouchers since these type of plantation activities had completed at least a year before the evaluation team visited the field.

2) For laying sample plot, Garmin GPS used to navigate to reach the randomly generated sample geocoordinate. A square plot of 0.1 ha[15] (*Fig 4.1.3.2*) was laid out by measuring 22.5 m horizontal distance i.e., half of the diagonal in all the four directions at 45^0 in north-east, at 135^0 in the south-east, at 225^0 in the south-west, and at 315^0 in north-west corners of the plot from true north. The dimensions of the plot, i.e. one side measured 31.62 m horizontal distance. Latitude and longitude of all the sample plots of plantations are shown in Annexure VII.

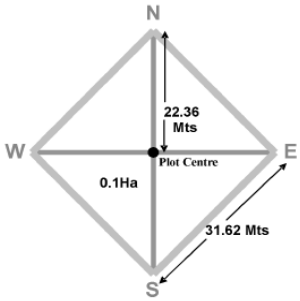


Fig 4.1.3.2: Sample plot layout.

3) After laying the sample plot, plots, the parameters evaluated is shown in table 4.1.3.2.a.

Table 4.1.3.2b: List of evaluation parameters for plantations.

Evaluation Parameters	Field Recordings to be made
Survival percentage	Plants surviving in the sample plot counted and recorded.
Growth of trees	Diameter and height of each tree inside the plots were recorded.
Habitat Improvement	Presence of wildlife, good growth of grasses, soil erosion, water sources if any observed recorded. Plantation watchman, officials, VSS members, if present were interviewed to record their qualitative perception of CAMPA plantations on habitat improvement.
Canopy density	Canopy density recorded using a densiometer. Number of plants wounded, stressed, wilt, diseased recorded.
Soil salinity and moisture status	Soil salinity and soil moisture estimated using a portable soil pH and soil moisture meter.
Carbon content of plantations	The carbon content of the plantations estimated based on allometric equations as given by Forest Survey of India. [16]

4) For assessing mortality, every tree growing inside the plot were counted. Diameter for every tree growing inside the plot was measured 50 cm above the ground level for up to 3 years old

[15]National Working Plan Code –– For Sustainable Management of Forests & Biodiversity in India (2014), MoEFCC, 91p.
[16]FSI (2015) Carbon Stocks in India's Forest, 164p

plantation and 100 cm above ground level for up to 5 years plantations as mentioned in NEM CAMPA, 2016[17] using a tape.

5) For calculating the carbon content trees with girth above 30cm was taken to apply the allometric equations as developed by FSI[10] for calculating tree carbon. Accordingly, the carbon content per tree was calculated.

6) Data observed were recorded in Form B (Appendix I). Evaluated samples detail of plantation activities is shown in Annexure V.

(B) Other activities:

7) For evaluation of other activities, from a total of the activities under each component, 10% of activity were randomly selected. Activities that were physically visible like RCC pillars, beat office, quarters, etc. field evaluation on work status was conducted and geotagged pictures were taken. Evaluations of samples of other activities like fuel charges, POL charges, payments, etc. were based on the information made available through measurement books / CAMPA register/vouchers / FA 9, since the activities had been completed five years before the field evaluation visited the sites.

8) Field observations were recorded in different forms namely Form A to Form L (*Appendix 1*). Form number with the activities information recorded during the field evaluation exercise is shown in table 4.1.3.2a.

Table 4.1.3.2a: List of Forms with the information of activities to be recorded during CAMPA field evaluation exercise.

S. No.	Form No.	Activities
1.	Form A	Summary
2.	Form B	Plantation Activities (CA / NFM)
3.	Form C	Soil & Water Conservation activities (CA-CAT, FWM, BDC)
4.	Form D	Forest Protection Activities
5.	Form E	Forest Fire Management Activities
6.	Form F	Biodiversity Conservation & Ecotourism Activities
7.	Form G	Infrastructure Development & Maintenance
8.	Form H	Research & Development
9.	Form I	Information & Communication technology Activities
10.	Form J	Capacity Building and Office Support Activities
11.	Form K	Monitoring & Evaluation Activities
12.	Form M	Third-party comments

The evaluated samples detail of other activities is shown in Annexure VI.

4.3 Evaluation scoring

(A) Quantitative aspects: Quantitative evaluation score for different plantation activities and other activities under different CAMPA components are elaborated below

[17]National Evaluation Manual for CAMPA Projects (2016) CEAMT, IIFM Bhopal, 25 pages

i) Plantation activities:

a) For raising of plantations, scoring of each sample was carried out on a scale of 0 to 300. Scoring for evaluating the field plantation samples was based on mortality. Sample plantation plots with mortality less than 10% was scored 300 points, for mortality 11% to 20% = 240 points, 21% to 30%= 180 points, 31% to 40% = 120 points, 41% to 50% = 60 points and for mortality of plantations above 50% = 0 points was given.

b) For advance works and maintenance of plantations, scoring was done on a scale of 0 to 100 based on the percent variations. For deviations less than 10% = 100 points, 11% to 20% = 80 points, 21% to 30%= 60 points, 31% to 40% = 40 points, 41% to 50% = 20 points and for mortality above 50% = 0 points was assigned.

c) Total score allotted to plantation activity for the year is the average score of the total plantation activities evaluated.

ii) Other activities:

a) For recording Soil and Water Conservation, the scoring was done in a scale of 0 to 50. Scoring to evaluated works was based on the deviations observed in between the records and in the field. For deviations less than 10% = 50 points, 11% to 20% = 40 points, 21% to 30%= 30 points, 31% to 40% = 20 points, 41% to 50% = 10 points and for deviations above 50% = 0 points was given.

b) For recording Forest Protection, the scoring was done in a scale of 0 to 300. Scoring to evaluated works was based on the deviations observed in between the records and in the field. For deviations less than 10% = 300 points, 11% to 20% = 240 points, 21% to 30%= 180 points, 31% to 40% = 120 points, 41% to 50% = 60 points and for deviations above 50% = 0 points was given.

c) For recording Biodiversity Conservation, the scoring was done in a scale of 0 to 200. Scoring to evaluated works was based on the deviations observed in between the records and in the field. For deviations less than 10% = 200 points, 11% to 20% = 160 points, 21% to 30%= 120 points, 31% to 40% = 80 points, 41% to 50% = 40 points and for deviations above 50% = 0 points was given.

d) Other activities under FFM, ICT, R&D, M&E and CB, the scoring was done in a scale of 0 to 10. Scoring to evaluated works was based on the deviations observed in between the records and in the field. For deviations less than 10% = 10 points, 11% to 20% = 8 points, 21% to 30%= 6 points, 31% to 40% = 4 points, 41% to 50% = 2 points and for deviations above 50% = 0 points was given.

(B) Qualitative aspects: Qualitative evaluation scoring for different plantation and other activities carried out under TSFD CAMPA are elaborated below

a) Impact awareness generation campaign is based on any evidence during evaluation on conducting of regular CAMPA campaigns by the forest department.

b) Identification of approved site for plantation were based on checking the availability of treatment plan on measurement books/ plantation journals.

c) Improvement in the quality of wildlife habitat are based on the impact of different plantations raised under CAMPA.

d) CAMPA benefits was based on a number of persons from BPL/SC/ST communities engaged for CAMPA activities.

e) Project awareness CAMPA is based on discussion with local people and forest officials about CAMPA.

f) Transparency maintenance and payment was based on the availability of matching CAMPA works at the division and at the head office.

g) Maintenance of assets created was based on the state of the physical assets created and plantations raised.

4.3.1 Evaluation scoring total: The total score of a component is the total of the average score of the points scored under each sub-component. The total score of evaluation was recorded in the overall site assessment sheet as shown in table 4.3.1 for the year evaluated.

Table 4.3.1: Overall site assessment sample sheet.

Quantitative Aspects (A)				Qualitative Aspects (B)			
S.No.	**Main Heading**	**Score**	**Total**	**S.No.**	**Main Heading**	**Score**	**Total**
I.	Plantation Activities (Compensatory Afforestation and Natural Forest Management)		500	I.	Impact of awareness Generation campaign		5
II.	CA&NFM Other Activities		50	II.	Identification of approved Site for plantation		5
III.	Soil and Water Conservation Measures		50	III.	Improvement in quality of wildlife habitat		5
IV.	Forest Protection		250	IV.	CAMPA benefits		10
V.	Forest Fire Management		10	V.	Project Awareness		5
VI	Biodiversity Conservation and Development		200	VI.	Transparency, maintenance And payments		5
VII	Research & Development		10	VII.	Maintenance of assets Created		10
VIII	Capacity Building		10				
IX	Information Communication & Technology		10				
X	Monitoring & Evaluation		10				
Total (A)			**1100**	**Total (B)**			**45**
GRAND TOTAL (A+B)							**1145**

The total figure under each main heading of quantitative aspect in the above table is based on the number of sub-components under the components evaluated.

Percent of the total score obtained is used to rank the performance[18] based on the following table.

Percent score	**Performance**
90 - 100	Highly satisfactory
80 - 90	Satisfactory
60 - 80	Moderately Satisfactory
40 - 60	Unsatisfactory
Below 40	Highly unsatisfactory

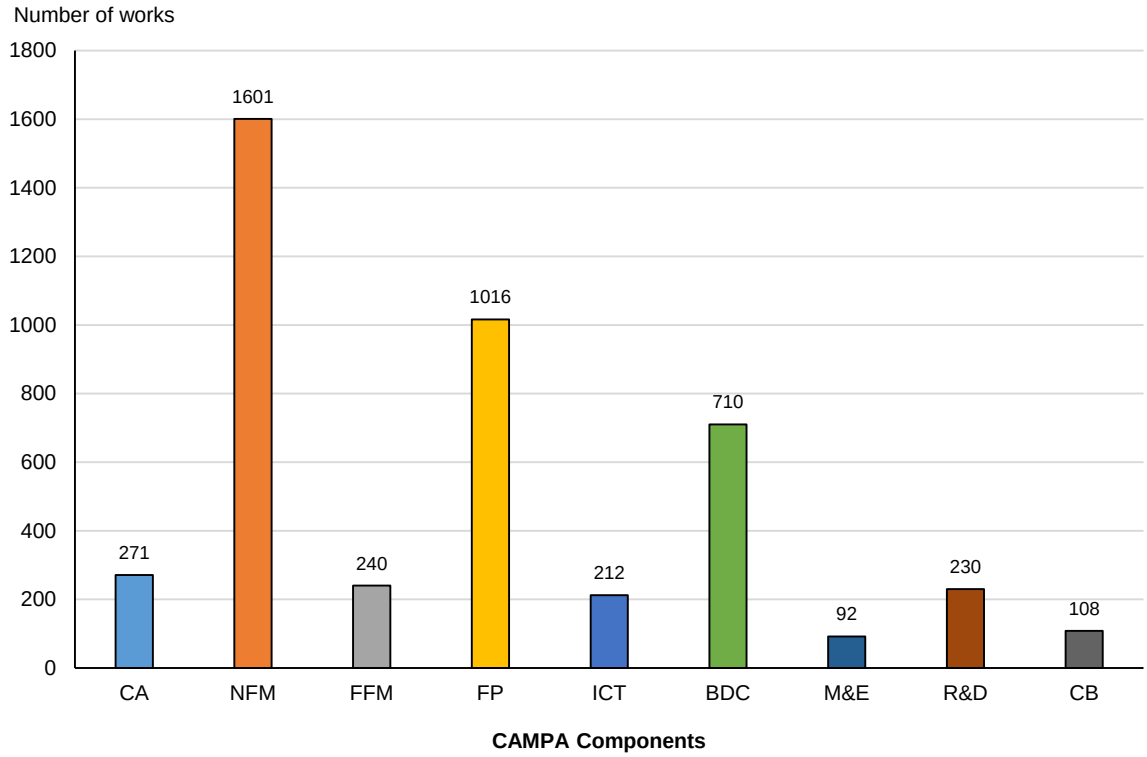
[18]National Evaluation Manual for CAMPA Projects (2016) CEAMT, IIFM Bhopal, 25 pages

Chapter 5

DATA ANALYSIS

The total number of activities undertaken by TSFD under different CAMPA components during 2014-2015 is shown in Figure 5.0.

