
Consolidated Report

Consolidated Report on Third Party Evaluation of Works done under Compensatory Afforestation Fund Management and Planning Authority (CAMPA) in the State of Telangana for the years 2009-2010 to 2015-16.

Submitted to

Telangana State Forest Department

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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, and others.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 2002². 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

¹Compensatory Afforestation in India: Report no 21.

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

³CAMPA Fact Sheet: A Compromised Composition CAF Bill and PSC Report, CSE, 7p.

⁴http://envfor.nic.in/sites/default/files/Guidelines_for_Investment_Policy_and_Procedure_0_0.pdf

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 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

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.

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

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 2009-2010.

1.4 3RD Party 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 2009-2010 to 2015-2016. Evaluation of activities under all the CAMPA components was conducted. Two-stage random sampling strategy has been adopted.⁹ 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-2014¹⁰ 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

³ Census of India (2011).

⁸ Telangana State of Forest report (2014), TSFD, 144p.

⁹ National Evaluation Manual for CAMPA Projects (2016) CEAMT, IIFM Bhopal, 25 pages

¹⁰ National Working Plan Code – For Sustainable Management of Forests & Biodiversity in India (2014), MoEFCC, 91p.

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.

1.5 Evaluation Scope

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

1.6 Evaluation objectives

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 years 2009-2010 to 2015-2016.
2. To evaluate the survival and health of plantations carried out under the CAMPA Scheme in Telangana State Forest department for the year 2009-2010 to 2015-2016 with photographic evidence.
3. To evaluate the other activities carried out by Telangana State Forest Department for the year 2009-2010 to 2015-2016 with photographic evidence.

1.7 Methodology

The process flow that was adopted during the third party CAMPA evaluation exercise is shown through a flowchart in Fig 1.7. The evaluation methodology was conducted in five stages.

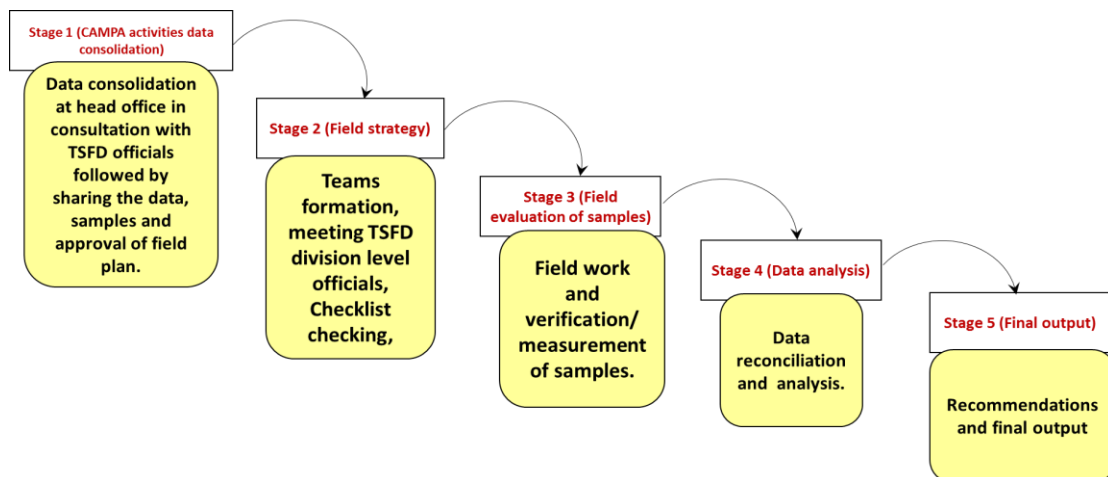


Fig 1.7: Process flow of third party CAMPA evaluation.

1.7.1 Stage 1 - CAMPA activities data consolidation: The first stage i.e. CAMPA Activities Data Consolidation consisted of four major activities namely data collection, sampling, field planning and issuance of field visit permission from APCCF (CAMPA). 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 2009-010 to 2015-2016. The list of data sources reviewed for consolidation of CAMPA list of works for 2009-2010 to 2015-2016 is shown in

Annexure I. The consolidated list of CAMPA works under different CAMPA components undertaken by TSFD, CAMPA for the year 2009-2010 to 2015-2016 was collected. 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.

A) 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 2009-2010 to 2015-2016. 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 available¹¹. 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 selected plantation sites, a random point was generated to lay plot for direct field enumeration adhering NWPC-2014 guidelines.

B) Sampling of other activities: For sampling other activities, the consolidated list of works of all the other activities undertaken by TSFD CAMPA for the year 2009-2010 to 2015-2016 was sorted. The sorted list was segregated into different CAMPA components. 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 under different CAMPA components namely, CA, NFM, FP, FFM, BDC, ICT, M&E, R&D, and CB.

¹¹National Evaluation Manual for CAMPA Projects (2016) CEAMT, IIFM Bhopal, 25 pages

C) 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 (CAMPAs) for its approval. The division-wise details of field visits are given in Annexure II.

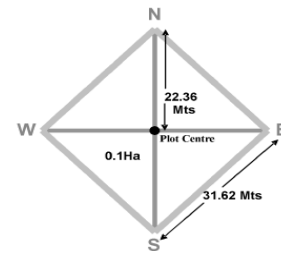
D) Issuance of field permission: Proposed field visit dates, records and other information to be furnished were circulated from the O/o PCCF & HoFF, TSFD to all DFO/FDO of the territorial and wildlife forest divisions of Telangana state (*Annexure III*). Field staff of the forest divisions to be visited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

1.7.2 Stage 2 - Field Strategy: In the second stage formation of evaluation teams (*Names and qualifications of the team members are shown in Annexure IV*), team visits to fifty-four forest divisions team visits was conducted followed by each team meeting DFO and discussion of field plan with DFO, FDO, and RFO. CAMPAs Works Register, Confirmation of Samples, Plantation Sites, Measurement Books, Plantation Journals and Vouchers, were requested from the forest division/range visited was checked and used for conducting site verification.

1.7.3 Stage 3 - Field evaluation of samples: Field evaluation of samples was conducted by first checking CAMPAs 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*). After meeting TSFD officials, each sample matched with the CAMPAs works register list. After confirmation ensured presence of forest department officials in each of the samples locations. Physical verification and geotagging. During field evaluation efforts laid 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.

A) Evaluation of plantation activities: 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. Garmin GPS used to navigate to plots. A square plot of 0.1 ha¹² (Box 1) laid out by measuring 22.5 m horizontal distance i.e., half of the diagonal in all the four directions at 45⁰ in north-east, at 135⁰ in the south-east, at 225⁰ in the south-west, and at 315⁰ 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. After laying the sample plot, the parameters evaluated is shown in table 1.7.3a.



Box 1: Sample plot layout.

Table 1.7.3a: 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. ¹³

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 plantation and 100 cm above ground level for up to 5 years plantations as mentioned in NEM CAMPA, 2016¹⁴ using a tape. For calculating the carbon content trees with girth above 30cm was taken to apply the allometric equations as developed by FSI¹⁰ for calculating tree carbon. Accordingly, the carbon content per tree was calculated. Data observed were recorded in Form B (Appendix I).

B) Evaluation of samples of other activities: 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

¹²National Working Plan Code — For Sustainable Management of Forests & Biodiversity in India (2014), MoEFCC, 91p.

¹³FSI (2015) Carbon Stocks in India's Forest, 164p

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

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. 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 1.7.3b.

Table 1.7.3b: 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

1.7.4 Stage 4 - Data analysis: This stage consisted of activities pertaining to data digitization, data reconciliation, and data analysis. The primary activities conducted for digitizing the data included allocation of a place at Aranya Bhavan, conversion of collected data on plantation activities and other activities to MS Excel, and data consolidated at the division level. The consolidated data was further reconciled with the spending records followed by its verification with audited reports and FA 9 for each CAMPA activities at Aranya Bhavan with support from STA CAMPA. Verified data was analysed 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.

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

i) Plantation activities scoring: 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.

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.

The total score allotted to plantation activity for the year is the average score of the total plantation activities evaluated.

ii) Other activities scoring: a) For recording CA and NFM other activities, Soil and Water Conservation measures Forest protection and 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% = 150 points, 21% to 30% = 120 points, 31% to 40% = 60 points, 41% to 50% = 30 points and for deviations above 50% = 0 points was given.

Other activities under FFM, ICT, R&D, M&E and OS 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 evaluation score: 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 is based on checking the availability of treatment plan on measurement books/ plantation journals.
- c) Improvement in quality of wildlife habitat are based on the impact of different plantation raised under CAMPA on the wildlife.
- d) CAMPA benefits is 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 is based on the availability of matching CAMPA works at the division and at the head office.
- g) Maintenance of assets created is based on the state of the physical assets created and plantations raised.

(C) 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 1.7.3c for each year evaluated.

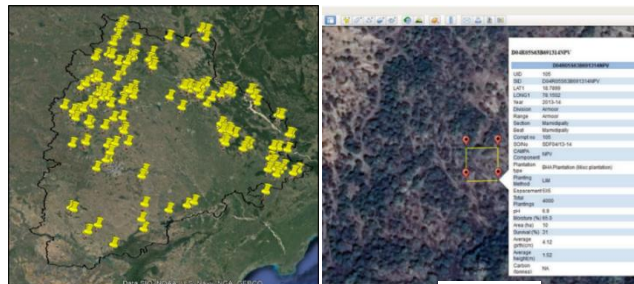
Table 1.7.3.c: Overall site assessment sample sheet¹⁵.

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.	Soil and Water Conservation Measures		200	II.	Identification of approved Site for plantation		5
III.	Other Activities (CA/NFM)		200	III.	Improvement in quality of wildlife habitat		5
IV.	Forest Protection		200	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.	M&E		10				
Total (A)			1350	Total (B)			45
GRAND TOTAL (A+B)				1395			

Percent of the total score obtained is used to rank the performance¹⁶ 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

1.7.5 Stage 5 - Final output: The final stage of evaluation constituted tabulation of results and production of outputs namely mapping of activities on Google platform (Box 2), geodatabase of sampling plots (Box 3) and draft evaluation report.



Box 1

Box 2

¹⁵ The total score assigned to the components were done as per the percentage expenditure under the various sub-components of CAMPA and their importance.

¹⁶National Evaluation Manual for CAMPA Projects (2016) CEAMT, IIFM Bhopal, 25 pages

Chapter 2: WORKS TAKEN UP UNDER DIFFERENT CAMPA COMPONENTS

Compensatory Afforestation (CA) and Net Present Value (NPV) components for which activities have been undertaken by Telangana State Forest department are shown in Fig 2.0.

Fig 2.0: Works undertaken for different CA and NPV components

Compensatory Afforestation (CA)	Net Present Value (NPV)
<ul style="list-style-type: none"> ➤ Compensatory Afforestation ➤ Safety Zone ➤ Extraction of Tree Growth in diverted areas ➤ Catchment Area Treatment 	<ul style="list-style-type: none"> ➤ 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) ➤ Office Support (OS)

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 / Penal CA / Safety Zone / Extraction of tree growth and Catchment Area Treatment are taken up by TSFD strictly as per the Government of India stipulations while granting the stage - I & II clearances of CA proposals. It also envisages proper demarcation of the CA areas by erecting boundary pillars.

