EVALUATION OF THIRTEENTH FINANCE COMMISSION 2013-14 TO 2015-16

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Karnataka Evalution Authority

KARNATAKA EVALUATION AUTHORITY

DEPARTMENT OF PLANNING, PROGRAMME MONITORING AND STATISTICS

GOVERNMENT OF KARNATAKA

MARCH 2021

Published

For:

Karnataka Evaluation Authority,

#542, 5th Floor, 2nd Stage,

M.S. Building, Dr. Ambedkar Veedhi,

Bengaluru – 560 001.

By:

The Energy and Rerources Institute (TERI)

4th Main, 2nd Cross, Domlur 2nd stage

Bangalore -560 071

Typeset and Printed by:

Colosia Creations Pvt. Ltd.

No. 27, AA Tower, Opposite BESCOM

Mathikere, Bangalore – 560054

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Foreword

Forest Department has implemented the schemes under 13th Finance Commission grants with the broad objectives of expanding the forest cover, technology upgradation and strengthening the infrastructure in the Department. The evaluation study on **'Evaluation of Forestry Works under Thirteenth Finance Commission'** was initiated by Karnataka Forest Department through KEA to assess the impact of these works and infrastructure created under the programme on achievement of the programme objectives. The study was carried out by The Energy Resource Institute (TERI) under the guidance and monitoring of KEA.

The study is based on secondary data as well as primary data collected from 10 percent sample works in different categories. The major findings are : plantations were raised mainly in forest areas, the boundary protection structures are not maintained properly, the average survival rate was 59 percent, Road side plantation model showed highest survival rate, Eucalyptus recorded highest survival rate (98%)but 67% APOs were sanctioned after planting season in sample plantations, less than2% of total expenditure on SMCs, only 33% plantations involved JFMCs, promotion of mixed plantations, the progress in other works is satisfactory 40 percent of them were repair works. The ICT wing is functioning effectively, and wildlife protection and forest conservation measures are taken up. The major recommendations are: developing benchmarks and rating indices for assessment of performance, timely approval of APOs, documentation of public awareness programme, decentralised planning at circle level, priority to SMC works, additional staff quarters based on need assessment, strengthening of research wing to undertake research activities to improve quality of plantations and to address field problems.

I expect that the findings and recommendations of the study will be useful to the Government and Karnataka Forest Department.

The study received support and guidance of the Additional Chief Secretary Planning, Programme Monitoring and Statistics Department, Government of Karnataka. The report was approved in 49th Technical Committee meeting. The review of the draft report by KEA, members of the Technical Committee and an Independent Assessor, has provided useful comments and inputs to improve the report. I duly acknowledge the assistance rendered by all in successful completion of the study.

Chief Evaluation Officer
Karnataka Evaluation Authority

ACKNOWLEDGEMENT

We are thankful to Karnataka Evaluation Authority (KEA) and Karnataka Forest Department (KFD) for assigning this evaluation to the Energy and Resources Institute (TERI), Bengaluru. Visiting several forestry plantations, and other works like soil moisture conservation, wildlife protection and management, habitat improvement works, infrastructure, working plan, research, training and interaction with field staff and officers of Karnataka Forest Department was an enriching and inspiring experience. We would like to acknowledge the guidance, support and cooperation of Mr. G. Sudarshan, IFS, Chief Evaluation Officer, KEA, Dr. Chaya Degaonkar, Additional Chief Evaluation Officer, KEA and Dr. Manjunath, Director (Evaluation), KEA and Ms. Jyothi Jenni, Associate Director, KEA and the entire staff team of KEA.

This study was possible only due to the cooperation and facilitation of officers of KFD, especially Mr. Punati Sridhar, PCCF and HoFF, Mr. Sanjai Mohan, PCCF and HoFF, Wildlife and Chief Wildlife Warden (erstwhile), Mr. Ajay Mishra, PCCF (Development), Ms. Ritu Kakkar, PCCF, (EWPRT & CC), Mr. Shiv Raj Singh, PCCF (Publicity and Communication), Mr. Puneet Pathak, APCCF (CAMPA), Mr. Brijesh Kumar, APCCF (TFC), Mr. R. K. Srivastava, APCCF (NBM), Mr. Hari Kumar Jha, APCCF (EWPRTI/C), Ms. Seema Garg, APCCF (Evaluation) and Mr. Bishwajit Mishra, CCF (ICT Cell). Our gratitude is due to the excellent assistance of RFOs, software developers and staff of Evaluation Wing and ICT Cell of KFD. The cooperation and coordination of all the Circle, Division and Range offices was crucial in completing the field work.

TERI would like to place on record the timely advice of Mr.Amit Kumar, Senior Director, Social Transformation, Dr. Debajit Palit, Director, Rural Energy and Livelihoods, Mr. D. N. Naramsimha Raju, Director, SRC. The study has been carried out with the excellent and committed efforts of the study team comprising of:

Core Team

- Dr. B. Shivaraju, IFS, APCCF (Rtd.), Principal Investigator
- Dr. Lasya Gopal, Co- Principal Investigator
- Dr. Nagraj Patil, Civil Engineering Expert
- Dr. Krishnamurthy, Statistician
- Mr. Ashwathaiah, DCF (Rtd.), Team Member

- Mr. Nagesh I. V DCF (Rtd.), Team Member
- Mr. H.H. Ninga Setty, Team Member
- Mr. Yabbati Nagaraju, Team Member
- Dr. Sridar Babu M. N., Team Member
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- Mr. Arjun Shetty, Team Member
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- Mr. T. Saravana, IT Manager
- Ms. Shobha M.P., Executive Secretary
- Ms. Jyothi. S., Secretary
- Ms. Manjula, Secretary
- Ms. Christina Preethi, Secretary

The assignment has provided interesting insights into the efforts of the KFD in forest and wildlife protection and conservation. Interactions with field staff and officers at various levels and individual beneficiaries gave an understanding of how the processes could be simplified and pointers for improving effective delivery of the schemes, which have been brought into the recommendations of this report. TERI hopes to work with the KEA in future too.

CONTENTS

List of tables

List of Figures

List of Photos

ABBREVIATIONS

ACF	Assistant Conservator of Forests
ANR	Assisted Natural Regeneration
APCCF	Additional Principal Chief Conservator of Forests
APO	Annual Plan of Operation
AR	Artificial Regeneration
ATMA	Agricultural Technology Management Agency
CAMPA	Compensatory Afforestation Fund Management and Planning
CCEA	Cabinet Committee on Economic Affairs
CCF	Chief Conservator of Forests
CF	Conservator of Forests
CPT	Cattle Proof Trench
DAC	Department of Agriculture & Cooperation
DCF	Deputy Conservator of Forests
DRFO	Deputy Range Forest Officer
EPT	Elephant Proof Trench
ER	Eco Restoration
FDA	Forest Development Agency
FG	Forest Guard
FNB	Field Note Book
FPO	Farmer Producers' Organization
GoI	Government of India
GoK	Government of Karnataka
GPS	Geographic Positioning System
HoFF	Head of Forest Force
HRD	Human Resource Development
ICT	Information and Communications Technology
IDI	In-depth Interview
IPRTI	Indian Plywood Research and Training Institute
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
KEA	Karnataka Evaluation Authority
KFD	Karnataka Forest Department
LPG	Liquefied Petroleum Gas
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MIDH	Mission for Integrated Development of Horticulture
NAP	National Afforestation Programme
NBM	National Bamboo Mission
NGOs	Non-governmental Organizations
NTFP	Non-timber Forest Produce
PCCF	Principal Chief Conservator of Forests
R	Rural

RFO	Range Forest Officer
SCP	Special Component Plan
SHGs	Self Help Groups
SMC	Soil moisture conservation
T	Territorial
TERI	The Energy and Resources Institute
TFC	13th Finance Commission
ToR	Terms of Reference
TSP	Tribal Sub Plan
U	Urban
VFC	Village Forest Committee
WF	Wildlife

EXECUTIVE SUMMARY

The Evaluation of Thirteenth Finance Commission for the period 2013-14 to 2014-15 was assigned to TERI in August 2019 by Karnataka Evaluation Authority (KEA) at the behest of Karnataka Forest Department (KFD), Government of Karnataka.The study is a summative evaluation wherein the scheme was evaluated post implementation to understand the overall effectiveness of the program/ scheme in terms of the objectives set out. The purpose was to assess the overall impact of the scheme, while also studying the effectiveness of the process/ delivery mechanism followed and to make suitable recommendations thereof to enhance the effectiveness and impact. Multi-dimensional approach including scientific, interactive/ consultative, objective-oriented, analytical, practical and participatory approach using appropriate methods were followed to gather qualitative and quantitative data. The primary data on plantations was gathered using the web based and android application developed by Karnataka Forest Department.

During the period of evaluation Rs.11020.76 lakhs was the financial target of which Rs. 11091.74 lakhs was expended, i.e. 101% achievement. In terms of plantation activities (raising, maintenance and advance works), 47,539.31 ha was the target against which the achievement was 61,388.61 ha (129%). During the evaluation period 1168 plantations works were carried out, of which 116 plantations were sampled across thirteen forest circles, covering a gross area of plantation of 1641 ha (average of 14.14 ha/ plantation) and net area of plantation of 1533 ha (average of 13.22 ha/ plantation).

During the period of study, an area of 1804 ha of new plantations were raised, exceeding the target (160%), besides, road side plantations of 42 km. This was in addition to maintenance of 38,850 ha old plantations and carrying out preliminary works of 4455 ha of next year's plantation as an auxiliary to increase forest cover.

Scrutiny of the planning process revealed that there was delay in approving APOs and sanctioning of estimates, where 67% were sanctioned after September. The plantation journals were updated in 88% plantations.

Soil moisture conservation works were implemented in 24% of plantations sampled, with an average expenditure of 2%, indicating that this activity was not given due priority. Monitoring visits by supervisory officers were made in 53% of the sampled plantations. Joint Forest Management Committees (JFMCs) were involved in some of the planting and maintenance activities in 2% of the cases, indicating greater scope for the participation of the community. Majority of the plantations sampled (42%) followed the ANR-I (B) model as denoted in respective plantation journals. About 110 species of plants were noticed during the study. It is noteworthy to mention here that the department is making an earnest attempt to encourage mixed plantations of native species which will enhance the biodiversity value of the forest and its intangible benefits to the environment.

Out of 116 plantations sampled, 57% had boundary protection measure, of which 77% structures were breached, indicating that majority of the protection measures were becoming ineffective within 3-6 years after establishment/ installation.

The overall survival observed was 59%, ranging from 97% in Hassan circle to 26% in Mysuru circle. Out of the sampled plantations, 28% plantations were damaged by grazing, wildlife and fire which was the main cause of low survival rate. Roadside planting model-VII showed the highest percentage of survival (79%) while least survival was recorded in NTFP model III. There was an increase in survival percentage as the number of years of maintenance increases as evidenced in this study. Eucalyptus *(Eucalyptus spp)* recorded the highest percentage of survival 98%, whereas least survival of 40% was recorded in Nerale *(Syzygium sp.)*.

During the period of evaluation, 1558 other works were carried out, of which 154 works were sampled. The works evaluated included boundary consolidation, buildings, formation of roads, soil and moisture conservation works, wildlife protection works, working plan works and research works. Check measurement with date in the field note books were not available in 26% of samples while 55% samples did not have completion certificates, indicating scope for improvement in record keeping.