Fig 5.0: Total number of works under different TSFD CAMPA components year 2014-2015



A total of 4480 works were undertaken in the state of Telangana during 2014-2015 under different CAMPA components. The highest number of works were undertaken under NFM followed by FP, BDC, CA, FFM, R&D, ICT, CB, M&E, CB, OS and ET. Division wise details of total works are shown in table 5.0. CA was undertaken by 19 divisions under 6 circles. The highest number of CA works was undertaken by Paloncha division. NFM activities were undertaken in 22 divisions under 6 circles, Karimnagar (E) undertook the highest number of NFM activities. FP works were carried out in 31 divisions of the state, among which Hyderabad had undertaken the maximum number of forest protection works. FFM works were undertaken by 16 divisions, maximum number of FFM activities was undertaken under Bellampally division. BDC works were undertaken by 18 divisions with Medak WL undertaking maximum number of BDC activities. IDM and ICT works were undertaken by 25 divisions and highest number of activities under both the components were undertaken under Hyderabad division

Table 5.0: Division wise total number of works under different components of CAMPA for the year 2014-2015

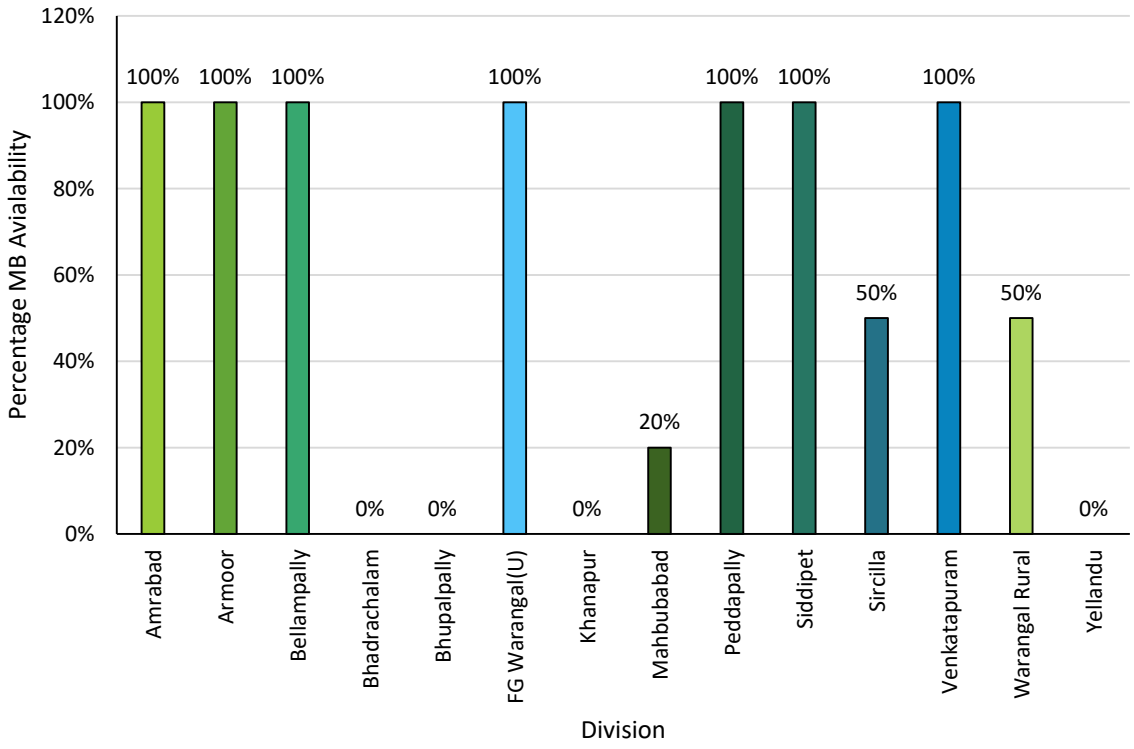
Circle	Division	CA	NFM	FFM	FP	ICT	BDC	M&E	R&D	CB	Total
Adilabad	Adilabad	5	71	3	38	6	8	6	-	-	**137**
	Nirmal	1	95	15	45	8	50	4	-	-	**218**
	Jannaram WL	-	-	6	37	8	28	3	-	-	**82**
	Mancherial	5	103	7	41	3	-	3	-	-	**162**
	Bellampally	25	95	7	22	6	4	2	-	-	**161**
	Kagaznagar	-	66	2	29	6	9	1	-	-	**113**
	Circle total	36	430	40	212	37	99	19	0	0	**873**
Hyderabad	Hyderabad	1	53	14	55	5	19	6	-	-	**153**
	Mahabubnagar	46	39	4	26	6	30	6	-	-	**157**
	Nalgonda	39	39	2	14	5	-	-	-	-	**99**
	Circle total	86	131	20	95	16	49	12	0	0	**409**
Khammam	Khammam	23	142	2	26	8	-	9	-	-	**210**
	Kothagudem	2	100	1	56	12	-	10	-	-	**181**
	Paloncha	31	101	1	33	8	-	1	-	-	**175**
	Bhadrachalam (N)	19	58	-	56	-	-	-	-	-	**133**
	Bhadrachalam (S)	3	12	-	71	-	-	1	-	-	**87**
	WLM Paloncha	-	6	10	31	5	45	3	-	-	**100**
	Circle total	78	419	14	273	33	45	24	0	0	**886**
Nizamabad	Nizamabad	-	58	11	45	6		6	-	-	**126**
	Kamareddy	2	70	40	80	20	80	3	-	-	**295**
	Medak	2	145	37	36	8	16		-	-	**244**
	Medak WLM	-	-	4	11	2	93	2	-	-	**112**
	Circle total	4	273	92	172	36	189	11	0	0	**777**
Warangal	Warangal (N)	36	42	7	36	16	-	4	-	-	**141**
	Warangal (S)	1	115	3	50	8	-	3	-	-	**180**
	Warangal WLM	-	-	7	18	5	128	3	-	-	**161**
	Karimnagar (E)	22	82	6	45	15	-	1	-	-	**171**
	Karimnagar (W)	3	92	21	24	14	7	5	-	-	**166**
	Circle total	62	331	44	173	58	135	16	0	0	**819**
FDPT	Achampet	-	15	12	58	9	52	1	-	-	**147**
	Nagarjunasagar	5	2	15	24	5	32	2	-	-	**85**
	Circle total	5	17	27	82	14	84	3	0	0	**232**
APFA Dullapally	APFA Dullapally	-	-	-	-	-	-	-	-	108	**108**
	Circle total	0	0	0	0	0	0	0	0	108	**108**
R & D Circle, Hyderabad	SS Hyderabad	-	-	-	-	-	-	-	88	-	**88**
	FG Warangal	-	-	-	-	-	-	-	142	-	**142**
	Circle total	0	0	0	0	0	0	0	230	0	**230**
WLM Hyderabad	CNP	-	-	1	4	3	84	2	-	-	**94**
	WLM Hyderabad	-	-	2	5	2	15	4	-	-	**28**
	Circle total	0	0	3	9	5	99	6	0	0	**122**
Director ZP Hyderabad	NZP Hyderabad	-	-	-	-	-	10	1	-	-	**11**
	Circle total	0	0	0	0	0	10	1	0	0	**11**
I&TC	I&TC	-	-	-	-	13	-	-	-	-	**13**
	Circle total	0	0	0	0	13	0	0	0	0	**13**
Total		**271**	**1601**	**240**	**1016**	**212**	**710**	**92**	**230**	**108**	**4480**

5.1 Data Analysis of CAMPA Plantation activities: Data collected for plantation activities and other activities during field evaluation of the sample CAMPA activities for the year 2014-2015 were digitized, collated and checked as per the audited records available at the O/o PCCF, TSFD, Aranya Bhavan. Thereafter, the data was analyzed to understand the status, performance of plantations, quantity and quality of other activities and any other critical issues on the CAMPA activities for the state of Telangana.

5.2 Maintenance of Records: Records were categorized as measurement books (*estimates*), plantation registers (*treatment maps*) and CAMPA schedule of works registers, vouchers, etc.

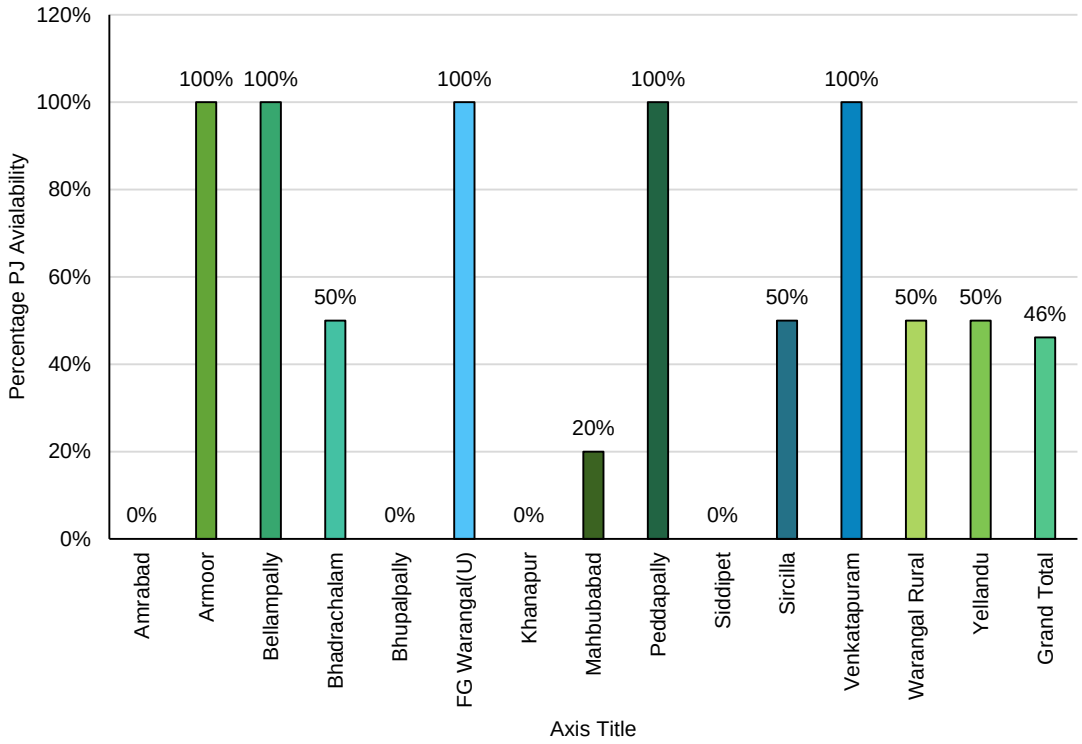
5.2.1 Measurement Books (MB) and Plantation journals (PJs): Section wise detail of works executed with estimates, amount disbursed, period of works, is mentioned in MB. It has been observed that out of 26 plantations, only for 13 plantations MBs were made available. Fig 5.2.1 shows the percent of MBs available during evaluation.

Fig. 5.2.1 Division wise measurement book availability in percentage



5.2.2 Plantation journals (PJ): Plantation journals contains all the information of the site, plantation map, sanctioned order, soil characteristics and records of activities, monitoring and evaluation and any other information, all updated on the plantation. It has been observed that out of a total of 29 sample plantations, only 21 plantations Plantation Journals were made available to the evaluation team. PJs of following plantations samples were not observed. Fig 5.2.2 shows the percent of PJs available during evaluation. Updated plantation journals section wise details on the area of plantation undertaken is mentioned.

Fig 5.2.2:Division-wise details on number of PJs available during evaluation.



5.2.2 CAMPA works register (CWR): CAMPA works register contains an index of work and summarized details of expenditure with the Schedule of Order. All the works entered in CWR are signed by the DFO. This information helps to authenticate whether works have been carried out. During field evaluation, it was observed that all the works were mentioned in the CWR.

Findings: Measurement Book (MB) could be examined for forty-one percent of the activities evaluated. Respective range level/ beat level officials during the evaluation time revealed that due to bifurcation of the Telangana state from erstwhile Andhra Pradesh and after further reconciliation of the divisions, documents have been kept at different places and therefore there were unable to produce during evaluation. It indicates that less attention is given to MBs which otherwise is a very important document. Irrespective of the situation MBs should always be kept with care in the range where plantation has been carried out. Further in all the available MBs for other activities, grid-wise details on volume of works undertaken is lacking. Lack of grid wise details makes it very difficult to quantify the works carried out. All the MBs that were made available during evaluation had the signature of RFOs indicating that RFOs have checked the works before making payments.

For plantations, PJs is one of the most important document. Irrespective of any situation PJs should always be kept with care in the range offices where plantation has been carried out. All the MBs that were available had the signature of RFOs indicating that RFOs have checked the works before making payments. Treatment plan and grid wise details of plantations are available in the

examined PJs. All the examined PJs had the signature of RFOs indicating that proper methods have been adopted for conducting plantations.