2.2 Net Present Value (NPV)

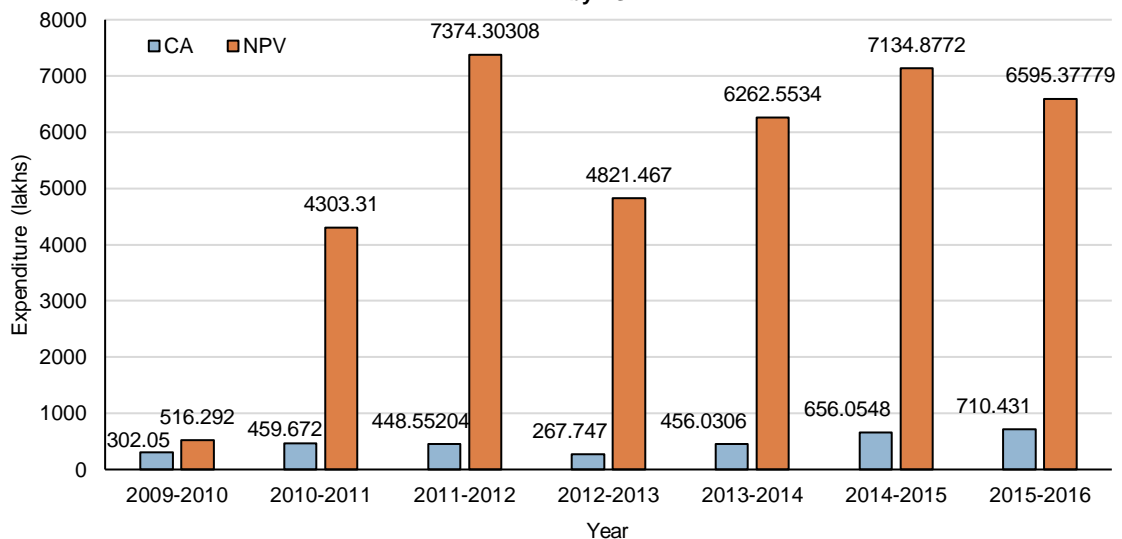
The components of NPV include natural forest management, forest protection, forest fire management, biodiversity conservation and development, research and development, capacity

building, information communication and technology, monitoring and evaluation and office support. Each of the NPV components is described in the following sub-sections.

2.3 Expenditure under CAMPA components by TSFD from 2009 to 2016

The main expenses taken up by TSFD under CA head namely on CA / Addl.CA / Penal CA / Safety Zone / Extraction of tree growth and Catchment Area Treatment are strictly as per the Government of India stipulations while granting the stage - I & II clearances of CA proposals. Under NPV funds spent on artificial regeneration (plantation), assisted natural regeneration, forest management, forest protection, forest and wildlife related infrastructure development, wildlife protection and management, supply of wood and other forest produce saving devices and other allied activities in the manner as may be prescribed by the Central Government. Fig 1 gives the comparative details of the expenditure under CA and NPV activities by TSFD (As per audited report).

Fig.1 CAMPA expenditure under CA and NPV components from 2009 - 2010 to 2015-2016 by TSFD.



Findings: Expenses incurred under the CA was lowest during the year 2012-2013 whereas expenses under NPV was lowest during 2009-2010. On the other hand, expenses under CA was highest during 2015-2016 and expenses under NPV was highest during 2011-2012. In terms of percentage, CA expenditure to total expenditure during year 2009-2010 was found to be 36.91% which was the highest as compared to the other year's expenditure under CA. In the other years, the percent expenditure under CA to the total expenditure ranged in between 5.75% to 9.6%. However, the expenditure in terms of money in rupees (in lakhs) was highest for 2015-16 which was Rs. 710.431 lakhs. No definitive trend was observed in the expenditure under CA and NPV

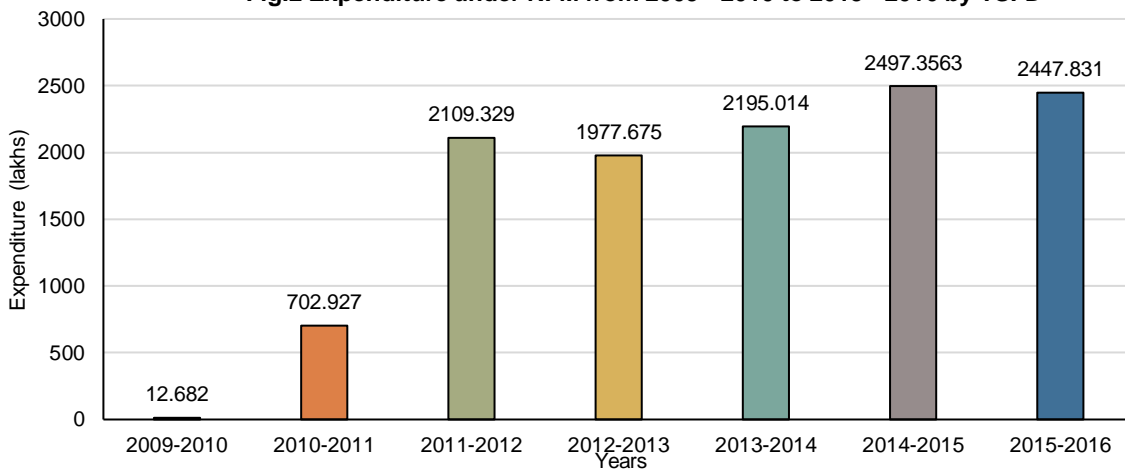
components due to fluctuations in the expenditure across the years. However, in case of CA there has been an overall increase in the expenditure across the years.

Expenditure under different NPV components by TSFD from 2009 to 2016

TSFD implemented different components under NPV. The comparative analysis of component under NPV are discussed below from figure 2 to Figure 10.

a. Natural Forest Management (NFM)

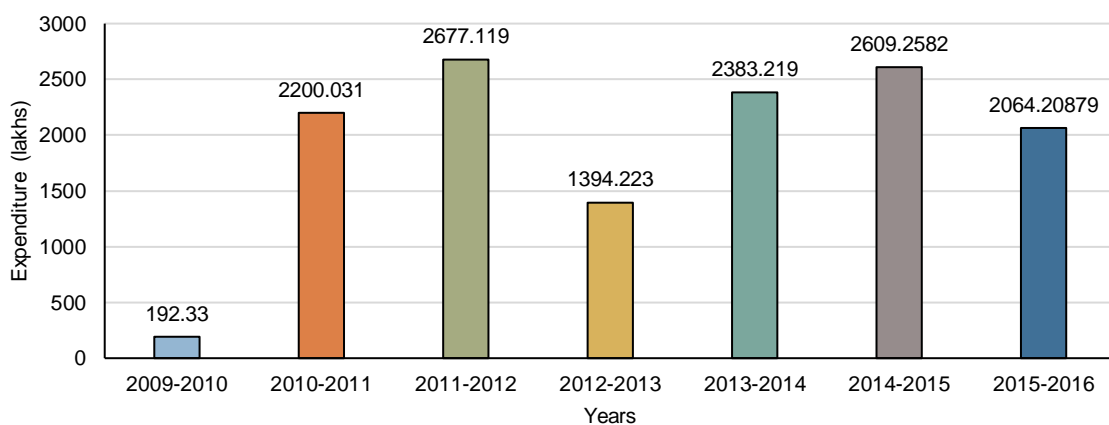
Fig.2 Expenditure under NFM from 2009 - 2010 to 2015 - 2016 by TSFD



Findings: Expenditure under NFM increased from 2009-2010 to 2011-2012 and from 2012-2014 to 2015-2016. The highest expenditure under NFM component occurred during 2014-2015. The expenditure under this component has constantly increased and there has been a phenomenal rise in the expenditure during 2015-2016 when compared to 2009-2010.

b. Forest Protection (FP)

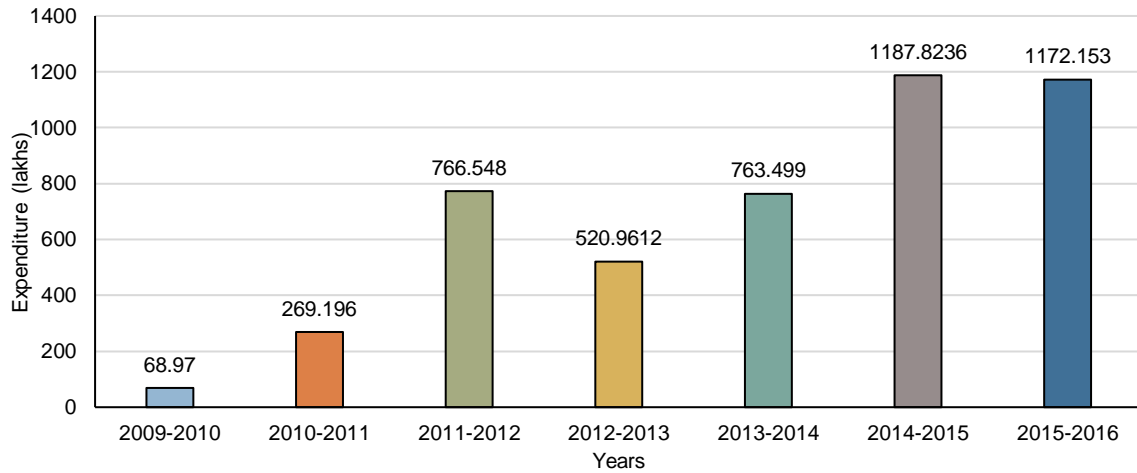
Fig3 Expenditure under FP from 2009 - 2010 to 2015 - 2016 by TSFD



Findings: The graph shows that expenditure under forest protection was highest during 2011-2012 which was Rs. 2677.119 lakhs, followed by Rs. 2609.25 lakh in 2014-2015. The expenditure under FP was lowest in 2009-2010. The major activities under this component are organization and maintenance of base camps, Check posts, wages to watcher, POL charges etc.

c. Biodiversity Conservation

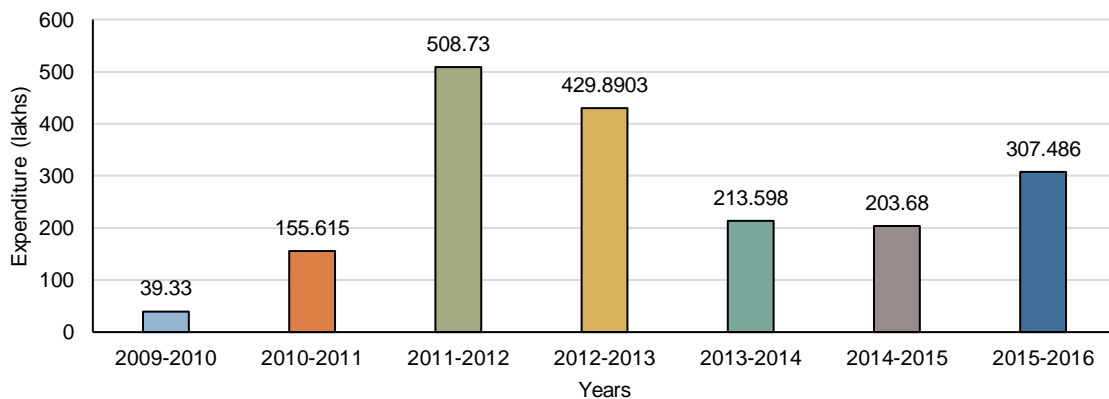
Fig 4. Expenditure under BDC from 2009 -2010 to 2015-2016 by TSFD



Findings: Highest expenditure under BDC reported in 2014-2015 and 2015-2016. Lowest expenditure was reported during 2009-2010. The main activities included under BDC are Wildlife habitat improvement, fringe area development, environmental education center setup and its maintenance, development of water resources, human wildlife conflict compensation, etc. The expenditure trend suggests that there has been an overall increase in the spending under this component from its inception phase.

d. Capacity Building (CB)

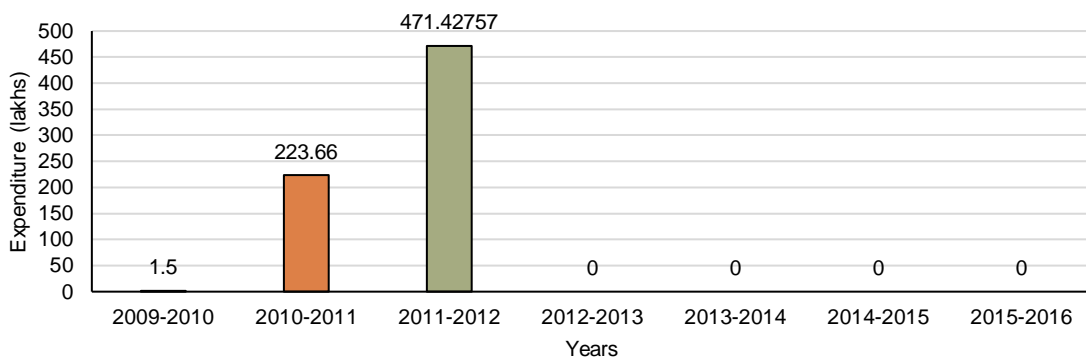
Fig 5. Expenditure under CB from 2009 - 2010 to 2015 - 2016 by TSFD