As per the data provided by the Working plan wing, 12,85,139 ha (40%) of the total forest area in the State was yet to be surveyed and demarcated. The training activities of KFD were carried out through a well-established network of Training centres located across the State. Training wing of the department was well equipped with state of the art equipment and technology to impart induction and on-the-job trainings. Comprehensive training needs assessment, a crucial step in human resource development, did not seem to be a systematic process of the training wing.

At the time of study the research wing was not being utilised to its optimum potential. There is much scope to provide comprehensive support to the functioning and execution of planting related activities of the KFD.

Infrastructure works of the KFD serves various purposes such as office and residential quarters for staff, training facilities, forest rest houses, eco-tourism and nursery sheds. All the works sampled were in functional condition at the time of visit and serving the intended purpose. It was learnt that there is scope to adopt the green building code in the planning and design phase, which offer the possibility to make the buildings green and sustainable.

Efforts have been made to improve the mobility of the field staff through the induction of vehicles by utilising 71% of the allocated funds. The reasons for underutilisation of funds were not forthcoming.

It was observed that the Information and Communications Technology (ICT) wing has put in tremendous efforts to digitize and automate data and processes, which is one of the kinds in the country, by using modern technologies including GIS. The ICT wing has supported the functioning of KFD in multiple ways. The various android applications developed have been helpful in ease of functioning, providing fire alerts, simplifying processes, monitoring work of the staff and so on. The website had a user friendly interface and is organized in an accessible manner. However, it was observed that the presence of a senior, experienced IT Developer would be helpful in blending the user requirements, technical architecture and development process.

Protected areas were managed in accordance with the approved management plans to ensure protection of forests and wildlife. Solar fencing, Elephant Proof Trenches (EPT) and railway barricades were installed in appropriate locations to mitigate human animal conflict. However, much work needs to be done to reduce further conflicts. Habitat improvement works were also being undertaken. Wildlife protection and forest conservation measures such as anti-poaching camps (APCs) and fire protection camps were established.

It was observed that in majority of the cases, the waterholes were filled with silt from adjoining areas since desilting was usually carried out once in 4-5 years, hence sufficient water could not be stored for longer period. With the limited prescribed sample size, it was understood that anti-poaching camps were located in vantage points, have adequate staff, but need modern communication devices, night vision binoculars, arms and ammunition and higher capacity battery back-up for effective functioning.

To reduce the dependency of forest fringe communities on firewood, energy saving devices and public awareness programmes on the importance of forests were conducted to benefit over 600 people during the period of evaluation. The LPG stoves and cylinders distributed to individual beneficiaries were used regularly by 96% of the beneficiaries and they appreciated the utility of the same. In case of solar lanterns, only 50% of the beneficiaries were using it regularly, since inadequate repair and maintenance mechanisms led to disuse. The community benefits have not served the purpose since it was not given after due consultation with the community and there was no proper mechanism for repair and maintenance.

The cost norms of the present plantation models are to be re-worked by involving the representatives from the field in order to fine tune the models and adopting the same.The present practice of augmenting mixed native species in degraded natural forests should be encouraged in all future afforestation activities of the department in order to increase the biodiversity value and the ecological services potential of the forests. Five-year plan mode could be adopted while planning new plantations with decentralised planning at circle level with approval of annual plans of operation well in advance. Timely approval of estimates coupled with regular monitoring by senior officers will help greatly in raising quality nurseries and plantations.

The functioning of the research wing can further be strengthened with adequate funding and recruitment of qualified manpower and by regular interactions with other wings of the department to support them appropriately. A systematic training need assessment, incorporating more practical aspects in trainings, will enhance the knowledge and skill of staff through concerted human resource development. Proper transfer policies should be developed to retain the trained specialist personnel in appropriate wings at least for three years tenure after completion of training.

Brainstorming on further possibilities for process automation, making software/ application more user friendly with appropriate field level testing along with the developers, making the content on website more comprehensive, especially for the general public will further enhance the effectiveness of the ICT wing.

There should be a regular provision for desilting and maintenance of waterholes/ tanks/ percolation ponds. In addition, mapping of the requirements of new APCs will enhance effective protection. Regular maintenance of EPTs, Cattle Proof Trenches (CPTs), solar fencing, ensuring water resources within forests, eviction of encroachments and ensuring adequate staff at wildlife ranges will help in reducing the incidences of human animal conflict.

Forestry operations, soil moisture conservation works, benefits to community and individuals can be dovetailed and converged with other ongoing government schemes/ programmes such as MGNREGS, Watershed Development Programmes, Krishi Bhagya, Ujwala and other related programmes. Participatory need assessment has to be done prior to distributing individual / community benefits, along with proper documentation of the same.

1 INTRODUCTION

1.1 Background

Forests have a significant role to play in mitigating climate change, conserving natural biodiversity and preserving the watershed functions of the region besides meeting the consumptive needs of human beings. Sustainable development and management of forests have intergenerational implications, which are enshrined in Sustainable Development Goals defined by United Nations. The goal number 15 states that *'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'*[1]. The National Forest Policy of 1988 also set an objective of increasing the tree cover to 33% in the country as a whole. Karnataka state has 20.11% of the state's geographical area[2] and has been making sincere efforts to meet the national forest policy objectives. Existing forests are conserved and green cover is sought to be extended to other government lands and also to private lands through as many as 50 different schemes/programs approximately. Karnataka Forest Department has afforested 2,65,714 ha during the years 2013-14 to 2016-17[3] in forest and non-forest areas under various plan and non-plan programmes.

Forest Cover in Karnataka State is 38,575.48 sq km which is 20.11% of the State's geographical area. The forest cover in Karnataka has enhanced by 1025.48 sq. kms as per the India State of Forest Report, Forest Survey of India, 2019, Ministry of Environment, Forest and Climate Change, Government of India[4] as compared to the previous report in 2017. Tree cover in Karnataka is 6,257 sq. km which has increased by 544 sq km as compared to the previous assessment report of 2017, which may be attributed to afforestation in non-forest areas.

[1] https://www.un.org/development/desa/disabilities/envision2030-goal15.html
[2] India State of Forest Report, Forest Survey of India, 2019, Ministry of Environment, Forest and Climate Change, Government of India http://fsi.nic.in/forest-report-2019
[3] Annual Reports, 2013-14, 2014-15, 2015-16 and 2016-17 of Karnataka Forest Department
[4] http://fsi.nic.in/forest-report-2019

The Karnataka Forest Department is implementing various schemes to protect and conserve the forest resources, biodiversity and wildlife across the state. The activities undertaken include site specific activities such as safety zone plantation, compensatory afforestation, consolidation and protection of forests, consolidation and regeneration of forests, wildlife protection and management, infrastructure development and forest produce saving devices and other activities.

Thirteenth Finance Commission (TFC)

Forests constitute the first line of defense against pollution resulting from economic activity, whether agricultural or industrial origin. In recognition of this, FC-XII provided a grant of Rs. 1000 crore to be distributed among States in accordance with the share accounted for by each State in the total forested acreage in the country. TFC was established in 2007 under the chairmanship of Dr. Vijay Kelkar, operational during 2010-15 for the purpose of allocation of certain resources of revenue between the Union and the State Governments. The scheme mandated that 75% of the total grant released could be used for development purpose while the remaining 25% of the grant could be used for preservation of forest wealth and was meant to be an additionality to the States' budget for development of forestry and wildlife.

The Bonn Challenge is a global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020, and 350 million hectares by 2030[5]. India has committed to restore 21 million hectares (13 million hectares of degraded land by 2020 and an additional 8 million hectares by 2030)[6]. India has already brought an area of 9.8 million hectares under restoration since 2011[7]. By integrating forest landscape restoration into ongoing environment and development programmes, countries can maximize the impact of their investment. In India most of these targets are integrated into the umbrella of Twenty Point Programme 2006, which is being monitored by the Ministry of Statistics and

[5] https://www.bonnchallenge.org/content/challenge
[6] The Bonn Challenge in Asia: Driving leadership on forest landscape restoration. IUCN Forest Brief, No. 17. April 2017. Accessed at https://www.bonnchallenge.org/sites/default/files/20170502_iucn-forest-brief-no-17-bonn-challenge-asia_web.pdf
[7] Bonn Challenge and India, Progress on restoration efforts across states and landscapes, 2018. International Union for Conservation of Nature, New Delhi, India, and the Ministry of Environment, Forest and Climate Change, Government of India

Programme Implementation, Government of India[8]. The targets of plantations in TFC are not explicitly aligned to this challenge. These are all included under the umbrella of the Twenty Point Programme.

This study covered the activities for the years 2013-14 and 2014-15.

1.2 Stated Objective of the Scheme

The main objective of this scheme was to provide the wherewithal for preservation, so as to halt and reverse past declines in the quantum and quality of area under forest. It also aimed to provide fiscal resources by which the State can enable alternative economic activities as a substitute for economic disability imposed by forest cover.

The specific objectives of the scheme were:

a. To increase forest cover of the State
b. To improve the infrastructure of the department especially for the front line staff
c. To improve the mobility of the field staff through induction of vehicles
d. Use of modern technology like GIS through ICT
e. Enhance protection mechanism for forest and wildlife

1.3 Scheme Structure

There was no separate structure for the implementation of this scheme. The administrative setup of the KFD implemented this scheme.

1.4 Scheme Components

The scheme included two broad components, development and forestry/ wildlife. The activities under these components were classified as follows:

i. Development Component

a. Plantation and related works
b. Working Plan activities
c. Boundary consolidation activities

[8] http://mospi.nic.in/sites/default/files/twenty_point_programme_2006/tpp_2006a_background/A_%20Brief_Description_TPP_2006_14may15.pdf?status=1&menu_id=162

d. Infrastructure development (buildings and eco-tourism)
e. Training activities
f. Research and utilisation activities
g. ICT and mobility
h. Publicity and awareness

ii. Forestry/ Wildlife

i. Soil moisture conservation activities
j. Wildlife protection activities

1.4.1 Development Component

a) Plantation and related works: This component comprised activities such as establishment and maintenance of central nursery, raising seedlings, advance works for plantation, raising plantations, maintenance of plantations, raising of seedlings, planting and maintenance of sandal and medicinal plantations, establishment of Hasiru Kavacha in coastal zones, Devivana etc.

b) Working plan activities: This component encompassed laying sampled plots for revision of working plans in various divisions, survey and demarcation of reserve forests, fixing of cairns, block and compartment works, fixing of galvanized iron plates constitute this component.

c) Boundary consolidation activities: This comprised boundary consolidation works, erection of chain link mesh, barbed wire fencing to plantation boundaries.

d) Infrastructure development: Construction and maintenance of buildings, eco-tourism development works comprised this component.

e) Training activities: This component included conducting training programmes, procuring software, purchase of reading materials and so on.

f) Research and utilization activities: This included creation of cane trial plots, maintenance of research plantations, cattle proof trenches and fencing, research studies and development of nursery

g) **ICT and mobility:** This component comprised IT related works like creation if geospatial database of forests, strengthening of ICT centres at circle level and purchase and maintenance of vehicles to facilitate mobility of forest staff.

h) **Publicity and awareness programmes:** Apart from including public awareness programmes, supply of energy saving devices to public to reduce the dependency on forests were covered under this component

1.4.2 Forestry/ Wildlife protection Component

a) **Soil Moisture Conservation (SMC):** This component consisted of habitat improvement measures such as soil moisture conservation works, creation and maintenance of waterholes/ check dams/ culverts/ desilting of tanks.

b) **Wildlife protection:** This component consisted of habitat improvement and wildlife protection measures such as creation and maintenance of forest roads, causeways, construction and maintenance of forest protection camps, fire protection works, creation and maintenance of fire lines etc.