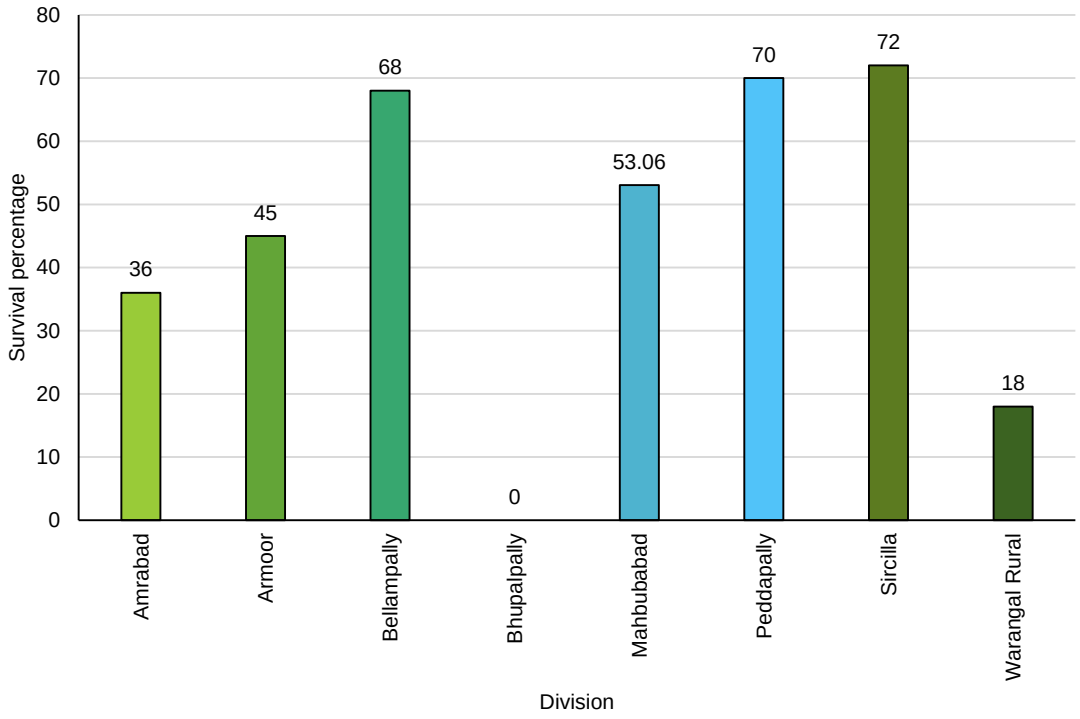
CAMPA works register (CWR) a record-keeping document was found in all the sites of evaluation. Works register hardcopy and softcopy were maintained at the division office. It contains an index of works based on Schedule of Order (SO) with the name of works/activity, site, and the summary of expenditure. All the activities entered in CWR was found to be signed by the DFO. The CWR maintained in the divisions and the final list of works as audited and maintained at the H/o does not totally tally.

5.3 Survival percentage: Survival percentage of plantations is one of the vital parameter evaluated. It reflects the overall performance of plantations. Analysis of the survival percentage of the plantations was analyzed from different aspects namely methods of plantations, CAMPA components, species, divisions and existence of protections measures to get a clear understanding on the plantations.

5.3.1 Division wise plantation survival percentages: Division wise survival percentage of eucalyptus, NTHS and teak plantations is shown in fig 5.3.1a to Fig 5.3.1d.

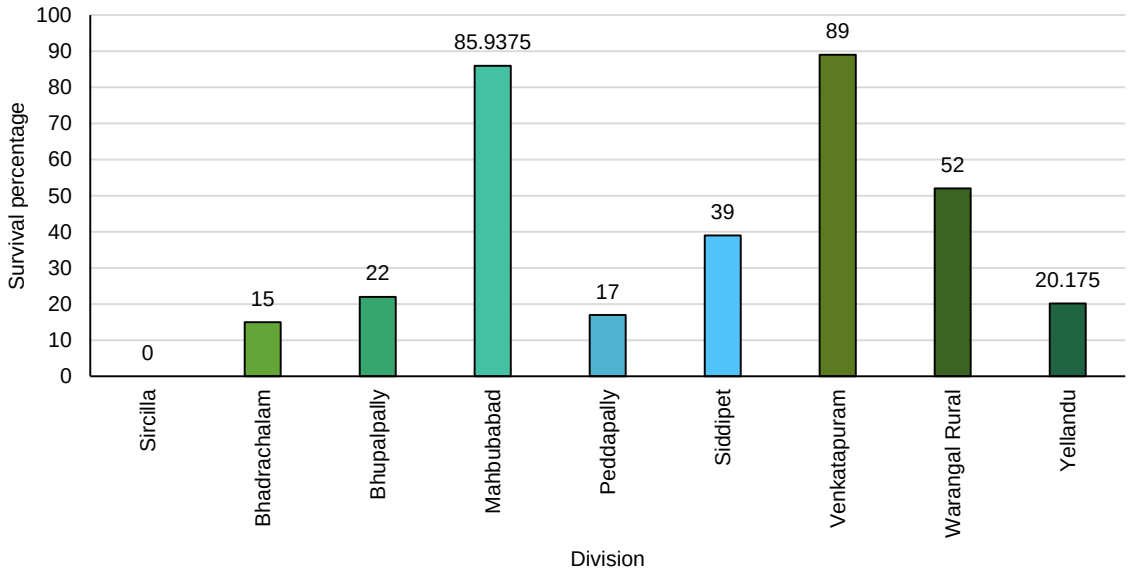
Samples of NTSH plantations raised under CAMPA during 2014-2015 was sampled from eight divisions. Average survival percentage of NTSH raised under TSFD CAMPA across the divisions ranged from 18% to 72%. Comparison of NTSH plantations survival across the divisions (*see Fig 5.3.1a*) revealed that Sircilla had the highest survival percentage of NTSH plantation followed by Pedapally, Bellampally and Mahbubabaad. Bhupalpally, Warrangal Rural, Amrabad and Armoor divisions reported the lowest survival rates and was below 50 % in NTSH plantations raised under TSFA CAMPA during 2014-2015.

Fig 5.3.1a:Division-wise survival percentage of NTSH plantation in 2014-2015



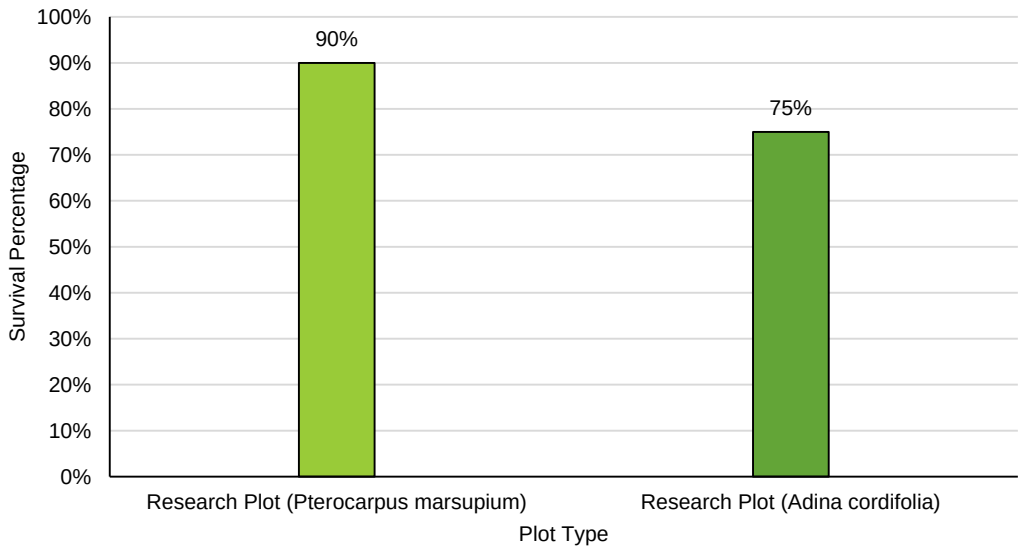
Teak plantations raised in 6 divisions under TSFD CAMPA during 2014-2015 was drawn as samples. Average survival percentage of the teak plantations under TSFD CAMPA across the divisions sampled ranged from 33% to 90%. Comparison of Teak plantations survival across the sampled divisions (*see Fig 5.3.1b*) reveals that the Teak plantations survival rate was much better than the other years.

Fig 5.3.1b: Division-wise survival percentage of Teak plantation in 2014-2015



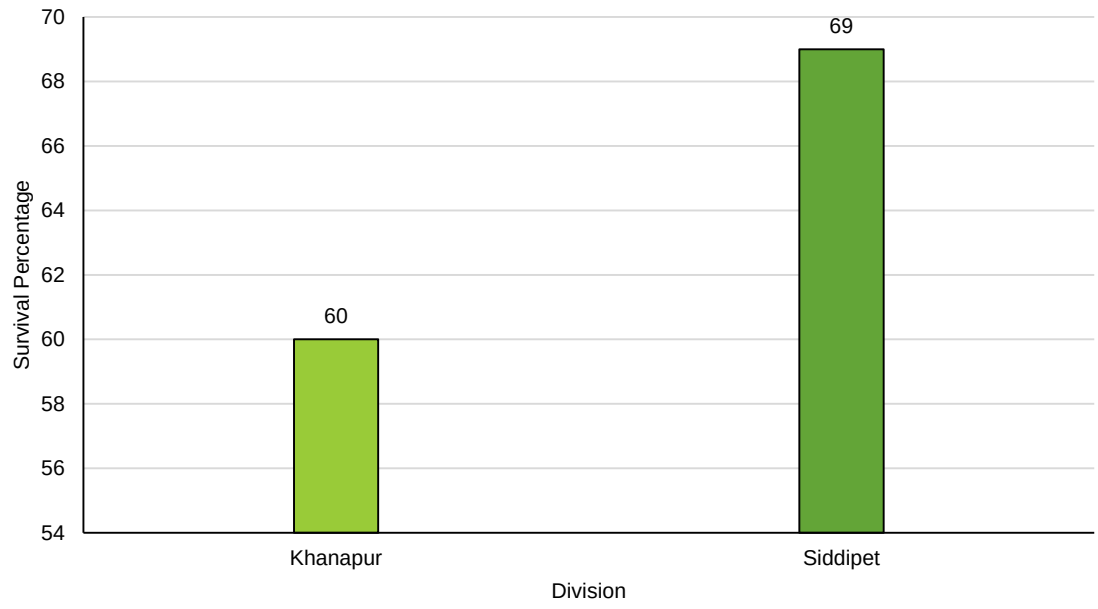
R&D plantations were raised by 2 divisions which were evaluated under TSFD CAMPA during 2014-2015. Average survival percentage of the R&D plantations under TSFD CAMPA was observed more in *Pterocarpus marsupium* plot as compared to *Adina cordifolia* plot. (*See Fig 5.3.1c*).

Fig 5.3.1b: Division-wise survival percentage of R&D plantation in 2014-2015



Miscellaneous species plantations were raised by 2 divisions which were evaluated under TSFD CAMPA during 2014-2015. Average survival percentage of the plantations under TSFD CAMPA was observed more in *Siddipet division* as compared to *Khanapur* division. (*See Fig 5.3.1d*).

Fig 5.3.1d: Division-wise survival percentage of Miscellaneous species plantation in 2014-2015



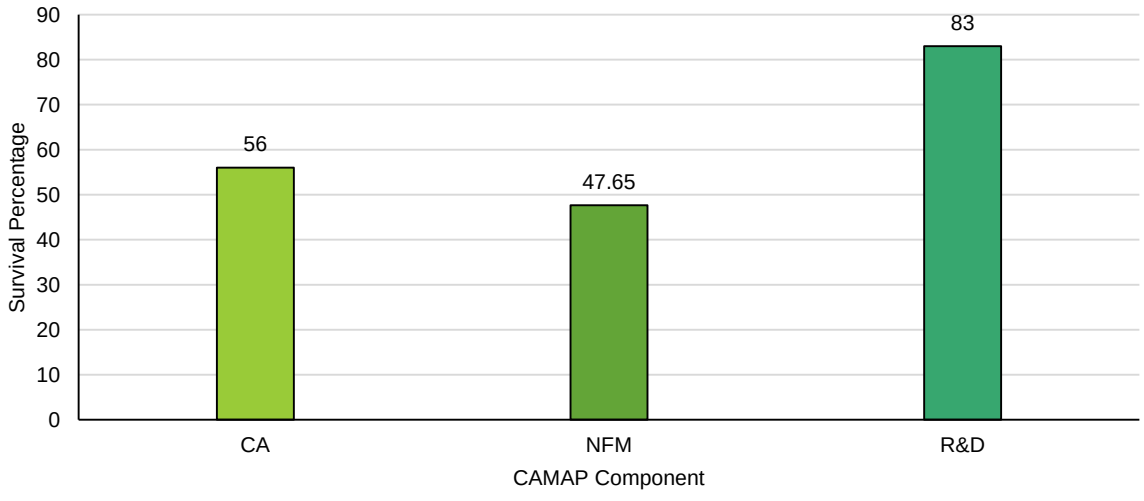
Findings: The plantations under TSFD CAMPA during 2014-2015 were raised under four different plantations types namely NTSH plantation, Teak plantations, R&D plantations and miscellaneous species plantation. Scoring was done as mentioned earlier on a scale of 300 based on the mortality of the plants during field evaluation. Among the different plantation types,

Species namely *Terminalia arjuna, Terminalia tomentosa, Terminalia chebula, Gmelina arborea, Pongamia pinnata, Agele marmelos, Emblica officinalis, Seemaruba glouca, Azadirachta indica, Hardwickia binnata and Sterculia urens,* were raised under NTSH plantation during 2014-2015. The average survival rate of the NTSH plantation from the evaluated plot was found to be 45.26%.

Information received during field visits revealed that heavy biotic pressure is one of the prime reason for very less survival of Teak plantations in the divisions. Additionally, it was also learned through discussions with forest officials, watchman, and other available local people during the evaluation that lack of rains after plantation of teak seedlings significantly reduce teak germination. Suitable soil, soil with good depth and ability to retain water is necessary for the survival of teak plants. It was observed that, during 2014-15 the surveyed Teak plantations fared well as compared to other year's plantation. However, the Teak plantation in Sircilla was encroached and legal case was pending before the court for its resolution. The Teak plantation with below 50% survival percentage in the surveyed divisions were Sircilla, Bhadrachalam, Pedapally, Bhupalpally, Yellandu and Siddipet.