Findings: Telangana State Forest Academy (TSFA), Dullapally conducts capacity building and training activities in the state. During the initial years, the expenditure under CB increased considerably during 2011-2012, before bifurcation of the Telangana state. However, after 2011-2012 a constant plunge was observed till 2014-2015 in the expenditure. Main activities under this component included construction of hostel building of TSFA and quarters at TSFA, trainings, workshops, study tours & publications, refresher training courses, conducting specialized training on GIS and GPS, weapons training, jeep driving training, etc.

e. Infrastructure Development and Management

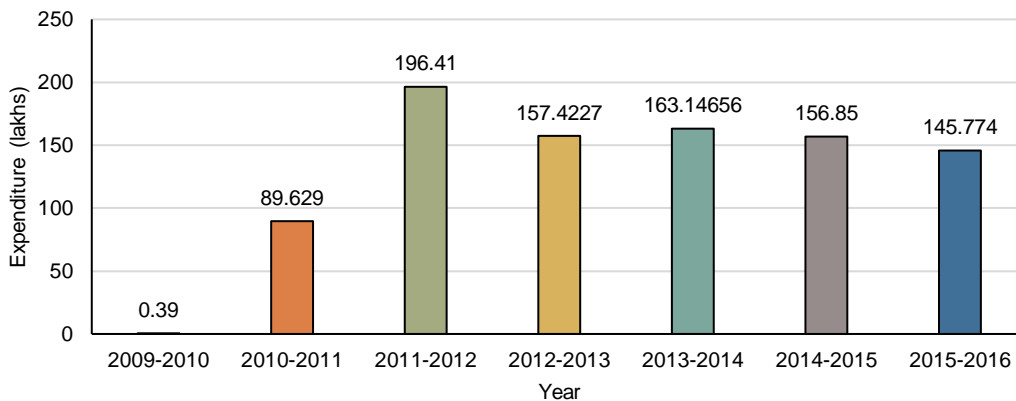
Fig 10 Expenditure under IDM from 2009 -2010 to 2015-2016 by TSFD



Findings: Highest expenditure under IDM, was reported in 2011-2012 and lowest in 2009-2010. The main activities under IDM includes; maintenance of office building, residential quarters and rest houses, construction of new buildings/rest house/guesthouse, IT center and website maintenance. In 2012-2013 to 2015-2016, no expenditure incurred under IDM component.

f. Research and Development (R&D)

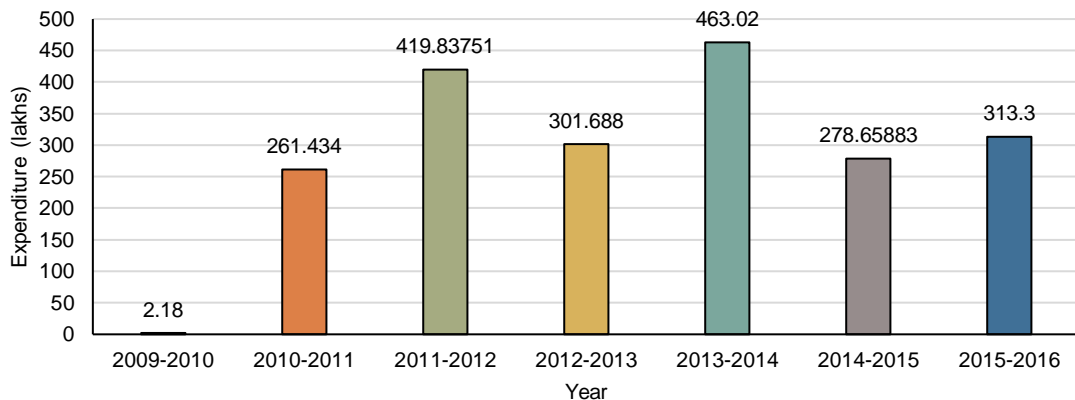
Fig 6 Expenditure under R&D from 2009 -2010 to 2015-2016 by TSFD



Findings: There are two main research centers in the state which are R&D Warangal Urban division with four sub-research centers and the State Silviculture division, Dullapally which are responsible for implementing R&D activities under CAMPA. Highest expenditure under R&D was reported during 2011-2012 and lowest during 2009-2010. There has been a decrease in the expenditure under this component from 2011-2012 in a constant manner. The main R&D activities includes improvement of nursery technology, analysis of MLCT plots, growth data documentation, maintenance of research plots, purchase of lab chemical and plant hormones, tree seed collection and processing, etc.

g. Information and Communication Technology (ICT)

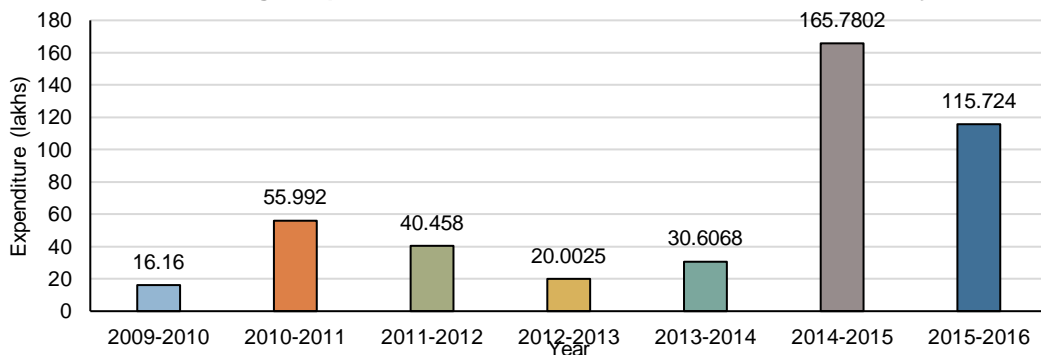
Fig 7 Expenditure under ICT from 2009 -2010 to 2015-2016 by TSFD



Findings: ICT activities were implemented by the territorial and wildlife divisions. Over the years the expenditure on ICT component has come down. Highest expenditure under Information Communication and Technology (ICT), was reported in 2013-2014 and lowest in 2009-2010.

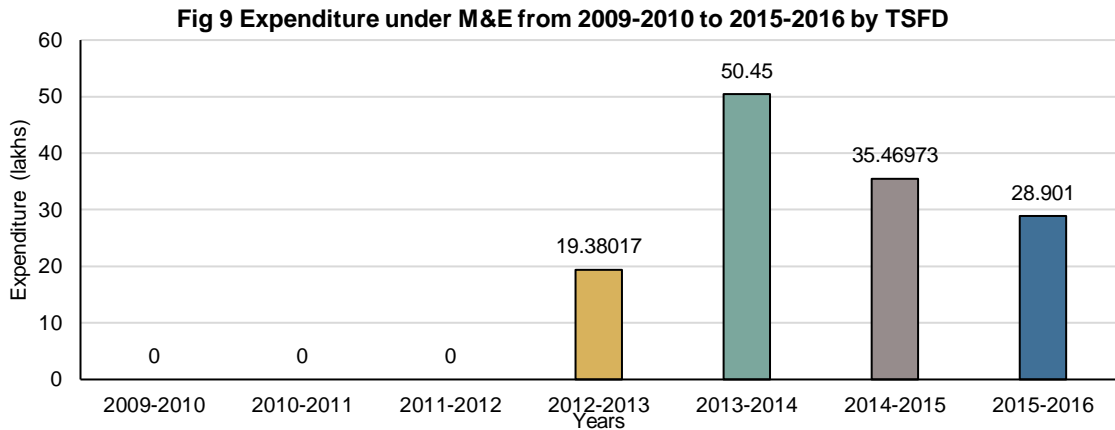
h. Forest Fire Management

Fig 8 Expenditure under FFM from 2009-2010 to 2015-2016 by TSFD



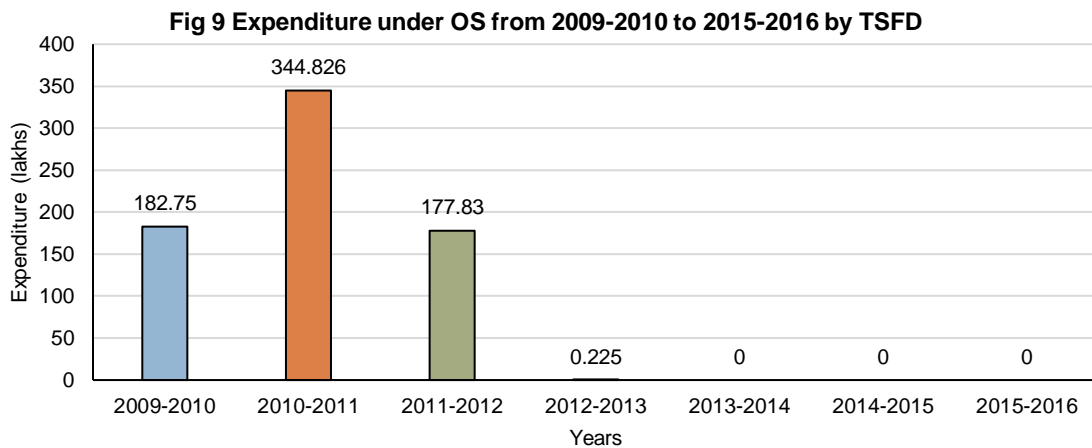
Findings: Highest expenditure under FFM, was reported during 2014-2015 and lowest in 2009-2010. There was a sharp increase in the FFM expenditure during 2014-2015 after which a decrease in the expenditure can be observed. The main activities under FFM includes, creation of fire lines, payment charges for fire watchers, construction of new fire watch tower, maintenance of existing fire watch tower in highly vulnerable areas.

i. Monitoring and Evaluation (M&E)



Findings: Highest expenditure under M&E, was reported in 2013-2014 and lowest in 2012-2013. The main activities under M&E include auditing fee. In 2009-2010 to 2011-2012, no expenditure was incurred under M&E component.

j. Office Support (OS)