1.5 Performance of the Scheme

Scrutiny of the data revealed that during the period of evaluation Rs.11020.76 lakhs was the financial target of which Rs. 11091.74 lakhs was expended, i.e. 101% achievement against the target. This included additional expenditure (based on additional allocations) of Rs. 141.03 lakhs in 2013-14 and Rs. 1294.83 lakhs in 2014-15. In terms of plantation activities (raising, maintenance and advance works), 47,539.31 ha was the target against which the achievement was 61,388.61 ha (129%).

As per the 20 Point Programme Progress reports of 2013-14 and 2014-15, Ministry of Statistics and Programme Implementation, Government of India[9], the afforestation (in public and forest lands) target for Karnataka was 1,26,760 ha, while achievement was 1,35,730 ha (107%).

[9] http://mospi.nic.in/sites/default/files/twenty_point_programme_2006/annual_report_of_tpp2006/QPR%20of%20TPP.pdf

Table 1: Twenty Point Programme Afforestation (in Public and Forest Lands) Progress of Karnataka

Year	Seedlings Planted (no.)			Area covered under Plantation (ha)		
	T	A	%	T	A	%
2013-14	51844000	77717000	150%	79760	82925	104%
2014-15	44300000	51929000	117%	47000	52805	112%
Total	**96144000**	**129646000**	**135%**	**126760**	**135730**	**107%**

Source: Secondary data from KFD

T=Target A = Achievement

The physical achievements to the respective targets revealed that in most activities targets have been achieved, except activities like, maintenance of roadside plantations (26%), raising roadside plantations (74%), establishment and maintenance of central nursery (76%), publicity and awareness (46%), ecotourism activities (60%), SMC works (81%), construction and maintenance of buildings (85%), sample plots for revision of working plans in various divisions (78%), mobility and maintenance (51%).

In terms of plantations activities, 18,083.6 ha of plantations were raised (160%) along with 42 kms of roadside plantation which were done with 109% financial achievement against the target. Advance works were carried out in 4455.4 ha (121% of the physical target) by utilising 90% of the funds allocated. Maintenance of 38849.61 ha of plantations was done with 94% financial expenditure. Seventy-one nurseries were established and 1,41,902 lakh seedlings were raised. In addition, 8.5 ha sandal and medicinal plants estate were developed/ maintained.

Working plan works such as 1125 sample plots for revision of working plans, 8846 cairns/ RF stones were fixed (95%), survey and demarcation was completed in 669.49 kms (103%) and galvanised iron plates were fixed for 2310.09 kms (89%). Boundary consolidation was completed in 9208.94 kms (251%). In terms of infrastructure development, 229 buildings were constructed/ maintained (85%). There was an expenditure of Rs. 35. 5 lakhs under infrastructure development head, but the physical achievement details were not made available. Three Eco-tourism activities (60%) were completed. Around 97 training and related programmes were conducted (92%). In research and utilisation 1319.25 ha of cane trial plots and maintenance of plantations were done (112%), 17.8 kms. fencing works and two nurseries were developed. Data on the physical achievements under ICT was not made available. In order to strengthen and support the mobility of forest staff, 66 vehicles were

purchased with 79% financial achievement. Around 587 people benefitted with the publicity and awareness activities with a financial achievement of 123%.

Under wildlife related interventions, activities such as 27,618 m^3 of soil moisture conservation works, waterholes/ check dams/ culverts/ desilting of tanks (26 numbers), construction of causeways (41 numbers) were constructed/ maintained. Prevention of forest fires through fire protection works such as creation and maintenance of fire lines (85%) have been carried out. In addition, amount has been expended to purchase/ maintenance of communication and electronic surveillance equipment.

Evaluation study has been carried out for the works implemented from 2009-10 to 2012-2013 (4 years) by two external agencies in 2013-14 where 188 plantations covering an extent of 4,648.84 ha were evaluated. As many as 267other works were evaluated, of which 257 were graded as good, 3 as satisfactory and 7 works were not verifiable due to time lag. The plantation survival was graded as follows:

- Very good : 81% and above
- Good: 61-80%
- Average: 41-60%
- Poor: 21-40%
- Failure: below 20%

Performance of natural regeneration was graded as follows:

i. Very good: > 81% saplings having >10 cm girth/ 0.1 ha
ii. Good: 61-80% saplings having >10 cm girth/ 0.1 ha
iii. Average: 41-60% saplings having >10 cm girth/ 0.1 ha
iv. Poor: below 40% saplings having >10 cm girth/ 0.1 ha

The overall average survival was found to be 71.37%. Of the plantations sampled, 58.16 % of sampled plantations were graded very good (above 80% survival of seedlings), 32.84% as good (survival rate 61-80%), 10.19% as average (survival rate 41-60%), 2.70% as poor (survival rate 21-40%) and 1.69% as failure (survival rate below 10%).

Table 2: Physical Targets and Achievements 2013-14 to 2014-15

Note: PT –Physical target, PA – Physical achievement

Sl. No.	Approved activities (separately for Development purpose (75%) & for development of Forestry & Wildlife (25%)	Unit of Activity	2013-14		2014-15		Additional 2014-15	Total		Progress
			PT	PA	PT	PA	PA	PT	PA	
1	Maintenance of Plantation (D)	Ha	12819.96	11718	19754.45	19668.5	7463.11	32574.41	38849.61	119%
		Kms		42	160	0		160	42	26%
								0	0	
2	Advance works for plantation (D)	Ha	2517	2180	1170.4	1070.4	1205	3687.4	4455.4	121%
								0	0	
3	Raising of plantation (D)	Ha	8628.5	9592.5	2649	3296.6	5194.5	11277.5	18083.6	160%
		Kms		81	109	0		109	81	74%
4	Establishment & Maintenance of Central Nursery (D)	Nos.	32	13	62	48	10	94	71	76%
								0	0	
5	Training (D) Refresher Training, Procuring software, Purchase of reading materials, Engaging Assistant Programmer & Procuring E-Enabled identity card	Nos.	105	66		31		105	97	92%
6	Raising of seedlings	Lakhs					141902	0	141902	
	Maintenance & Development of Sandal & Medicinal Plants Estate (D)	Nos.	6	3	1.05		5.5	7.05	8.5	121%
		Ha			14.16	15.16		14.16	15.16	107%
7	Erection of chain link mesh	Rmt					3100	0	3100	

Sl. No.	Approved activities (separately for Development purpose (75%) & for development of Forestry & Wildlife (25%)	Unit of Activity	2013-14		2014-15		Additional 2014-15	Total		Progress
			PT	PA	PT	PA	PA	PT	PA	
8	Barbedwire fencing	Ha					352	0	352	
9	Publicity & Awareness Programmes (D) (Supply of Energy saving devices)	Nos.	5	1	1278	586		1283	587	46%
10	Ecotourism development activities (D)	Nos.	5	3				5	3	60%
11	Habitat improvement									
	SMC Works	M3	29109	2746	5000	72	24800	34109	27618	81%
	Construction of causeway	Kms		41				0	41	
	Creation Maintenance of waterholes/Checkdams/Culverts & Desilting of tanks	Nos		26				0	26	
12	Head quarters support (D) (including additional new works)									
13	Protection work of Wildlife wing	Cmtr					11065	0	11065	
14	GIS									
	(a) Creation of Geospatial Database of Forests in Karnataka using high resolution satellite imageries and ground truthing by ETP/GPS									

Sl. No.	Approved activities (separately for Development purpose (75%) & for development of Forestry & Wildlife (25%)	Unit of Activity	2013-14		2014-15		Additional 2014-15	Total		Progress
			PT	PA	PT	PA	PA	PT	PA	
	(b) Strengthening of ICT sub centres at Circle level for creation of Geospatial Database of Forest land and other GIS works									
15	Construction & Maintenance of buildings (M)	Nos.	80	70	188	118	41	268	229	85%
16	Construction & Maintenance of Forest protection camps (M)	Nos.	251	238	296	296	71	547	605	111%
17	Boundary consolidation (M)	Kms	2021.29	1395.09	1640.43	1148.28	6665.57	3661.72	9208.94	251%
		Cum			5937.5	7779		5937.5	7779	131%
		Rmt			40891	11046		40891	11046	27%
		(Nos)		546				0	546	
18	Fire protection works, Creation &Maintenance of fire lines, Engaging fire watchers	Kms	1305	1185	776	588.5		2081	1773.5	85%
19	Working plan support (M)									
	a) Sample plots for revision of working plans in various divisions)	Nos.	1133	768	302	302	55	1435	1125	78%
	b) Survey & Demarcation of RF with fixing stones & Cairns	Nos.	9269.68	8846				9269.68	8846	95%
	c) Survey & Demarcation of RF	Kms			648	624	45.49	648	669.49	103%

Sl. No.	Approved activities (separately for Development purpose (75%) & for development of Forestry & Wildlife (25%)	Unit of Activity	2013-14		2014-15		Additional 2014-15	Total		Progress
			PT	PA	PT	PA	PA	PT	PA	
	d) Block & Compartment works with fixing of G plate RF	Kms	1562	1142	1037	1107.49	60.6	2599	2310.09	89%
		Nos	144.35	8367				144.35	8367	5796%
22	Mobility & Maintenance (M)	Nos.	70	30	60	36		130	66	51%
23	Research &Utilization Activities (D)									
	Creation of Cane trail plot & maintenance of plantation	Ha	522.25	507.25	652	618	194	1174.25	1319.25	112%
	CPT & Fencing	Kms			16.8	17.8		16.8	17.8	106%
	Research Studies	Nos.	19	2	16	16	119	35	137	391%
	Development & Nursery	Nos.			2	2		2	2	100%
25	Infrastructure development							0	0	
								0	0	
26	Development of Devivana, Karenjeshwarvana in Mangalore							0	0	

Source: Secondary data from KFD

Table 3: Financial Targets and Achievements 2013-14 to 2014-15

Note: FT – Financial target, FA – Financial achievement

Sl. No.	Approved activities (separately for Development purpose (75%) & for development of Forestry &Wildlife (25%)	Unit of Activity	2013-14		Additional 2013-14	2014-15		Additional 2014-15	Total		Progress
			FT	FA	FA	FT	FA	FA	FT	FA	
						Rs.Lakhs	Rs.Lakhs				
1	Maintenance of Plantation (D)	Ha	802.771	611.742		1333.06	1277.651	121.55	2135.831	2010.943	94%
		Kms									
2	Advance works for plantation (D)	Ha	608.618	372.678	9.84	359.007	283.606	217.24	967.625	883.364	91%
3	Raising of plantation (D)	Ha	967.644	943.254		524.981	596.637	83.39	1492.625	1623.281	109%
		Kms						14.64		14.64	
4	Establishment & Maintenance of Central Nursery (D)	Nos.	78.335	39.962		141.1	144.192	39.64	219.435	223.794	102%
5	Training (D) Refresher Training, Procuring software, Purchase of reading materials, Engaging Assistant Programmer & Procuring E-Enabled identity card	Nos.	66.309	29.88		36.47	25.97	3.031	102.779	58.881	57%
6	Raising/ Maintenance of seedlings							14.64		14.64	
	Maintenance & Development of Sandal & Medicinal Plants Estate (D)	Nos.	90.552	36.66		3.106	3.111	0.35	93.658	40.121	43%
7	Erection of chain link mesh							98.7		98.7	
8	Barbed wire fencing							5.94		5.94	