5.3.2 Survival percentage of plantations under different CAMPA components: Plantations activities was carried out under three CAMPA components namely CA, NFM and R&D in the state of Telangana during 2014-2015. Comparison of average survival percentages of plantations raised under the different CAMPA components is shown in Fig 5.3.2. It shows that average survival

Fig 5.3.2: Average survival percentage of plantations raised under different CAMPA components in 2014-2015

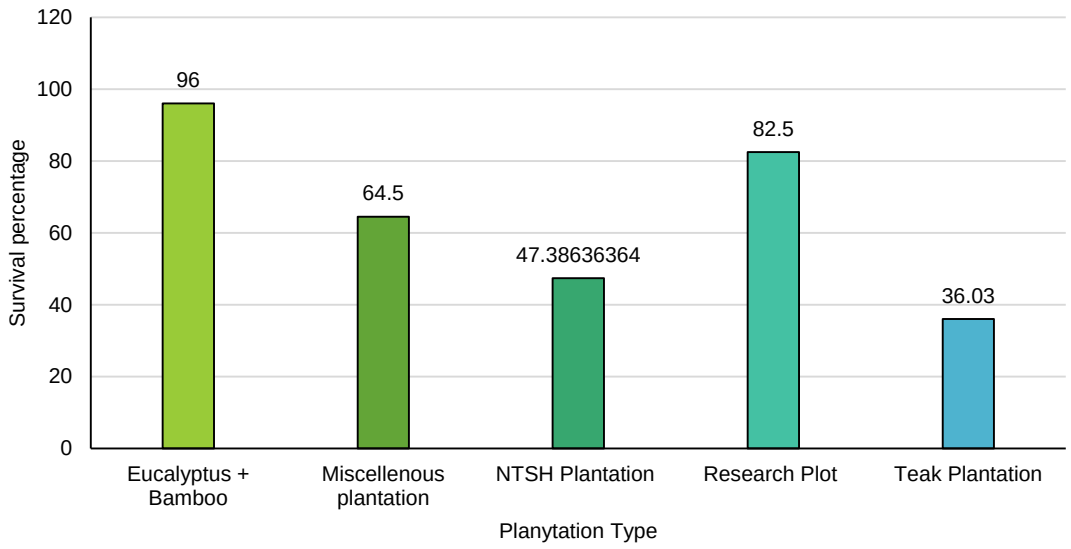


percentage of plantations raised under CA was highest (56%) followed by plantations raised under NFM (47.65%) and R&D (83%).

Findings: Analysis of field evaluation revealed that plantations raised under R&D performed better than those raised under NFM and CA. **Average scores obtained by the plantation raised under different CAMPA components namely CA, NFM, and R&D are 90, 81.81 and 270, respectively**.

5.3.3 Survival percentage of plantations raised under different plantation type: Survival percentage different CAMPA plantation types raised by TSFD CAMPA during 2014-2015 is shown in figure 5.3.3.

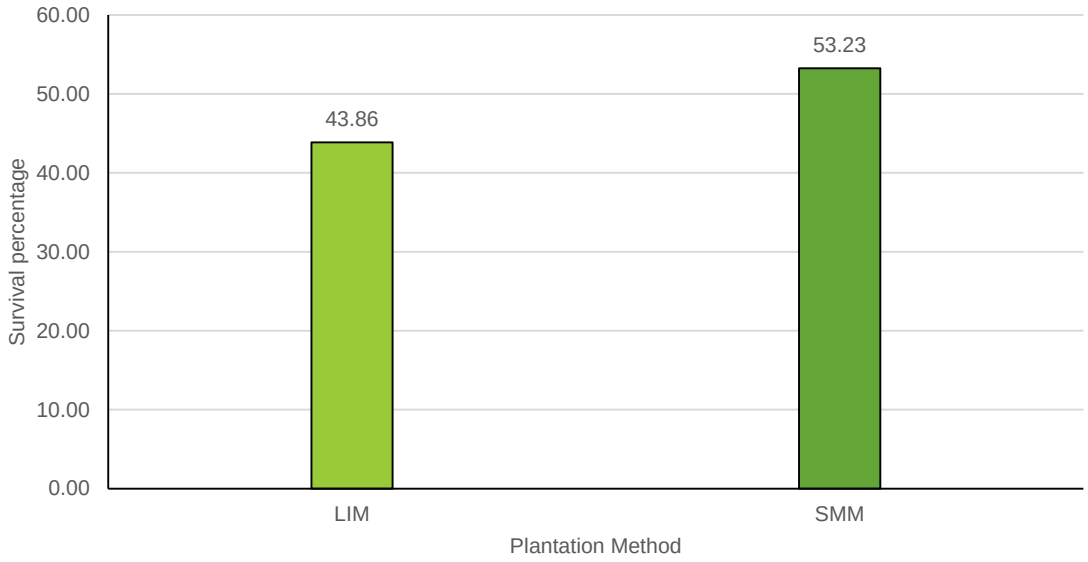
Fig 5.3.3: Survival percentage of different CAMPA plantation types raised in 2014-2015



Findings Five different plantation types were recorded, namely Eucalyptus + Bamboo plantation, NTSH plantation, plantations under research plots, miscellaneous species plantation and Teak plantations. Eucalyptus + Bamboo plantation had the highest survival percentage followed by research plots and miscellaneous species plantation. Teak showed the lowest survival percentage. **Average scores obtained by different plantation types namely Eucalyptus + Bamboo, Miscellaneous species, NTSH, Research plots and Teak during 2014-2015 are 300, 150, 76.36, 270, and 54, respectively**.

5.3.4 Survival percentage of plantations under different planting methods: Two planting methods, namely Labour Intensive Management (LIM) and Semi Mechanical Management (SMM) were adopted for raising plantations under TSFD, CAMPA during 2014-2015. Survival of

Fig 5.3.4: Survival percentage of plantation under LIM & SMM in 2014-2015

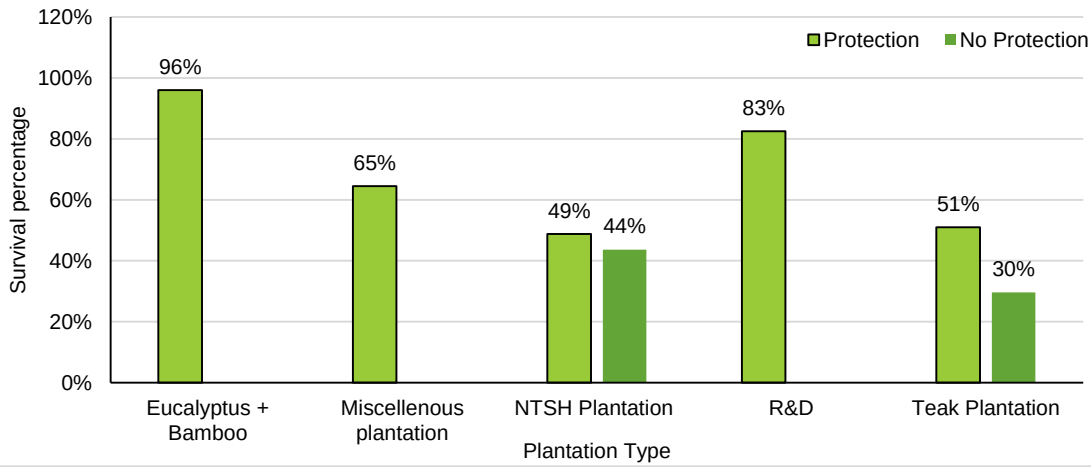


plantations (*Fig 5.3.4*) was significantly higher (53.23%) under SMM method. Average survival percentage of plantations raised under LIM was found to be 43 .86% percent.

Findings: On the basis of scores, survival percentage of plantation raised under LIM was much lower than that of plantations raised under SMM. **The average score obtained by SMM was 120 and LIM was 70.**

5.3.5 Survival percentage of plantations with protection and without protection: Comparison survival of different plantation types with protection and without protection is shown in Fig 5.2.5. It reveals that survival of NTSH plantations was slightly more (49%) in areas with protection and lower (44%) in areas with without protection. Similarly, survival of plants raised under Teak plantation was

Fig: 5.3.5: Impact of protection on survival of different CAMPA plantation types raised during 2014-15



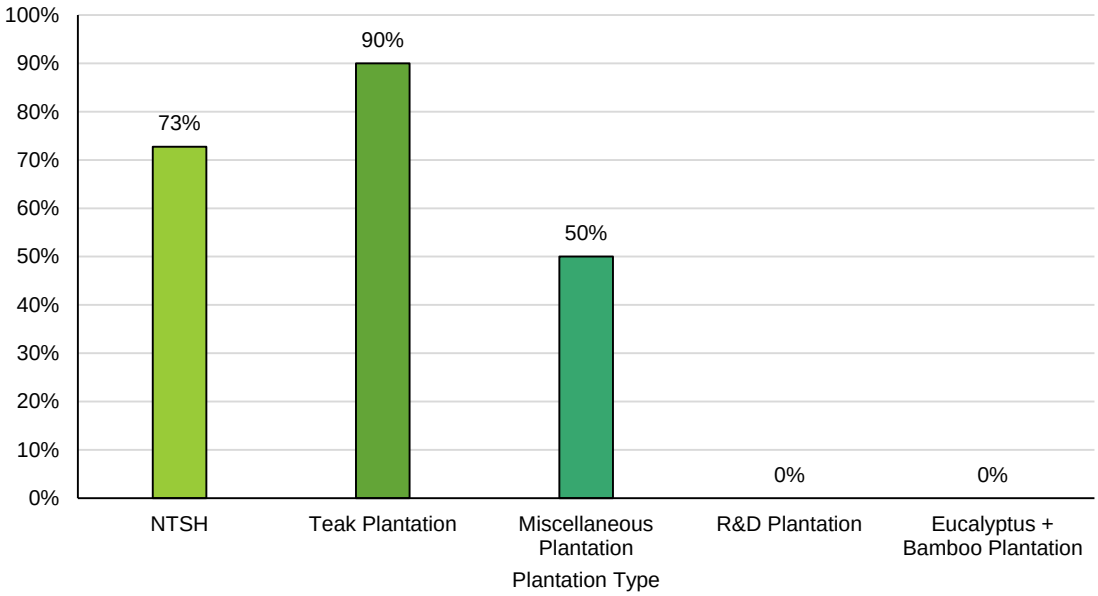
higher in areas without protection (51%) from the protected ones (30%). Plantations under R&D and teak were raised without protection.

Findings: In both NTSH plantations and Teak plantations, survival percentages of plantation were higher in the sites with protection from the sites that were not protected.

5.4 Habitat improvement: Comparison of plantations on habitat improvement under different plantation type raised during 2014-2015 is shown in Fig 5.4. Presence of wildlife, its indications like observing scat/dung during evaluation were recorded. Percent record of indicators was used to score habitat improvement.

Presence of wildlife was recorded in hundred percent of Teak plantations raised under TSFD, CAMPA, followed by NTSH plantations. Presence of wildlife was recorded in 90% of the teak plantations. Presence of wildlife was observed only in 73% of the NTSH plantation.

Fig 5.4: Comparison of percent HI indicator present under different plantation type

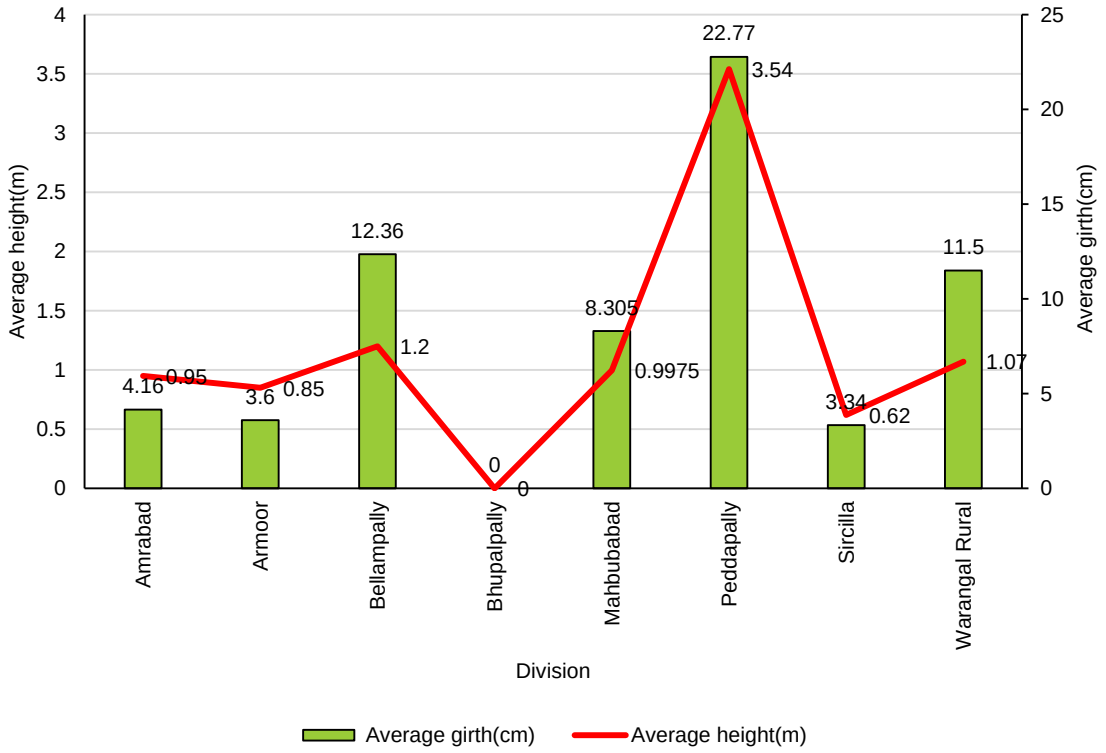


In two miscellaneous plantations visited wildlife presence was observed in one of it only. In case of R&D and Eucalyptus + Bamboo plantations no wildlife presence were observed.