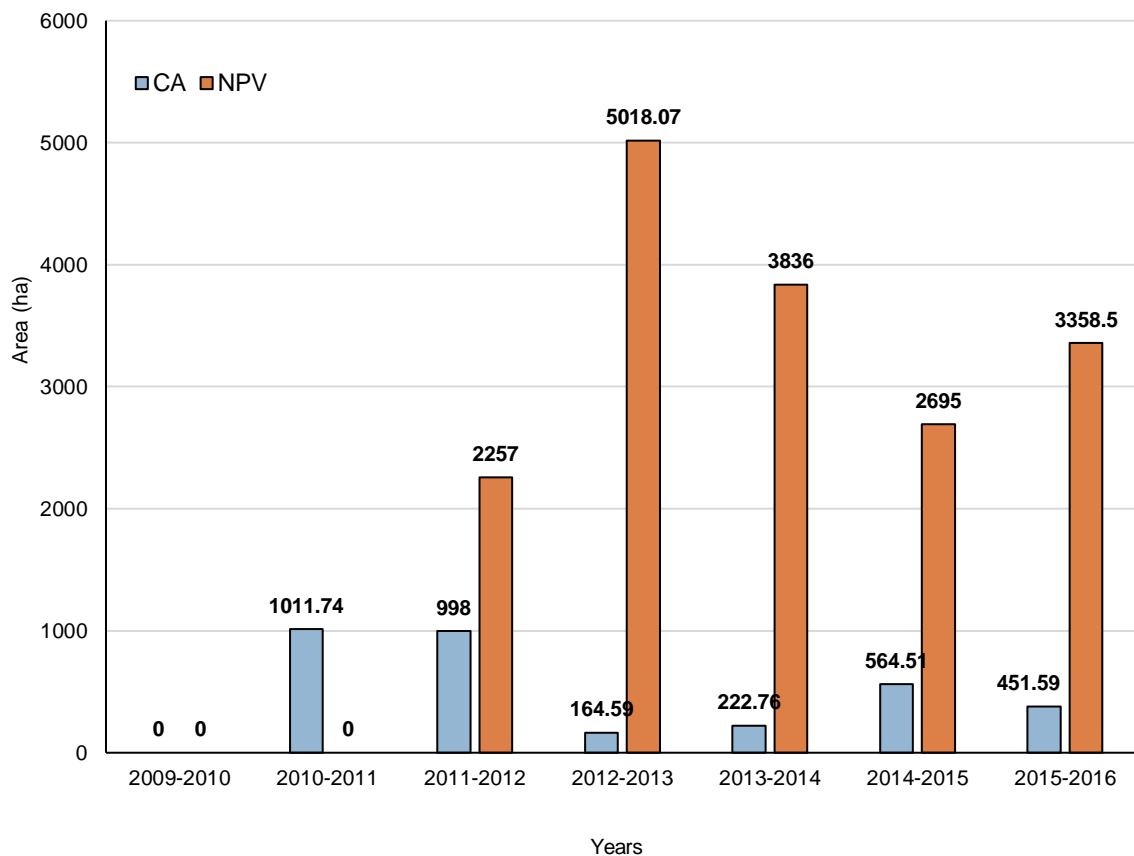
Findings: The graph shows highest expenditure under Office Support (OS), in 2010-2011 and lowest in 2012-2013. The main activities under OS includes purchase of office stationery, water and electricity charges and other overhead charges. In 2013-2014 to 2015-2016, no expenditure was incurred under the OS component.

Chapter 3: CONSOLIDATED 3RD PARTY EVALUATION FINDINGS

3.1 Plantation activities

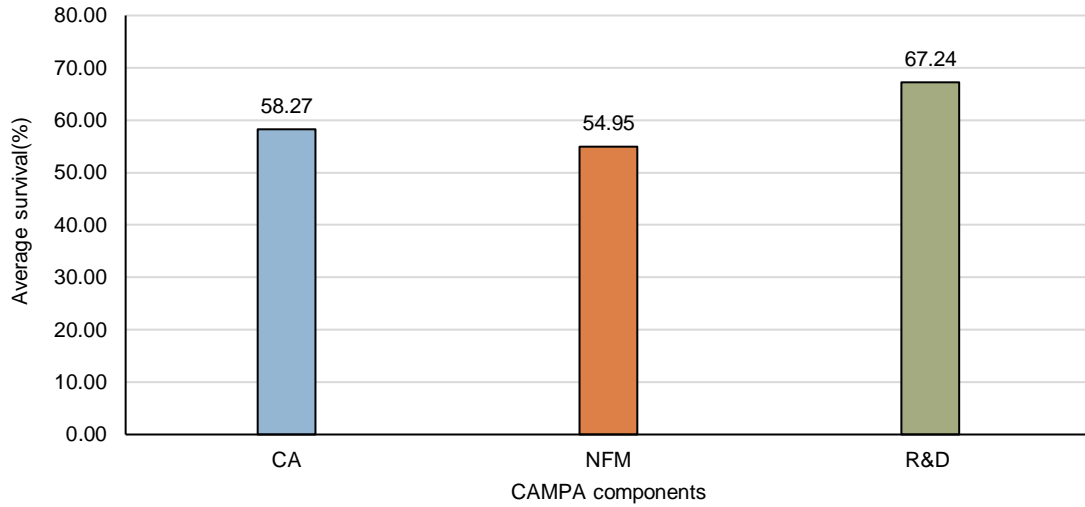
The analysis and finding on the performance of the plantations is based on the year wise sample collected on CAMPA plantations raised by TSFD as discussed below. Fig. 11 shows the area of plantation raised under CA and NPV component from 2009-2010 to 2015-2016 under CAMPA. Under NPV, raising of plantation during 2012-2013 was highest which covered an area of 5018.07 ha. Whereas, during 2011-2012 raising of NPV plantation was lowest which covered an area of 2257 ha. Under CA, highest number of plantation was raised during 2010-2011 covering an area of 1011.74 ha, whereas raising under CA was lowest during 2012-2013 which covered an area of 164.56 ha.

Fig 11 Detail of plantation area (ha) achieved under CA and NPV from 2009-2010 to 2015-2016



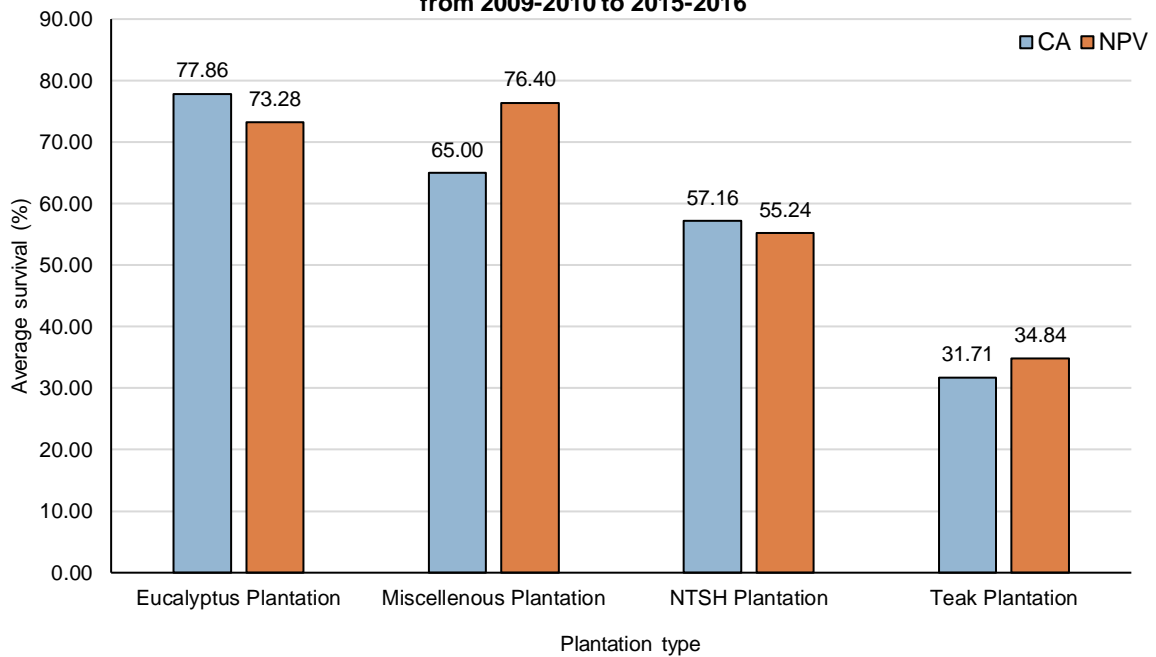
3.1.1 Performance of plantation under various CAMPA components

Fig 12 Survival of plantation under different CAMPA component from 2009-2010 to 2015-2016



Findings: The analysis shows that the survival of plantation raised under CA from 2009-2010 to 2015-2016 is slightly better than those plantations raised under NFM. The plantations raised under R&D show 67.24% survival.

Fig 13 Survival of plantation type under different under CA & NPV component from 2009-2010 to 2015-2016



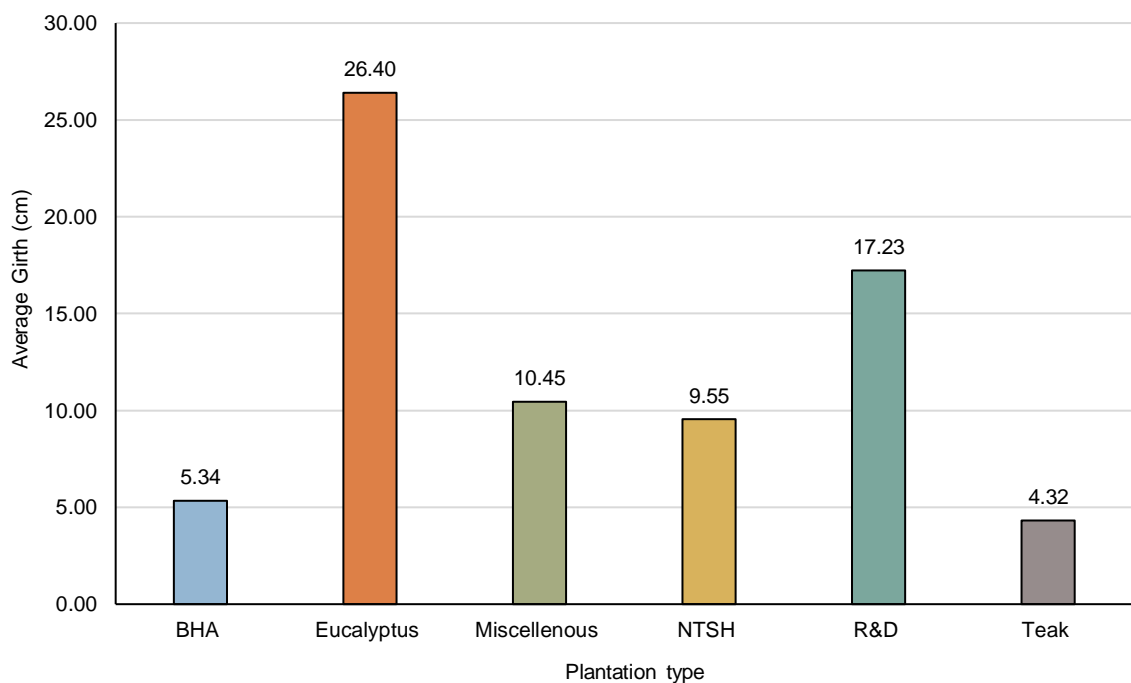
Findings: Plantation type wise analysis shows that the survival of plantation raised under CA are slightly better for Eucalyptus and NTSH species, whereas raising of miscellaneous and Teak plantations shows better performance under NPV. The survival of Eucalyptus plantation are much better as compared to the other plantations. Among all of the plantations, average survival of teak plantation was significantly lower than the other species.

Recommendations: Performance of plantation under various CAMPA components

Survival percentage of miscellaneous plantations are as good as Eucalyptus plantations. Therefore, we recommend promotion of endemic and diverse native species. This will develop resilience of the forest ecosystems and improve flows of ecosystem services.