Sl. No.	Approved activities (separately for Development purpose (75%) & for development of Forestry &Wildlife (25%)	Unit of Activity	2013-14		Additional 2013-14	2014-15		Additional 2014-15	Total		Progress
			FT	FA	FA	FT	FA	FA	FT	FA	
9	Publicity & Awareness Programmes (D) (Supply of Energy saving devices)	Nos.	9.25	3.85		35.623	51.42		44.873	55.27	123%
10	Eco-tourim development activities (D)	Nos.	44.866	41.25	30.12			3.85	44.866	75.22	168%
11	Habitat improvement										
	SMC Works	M3	73.907	62.16		52.473	77.281	55.65	126.38	195.091	154%
	Construction of causeway	Kms									
	Creation Maintenance of waterholes/Checkdams/Culverts & Desilting of tanks	Nos									
12	Head quarters support (D) (including additional new works)		466.719	194.881		174.964	142.298		641.683	337.179	53%
13	Protection work of Wildlife wing					30	27.77	39.47	30	67.24	224%
14	GIS										
	(a) Creation of Geospatial Database of Forests in Karnataka using high resolution statelite imageries and ground truthing by ETP/GPS					100	86.26	7.32	100	93.58	94%

Sl. No.	Approved activities (separately for Development purpose (75%) & for development of Forestry &Wildlife (25%)	Unit of Activity	2013-14		Additional 2013-14	2014-15		Additional 2014-15	Total		Progress
			FT	FA	FA	FT	FA	FA	FT	FA	
	(b) Strengthening of ICT sub centres at Circle level for creation of Geospatial Database of Forest land and other GIS works										
15	Construction & Maintenance of buildings (M)	Nos.	485.714	465.215	96.23	837	720.911	221.61	1322.714	1503.966	114%
16	Construction & Maintenance of Forest protection camps (M)	Nos.	634.741	503.26	4.84	800.133	824.873	81.76	1434.874	1414.733	99%
17	Boundary consolidation (M)	Kms	452.869	406.3		405.585	490.967	76.49	858.454	973.757	113%
		Cum									
		Rmtr									
		(Nos)									
18	Fire protection works (M)	Kms	36.343	37.5		30.351	66.246		66.694	103.746	156%
19	Working plan support (M) sample plots for revision of working plans in various divisions)	Nos.	294.376	186.865		240	240		534.376	426.865	80%
	Survey & Demarcation of RF with fixing stones & Cairons	Nos.									
	Working plan support (M) Survey & Demarcation of RF	Kms						26.11		26.11	
	Block & Compartment works with fixing of G plate RF	Kms									

Sl. No.	Approved activities (separately for Development purpose (75%) & for development of Forestry &Wildlife (25%)	Unit of Activity	2013-14		Additional 2013-14	2014-15		Additional 2014-15	Total		Progress
			FT	FA	FA	FT	FA	FA	FT	FA	
20	Compartment boundary	Kms						15.3		15.3	
21	Sample plots	Nos.						28.09		28.09	
22	Mobility & Maintenance (M)	Nos.	250	150.5		210	213.17		460	363.67	79%
23	Research &Utilization Activities (D)		162.984	119		180.904	178.56		343.888	297.56	87%
	Creation of Cane trail plot & maintenance of plantation	Ha						9.01		9.01	
	CPT & Fencing	Kms.									
	Research Studies	Nos.						39.99		39.99	
	Development & Nursery	Nos.									
24	Fire protection works, Creation &Maintenance of fire lines, Engaging fire watchers	Kms									
25	Infrastructure development							36.5		36.5	
26	Development of Devivana, Karenjeshwarvana in Mangalore							54.56		54.56	
	Total		**5526.00**	**4204.96**	**141.03**	**5494.76**	**5450.92**	**1294.83**	**11020.76**	**11091.74**	**101%**
	Progress			**76%**			**99%**			**101%**	

1.6 Scope of the Evaluation

The Energy and Resources Institute (TERI) was entrusted by Karnataka Evaluation Authority to carry out the task of Evaluation of Compensatory Afforestation Fund Management and Planning (CAMPA) 2013-14 to 2015-16, 13th Finance Commission (TFC) 2013-14 to 2014-15, National Afforestation Programme (NAP) 2013-14 to 2016-17 and National Bamboo Mission (NBM) 2013-14 to 2016-17. This report focuses on TFC, while separate reports were submitted for the other three schemes.

1.6.1 Purpose of the Evaluation

To assess the achievement of the objectives of the scheme and propose suggestions based on the observations to enhance effectiveness in delivery of the scheme.

1.6.2 Objectives of the Evaluation

To evaluate the works under the scheme that were carried out by Territorial, Wildlife, Research, Working Plan and Training wings of the Karnataka Forests Department.

- To assess whether the desired impact on natural and social environment is achieved and or undesirable impact is avoided under this scheme.
- To assess the efficiency and effectiveness of the scheme and the ability of the works executed to meet the intended objectives of the scheme.
- To assess the performance of the works under different categories and across the divisions.
- To examine the requirement of works executed under the scheme, whether these works to be continued or closed.
- To assess whether the existing arrangements of accounting and reporting are adequate and transparent.
- To analyse whether the grants under the scheme were utilized for the intended objectives/ purposes.
- To examine the quality of works and the final success rates are satisfactory etc.
- To examine the impact of beneficiary schemes on the households.

1.6.3 Evaluation Questions

The detailed evaluation questions given as per the ToR maybe referred in the annexure. The main components that were studied were as follows.

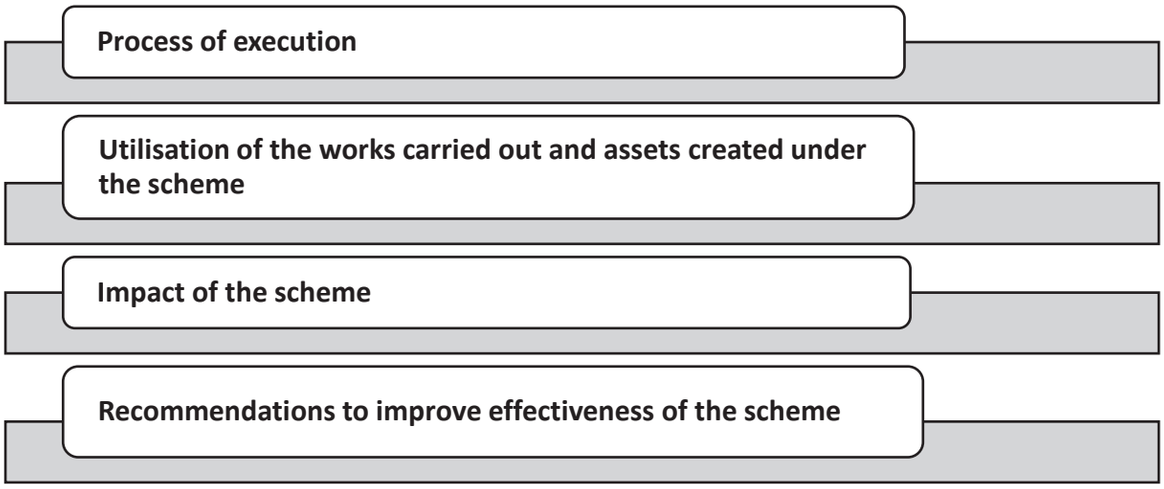

Figure 1: Major Components of Evaluation

1.7 Review of Literature

Secondary data such as scheme guidelines, target and achievements for the reference years of the study and previous evaluation reports were sourced from KFD. In addition, review of existing literature that studied similar aspects was researched online. The major study findings were tabulated to gain an understanding of the work already done in this direction.

Table 4: Brief summary of review of literature

Sl. No.	Study	Highlights
1.	Given. Lisa. M. 2008. The SAGE Encyclopaedia of Qualitative Research Methods. (Vol. 1-0). Thousand Oaks, CA. SAGE Publications.	In-depth interviews were conducted with officers and other stakeholders wherever necessary. The in-depth interviews (IDI) encourages and prompts participants to talk in depth about the topic under investigation without the researcher's use of predetermined, focused, short-answer questions as suggested by Given. L.(2008).
2.	Kruger Richard. 2017. Observation in Evaluation, retrieved from https://www.betterevaluation.org/en/resources/guide/how_to_use_observation	Kruger .R. (2017) opines that observation has a unique niche among evaluation methods and careful observation is distinctive in three important ways: the person doing the observation is trained, prepared, and systematic.
3.	Rao Govinda Marapalli. November 2010. The 13th Finance Commission's Report: Conundrum of Conditionalities' published in Economic and political weekly XIV(48):46-56.	Critically appraising the recommendations of the Thirteenth Finance Commission, Rao (2010), report points out that, despite some tinkering with one of the indicators, its approach to tax devolution suffers from the same limitations as those of the previous commissions.

Sl. No.	Study	Highlights
4.	Chakraborthy, Pinaki. November 27-December 3, 2010. Report of the 13th Finance Commission: Introduction and Overview. Economic and Political Weekly. Vol. 45, No. 48 , pp. 35-37	While acknowledging the many plus points of the report, the writers also draw attention to its numerous drawbacks, ranging from a lack of proper attention and omissions to faulty logic.
5.	Anonymous. Species and Planting Technique Models. 2012. General Guidelines 2012. Karnataka Forest Department. Government of Karnataka.	The State is divided into four silvi (agro) climatic zones for the purpose of this guideline/ report. The taluks/ districts in each zone are as per the agro-climatic zone recognize by the State Agriculture Department. The zones are grouped as follows: • Dry zone – North eastern dry zone, northern dry zone, central dry zone, eastern dry zone, southern dry zone. • Transitional zone – southern transition zone, northern transition zone, north eastern transition zone • Malnad and Western Ghat zone – Corresponding to Hilly zone of Karnataka Land Use Board classification • Coastal zone – Coastal zone
6.	Anonymous. Evaluation of Forestry Works 2009-13, Evaluation of 13th Finance Commission Report. August 2015. Additional Principal Conservator of Forests (EWPRT), Karnataka Forest Department.	Evaluation study has been carried out for the works implemented from 2009-10 to 2012-2013 (4 years) by two external agencies in 2013-14where 188 plantations covering an extent of 4648.84 ha has been evaluated. The overall average survival was found to be 77.34% Of the plantations sampled, 58.16 % of sampled plantations were graded very good (above 80% survival of seedlings), 32.84% as good (survival rate 61-80%), 10.19% as average (survival rate 41-60%), 2.70% as poor (survival rate 21-40%) and 1.69% as failure (survival rate below 10%). As many as 267other works were evaluated, of which 257 were graded as good, 3 as satisfactory and 7 works were not verifiable due to time lag.