Findings: Wildlife presence was recorded in 90% of Teak plantations raised under TSFD, CAMPA. Although survival of Teak was considerably less, yet 90% of teak sites showed presence of wildlife. The findings from the analysis reveals that though the survival percentage of the NTSH plantations and Teak plantations are lower in comparison to that of Eucalyptus + Bamboo, R&D and miscellaneous plantations, yet wildlife species prefers teak and NTSH plantations sites as their habitat.

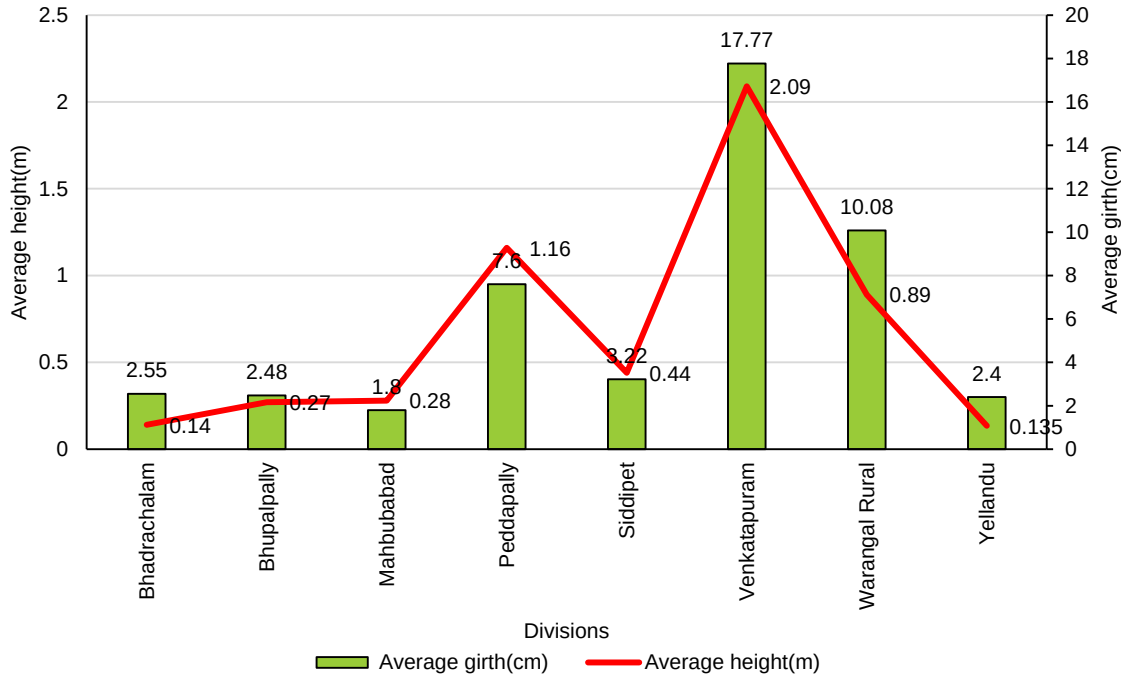
5.5 Growth of trees: Comparison of average height and average girth of different tree species raised under TSFD CAMPA during 2014-2015 is shown in Figure 5.5.1. NTSH plantations analysis in terms of height and girth in various divisions under CAMPA during 2014-2015. The average height and average girth recorded during the evaluation was 1.15 m and 8.25 cm, respectively.

Fig. 5.5.1: Division wise details for girth and height parameters for NTSH plantation 2014-2015



Division wise average girth and average height of Teak plantation is shown in Fig 5.5.2. The growth in the Teak plantation was much less than as compared to the NTSH plantation. The average girth and height attained by the Teak plantations in various divisions were 5.98 cm and 0.66 meters respectively.

Fig. 5.5.3: Division wise details for girth and height parameters for Teak plantation 2014-2015

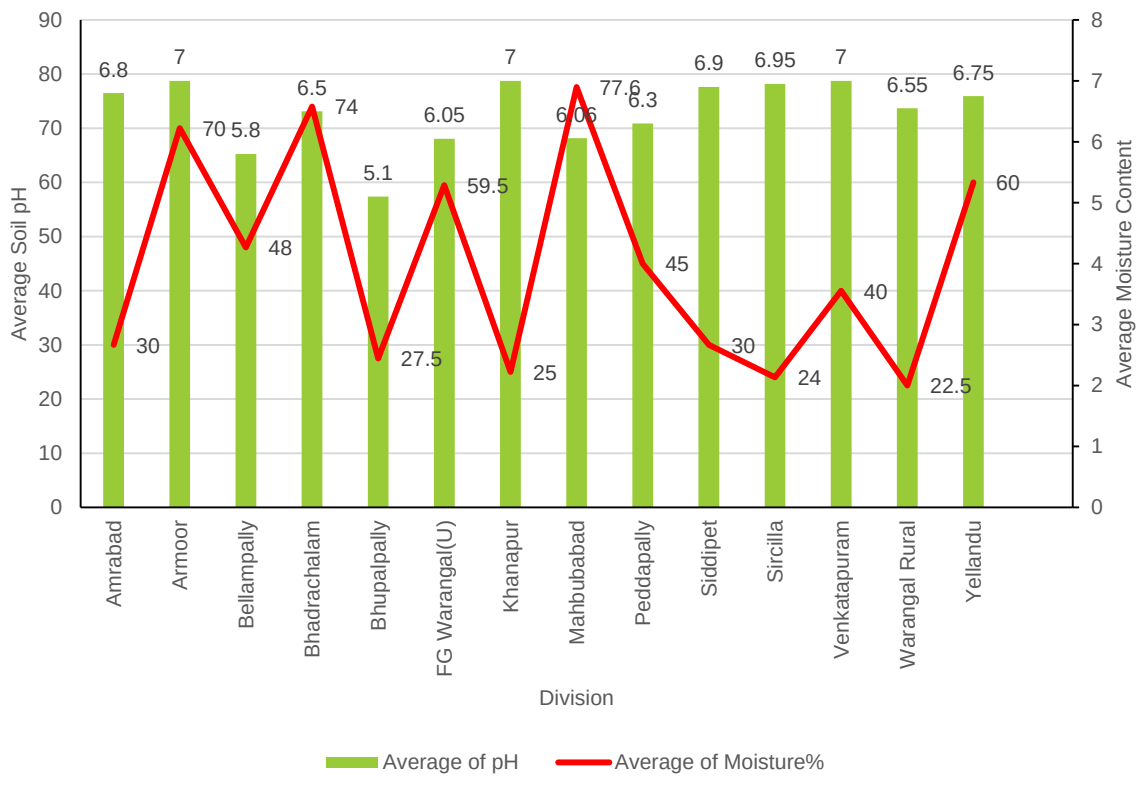


Findings: The best growth was exhibited in the Eucalyptus Bamboo plantation followed by R&D plantations. The NTSH plantation average girth and height exhibited poor growth. Amongst all the plantations, Teak is not a good performer under TSFD CAMPA plantation in all the sites. It reflects the fact that, teak being a microsite specific species requires proper site selection and silvicultural operations for establishment and growth. Choosing mother trees for seed collection and stumps preparation, is a vital factor for producing quality planting stock of teak. Teak plantlets raised in nursery needs to be acclimatized properly till the sapling stage for field transplantation. Teak also requires sufficient moisture for retaining its faster growth in the initial years. Proper synchronization of the onset of monsoon and teak plantation is vital for best field performance of this species.

5.6 Soil salinity and moisture status: Soil pH and soil moisture content recorded during the evaluation is shown in Fig 5.6. Soil pH ranged from very acidic 5.1 at Bhupalpally to saline 7 at Khanapur. Percent soil moisture content varied widely across the divisions. It varied from 24% to

77.6%.

Fig 5.6: Soil pH and moisture content in the plantation sites.



Findings: Soil pH and soil moisture content are vital factors for establishment of plantations. Soil pH ranged from acidic to slightly saline across the plantation sites, indicating that soil pH amelioration practices are necessary for better performance of plantations across the sites. Percent soil moisture content varied widely across the divisions. It varies from 24% to 77.6%. It indicates that average soil moisture content is relatively on a lower side, stressing plantations especially during the period of establishment unless artificial irrigation practices are adopted.

5.7 Canopy density: The canopy density of plantation raised under 2015-16 by TSFD CAMPA is very low as the plantation is young and small without definite canopy coverage.

5.8 Forest carbon: Forest carbon (*shown in fig 5.8*) was estimated using the standard methodology adopting allometric equations (*see Box*) as given by FSI.[19] Allometric equations are

[19] FSI (2011) Carbon Stocks of India's Forest.

applied only on those species that are above 10 cm in diameter. Average per hectare forest carbon varied from 0.00 tonnes per hectare to 0.1 tonnes per hectare.

Average forest carbon in tons per hectare of NTSH plantations raised during 2014-2015 (*Fig 5.8a*) varied from 0.00 tonnes per hectare in Banswada to 0.04 tonnes per hectare in Yallandu.

South Deccan

S.No.	Species Name	Volume Equation
1	*Acacia auriculiformis*	$\sqrt{V} = -0.00142 + 2.61911\ D - 0.54703\ ^{n}D$
2	*Albizzia amara*	$\sqrt{V} = -0.07109 + 2.99732\ D - 0.26953\ ^{n}D$
3	*Anogeissus latifolia*	$V = 0.289 - 2.653\ D + 11.771\ D^2$
4	**Butea monosperma(Old) Butea frondosa*	$V = 0.088183 - 1.490948\ D + 8.984266\ D^2$
5	*Chloroxylon swietenia*	$V = -0.0532\ D + 3.2378\ D^2$
6	*Dalbergia paniculata*	$V = 0.18945 - 2.46215\ D + 10.54462\ D^2$
7	*Eucalyptus species*	$V = 0.02894 - 0.89284\ D + 8.72416\ D^2$
8	*Hardwickia binata*	$V = 0.063632 + 5.355486\ D^3$
9	*Lagerstroemia parviflora*	$V = 0.066188 - 1.334512\ D + 9.403257\ D^2$
10	*Lannea coromandelica/lannea grandis/odina wodier*	$V = 0.091153 - 1.66153\ D + 10.24624\ D^2$
11	**Syzygium cumini/jambolanum (Old) Eugenia jambolana*	$V = 0.088183 - 1.490948\ D + 8.984266\ D^2$
12	*Tectona grandis*	$V = -0.2414 + 2.8458\ D - 5.5816\ D^2 + 14.816\ D^3$
13	*Terminalia crenulata/tomentosa*	$V = 0.051812 - 1.076790\ D + 7.991280\ D^2$
14	*Terminalia paniculata*	$V = 0.13100 - 1.87132\ D + 9.47861\ D^2$
15	*Wrightia tinctoria*	$\sqrt{V} = 0.050294 + 3.115497\ D - 0.687813\ \sqrt{D}$

* For these species, *Rest of species's* Volume Equation is used.