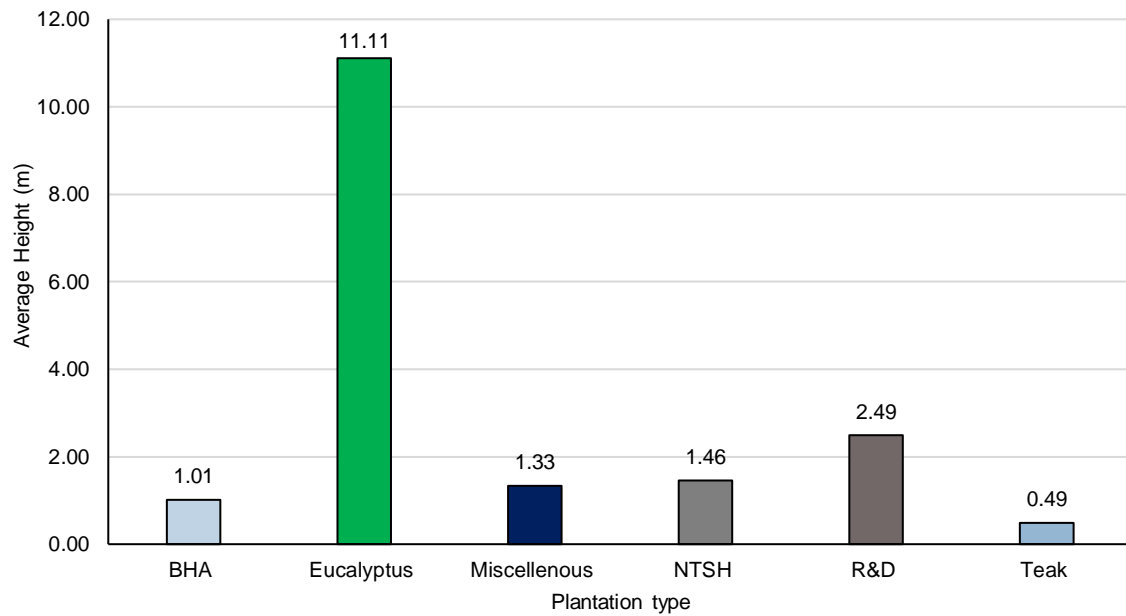
3.1.2 Girth and height analysis of the plantations

Fig 14 Girth (cm) of different plantation type raised from 2009-2010 to 2015-2016



Findings: The girth analysis based on different plantation type raised under CAMPA shows that Eucalyptus plantation achieved highest girth, followed by R&D and miscellaneous plantation. The growth of teak in term of girth is lowest followed by the BHA plantations

Fig 15 Height (m) of different plantation type raised from 2009-2010 to 2015-2016



Findings: Comparison of plant height for different plantation type raised under CAMPA shows that Eucalyptus plantation achieved highest height, followed by R&D and NTSH plantation. The growth of teak in term of height is lowest followed by the BHA plantations.

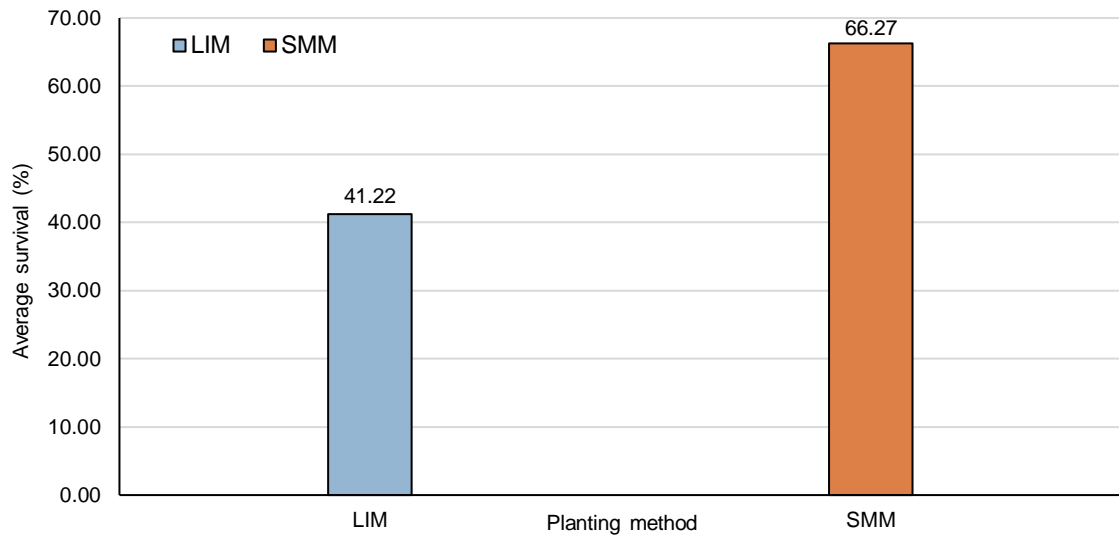
Recommendations: On growth parameters

Native and endemic species performs better on selected microsites. Proper site selection for raising native and endemic species is vital for success of plantation. Selecting aged, good phenotype mother trees for seed collection and stumps preparation is vital for artificially producing superior planting material. Only plantlets raised in the nursery, at their 3 leaf stage with straight taproot be transferred to bigger bags/containers and raised for making sapling. Saplings at least of 6 ft in height to be field transplanted. Proper synchronization of the onset of monsoon and teak plantation is vital for best field performance of this species.

3.1.3 Analysis of plantations raised by Labour Intensive Method (LIM) and Semi Mechanical Methods (SMM)

3.1.3a Consolidated performance of plantations under LIM and SMM

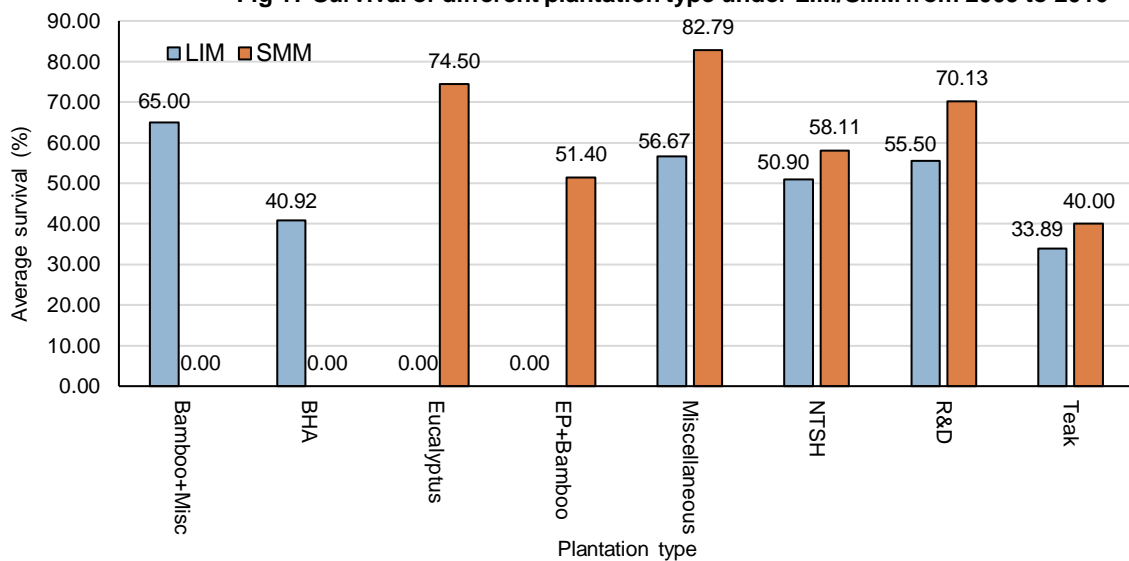
Fig 16 Survival of plantation raised under LIM/SMM from 2009-2010 to 2015-2016



Findings: The performance of plantation raised under SMM technique was found to have better survival percentage than plantation raised under LIM. The average survival of plantation under SMM showed 66.27 percent survival against the LIM which was only 41.22 percent.

3.1.3b Consolidated species wise average survival performance under LIM and SMM

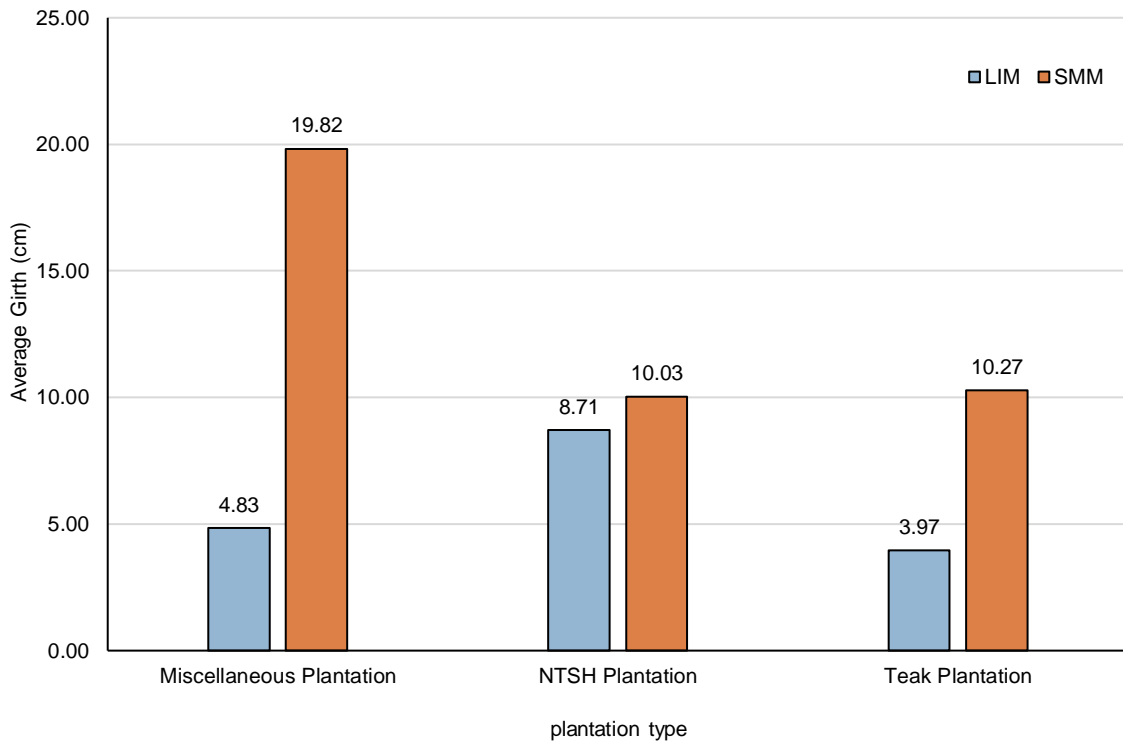
Fig 17 Survival of different plantation type under LIM/SMM from 2009 to 2016



Findings: The data and analysis reveals that plantations which can be raised using both by LIM and SMM methods have a better survival percentage if it is raised through SMM method. Miscellaneous, NTSH, Teak plantations perform better when raised using SMM technique as compared to LIM.

3.1.3c Consolidated average girth of plantations under LIM and SMM

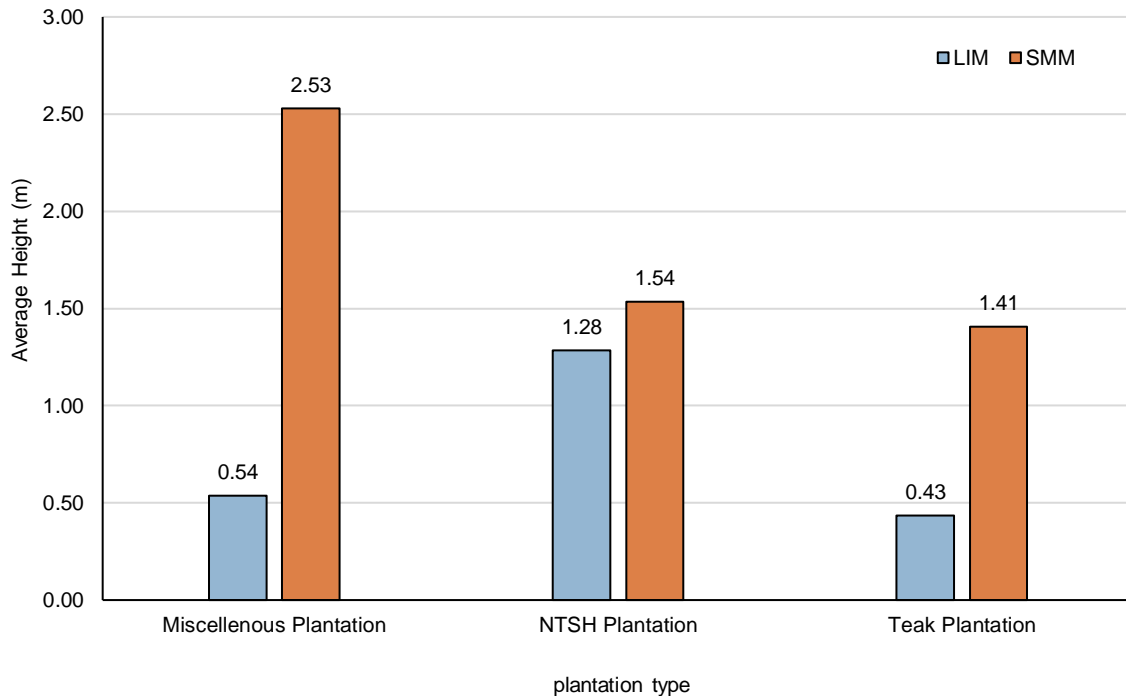
Fig 18 Girth(cm) of different plantation type raised under LIM/SMM from 2009 to 2016



Findings: The analysis of the girth in plantations raised by LIM and SMM techniques depicts that better girth was achieved by plantations raised by SMM planting techniques as compared to LIM. Miscellaneous, Teak plantations performed better when raised using SMM technique as compare to LIM, while NTSH plantation on the contrary showed a small difference in girth achieved under plantations raised by LIM and SMM planting techniques.