Source: Secondary data

2 EVALUATION METHODOLOGY

2.1 Approach

The study was a summative evaluation wherein the scheme was evaluated post implementation to understand the overall effectiveness of the program/ scheme in terms of the objectives set out. The purpose was to assess the overall impact of the scheme, while also studying the effectiveness of the process/ delivery mechanism followed and to make suitable recommendations thereof to enhance the effectiveness and impact. Multi-dimensional approach including scientific, interactive/ consultative, objective-oriented, analytical, practical and participatory approach using appropriate methods were followed to gather qualitative and quantitative data. Primary and secondary data were collected and analysed to understand if the works executed are contributing to the objective of the scheme, if so to what extent.

For a project of this nature, the study was carried out using qualitative and quantitative methods. The approach process and methods that were used are as below:

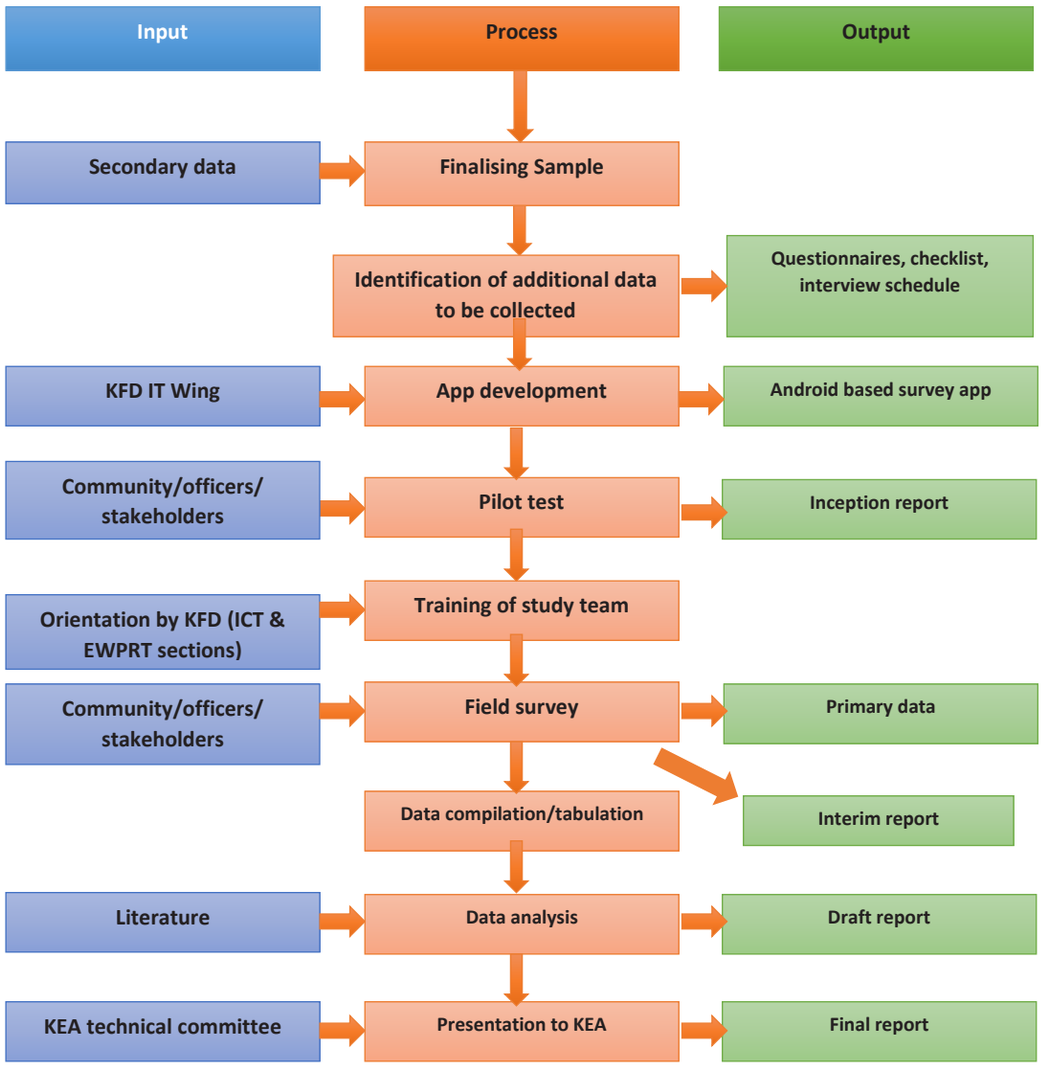

Figure 2: Approach for the evaluation study

2.2 Theory of Change

The following theory of change was developed based on the components of the forestry works assigned for evaluation. The outputs are measurable, while outcomes may be perceivable in the medium - long term after work implementation. The impacts are indicative and can be perceived only in the long term, which is not under the ambit of this study since the works have been executed 3-5 years ago.

Table 5: Theory of Change

Resources/ Inputs	Activities	Outputs	Outcomes	Impact
Policies Schemes Objectives Guidelines Budget Manpower Knowledge Infrastructure Requisite materials	Raising of nursery, plantations and bamboo plantations	• No. of nurseries and seedlings raised • No. of Plantations raised • Area covered by plantation	• Species-wise survival rate • Improved forest tree cover • Reduced dependency on forest for fuel wood and maintenance	• Improved environment in the areas planted • Increased biodiversity • Reduced emission of greenhouse gases • Reduced erosion and pollution
	Soil moisture conservation works	• No. of SMC works undertaken	• Better moisture and soil retention in plantations • Enhanced survival of plantations • Enhanced water availability in summer months for wildlife • Better wildlife conservation and management	• Increased soil and moisture conservation in the watershed & forests • Enhanced flora and fauna and biodiversity conservation

Resources/ Inputs	Activities	Outputs	Outcomes	Impact
	Specialised works of Wildlife	• No. of Anti-poaching camps established, including manpower • No. of measures put in place to reduce man-animal conflict • No. of equipment (available for anti-poaching and wild life protection) procured for wildlife protection works • No. of fire protection camps	• Reduction in the number of poaching cases • Reduction in the number of animal attacks cases • Reduction in cases of forest fires • Better wildlife conservation and management • Better cooperation and support of communities in forest fringe areas	• Enhanced flora, fauna and biodiversity conservation • Enhanced participation of communities in wildlife protection and management
	Specialised works of Working Plan	• No. of survey and demarcation works undertaken • No. of boundary works undertaken	• No. of working and management plans prepared and being implemented • Area of forest boundary demarcated • Reduction in encroachment cases • Forest land protected from encroachment	• Preservation of diverse flora relevant to different forest locations
	Specialised works of Research and Utilisation	• No. of activities taken up under the research wing • No. of research/ preservation plots maintained	• The issues of the operational wings of the department are being addressed and requirement is met adequately • Learnings from research plots being adopted to improve quality and survival of plantations • Improved quality and survival of plantations	• Research activity is contributing to the broad objectives of forest policy

Resources/ Inputs	Activities	Outputs	Outcomes	Impact
	Specialised works of Training wing	• No. of training programmes conducted for department staff • No. of awareness programmes conducted • No. of infrastructure created/ enhanced for training purpose	• The capabilities of the trained staff to discharge duties improved • Extent of participation of communities in awareness programmes • Department has adequate infrastructure for training • Department staff are equipped to handle all tasks and challenges in the protecting and conserving forests	• Forests are managed in a scientific manner • Enhanced awareness among communities about forest conservation and protection • Enhanced participation of communities in forest protection and management
	Construction and maintenance of Buildings, Roads and other infrastructure	• No. of buildings, roads and infrastructure developed • No. of works undertaken/ equipment procured to improve digitization and communication network	• Percentage of assets/ infrastructure is being utilised for the said purpose • Latest technology/ software and equipment being used	• Department efforts towards forest conservation and protection is strengthened and augmented • Department is modernised by using latest It technologies
	Providing individual/ community benefits	• No. of people benefitting from LPG connections and continued usage • No. of people benefitting from bamboo plantations	• Percentage of household adopted LPG, thus changing the fuel used for cooking • Reduced dependency on forest for fuel wood • Employment opportunities generated for skilled and unskilled persons	• Economic upliftment of households depending on bamboo related enterprises • Productive use of time saved by forest fringe community women

Source: Secondary data and TERI Inception report

2.3 Methodology

2.3.1 Study area

Thirteen forest circles and all forest divisions in Karnataka State comprised the study area. A mixed method approach was followed for this study as follows:

- Laying and Measurements of sample plots in plantations
- Field Observations of Other Works
- Interview – with officers/ field officers/ individual beneficiaries
- Focus group discussion with beneficiaries of community assets

There was considerable diversity in the works to be evaluated, which necessitated multiple methods to be used. Most importantly, visiting the work sites, physical verification and taking measurements of the plantations, observing other works such as civil structures, soil and water conservation works, roads, working plan, research, boundary consolidation etc. were carried out.

The boundary of the plantation was perambulated using the KFD android app and random plots generated in the app were considered as the centre of the sample plot to be laid. A minimum of one sample plot was laid for every 5 ha of plantation and a maximum of 10 sample plots were laid for plantations above 50 ha. The size of each sample plot was 1000 square meters (0.1 ha), having a measurement of 31.42 meters x 31.42 meters, laid at random intervals (as indicated in the KFD app) in the block plantation selected for evaluation. In case of plantations like Roadside, Greening of urban areas, Institutional plantations etc., the whole plantation was considered as one sample and 100% evaluation was done in each case.

Observation method was used to study the quality of the works (including community benefit works) executed based on appropriate parameters. Kruger, R. (2017)[10] opines that observation has a unique niche among evaluation methods and careful observation is distinctive in three important ways: the person doing the observation is trained, prepared, and systematic.

[10] Kruger Richard. 2017, Observation in Evaluation, retrieved from https://www.betterevaluation.org/en/resources/guide/how_to_use_observation

In-depth interviews were conducted with officers and other stakeholders wherever necessary. The in-depth interviews (IDI) encourage and prompt participants to talk in depth about the topic under investigation without the researcher's use of predetermined, focused, short-answer questions as suggested by Given. L. (2008).[11]

2.3.2 Sampling Design

Forest Department has Territorial, Social Forestry and Wild life Divisions. Apart from this, there are specialized wings like Working Plan & Research which are divided as functional units. The Training wing has a state academy with six institutes spread across the state. At first stage, the Division/unit wise work list as provided by respective APCCF for the scheme was compiled for the whole state in the forest department. Then from this, state level work list the scheme, sorting of various types of works into nine categories was done. This was the second stage of clustering being done at the Department level. From this, the sample work the list for evaluation was generated for the scheme by random sampling of 10% of works from each category (type) of work in the scheme covering all the circles in the State. Thus, the method followed is basically a multi stage sampling in which the first stage of cluster formation is at division/unit level and second stage is at type of work level and 10% works were identified randomly at KEA. The sample to cover all the Circles and all the categories of works implemented in a circle. Selection of samples was based on proportional representation to its area/ no. of works and representing all years of work. Works of individual/ community benefits were randomly selected across representative divisions.