Fig. 5.8.a Average Caron Tonnes/ha of NTSH plantation in various divisions

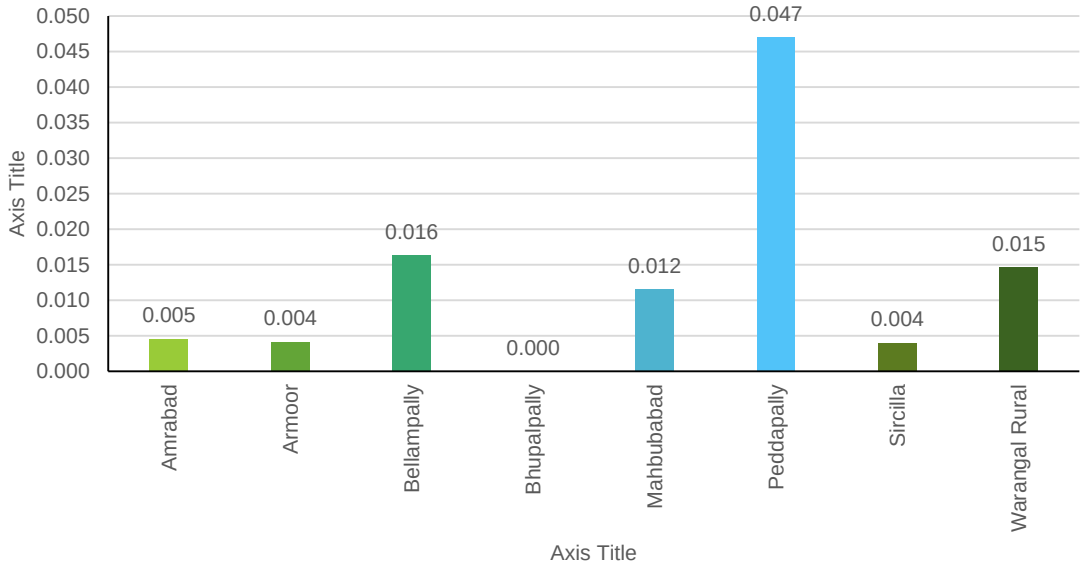
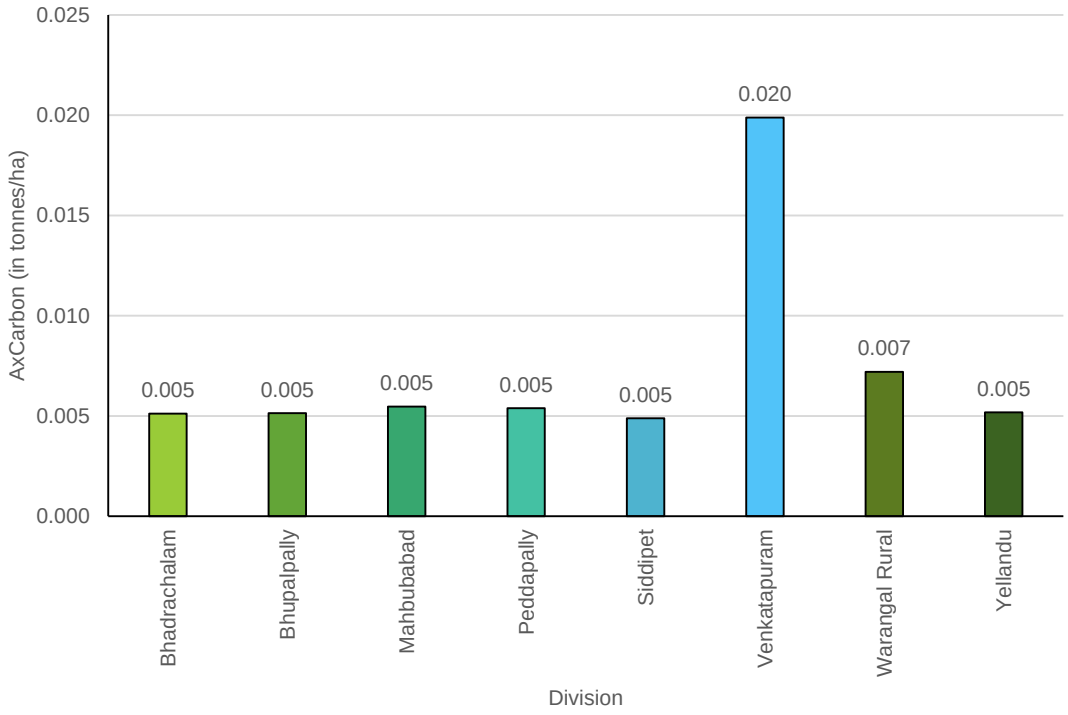


Fig. 5.8.b Average Caron Tonnes/ha of Teak plantation in various divisions



Findings: Per hectare average carbon varied from 0.03 tonnes to 0.36 tonnes in Eucalyptus plantations and 0.01 tonnes to 0.04 tonnes in NTSH plantations raised by TSFD CAMPA during 2014-2015.

5.9 Data analysis of CAMPA Other Activities: Data collected for CAMPA other activities during field evaluation of the sample CAMPA activities for the year 2014-2015 were digitized, collated and checked as per the audited records available at the O/o PCCF, TSFD, Aranya Bhavan. Thereafter, the data was analysed to understand the deviation with that of field and any other critical issues on the CAMPA activities for the state of Telangana.

5.9.1 Soil and Water Conservation Measures: Soil and water conservation activities (SWC) were undertaken under TSFD CAMPA during 2014-2015. The random samples evaluated comprised of improvement of degraded forest through SMC works. Summary of the evaluated samples is provided in table. 5.9.1. Details of sample evaluation details are provided in Annexure V.

Table 5.9.1: Summary of 3rd party CAMPA evaluation score of SWC samples for 2014-2015.

S	Division	Range	Activity	SO.No	Lat.	Long.	Characteristics	Condition	Remarks	Score
1	Asifabad	Asifabad	Spillover) Improvement Degraded Natural Forests, Soil and Moisture Conservation works in Compt.No.30, RF: Manikgarh(W), Beat & Section: Indhapur through VSS Agarwada in Asifabad Range during 2014-15	151/2014-15	17.0893	78.5559	Earth work excavation, labour charges	Well maintained	The sanctioned amount was 37848 and same was spent.	50

Findings: Soil and water conservation measures undertaken by TSFD CAMPA is able to retain water for a two to a maximum of about four months. **The total score of the SMC activity based on the samples for the 2014-2015 is 50.**

5.9.2 Other activities under CA and NFM: Thirty one samples *(under CA 9 and NFM 22 samples)* were evaluated. Sample evaluation details is provided in Annexure V.

Table 5.9.2: Number of samples evaluated under different sub-components of CA&NFM Other Activities.

Sl. No.	Division	Range	Activity	SO/No
1	Adilabad	Adilabad	Transportation of 20,900 bags from Warrangal Nursery to Durganagr nursery	3_2014-15
2	Nirmal	Nirmal	Maintenance of (4X7) Teak tissue culture at Narsapur	264_2014-15
3	Nirmal	Nirmal	Conversion of bag plants nursery for 6X12 to 8X12 at Narsapur	408_D_2014-15
4	Nirmal	Nirmal	Conversion of bag plants nursery for 5X 9 to 6X12 at Narsapur	409_D_2014-15
5	Asifabad	Asifabad	Extraction of industrial cuts from BC no. II Dhanora RF	305_2014-15
6	Asifabad	Asifabad	Maintenance of 100000 (6"X12') 90 beds misc. BPS nursery at forest complex Asifabad	51_2014-15
7	Bellampally	Bellampally	Maintenance of Bag plants misc. Nursery (6X12)	227_2014-15
8	Bellampally	Bellampally	Estimate for maintenance of left over stock of Bamboo bag plants at Bellampally	61_2014-15
9	Wanaparthy	Wanaparthy	Village Development - Const. of Mini Water Tank at Jagathpally	NA
10	Wanaparthy	Wanaparthy	Construction of RCC Boundary Pillars in CA area Polikapad	29/S4/14-15
11	Nalgonda	Nalgonda	Raising of 350000 No's 6x12 Bps Nursery at gollaguda -I RF during 2014-15 under CA scheme-BDL	68/CA/ 2014-15, dt. 27.11.2014
12	Nalgonda	Nalgonda	Raising of 45000 no's 6"x12" bps nursery at gollaguda - I	75/CAMPA/14-15, dt. 04.02.2015
13	Nalgonda	Miryalaguda	Raising of 350000 No's 6x12 Bps Nursery at gollaguda -I RF during 2014-15 under CA scheme-BDL	68/CA/ 2014-15, dt. 27.11.2014
14	Yellandu	Yellandu	Raising of Misc., Bag Plants Nursery (6x12) at Range Complex, Yellandu (2016 Planting season) of Yellandu Range	201 2014-15
15	Paloncha	Paloncha	Maintenance of Misc. bag plants nursery at Division Office complex of Paloncha Range (2015-16)	13 2014-15
16	Manuguru	Ashwapuram	Fencing around the bamboo cum Misc. nursery and digging of bore well in Mondikunta VSS of Nellipaka Beat of Ashwapuram Range	219 2014-15
17	Bhadrachalam	Charla	Maint. of bag plant nursery NTSH species(13300 No's) at Lenin nagar colony VSS from 04/2014 to 07/2014	93 2014-15
18	Venkatapuram	Venkatapuram	Digging of Trench around the Pragallapally beat of Venkatapuram range(6.5 KM)	102 2014-15
19	Venkatapuram	Venkatapuram	Uprootal of Mahaveera weed growth	RSO 02 2014-15
20	Nizamabad	Nizamabad	Raising of 300 Teak beds at C/N at Thirmanpally	41/DFOKMR/2014-15

Sl. No.	Division	Range	Activity	SO/No
21	Nizamabad	Indalwai	Payment of conversion from 5X9 to 8X12 bag plants at TDC Morsa during 2014-15	68/DFO/2014-15
22	Medak	Pocharam	Dibbling of seed of Indigenous species in Pocharam WLS	26_2014-15
23	Bhupalpally	Bhupalpally	Estimate for raising of Miscellaneous seedlings (1,14,000 Nos) Nursery at Manzoornagar Central Nursery during 2014-15	100/2014-15/A2
24	Mahbubabad	Kesamudram	Maintenance of Balance Bag Plants for 1.50 Lakh NTSH Bag Plants Nursery at Kesamudram.	14 2014-15
25	Warangal(Rural)	Narsampet	Estimate for Peripheral Trench in Compt. No. 676 & 679 o Beat Pakhal of Section Ashoknagar of Range Narsampet during 2014-15	SDFO 19/2014-15
26	Pedapally	Manthani	Extraction of timber: Diversion of 2.8279 Ha of forest land for Tripling of Railway line between Raghavapuram - Peddampet and Mancherial stations in favor of SCR	5/B/SDMNT/2014-15
27	Pedapally	Manthani	Preparation & Erection of publicity hoarding for Peddapally section in Manthani range	22_SDMNT_2014-15
28	Amrabad	Amrabad	Maintenance of 100000 No's 6x5 Bag Plants Nursery at Range compound, Amrabad	DSO.No.69/ CAMPA/14-15, dt. 26.08.2014
29	Yellandu	Yellandu	Digging of Cattle proof Trench around the plantation in Kommugudem beat of Yellandu Range	216_2014-15
30	Manuguru	Bayyaram	Digging of cattle proof trench around the advance works at VSS Kalvalnagaram of Bayyaram Range	229 2014-15
31	Manuguru	Ashwapuram	Trench work of RF boundary cum cattle proof Misc. planting VSS Kattamvarigudem of Ashwapuram Range Sarapaka Compt No223	214 2014-15

Findings: The total score obtained by CA and NFM other activities is 48.71 out of 50.

5.9.3 Forest Protection: A total of 1033 forest protection activities (FP) were undertaken by TSFD CAMPA during 2014-2015. One hundred and three samples were evaluated under seven sub-components of FP. Sample evaluation details is provided in Annexure IV. Average score based on the percent variation obtained by each FP sub-component is shown in Table 5.9.3.

Table 5.9.3: Number of samples evaluated under different sub-components of FP.

No.	Forest Protection (FP) sub components	Number of samples
A	Trench	20
B	Strike Force	22.31
C	Base camp	47.72
D	Check Post	24
E	Seizure and Legal Charges	18
F	Boundary walls, watchtowers and Quarters	45.38
G	Other activities	54.14
Total score Forest Protection (FP)		**231.56**

Findings: Of seven FP sub-components evaluated, maximum variation was observed in chain link fences. Regular maintenance of boundary wall and quarters which could not be ascertained.

Maximum activities under FP were carried out by Bhadrachalam Division followed by Kamareddy. **The total score obtained by forest protection is 231.56 out of 250**.

5.9.4 Forest Fire Management: A total of 240 different forest fire management (FFM) works were undertaken by TSFD CAMPA during 2014-2015. 10% sample, i.e. 24 samples all falling under one sub-component namely fires watchers were evaluated. Scores obtained during field evaluation is provided in table. 5.9.4. Sample evaluation details is provided in Annexure V.

Table 5.9.4: Evaluation summary of FFM samples.