3.1.3d Consolidated average height of plantations under LIM and SMM

Fig 19 Achieved height (m) in different plantation types raised under LIM/SMM from 2009 to 2016



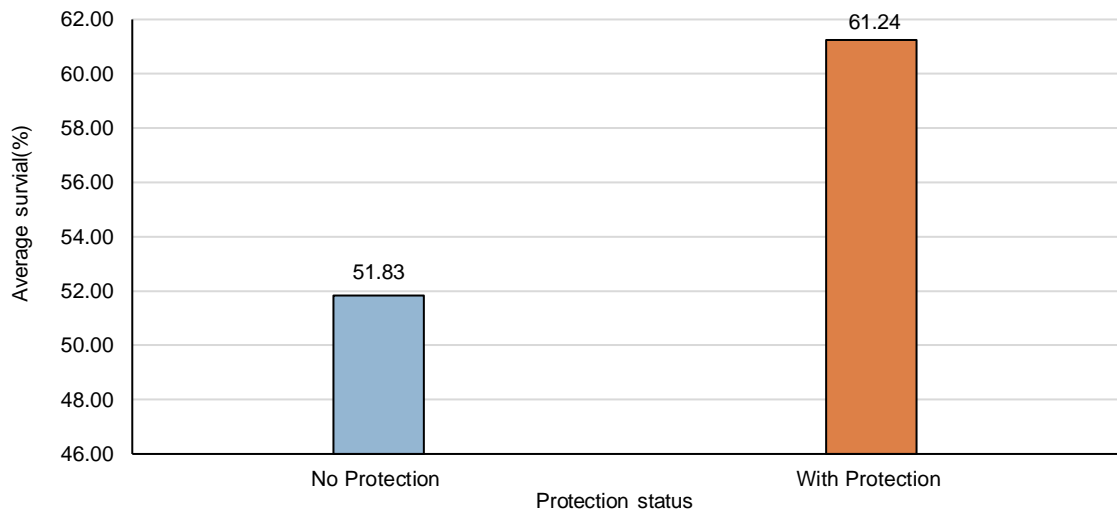
Findings: The height of the plantations raised under CAMPA based on LIM and SMM planting techniques shows that better survival percentage is achieved under SMM planting techniques. Miscellaneous, Teak plantations perform better when raised using SMM technique as compared to the LIM, while there is a small difference in the achieved height in case of NTSH plantation raised under LIM and SMM.

Recommendations: On planting method and survival

Use of heavy machineries under SMM method affects the soil. Apart from increasing emissions, the original microsite conditions that prevailed are altered. Microsite alterations weakens native species and make sites susceptible to invasive. It is always better to adopt practices with minimum soil working and strengthen the microsite for building resilience of the landscape.

3.1.4 Effect of protection to plantation on the survival percentage

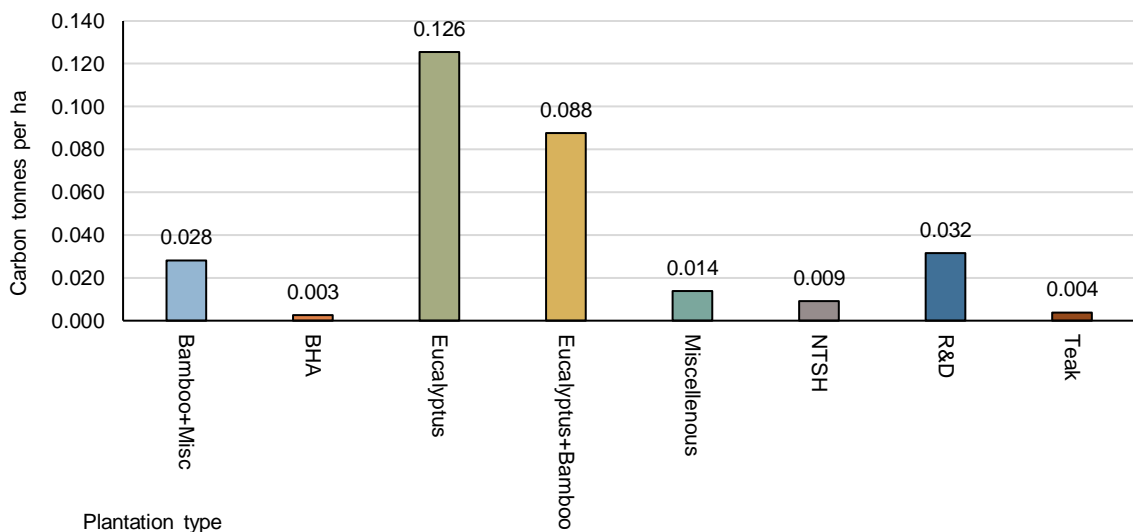
Fig 20 Effect of protection to plantation on survival rates raised from 2009 to 2016 by TSFD



Findings: The performance of plantation raised under CAMPA does not show much variation in the survival of plantation with respect presence and absence of protection to the plantation. It is perhaps due to the reason that plantations under protection are exposed to extreme anthropogenic pressure.

3.1.5 Carbon content analysis of the plantations

Fig 21 Carbon tonnes per ha of plantation type raised from 2009 to 2016 by TSFD



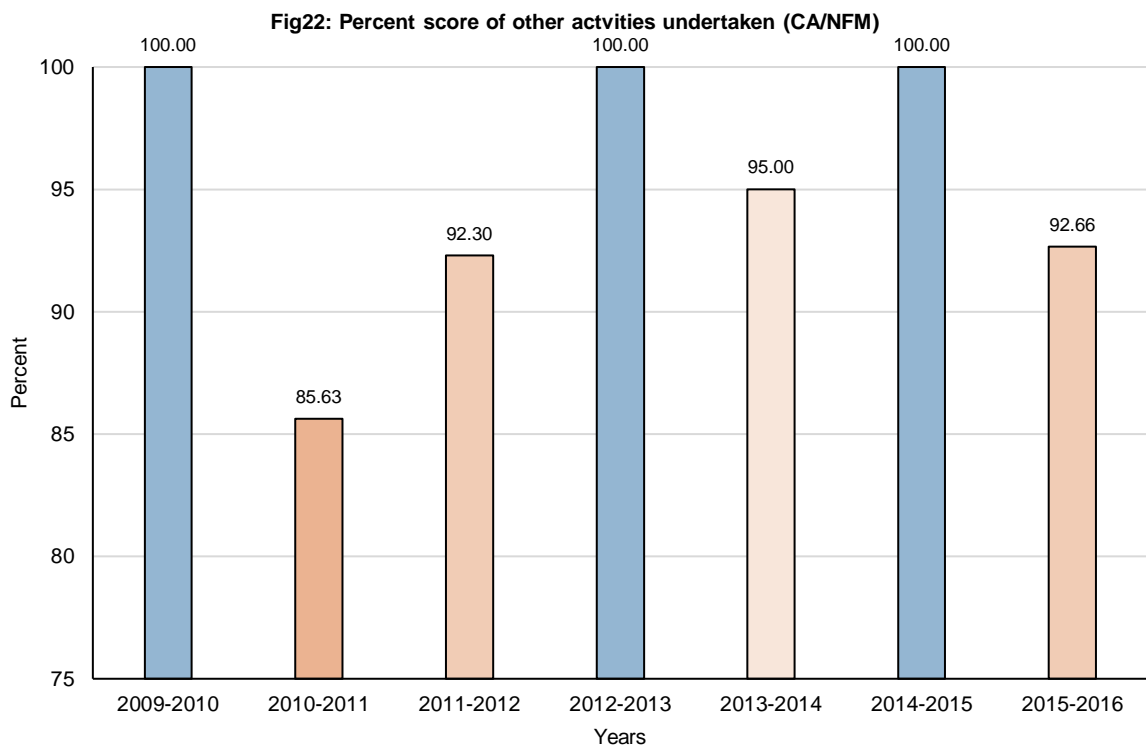
Findings: In terms of carbon content of the plantation, Eucalyptus plantations performed best with an average of 0.126 tonnes of carbon per hectare due to better growth in terms of girth and height as compared to the other plantation types raised under CAMPA. Teak and BHA plantations showed least carbon content of 0.004 and 0.003 tonnes per hectare respectively.

The total estimated carbon content in the plantations covering an area of 3340.36 hectares raised under CA is 246.62 tonnes. The total estimated carbon content in the plantations covering an area of 17164.57 hectares raised under NPV is 576.21 tonnes.

3.2 Other activities

3.2.1 Other activities under CA/NFM

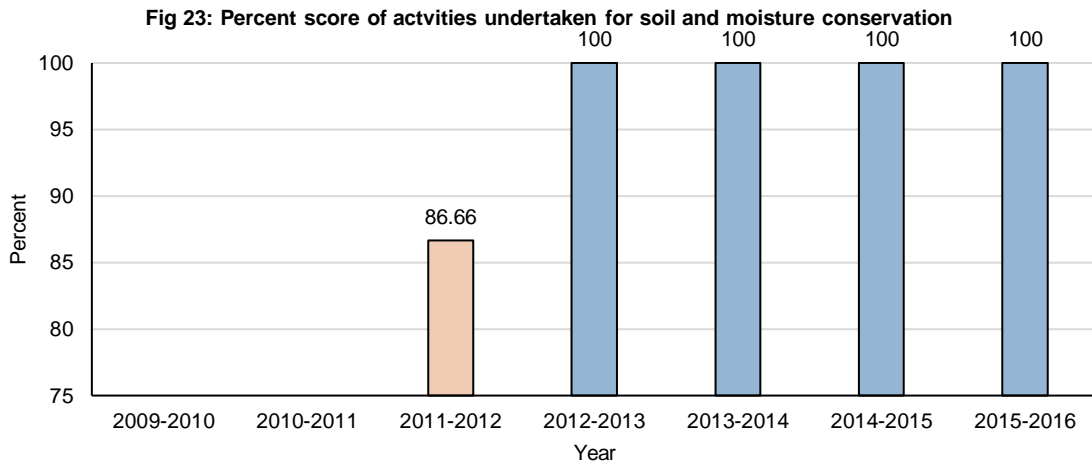
It includes purchase, transport, maintenance of nursery seedlings and extraction of timber.



Findings: Percent score obtained by other activities in all the years ranged from 85.63% to 100%.