2.3.3 Sample size

One hundred and sixteen plantations were selected for sampling out of 1168 plantations raised/ maintained during the period of evaluation. The circle-wise population and samples which was followed for the study is as follows:

Table 6: Circle-wise and Division-wise Plantations Sampled

Circle	Division	No. of plantations works	No. of plantation sampled
Ballari		**28**	**3**
	Ballari T	20	1
	Chitradurga T	6	1
	Koppal T	2	1

[11]Given. Lisa. M. , The SAGE Encyclopaedia of Qualitative Research Methods. (Vol. 1-0).Thousand Oaks, CA. SAGE Publications. 2008

Circle	Division	No. of plantations works	No. of plantation sampled
Belagavi		**86**	**9**
	Belagavi T	84	7
	Gokak T	2	2
Bengaluru		**37**	**4**
	Bengaluru Rural T	13	1
	Bengaluru Urban T	2	0
	Chikkaballapura T	11	2
	Kolar T	10	1
	Ramanagara	1	0
Chamarajanagra		**29**	**3**
	Cauvery WL	25	3
	Chamarajanagara	4	
Chikkamagaluru		**98**	**10**
	Chikkamagaluru T	11	1
	Koppa T	87	9
Dharawada		**41**	**3**
	Dharawada T	21	1
	Gadag T	14	1
	Haveri T	6	1
Hassana		**52**	**5**
	Hassana T	46	4
	Tumkur T	6	1
Kalaburagi		**24**	**2**
	Bidar T	7	1
	Kalaburgi T	5	
	Raichur T	12	1
Kodagu		**45**	**5**
	Madikeri T	20	4
	Virajpet T	25	1
Mangaluru		**293**	**26**
	Karkala T	6	1
	Kundapura T	102	13
	Mangaluru T	185	12
Mysuru		**31**	**2**
	Mandya	4	
	Mysuru T	17	
	Hunsur T	10	2
Shivamogga		**125**	**13**
	Bhadravathi T	38	5
	Sagar T	46	3
	Shivamogga T	36	5

Circle	Division	No. of plantations works	No. of plantation sampled
	Shivamogga WL	5	0
Uttara Kannada		**310**	**31**
	Honnavara T	106	10
	Karwar T	94	10
	Sirsi T	71	7
	Yellapur T	39	4
Grand Total		**1168**	**116**

Source: Terms of Reference

Sampling of other Works

Other works were sampled across 14 circles. During the period of evaluation, 1558 other works have been carried out, of which 154 works were sampled. The works were classified broadly into boundary consolidation, buildings, formation of roads, soil and moisture conservation works, wildlife protection works, working plan works and research works.

Table 7: Circle-wise Details of Other Works sampled

Circle	Boundary consolidation	Buildings	Formation of Roads	Soil & moisture conservation	Wildlife Protection	Working Plan works	Research works	Total
APCCF (WP)						43		43
APCCF (Research)							2	2
APCCF(HRD)		5						5
Ballari	1	3						4
Bengaluru	1							1
Chamarajanagara		1			2			3
Chikkamagaluru	9	4			2			15
Dharawada		3						3
Hassana	2			1				3
Kalaburgi	2	3						5
Kodagu	1	2			2			5
Mangaluru	7	12	2	5	3	6		35
Mysuru	1							1
Shivamogga	3	4		1	2			10
Uttara Kannada	8	2		2		7		19
Total	**35**	**39**	**2**	**9**	**11**	**56**	**2**	**154**
Per cent	**23**	**26**	**1**	**6**	**7**	**36**	**1**	**100**

Source: Primary data

Table 8: Details of Officers Interviewed

Designation	Territorial	Wildlife	Aranya Bhavan	Total
PCCF			5	**5**
APCCF			10	**10**
CCF	6	1		**7**
CCF & Director		2		**2**
CF	1			**1**
DCF	17	3		**20**
ACF	19	7		**26**
RFO	51	25	1	**77**
DRFO	51	15		**66**
Forest Guard	1			**1**
Total	**146**	**53**	**16**	**215**

Source: Primary data

2.3.4 KEA and KFD consultation

Discussions were held with the officers of various levels to understand the ToR, scope of work, secondary data sources and data collection process on the KFD app. Fine tuning of the app and modifications consumed considerable time initially.

2.3.5 Tools for Evaluation

Primary data was collected on the android based evaluation application developed by the ICT wing of Karnataka Forest Department. The main purpose of the app was to use it for plantation perambulation and plot location selection, which was needed to understand the actual extent of plantation and ensure random selection of sample plot location. The GPS location and photo of each sample was also captured in this application. Series of discussions and field trials were held in association with KFD to fine tune the app to the best possible extent. It was agreed that the data security including data collected/ photo/ plantation map and backup was the responsibility of the KFD. As per the discussion with KFD it was proposed to consider the surviving plants for estimating the survival percentage and ocular perception of field investigator to determine the health of the plants. Similarly, in other works, in addition to observation by field investigators, the utility of the works was assessed in discussion with the forest watchers, guards and other staff as appropriate.

An interview schedule was prepared to gather information from key persons at various levels including policy makers, supervisors and field executives. An android app called 'Collect' app was developed in-house by TERI to elicit information from individual beneficiaries. In addition, a focus group discussion schedule was prepared to interact with community beneficiaries.

The methodology and tools used are presented below:

Table 9: Methodology and tools

Work	Method of data collection	Tool
Plantation	Laying and measurement of sample plots	KFD Evaluation app (web and android)
Other Works	Observations	KFD Evaluation app (web and android)
Individual beneficiaries	Interview	Collect Android App (Interview schedule)
Community benefits	Focus Group Discussion	FGD checklist
Implementation and Administration	Interview with officers/ field officers	Questionnaire

Source: TERI Inception report

In addition to the above, a detailed questionnaire was prepared to obtain division level information on the scheme. Tools were submitted to KEA with the inception report and due approval was obtained.

2.3.6 Hypothesis

The hypothesis that there is variation in survival percentage of plantations across the different forest circles was formulated

2.3.7 Techniques for Evaluation

Gross plantation area was considered as the total land area falling within the boundary of plantations. It included areas like river, marshy patch, rocky outcrops, ponds etc. Net plantation area was considered as the actual area within the plantation boundary excluding the area which was not planted with a given species. It excluded the non-planted area like river, marshy patch, rocky outcrops, ponds etc. The sample plantations were selected irrespective of the area. The gross area and net area and all other secondary data were entered

into the web app from the respective plantation journal, sample plots were laid and data collected in the presence of the local officers/ staff.

Survival was considered as the actual number/ count of seedlings surviving in the sample plots, irrespective of the health of the existing seedlings. This number was represented as 'total seedlings survived '. The number of empty pits in the sample plots was entered in the android application, based on which 'calculated failure' was generated automatically by the android application. The number of total seedlings planted was derived as follows:

Total seedlings planted = Total seedlings survived + Total calculated failures
Survival percentage(%)= Total seedlings survived / Total seedlings planted * 100

The health/ general performance of the seedlings of a given species in the plantation was assessed based on ocular estimation. The best performing seedlings within the plantation was compared with the poorest ones within the same plantation and was graded as good, satisfactory and poor.

2.3.8 Evaluation Team

Five field teams, each consisting of one key professional and one field assistant was formed to collect plantation data and a team of four TERI professionals with diverse expertise carried out evaluation of other works component. The study team consisted of trained TERI professionals and also retired officers of the KFD, all of whom have been involved in evaluation of works of the forest department earlier using the android app. The team members were oriented on the methodology and the process to be followed for data collection to ensure uniformity in data collection.

It was ensured that all the team members followed the same protocol i.e. all team members adopted the same approach in collecting field information, laying sample plots, and interviewing in similar manner. This procedure helped minimise observer bias and avoid inconsistency in reporting.

2.3.9 Pilot study

One of the major tasks in this assignment was finalisation of the web app and android app developed by ICT section of KFD. Several rounds of tests, discussions and deliberations were carried out prior to finalising the app.

The first pilot test was conducted initially in Chikkaballapur range on 13th May 2019 along with the representatives of KEA (ICT Manager) and KFD (Range Forest Officers of ICT and Evaluation sections) to gain an understanding of the application and its feasibility. Raising of plantation in encroachment evicted area in Kyathanahalli block 1 and another work on vehicle parking shed in Chikkaballapur division office were selected for this study. The secondary data was first input into the web app in the Chikkaballapur range office and then the works were evaluated on the field. Several challenges were faced during this test, wherein the android app failed to work without the access to internet and some modifications were required in the web app, android app, questions to be added to the app and some modifications in the app from programming perspective which was communicated to KEA and KFD on 14th May 2019. Based on this field trial, a revised version of the app was tested for second time in Cubbon Park and TERI premises on 18th June 2019. Issues found during this iteration were shared with KEA and KFD.

On 20th June 2019, the revised app was tested for the third time in the Institute of Wood Science and Technology along with the Range Forest Officers (ICT and Evaluation sections). The app with all validations (version 1.2.5.6.1) was given to TERI on 20th July 2019 vide email from KEA. This version was tested for fourth time in Cubbon Park and TERI premises on 22nd July 2019. Issues faced were once again shared with KEA and KFD for modification.

This version was pilot tested for the fifth time on 30th July 2019 at Bangalore Division, Doddaballapur sub division, Devenahalli range. The app was tested in the presence of Deputy Conservator of Forests, Assistant Conservator of Forests, Range Forest Officer, Deputy Range Forest Officer and team. One plantation and two boundary consolidation works were tested from the samples selected.

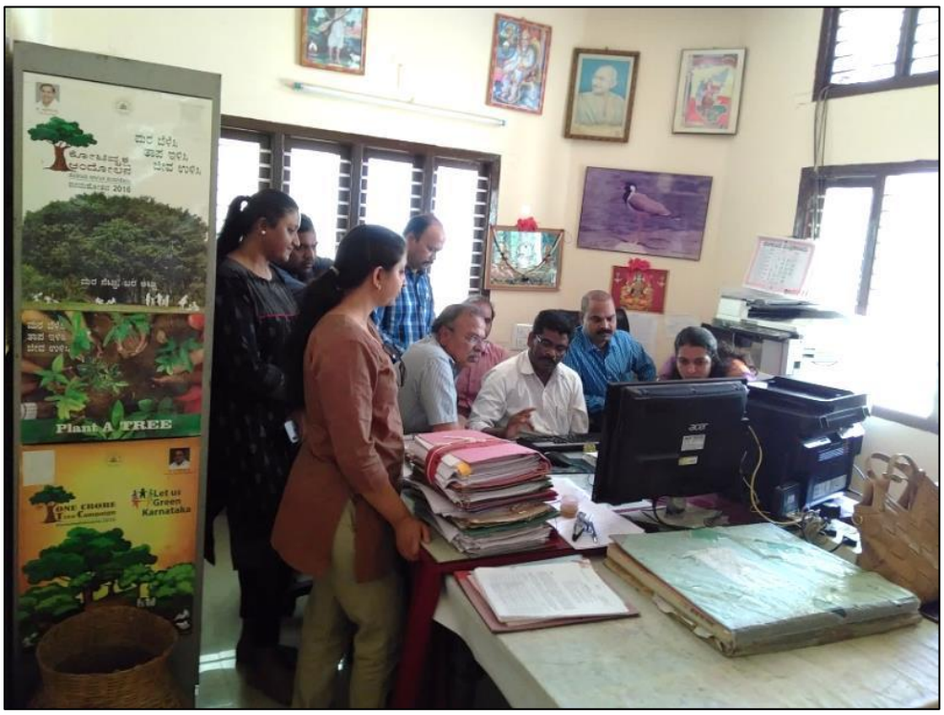

Photo 1: Secondary data entry at Chickballapur Range Office

Photo 2: Pilot test at Cubbon park

Photo 3: Primary data collection at Devanahalli range, Bangalore Rural division

Photo 4: Project Team with KFD officers at Devanahalli range, Bangalore Rural division

2.3.10 Observations of the Pilot Study

a) Plantation

The Akkupet plantation established under 13th Finance Commission raised in 2013-14 was selected for the study. This plantation followed the ANR model in 3.24 ha of land where 850 seedlings of Honge, Hippe, Mathi and Nerale were planted in pits (0.60x 0.60x0.60) with an espacement of 5m x 5m. Some records were available, while plantation journal was incomplete. Planting density was 262/ha. Maintenance was done for two years thereafter. There was no protection measure around the plantation.