S. No.	Division	Range	Activity	SO. No	FFM Score
1	Adilabad	Adilabad	Remuneration charges to Forest Fire Watchers engaged in Adilabad Range	DFO135/2014-15	10
2	Echoda	Boath	Remuneration charges to Forest Fire Watchers engaged in Boath Range	DFO133/2014-15	8
3	Utnoor	Utnoor	Remuneration charges to Forest Fire Watchers engaged in Utnoor Range	DFO136/2014-15	8
4	Jannaram	Tadlapet	Wages to fire protection watchers of Tadlapet range	31/2014-15/S5	10
5	Khanapur	Khanapur	Wages to the Fire watchers working in Khanapur Range	332/2014-15	10
6	Wanaparthy	Wanaparthy	Fire Watcher RF Jangamaipally Apr-14 & May-14, Jan-15 to Mar-15 (5 Months)	4/W4/21-4-14	10
7	Nalgonda	Miryalaguda	Engaging Fire watchers in Miryalaguda	7/Campa/NPV/14-15 dt. 09.05.2014	10
8	Yadadri Bhuvangiri	Choutupal	Engaging Fire Watchers for Maintaining Firelines at Choutuppal Range during 2014-15	9 CAMPA NPV 2014-15	10
9	Yellandu	Komaramam	Wages to Fire Watchers in Komararam Range	308	8
10	Kinnersani WLM	Chatakonda	Creation of Fire lines with 3 mtrs width in Bangaruchelka Beat	2	8
11	Banswada	Gandhari	Estimate for engaging of fire watcher in forest block Vellutla-I of Mudhelli Section of Gandhari Range during 2014-15	17/G/CAMPA/2014-15,	10
12	Bhupalpally	Azamnagar	Estimate for Payment of Fire Watchers in Range: Azamnagar during 2014-15.	124/DSO/2014-15.	10
13	Sircilla	Sircilla	Fire watcher at Mucherla	50/SRL/2014-15	10
14	Sircilla	Sircilla	Fire watcher at Garjanpally	51/SRL/2014-15	10
15	Jagtial	Jagtial	Estimate for Maint. Of Fire Watchers in Thungur Section of Jagtial Range (2 Nos.)	36/J/2014-15	10
16	Jagtial	Raikal	Establishment of fire watchers for maintaining the existing fire line and control burning for 3 months at Raikal	39_2014-15	10
17	Amrabad	Mannanur	Wages to Fire Watchers in Mannanur Range	ACF.No.01/ CAMPA/14-15, dt. 07.04.2014	8
18	Amrabad	Mannanur	Creation of 3 km fireline in Mannanur S Beat in Mannanur Section	DSO No.54/State CAMPA/2014-15	10
19	Nagarjunasagar WLM	Nagarjunasagar	Wages to fire watchers in Pedagattu Beat	DSO.No.22/ 2014-15	10
20	Hyderabad	Hyderabad (Central)	Engaging Fire terracing watchers in RF Medipally	6HC/2014-15	8
21	Jannaram	Jannaram	Wages to Fire Protection watchers of Jannaram range	28_2014-15/S5	8
22	Kamareddy	Kamareddy	Wages to Fire watchers at Ghanpur (M)	1/CAMPA/2014-15	8
23	Nagarjunasagar	Devarkonda	Wages to Fire watchers	DSO_20_2014-15	8
24	Paloncha	Yanambally	Wages to Fire Watchers	124_2014-15	8

Findings: Highest FFM works were undertaken in Amrabad, Jannaram, Jagtial and Sircilla. Evaluation of fire lines made at least two years back cannot be evaluated on the field. Evaluation was done on the basis of the available records. **The average score obtained by forest protection is 9.17 out of 10**.

5.9.5 Biodiversity Conservation and Development (BDC): A total of 710 different biodiversity conservation and development activities were undertaken by TSFD CAMPA during 2014-2015. Seventy One samples were evaluated under six sub-components of BDC (*table 5.9.5*). Sample evaluation details is provided in Annexure V. Average score based on the percent variation obtained by each BDC sub-component is shown in Figure 5.9.5.

Fig 5.9.5: Summary sore of evaluated samples under different BDC sub-components

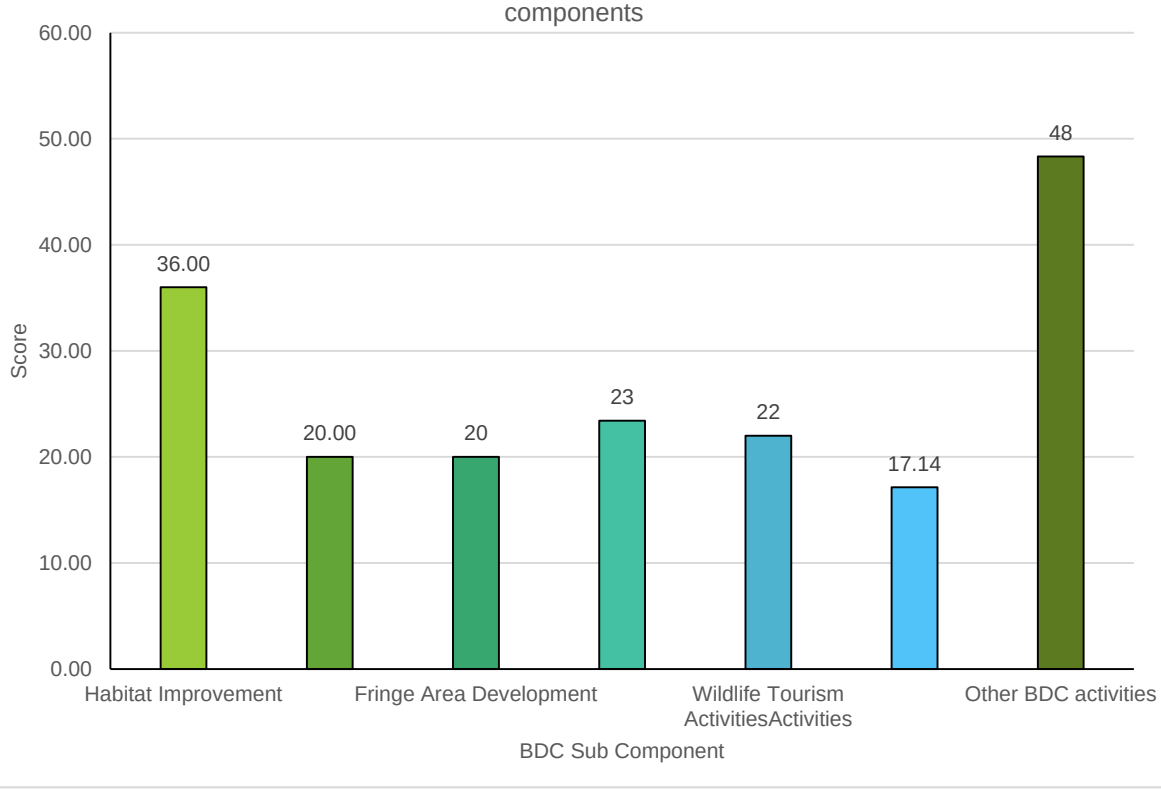


Table 5.9.5: Number of samples evaluated under different sub-components of BDC.

Findings: There were 710 works under BDC component undertaken in TSFD CAMPA. Highest activities were undertaken in WLM Warrangal, followed by WLM Medak and CNP. **The total score obtained by biodiversity conservation and development is 186.90 out of 200**.

Table 5.9.5: Number of samples evaluated under different sub-components of BDC.

No.	BDC sub components	Samples
A	Habitat Improvement	36.00
B	Development of water sources	20.00
C	Fringe Area Development	20
D	Activities (anti - poaching, Ex situ conservation, Research)	23
E	Wildlife Tourism Activities	22
F	Man Animal Conflict (MAC)	17.14

F	Other BDC activities	48
Total		186.90

5.9.6 Research & Development (R&D): The total number of different works under CAMPA NPV component research and development undertaken by TSFD CAMPA during 2014-2015 is 230. 10% of the total works, 23 samples of R&D were evaluated. Details of evaluated samples is provided in Annexure V. The activities were undertaken under FG Warangal and SS Hyderabad divisions.

Table 5.9.6: Evaluation summary of R&D samples.

S. No.	Division	Range	Activity	SO. No	Score
1	SS Hyderabad	FRC-Mulugu	Estimate for preparation of Karbling by 1:6 with 2nd class bricks traditional size 23X11X7cm bricks at FRC Dulapally 2014-15	29/2014-15	10
2	SS Hyderabad	FRC-Mulugu	Estimation for raising of 1 lakh 100 cc root trainers at FRC Mulugu during 2014-15	36/2014-15	10
3	SS Hyderabad	FRC-Mulugu	Estimate for raising of 1 lakh no of 100 cc root trainers nursery at FRC Dullapally 2014-15	38/2014-15	10
4	SS Hyderabad	FRC-Mulugu	Estimate for maintenance of 100 CMT vermicompost at FRC Dullapally	49/2014-15	10
5	FG Warrangal	ARC, Achutapuram	Maintenance of Medicinal garden at ARC	11/Div/2014-15	10
6	FG Warrangal	ARC, Achutapuram	Repair and maintenance of lathe houses	19/ARC/2014-15	10
7	FG Warrangal	ARC, Achutapuram	Maintenance of vermicompost shed	20/ARC/2014-15	10
8	FG Warrangal	ARC, Achutapuram	Development of Macro-propagation protocol (reservoir grafting) in low cost sand beds	22/ARC/2014-15	10
9	FG Warrangal	ARC, Achutapuram	Maintenance and repair of existing old chain link mesh at ARC	106/Div/2014-15	10
10	FG Warrangal	ARC, Achutapuram	Purchase of Electronic Camera	39/Arc/2014-15	10
11	FG Warrangal	ARC, Achutapuram	Estimate for maintenance of field research station at Achutapuram	5 ARC-2014-15	10
12	FG Warrangal	FG Warangal-1	Est. for Watch & ward of field research Centre at WRC for day & night time O/o F G Wgl during 14-15	1/Div/14-15	10
13	FG Warrangal	FG Warangal-1	Rev. Est. for improvement & maint. Of nursery infrastructure irrigation system and electricity charges in WRC during 2014-15	4/Div/ 14-15	10
14	FG Warrangal	FG Warangal-1	Est. for maint. Of seed godown and seed drying yard at Warangal research Centre in O/o FG Wgl during 2014-15	66/Div/ 14-15	10

S. No.	Division	Range	Activity	SO. No	Score
15	FG Warrangal	FG Warangal-2	Est. for purchase of Agro Shade Net for the use in Jakaram Research Centre during 2014-15	01/Wgl.II/ 2014-15	10
16	FG Warrangal	FG Warangal-2	Est. for purchase of library books for the use in library of O/o. Forest Geneticist, Warangldуring 2014-15	05/Wgl.II/2014-15	10
17	FG Warrangal	FG Warangal-2	Est. for Repairs and rewriting of board at Entrance of Jakaram RC during 2014-15	06/Wgl.II/2014-15	10
18	FG Warrangal	FG Warangal-2	Est. for Measurement of growth parameter in various plots in Jakaram	12Wgl.II2014-15	10
19	FG Warrangal	FG Warangal-2	Est. for fixing of Drip Irrigation system in nursery (WRC) Oo Forest Geneticist	17Wgl-I(2014-15)	10
20	FG Warrangal	FG Warangal-2	Est.for Watch & Ward for protection of Jakaram R.C.	05/Divn/ 2014-15	8
21	FG Warrangal	FG Warangal-2	Est.for Watch & Ward for protection of Kesamudram R.C.	06/Divn/ 2014-15	8
22	FG Warrangal	ARC, Achutapuram	Estimate for Watch and Ward at ARC for the year 2014-15.	08/DIV/14-15	8
23	FG Warrangal	ARC, Achutapuram	Estimate for Daily wages to Office Assistant for RRO, ARC for the year 2014-15.	10/DIV/14-15	8

Findings: FG Warangal having four centers across the state and SS Hyderabad undertook 230 R&D activities under TSFD CAMPA during 2014-2015. **The average score obtained by Research and Development is 9.65 out of 10**.

5.9.7 Capacity Building: CB activities were undertaken in Telangana State Forest Academy under CAMPA NPV component during the year 2014-2015. The total number of different works under CB component undertaken by TSFD CAMPA during 2014-2015 is 108. 10% of the total works, 11 samples of CB were evaluated. Details of evaluated samples is provided in Annexure V.

Table 5.9.7: Evaluation summary of CB samples.

S.No.	Division	Activity	SO.No	Score
1	TSFA, Dullapally	Construction of Proposed (Phase-II) 1st Floor, 2nd Floor & 3rd Floor of Hostel Cum Auditorium Building for Forest Range Officer Trainees at APFA, Dulapally during 2014-15.	14_PCCF_ (2014-15)	10
2	TSFA, Dullapally	Training programme on Silviculture Techniques & Treatment Practice to the Dept. Staff	100/2014-15	10

S.No.	Division	Activity	SO.No	Score
3	TSFA, Dullapally	Estimate for Weapon training charges for FSO (T) (15th Batch)	104/2014-15	10
4	TSFA, Dullapally	Procurement of Lecture Notes to FRO (T) 3A & 3B Batches at APFA, Dulapally	57/2014-15	10
5	TSFA, Dullapally	Estimate for Organizing training programme on Modern Nursery Management, APFA Dullapally	19/2014-15	10
6	TSFA, Dullapally	Estimate for organizing training programme on "Personality Development" to the Deptl. Staff	3/2014-15	10
7	TSFA, Dullapally	Estimate for organizing training programme on "Modern Nursery Management" to the Deptl. Staff	6/2014-15	10
8	TSFA, Dullapally	Estimate for organizing training programme on "Silviculture Techniques and Treatment Practices" to the Deptl. Staff	13/2014-15	10
9	TSFA, Dullapally	Estimate for preparation of ID cards for FBO trainees (17th Batch) at APFA, Dulapally during 2014-15	17/2014-15	10
10	TSFA, Dullapally	Payment of Honorarium & conveyance charges to resource Persons (FRO Trainees 3rd Batch)	22/1/2014-15	10
11	TSFA, Dullapally	Payment of Audit fee charges of (CAMPA) 2014-15 during the year 2014-15	22/3/2014-15	10

Findings: All the CB activities was undertaken in Telangana State Forest Academy, Dullapally. CB activities obtained full points during evaluation, the activities were evaluated based on the documents made available by TSFA, Dullapally. **The total score obtained by CB is 10 out of 10**.