3.2.2 Soil and water conservation measures

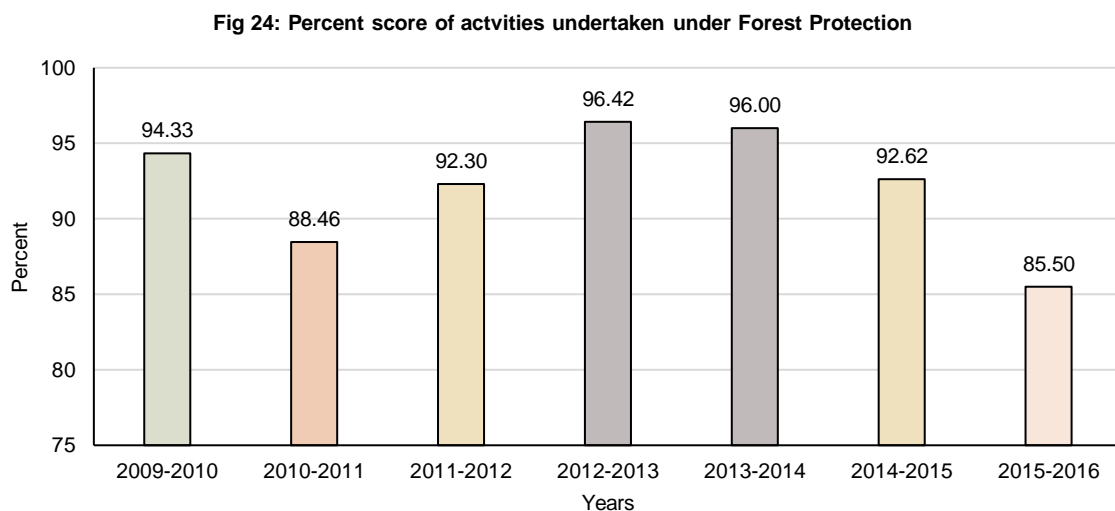
It includes soil and water conservation measures like construction of rock filled dam, CC dam, water tanks, etc.



Findings: Activities for conservation of soil and water were undertaken from 2011-2012 to 2015-2016. Percent score obtained ranged from 86.66% to 100%.

3.2.3 Forest Protection

Activities for forest protection included chain link fences, RCC Boundary pillars, Peripheral trenches, Strike forces, Boundary walls, quarters, Watch towers, Seizures, Base camps, Check posts, and Other activities like POL charges, payments of wages, etc.

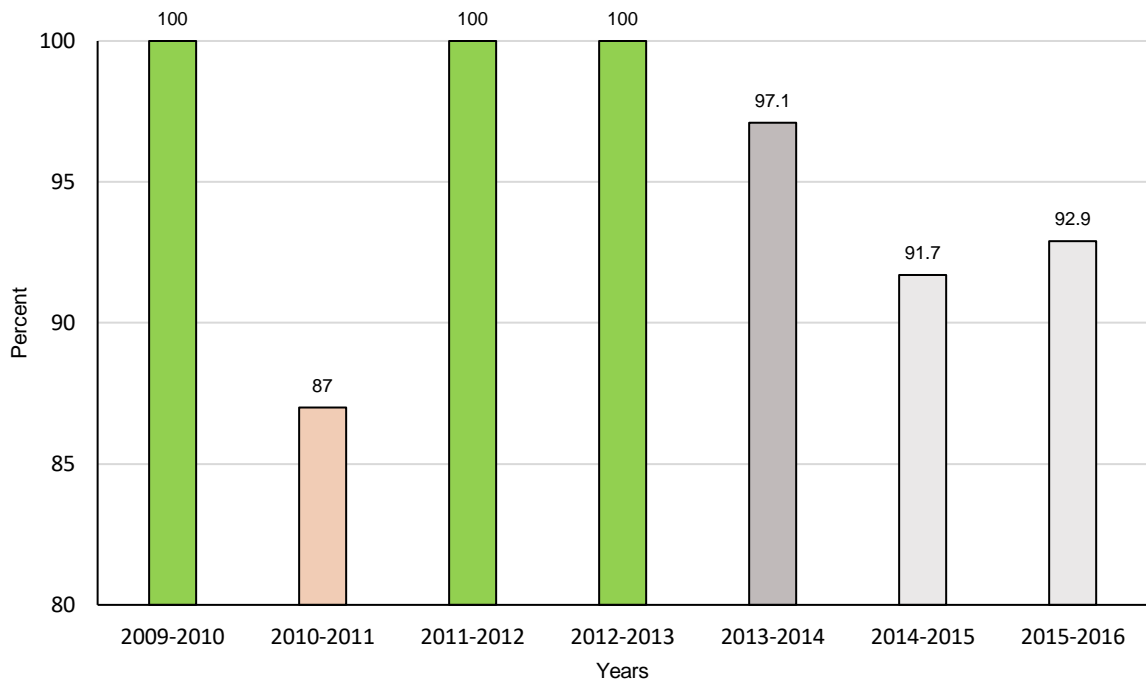


Findings: Percent score obtained by activities for forest protection ranged from 85.5% to 96.42%. Maintenance of protection measures namely chain link fences, trenches is necessary.

3.2.4 Forest Fire Management

Activities for forest protection included making fire lines, engagements of fire watchers, construction of fire watch towers, payments, etc.

Fig 25: Percent score of activities undertaken under Forest Fire Management

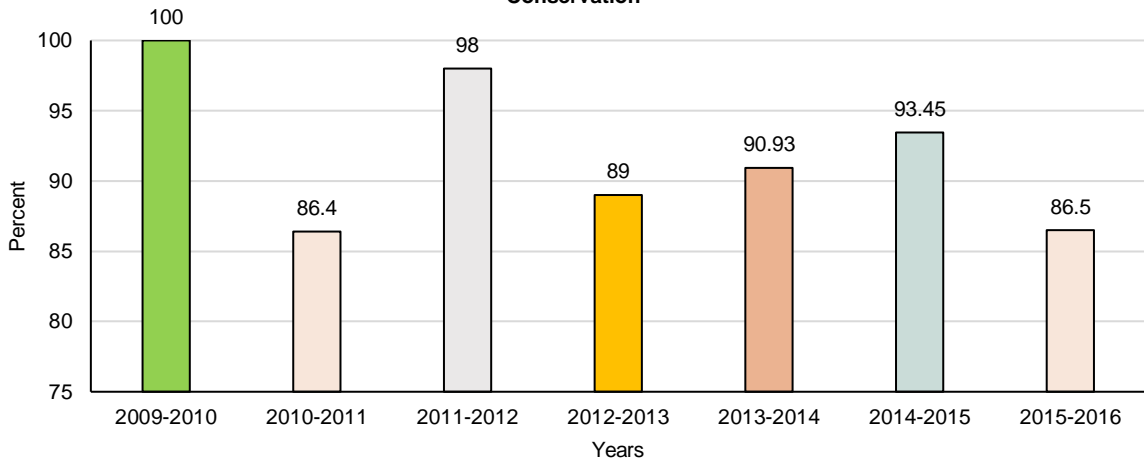


Findings: Percent score obtained by activities undertaken for forest fire management ranged from 87% to 100%.

3.2.5 Biodiversity Development and Conservation

Activities for forest protection included Habitat Improvement, Fringe Area Development, Development of water sources, Rescue animal trekkers, Wildlife tourism activities, WEE activities, *Ex-situ* conservation research, Human and animal conflicts, Awareness of VSS, Other BDC activities.

Fig 26: Percent score of activities undertaken under Biodiversity Development and Conservation

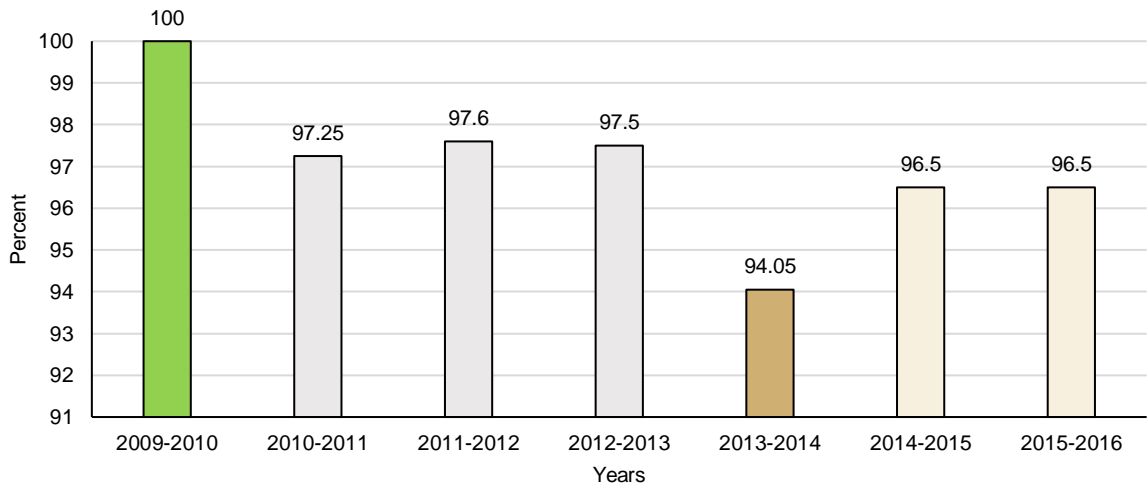


Findings: Percent score obtained by activities for biodiversity development and conservation ranged from 86.4% to 100%.

3.2.6 Research and Development

Research and development activities were undertaken at FG Warangal, SS Hyderabad. It include progeny trails, trials on plant improvement, vermicomposting, trials on raising quality planting materials, etc.

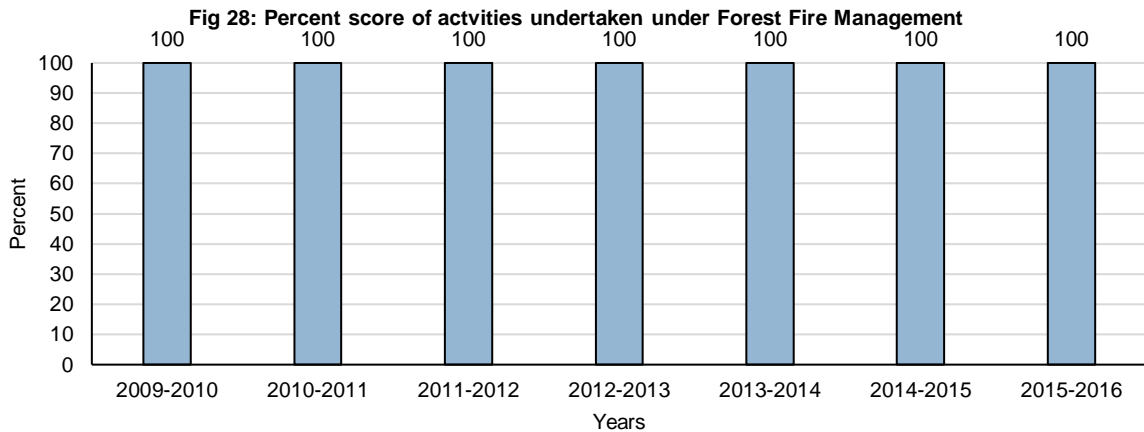
Fig 27: Percent score of activities undertaken under Forest Fire Management



Findings: Percent score obtained by R&D activities in all the years ranged from 94.5% to 100%.

3.2.7 Capacity Building

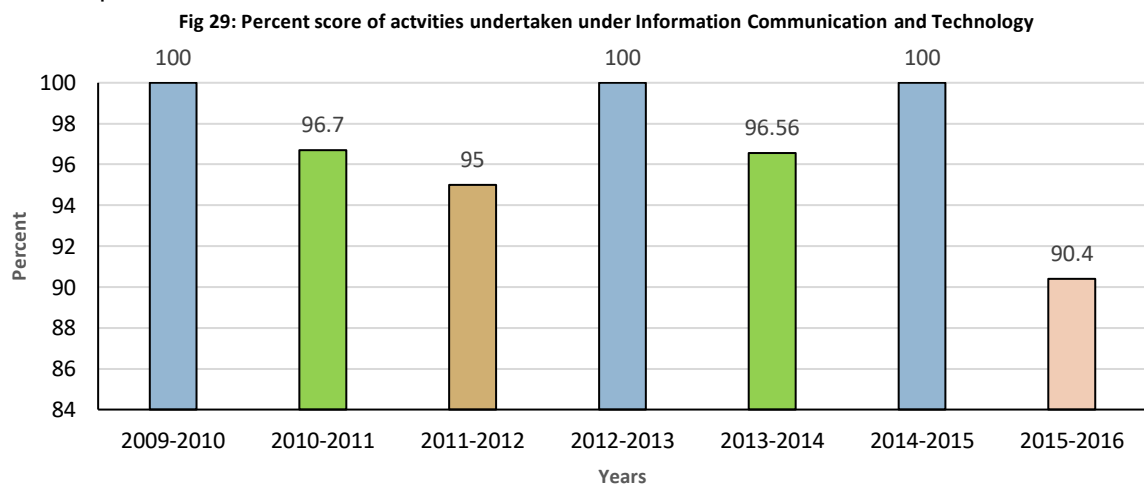
Capacity building activities were undertaken in FTS Dullapally. It include construction of hostel, condcting various trainings for forest officials from across the country, etc.