One sample plot was laid to understand the details of plantation. In the sample plot, it was observed that only 7 (14.28%) out of 49 plants planted had survived, which were all Honge species. This low survival was attributed to poor soil quality and drought as explained by the local officers. There were no SMC works in this plantation and there was no VFC.

b) Other Works

Two boundary consolidation works, i.e. cattle proof trenches (CPT) were selected for the study. One work was undertaken in 2013-14 under CAMPA and another one in 2014-15 under 13th Finance. Records were available for one work, while it was not available for the other. Incidentally both works were undertaken in B.S. Gidakaval which is a Reserve Forest (predominantly eucalyptus trees) with adjoining private farm lands. CPT was done in the same forest land in 2001-02, 2006-07, 2010-11 and 2013-14. In both cases selected for study, the CPT was intact with shrub and vegetation growth in some places. It was observed that in few locations the CPT had been intentionally breached and could be easily accessed by cattle. It was understood that there was an ancient temple inside this forest, which villagers often visit. Apart from this usage, the forest boundary was maintained.

The KFD app was a useful tool that saves data entry time, besides reducing human bias. However, over the course of using the app for the field study, it was observed that some issues were still persisting (data loss, uploading issues etc.). In addition, the output tables need to be modified to suit the report requirements and in a way which can be easily tabulated, especially species-wise data. These issues were brought to the notice of KEA and KFD.

2.3.11 Interim Report

An interim report was submitted to the Karnataka Evaluation Authority on 3rd January 2020 vide email and hard copy on 14th January 2020 in addition to the agreed deliverables. The report was presented to KEA on 14th January 2020. The report presented a preview into the way in which data was analysed based on the objective of the scheme (the report was expected to answer the evaluation questions raised in the ToR, and was later modified to assess the achievements of the objectives of the schemes as suggested by KEA).

This modification necessitated gathering additional data adding to additional resources and time. At this stage, data collection was in progress, while data collection on certain aspects such as interview with officers was yet to commence, and much of the secondary data was awaited from Karnataka Forest Department. The app based primary data was yet to be provided to TERI in a usable form (especially species-wise data) and certain issues with the app still persisted. Hence, the content in this report was cursory and more in terms of being an initial template for the draft report.

2.3.12 Limitations

- Time lag between works executed and evaluation due to which some works are not amenable for evaluation
- Availability of required data and information in a timely manner
- Data maintenance and data parameters maintained are not amenable for evaluation
- Option to record non-availability of information/ work in the app
- Ambitious evaluation tasks overlays the time frame
- Resolution of some issues with the app and uploading data remained ongoing
- Delay in receiving secondary data from forest department
- There was limited response to questionnaires from KFD officers
- Shift in the focus of evaluation from answering the questions to meeting the objectives of the scheme necessitated major overhauling of data collection and hence could be carried out to a limited extent due to paucity of time
- The expectation from the study exceeds the time frame and resources allocated for the study.

3 RESULTS AND DISCUSSION

TFC has focused its thrust on providing the means for preservation, so as to halt and reverse past declines in the quantum and quality of area under forest, and to provide financial resources by which the state can enable alternative economic activities as a substitute for economic disability imposed by forest cover. TFC guidelines provide a broad framework for implementation. Apart from setting physical and financial targets for some of the activities, the KFD has not prepared a log frame for the period of evaluation.

This chapter discusses the results of the primary data collected with respect to the activities set forth in the scheme covering the following broad components/ issues as follows:

i. Development Component

a. Plantation and related works
b. Working Plan activities
c. Boundary consolidation activities
d. Infrastructure development (buildings and eco-tourism)
e. Training activities
f. Research and utilisation activities
g. ICT and mobility
h. Publicity and awareness

ii. Forestry/ Wildlife

a. Soil moisture conservation activities
b. Wildlife protection activities

In the evaluation of TFC, as per the ToR, plantations and other works were sampled. In addition, interaction was held with beneficiaries of individual benefits.

3.1 Development Component

This activity was undertaken to address the objectives of increasing forest cover of the state, improving infrastructure of the department especially for the front line staff, improving the mobility of the field staff through induction of vehicles and use of modern technology like GIS through ICT.

3.1.1 Plantation and related works

Among the 116 plantations sampled, gross area of plantation is 1641 ha (average of 14.14 ha/ plantation) and net area of plantation is 1533 ha (average of 13.22 ha/ plantation).

The TFC guidelines do not mention the criteria or benchmarks of the success of a plantation raised. However, in a previous internal evaluation report of the forestry works by the Karnataka Forest Department, weighted average survival rates of all departmental plantations sampled were used as the indicator for grading the performance[12].

i. Planning process

Plantations were raised mostly in forest areas in the sampled plantations, with the highest net planted area in Uttara Kannada (21%), followed by Mangaluru (13% each), and 11% in Shivamogga circle.

Interview with officers at the implementation, supervisory and policy level revealed that targets for the scheme were generally given in the second quarter, based on a planning meeting held in the month of February/ March. Funds were released in the second or third quarter and were adequate. They were utilized completely.

Among the plantations sampled, Annual Plan of Operations (APOs) with approved dates were available at the time of visit in 36 (31%) samples. Of these, 33% were approved before October, 39% were approved between Oct – Dec and 28% were approved after January. It may be inferred that 67% of APOs were sanctioned after planting season, .i.e. after September.

Intervention at policy level may be done to sanction APOs well in advance so that due diligence can be taken by field officers for raising quality nurseries and plantations within appropriate season.

[12] Anonymous. Evaluation of Forestry Works 2009-13, Evaluation of 13th Finance Commission Report. August 2015. Additional Principal Conservator of Forests (EWPRT), Karnataka Forest Department.

Table 10: Year-wise timeline of APO approvals

Year of planting	APO approvals timeline (no. of plantations)							Total
	Before Oct	Oct	Nov	Dec	Jan	Feb	Mar	
2011-12	5	4	1		1	1		12
2012-13	1	2	3					6
2013-14	6	1	1	2	1	4	3	18
Total	**12**	**7**	**5**	**2**	**2**	**5**	**3**	**36**
Per cent	**33**	**19**	**14**	**6**	**6**	**14**	**8**	**100**

Source: Primary data

Table 11: Circle-wise timeline of APO approvals

Circle	APO approvals timeline (no. of plantations)							Total
	Before Oct	Oct	Nov	Dec	Jan	Feb	Mar	
Belagavi					2			2
Bengaluru			1					1
Chikkamagaluru	2		1				1	4
Dharwada	1			1				2
Kalaburgi			1					1
Mangaluru			1			4	2	7
Mysuru			1					1
Shivamogga	4	6						10
Uttara Kannada	5	1		1		1		8
Total	**12**	**7**	**5**	**2**	**2**	**5**	**3**	**36**
Percent	**33**	**19**	**14**	**6**	**6**	**14**	**8**	**100**

Source: Primary data

Table 12:Work stage-wise timeline of estimate approvals

Year of planting	Sanction Date not available (no. of plantations)	Sanction Date available (no. of plantations)	Estimate approvals timeline (no. of plantations)							Total
			Before Oct	Oct	Nov	Dec	Jan	Feb	Mar	
Earth Work	80	36	2	3	2	10	6	6	7	36
			6	8	6	27	17	17	19	100
Raising Seedling	86	30	3	6	1	6	5	1	8	30
			10	20	3	20	17	3	27	100
Planting	90	26	14	3	2	3	1	2	1	26
			52	12	8	12	4	8	4	100
Total	**256**	**92**	**19**	**12**	**5**	**19**	**12**	**9**	**16**	**92**
Per cent	**74**	**26**	**21**	**13**	**5**	**21**	**13**	**10**	**17**	**100**

Source: Primary data

Estimates were available at the time of visit in 114 (98%) samples, partially available in one sample and not available in one case. Of these, 81 (70%) plantations had more than one estimate. Out of the total 348 estimates available, 92 (26%) had sanction dates, while 256

(74%) did not have dates. Overall, it was observed that 40% of the estimates were sanctioned between January – March. Among the samples that had estimates with dates, it was noticed that 6% estimates for earth work and 10% estimates for raising seedlings were approved before October, while 53% estimates for earth work and 47% estimates for raising seedlings were approved after January. In case of planting works, 54% of the estimates available with date were approved before October, while 15% were approved after January. This indicates that the sanctioning process has delays especially in advance works which affects the quality of seedlings, which may reflect on the success of the plantation.

ii. Cost Norms and Expenditure

The total and average amount spent on raising of plantations including boundary works, SMC, maintenance, earthwork, seedling and planting is as given below:

Table 13: Summary of Expenditure among Sampled Plantation

Details	Expenditure as per records (Rs.)	% of expenditure for each activity out of total planting cost (Rs.)	Avg. expenditure/ ha (Rs.)
Planting Cost (Rs.)	16777181	27	10944
Raising seedlings (Rs.)	4954960	8	3232
Earthwork (Rs.)	11897339	19	7761
Plantation Boundary work (Rs.)	4578850	7	2987
Soil moisture conservation works (Rs.)	1268234	2	827
Maintenance (Rs.)	23620722	37	15408
Total	**63097286**	**100**	**41159**

Source: Secondary data from KFD

The average expenditure per hectare was Rs. 41,159 as revealed by the records made available at the time of field visit, out of which, Rs. 827 (2% of the total cost) was expended on soil moisture conservation works. However, expenditure per hectare ranged from Rs. 13,882 to Rs. 4,88,790. Average maintenance cost of Rs. 15,408 was the major chunk of expenditure followed by planting cost of Rs. 10, 944.

Table 14: Circle-wise expenditure for Plantation Works(Rs.)