5.9.8 Information Communication and Technology (ICT): The total number of different works under ICT component undertaken by TSFD CAMPA during 2014-2015 was 229. 10% of the total works, 23 samples of ICT were evaluated. Details of evaluated samples is provided in Annexure V.

Table 5.9.8: Evaluation summary of ICT samples.

S. No.	Division	Range	Activity	SO. No	Score
1	Adilabad	Adilabad	Monthly rental charges to internet of Adilabad	1_2014-15	**ICT Score**
2	Bellampally	Bellampally	Wages to the Data Entry Operators working in Bellampally Division during 2014-15	06/2014-15	10
3	Utnoor	Utnoor	Monthly rental charges to internet of Range Utnoor	FRO1/2014-15	10

S. No.	Division	Range	Activity	SO. No	Score
4	Jannaram	Tadlapet	Wages to Data Entry Operator of Tadlapet range	32/2014-15/S5	10
5	Khanapur	Khanapur	Wages to Data Entry Operator working and Internet charges in O/o FRO, Khanapur	32/2014-15	10
6	Hyderabad	Hyderabad	Vegetation canopy cover assessment using high resolution data , Ground Truthing, Data Compilation, Accuracy Assessment, Report Generation etc.	1 2014-15	10
7	Hyderabad	Hyderabad	3 No's HP Plotters + 1 No's HP CLJ A3 Printer + 1 Xerox CLJ A3 Printer	5 2014-15	10
8	Siddipet	Siddipet	Improvement of infrastructure Communication- broad band connectivity up to range level.	2/FRO/2014-15	10
9	Wanaparthy	Wanaparthy	Maintenance of Division Office Telephone Bill Charges	21(R) /W4/5-8-14	10
10	Nalgonda	Miryalaguda	Assessment Tree Outside Forest area in Miryalaguda Range	56/CAMPA/2014 dt. 22.09.2014	10
11	Nalgonda	Miryalaguda	Communication charges to the staff of Miryalaguda Range	5/Campa/NPV/14-15, dt. 09.05.2014	10
12	Yadadri Bhuvangiri	Choutupal	Assessment of Tree Outside Forests Choutuppal range during 2014-15	57 CAMPA 2014-15	10
13	Yellandu	Komaramam	Internet Charges in Komararam Range during 2014-15	42_2014-15	10
14	Sangareddy	Narayankhed	Internet charge of Range office Narayankhed	1_campa_2014-15	10
15	Bhupalpally	Azamnagar	Estimate for remuneration charges to Data entry operator of Azamnagar range, during the year 2014-15	04/DSO/2014-15.	10
16	Sircilla	Sircilla	Tree outside the Forests (TOF) in Sircilla Range	07/2014-15	10
17	Mahbubabad	Mahbubabad	Assessment Study of Tree Outside Forest at Mahbubabad Range	14_2014-15	10
18	Jagtial	Jagtial	Remuneration charges to Data Entry Operators in the Office of Sub-Divisional Forest Officer, Jagtial for the Year 2014-15.	13/2014-15	10
19	Pedapally	Manthani	Improving communication infrastructure broadband connectivity of Manthani Range	1/RSO/2014-15	10
20	Amrabad	Amrabad	Broad Band charges of Amrabad Range During the 2014-15	RSO.No.1/ CAMPA/14-15, dt. 20.04.2014	10
21	Nagarjunasagar WLM	Devarkonda	Improvement of Communication Broadband connectivity in WLM Range Nagarjunasagar	RSO.No.1(R)/ 2014-15	10

S. No.	Division	Range	Activity	SO. No	Score
22	Nagarjunasagar WLM	Nagarjunasagar	Communication expenses of Mobile charges to WLM Range Devarakonda period from April-2014 to March-2015	RSO No. 02/ 2014-15	10
23	KBR National park	KBR National park	Improvement of Infrastructure and communication - Improving communication Infrastructure - Broad Band Connectivity up to Range level.	10_Campa_2014-15	10

Findings: ICT works were carried out under 28 divisions and was shown in the table under ICT Circle, Head Office. **The total score obtained by ICT is 10 out of 10.**

5.9.9 Monitoring & Evaluation (M&E): The total number of different works under M&E component undertaken by TSFD CAMPA during 2014-2015 is 92. 10% of the total works i.e. 9 samples were evaluated. Details of the evaluated sample is provided in Annexure V.

Table 5.9.9: Evaluation summary of M&E samples.

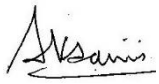
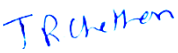
S.No.	Division	Range	Activity	SO.No	Score
1	Bellampally	Bellampally	CA External Audit Fee for CAMPA expenditures for the Bellampally Division	242/2014-15	10
2	Bellampally	Bellampally	Office Support for Monitoring CAMPA Scheme for the year 2014-15	243/2014-15	10
3	Hyderabad	Hyderabad	Towards Sitting Fees and conveyance charges Non official members	7/R/HC/2014-15	10
4	Hyderabad	Hyderabad	Towards Payment of Audit Fee for CAMPA AC	159/2014-15	10
5	Kothagudem	Kothagudem	Miscellaneous expenditure for review meeting at Central nursery, Chatakonda	194/2014-15	10
6	Kothagudem	Kothagudem	Miscellaneous expenditure for Grievance day at Central nursery, Chatakonda	192/2014-15	10
7	Paloncha	Paloncha	CA Audit fee for external audit of CAMPA	270/2014-15	10
8	Mahbubabad	Mahbubabad	CA Audit fees for external audit of CAMPA.	89/2014-15	10
9	Jagtial	Raikal	Office support for Monitoring and Evaluation works in CAMPA	15/2014-15	10

Findings: There were a total of 92 activities under M&E undertaken in 2014-2015 in seven divisions. OS activities were evaluated based on the available records. **Total score based on the percent variation of the OS activity evaluated on the basis of the available documents is 10 out of 10**.

5.11 Over all evaluation score: Scores obtained by different plantation activities and other activities under different CAMPA components is shown in Table 5.11. The total score obtained for the 2014-2015 CAMPA activities is **868.03** out of 1105 i.e. 78.56% indicating "**moderately satisfactory performance**".

Table 5.11: Overall scoring of TSFD CAMPA undertaken during 2014-2015.

Quantitative Aspects (A)				Qualitative Aspects (B)			
S.	**Main heading**	**Score**	**Total**	**S.**	**Main heading**	**Score**	**Total**
I.	Plantation activities (CA and NPV)	274.29	500	I.	Impact of awareness generation campaign	2.2	5
II	Soil and Water Conservation Measures (CA)	50	50	II.	Identification of approved site for plantation	2.7	5
II.	Other activities (CA & NFM)	50	50	III.	Increase in Forest Area	2.7	5
III.	Forest Protection	231.57	250	IV.	CAMPA benefits (SC/ST/BPL households)	10	10
IV	Forest Fire Management	9.17	10	V.	Project Awareness	2.1	5
V	Biodiversity Conservation	186.90	200	VI.	Transparency, maintenance and payments	2.5	5
VI	Research & Development	9.65	10	VII.	Maintenance of assets created	7	10
VII	Capacity Building	10	10				
VIII	ICT	10	10				
IX	M&E	10	10				
Total (A)		**841.58**	**1060**	**Total (B)**		**29.2**	**45.00**
Grand Total (A+B)						**868.305**	**1105.00**

Name of evaluators	Signatures	Name of evaluators	Signatures
Dr. Satvant K Saini		Dr. Saurindra Nr Goswami	
Akhilesh Singh		Amit Ashok Singhe	
Ankit Rawat		Aniket Choudhury	
Chetan TR		Rohit Kumar	
Raj Kumar Arya		Neeraj Agrawal	

5.9.11 Third party critical comments

1. Project constraints/limitations

What were the constraints /limitations faced by the project authority based on evaluator'? Specify

a) Lack of community participation in CAMPA activities.
b) Lack of readily available quality planting materials of Teak and NTSH species.
c) Lack of proven nursery practices for developing quality saplings within the state.
d) Severe pressure on lands from encroachments.
e) Lack of sufficient time for site preparation in the degraded lands before plantation.
f) Lack of sufficient manpower to conduct regular maintenance of plantation and structures.
g) Lack of holistic understanding on CAMPA components, reporting amongst forest department staffs.
h) Poorly organized record keeping.

2. Suggestions for improvement

Areas of improving the project output? Specify

a) Involvement of local stakeholders from site selection to maintenance activities.
b) Identification of mother trees bearing areas for teak and NTSH species.
c) Training on forest trees nursery practices for producing quality planting stocks.
d) Planting of saplings to be synchronized with meteorological conditions (forecasting).
e) Site - species relationships needs consideration for raising plantation.
f) Adoption of innovative solutions (*wadi*, etc.) for soil and water on degraded areas.
g) Emphasize on developing short rotation forest plantations as carbon sinks.
h) Emphasize on wildlife habitat improvement including improvement of the hydrological regime.
i) Updated CAMPA works on E-green watch and TGFIMS.

3. Whether the project authorities have felt any need of improving upon any particular activity on methodology? Specify.

Stakeholders' participation in all the project activities from planning to implementation needs to be initiated. Development of ecosystem based site quality indices including key considerations of community preference, biodiversity conservation, soil and water conservation, and carbon sequestration should be included.

4. Whether the people of the project area feel any need to improve any particular aspects of the project? Specify.

Presently few people from the project area were associated during implementation of activities as daily wage labour. Unless local people are totally aware of the benefits of CAMPA project and they actively participate, it is difficult to get reflections from them on the project.

5. Whether the project should be continued on the same lines or some modifications are necessary. Specify.

The project should seriously make modifications by adopting ecosystem approach to ensure ecological security of the affected areas and the livelihoods of the communities affected by forest diversions. Plantation of local species with multiple benefits instead of planting exotic monoculture like eucalyptus is necessary to improve wildlife habitat and also distribute benefits for the affected people. Project activity should aim at rejuvenation of ecological goods and services like rebuilding soil fertility, pollination, seed dispersal, perennial stream flow, availability of fuelwood, fodder, fruits for the local people. Mechanism for ecological monitoring should be employed for observations, estimation and forecast of the environmental conditions, defining the degree of factors influence resulting in ecosystem changes and estimation of anthropogenic influence resulting in deterioration of the environment. The monitoring should help in the evaluation of biodiversity, conservational, climate change and other ecological aspects of CAMPA activities. A system for ecological monitoring should be devised and developed at different tiers of TSFD.

Chapter 6

RECOMMENDATIONS

Plantation activities

1. Development of Telangana State Site Quality Index (TSQX) based on climate variable, soil parameters, topography, land tenure, and degradation status for plantations.

2. Although from survival point of view, eucalyptus plantations obtained a better score yet avoidance of eucalyptus plantations as habitats by wildlife is a serious concern. It is recommended raising of local fast growing non timber forest products (NTFP) species for deriving multiple benefits for wildlife, human beings and rejuvenation of ecosystem services.

3. For raising teak plantation, planting stock of teak needs to be made from selected mother trees followed by proper root training of teak seedlings and acclimatization of the saplings before field transplantation with a ball of earth. Plantations to synchronize with the onset of monsoon. Sapling not less than 6ft in height should be field planted.

4. Keep updated plantation journals of all the CAMPA plantation activities in every ranges.

5. Eucalyptus not to replace natural teak growing areas.

6. Regular silvicultural practices for NTFP/NTSH and teak plantations to enhance the forest canopy.

7. Fast growing native NTFP/NTSH plantations should be raised for developing forest carbon sink.

Other activities

1. Plantation of native NTFP trees to join fragmented reserve forests for improving wildlife habitat and ensure ecosystem continuity.

2. Regular maintenance operations of soil and water conservation structures is necessary. Innovative low cost water harvesting structures like staggered trenches, *jaal kund* is better for treating catchments.

3. In areas frequented by wild herbivores, CPT be avoided to reduce the risk of wildlife accidents.

4. Maintenance of forest protection measures like chain link fencing in areas susceptible to severe grazing pressure is necessary.

5. Building trust among the forest fringe population on the benefits of stall-feeding for ecological benefits is a better way to reduce the grazing pressure.

6. Awareness programme for communities on the need for biodiversity conservation to enhance the perennial flow of ecosystem services is necessary.

7. All the activities undertaken under CAMPA is to be updated regularly in E-green watch for ease in conducting google earth based regular monitoring of activities.

8. Ecological monitoring of all the works on an annual basis is necessary.

General activities

1. Each division to update CAMPA list of works under each component as presently done for the year 2016-2017 in the FAMIS portal.

2. Training of officials on CAMPA components/sub-components for correct booking of works under the appropriate head/sub-head. A web based toolkit support system if available will assist forest officials to correctly book CAMPA works under the appropriate components.

3. Maintenance of record for all the activities is vital for proper monitoring of works. Irrespective of any situation measurement books / plantations journals should always be kept with care in the ranges where CAMPA works (*plantation and other activities*) have been carried out.

4. Adoption of recording CAMPA activities details grid wise. This is vital for ease in evaluating quantification of works.

5. Participatory selection of sites for CA plantations and CAMPA other activities in degraded lands with stakeholders for developing enhanced climate change resilient forests.