Findings: Hundred percent score obtained by capacity building activities undertaken nu TSFD in all the years.

3.2.8 Information Communication and Technology

Activities carried out under IC&T include, broadband and internet connections; Maintenance of geomatics ARC GIS server; Monitoring of vegetation cover change within and outside the forest; Development of Web-enabled FMIS Package; Website Development for GIS-MIS Integration; DEM generation; Stock Mapping; Density Mapping; Forest Fire Atlas Maps; WHS Maps etc., Survey of boundaries using modern technology; Refining of Forest Fire Atlas Maps and WHS Maps, etc.

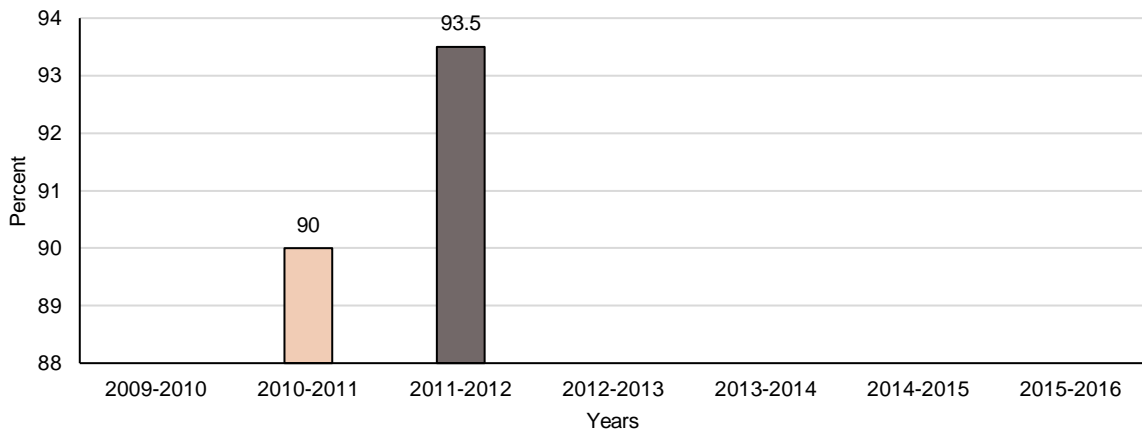


Findings: Percent score obtained by IC&T activities in all the years ranged from 90.4% to 100%.

3.2.9 Infrastructure Development and Maintenance

Activities under infrastructure development and maintenance include maintenance of office building; maintenance of residential quarters., maintenance of rest House for monitoring forestry works, etc.

Fig 30: Percent score of activities undertaken under Infrastructure Development and Maintenance



Findings: IDM activities were booked for the year 2010-2011 and 2011-2012. Percent score obtained by IDM activities undertaken during 2010-2011 and 2011-2012 are 90% and 93.5%, respectively.

3.2.10 Ecotourism

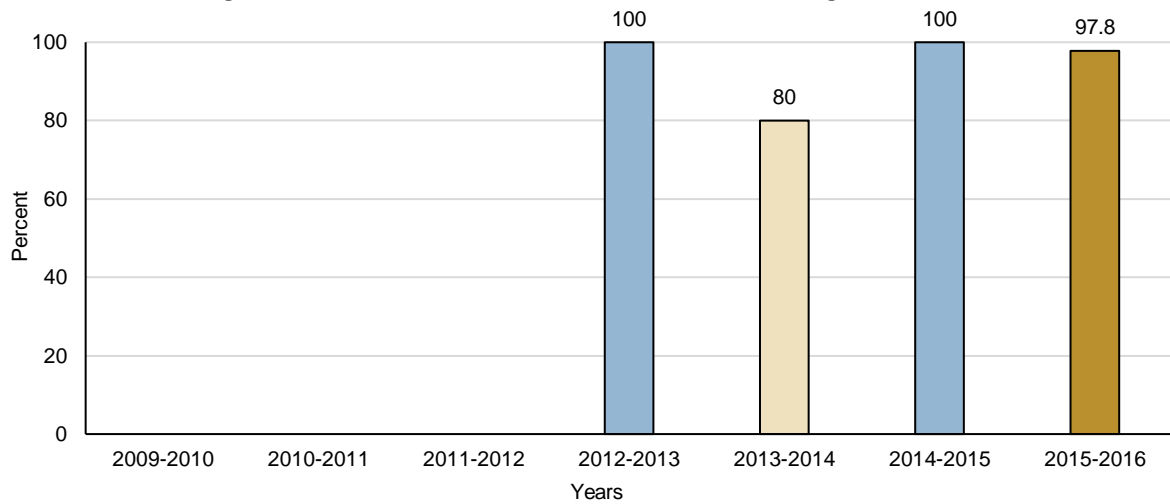
Eco-tourism have been encouraged in the protected areas under Community Based Eco-Tourism (CBET) model duly following the National Eco-tourism Policy and guidelines. An amount of 6.139 lakhs have been spent in two works namely purchase of rowing boats in Manjeera and Maintenance of crocodile breeding center under WLM Medak division during the year 2011-2012.

Findings: Percent score obtained by activities under ecotourism is 100%.

3.2.11 Monitoring and Evaluation

Activities under monitoring and evaluation under CAMP include included Forest resources management monitoring and evaluation, CA and audit fees for auditing 4 numbers of works, support for monitoring and evaluation works, etc.

Fig 31: Percent score of activities undertaken under Monitoring and Evaluation

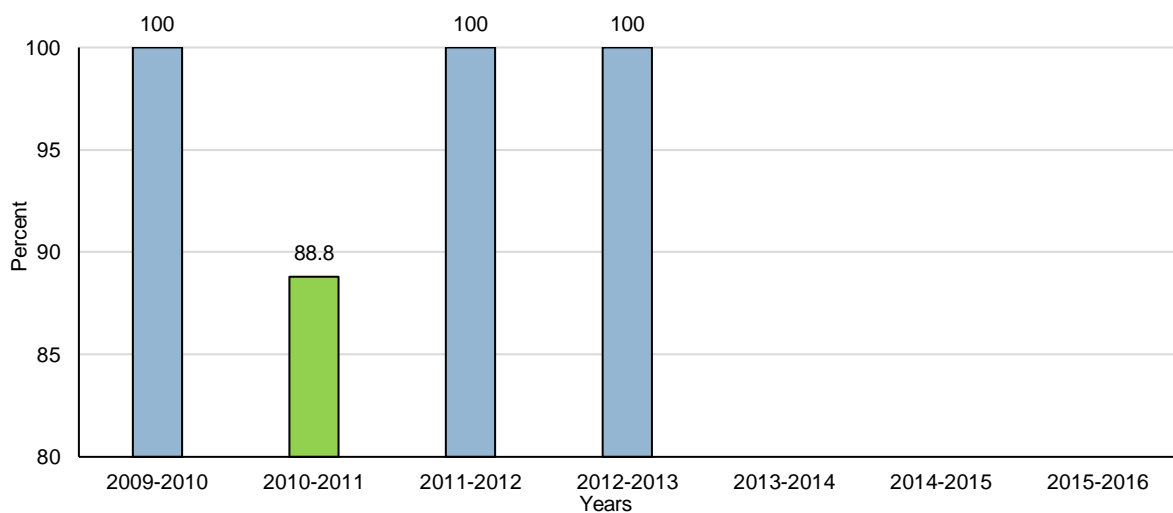


Findings: Monitoring and evaluation was recorded for the years 2012-2013 to 2015-2016. Percent score obtained by other activities ranged from 80% to 100%.

3.2.12 Office Support

Office support activities included POL, Telephones & communication charges, Office Stationery, Water and electricity charges, etc.

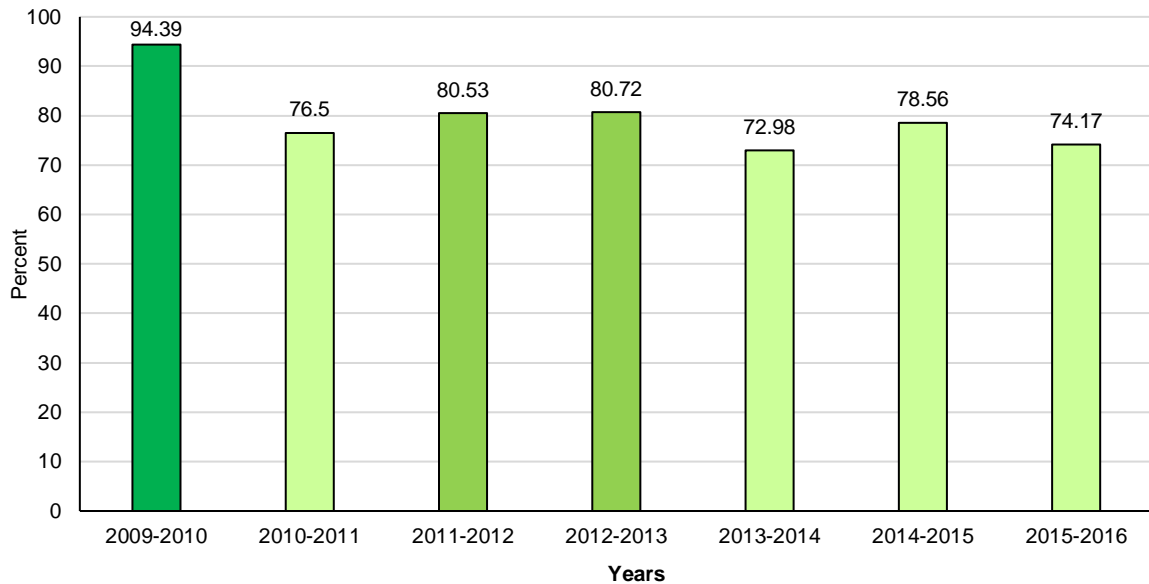
Fig 32: Percent score of activities undertaken under Office support



Findings: Percent score obtained by activities under office support in all the years ranged from 88.8% to 100%.

3.3 Consolidated yearwise 3rd party evaluation score of CAMPA works undertaken by TSFD

Fig 33: Consolidated yearwise total 3rd party evaluation scores of CAMPA works



Note: Percent of the total score obtained is used to rank the performance¹⁷ 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

Findings: Based on the percent total score obtained by different CAMPA activities, performance of CAMPA activities for the year 2009-2010 was **Highly satisfactory**. CAMPA activities undertaken for the years 2011-2012 and 2012-2013 was **Satisfactory**, while CAMPA activities undertaken for the years 2010-2011, 2013-2014, 2014-2015 and 2015-2016 was **Moderately satisfactory**.

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

Chapter 4: 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) 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 understand 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 of 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 integrated in planning and implementation of CAMPA works.

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 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 forest health, biodiversity conservation, soil and water conservation, carbon sequestration and other ecological aspects of CAMPA activities. A system for ecological monitoring of plantations raised under CAMPA needs to be devised and developed at different tiers of TSFD.

The ecological indicators should include the following categories:

Categories	Monitoring Methods	Monitoring Frequency
Biodiversity assessment	Biodiversity indices	5 year
Fragmentation and intactness of CAMPA plantations	Rate of conversion of forest cover (by type) to other uses	Biennial (<i>every two years</i>)
Species abundance	Simpson index	5 year
Availability of water resources in forest	Monitoring of water sources	5 year
Carbon sequestration monitoring	Periodic carbon forest inventory and soil organic carbon testing	5 year (<i>as per GPG LULUCF, IPCC, 2003</i>)

Chapter 5: 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 2017-2018 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 plantations and other CAMPA activities in degraded lands with stakeholders for developing climate adapted forests.