Circle	No. of planta-tions sample d	Net area of the sampled plantation (ha)	Earth work	Raising Seedling	Planting	SMC Work	Boundary protection	Mainte-nance	Total	Average per ha
Ballari	3	65	676277	153541	655850	123250	350496	1618600	**3578014**	**55046**
			19%	4%	18%	3%	10%	45%	**100%**	
Belagavi	9	153	647595	298435	985716	NA	68000	1504663	**3504409**	**22905**
			18%	9%	28%	0%	2%	43%	**100%**	
Bengaluru	4	85	606938	684263	739423	17200	NA	1402953	**3450777**	**40597**
			18%	20%	21%	0%	0%	41%	**100%**	
Chamarajanagara	3	70	411420	113058	374131	NA	NA	649575	**1548184**	**22117**
			27%	7%	24%	0%	0%	42%	**100%**	
Chikkamagaluru	10	119	1164335	305910	947481	178491	486421	1428896	**4511534**	**37912**
			26%	7%	21%	4%	11%	32%	**100%**	
Dharawada	3	90	277044	297144	552699	67300	NA	1248706	**2442893**	**27143**
			11%	12%	23%	3%	0%	51%	**100%**	
Hassana	5	104	1227500	255000	1952600	NA	253000	1453523	**5141623**	**49439**
			24%	5%	38%	0%	5%	28%	**100%**	
Kalaburgi	2	37	323934	119815	499850	90486	244030	425740	**1703855**	**46050**
			19%	7%	29%	5%	14%	25%	**100%**	
Kodagu	5	105	510529	156899	462423	154689	NA	946116	**2230656**	**21244**
			23%	7%	21%	7%	0%	42%	**100%**	
Mangaluru	26	203	1814020	836774	3521616	213584	1121352	6615066	**14122412**	**69569**
			13%	6%	25%	2%	8%	47%	**100%**	
Mysuru	2	15	8100	4895	69000	14500	NA	182258	**278753**	**18584**
			3%	2%	25%	5%	0%	65%	**100%**	
Shivamogga	13	174	1762263	758838	2396885	148024	860934	2491301	**8418245**	**48381**
			21%	9%	28%	2%	10%	30%	**100%**	
Uttara Kannada	31	314	2467384.1	970388	3619507.3	260710	1194616.6	3653325	**12165931**	**38751**
			20%	8%	30%	2%	10%	30%	**100%**	
Total	**116**	**1533**	**11897339**	**4954960**	**16777181**	**1268234**	**4578850**	**23620722**	**63097286**	**41159**
Per cent			**19**	**8**	**27**	**2**	**7**	**37**	**100**	

Source: Secondary data from KFD

Note: ND – Details not available during field visit. In some cases, documents were not available at the time of visit, hence average may not be comprehensive

Analysis of the activities in raising plantations in the study period has indicated that Chamarajanagara circle invested 27% of the total cost on earthwork whereas Mysuru, Dharawada and Mangaluru circle showed the least (3% , 11% and 13% respectively).

Bengaluru circle spent 20% of the total cost for raising the seedlings, whereas, Mysuru, Ballari and Hassana circles indicated only 2%, 4% and 5% respectively. Similarly, planting cost varied from 38% in Hassana to 18% in Ballari circle. Likewise, boundary protection was at the cost of 14% in Kalaburgi, whereas it was 2% in Belagavi. Cost of maintenance was highest in Mysuru circle, i.e. 65% and lowest in Kalaburgi, i.e. 25%. Soil moisture conservation appears to be the least priority as indicated by the cost incurred, i.e. 2% expenditure in Shivamogga and Uttara Kannada, on the contrary 7% was spent in Kodagu circle.

Table 15: Cost Norms for Planting Technique Models for Various Agro-Climatic zones[13]

Planting Technique Model	Details							
	Advance works (Rs. /ha)	Planting Cost (Rs./ha)	Maintenance (Rs./ha)					
			1	2	3	4	5	Total
ER IA (all zones)	13000	-	1400	1400	1400	-	-	**17200**
ANR IB (Transitional/ Malnad/ Coastal)	24300	10150	4670	3600	3600	3600		**49920**
ANR IB (Dry)	24550	9410	4170	3270	3270	3270	-	**47940**
AR II A (Dry)	30420	17370	6780	2930				**57500**
AR IIB & IIC (Dry & Transition)	31020	17975	6820	2930	-	-	-	**58745**
AR IIC, IID, IIE, IIG (Transitional/ Malnad/ Coastal)	28580	13940	7000	2950	-	-	-	**52470**
AR IID (moderate to high fertile area in Transitional zone)	27865	19080	9000	5400	-	-	-	**61345**
Others IIG, IIH, IIG, IIF (Teak in Malnad, lateritic soil & foreshore)	36250	14820	7420	4740	-	-	-	**63230**
NTFP Model-III (all zones) 100 plants	23300	14100	-	3570	3260	3260	3260	**50750**
NTFP Model-III (all zones) 275 plants	41050	17750		4700	3850	3850	3850	**75050**
Sandal estate IVA (Regeneration)	-	8937710	452710	452710	452710	452710	-	**10748550**
Sandal estate (Raising plantation)	34500	34549	16510	4810	4810	4810	4810	**104799**
Sandal estate (Raising Monsoon plantation)	-	47400	-	-	-	-	-	**47400**
Institution and School	12050	15450	-	1400	500	500	500	**30400**
Greening of urban areas VI (raising plantation in advanced worked areas)	-	35850	24100	700	700	700	700	**62750**
Greening of urban areas VI (raising of monsoon plantation)	-	42300	24100	700	700	700	700	**69200**
Roadside and Canal Bank – VII/VIII	23850	39900	28450	24150	23525	23525	23525	**186925**

Source: Secondary data from KFD

[13] Anonymous. 2012. Species and Planting Technique Models. General Guidelines 2012. Karnataka Forest Department. Government of Karnataka.

Table 16: Average expenditure per ha as per sampled plantations

Rs. Per hectare

Plantation Model	No. of plantation	Net plantation area (ha)	Advance work / ha	Planting work/ha	Maintenance/ha	Total
ANR Model-I(B)	49	755	14230	9481	12538	36249
AR Model-II(A)	21	308	15290	10138	13609	39037
AR Model-II(B)	8	135	11526	8215	11533	31274
AR Model-II(C)	2	6	29714	26287	20450	76451
AR Model-II(D)	3	34	9877	3289	7151	20317
AR Model-II(F)	3	45	21780	15156	22507	59443
AR Model-II(H)-Coastal Zone	16	117	14871	16544	18438	49853
ER Model-I(A)	3	95	13884	5349	12118	31351
NTFP Model-III	1	10	17662	36930	15509	70101
Roadside Planting Model(RSP)-VII	10	29	33418	56112	123113	212643
Total	**116**	**1533**				

Source: Primary data

Based on the available information collected from secondary sources such as plantation journals, the expenditure incurred for various models is given above.

iii. Soil Moisture Conservation

Among the plantations sampled, 28 (24%) plantations had SMC structure despite the fact that most models have a budgetary allocation for SMC work ranging from 14-25% of the advance work cost allocated per hectare. Among the structures observed, three structures were damaged and not serving the intended purpose, while the others were found to be useful. The construction quality of 15 (56%) structures were satisfactory, 10 (37%) structures were good, while two (7%) were not satisfactory.

Table 17: Details of SMC works in Sample Plantations (n=116)

Type of structure	No. of Structure	Average cost per structure (Rs.)
Gully checks/plugs	4	46159
Nala bunds	1	93250
Percolation ponds	5	42485
Rain water harvesting trenches	21	37044
Total	**31**	

Source: Primary data

iv. Monitoring

This section discusses the status of plantation journals and monitoring of the plantations by various levels of officers such as Assistant Conservator of Forests (ACF), Deputy Conservator of Forests (DCF), Chief Conservator of Forests (CCF) and Assistant Principal Chief Conservator of Forests (APCCF).

Plantation journals were available in 112 samples (except two in Shivamogga, one in Uttara Kannada and one in Mysuru) and field note book was available in all samples at the time of visit. Among these, 11 (10%) had partial details, 99 (88 %) samples had complete details, while 5(3%) had no details.

Among the plantations sampled, 61 (53%) plantations were inspected by a senior officer as recorded in the respective plantation journals. The details are furnished below. Among the sample plantations, 58 plantations (50%) journals had notes recorded by ACFs and 15 journals (13%) were recorded by DCF. This indicates that there is a need to document the visits with recommendations of senior level officers for effective implementation in the plantation journals.

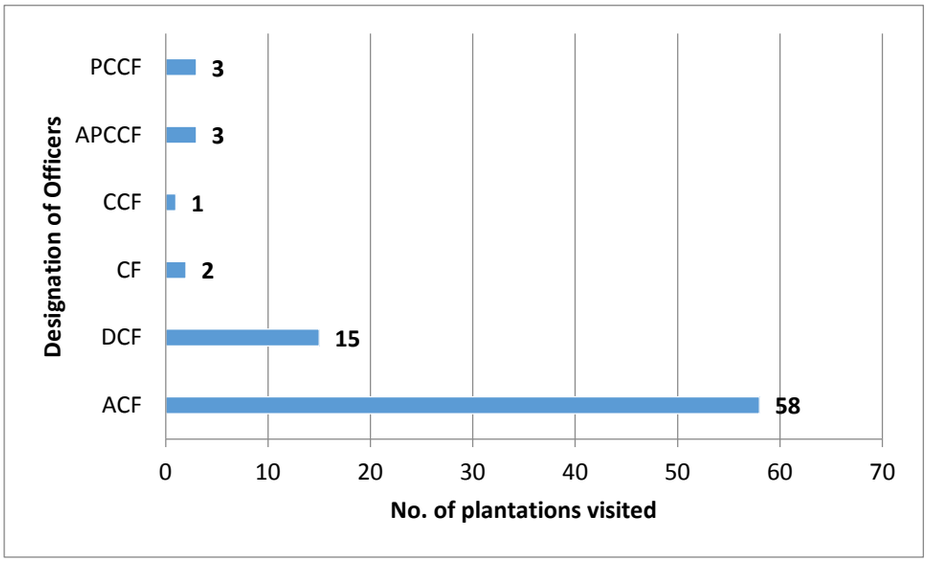

Chart 1: Inspection of Plantation by Senior Officers (n=116)

v. Involvement of Community

Among the 116 plantations sampled, 23 (20%) had Joint Forest Management Committee (JFMCs), of which only 8 (35%) plantations were raised in JFM area. These included, four in Chikkamagaluru, two in Uttara Kannada and two in Mangaluru. Among these only two JFMCs in Sirsi division, Uttara Kannada circle were involved in some of the plantation activities, namely Takeleri Village Forest Committee, Valgod Gram Panchayat, Kyadgi T range and Saraguppa Village Forest Committee, Devanahalli Grama Panchayat, Janmane T range. Both VFCs were involved in advance work, approval of planting work, supervising planting work, and maintenance.

vi. Planting Models and Species Planted

Table 18: Circle-wise and Model-wise plantations sampled

Circle	Total plantation sampled	ANR Model-I(B)	AR Model-II(A)	AR Model-II(B)	AR Model-II(C)	AR Model-II(D)	AR Model-II(F)	AR Model-II(H)-Coastal Zone	ER Model-I(A)	NTFP Model-III	Roadside Planting Model (RSP)-VII
Ballari	3	1	2								
Belagavi	9	5	4								
Bengaluru	4	2		2							
Chamarajanagara	3	3									
Chikkamagaluru	10	6	2			2					
Dharawada	3	2							1		
Hassana	5	5									
Kalaburgi	2		2								
Kodagu	5		5								
Mangaluru	26	10	1					6			9
Mysuru	2	1	1								
Shivamogga	13	3	3	1		1	3		1	1	
Uttara Kannada	31	11	1	5	2			10	1		1
Total	**116**	**49**	**21**	**8**	**2**	**3**	**3**	**16**	**3**	**1**	**10**
Per cent		**42**	**18**	**7**	**2**	**3**	**3**	**13**	**3**	**1**	**8**

Source: Primary data

It may be observed from the above table that ANR Model I (B) was the model used in majority (42%) of the sampled plantations, followed by AR Model II (A) in 18% plantations and 13% of AR Model II (H) plantations.

Table 19: Planted species in the scheme

Listed in order of highest occurrence in sampled plots

Sl. No.	Species	Species Count	Per cent
1.	Others	192	10
2.	Nerale *(Syzygium sp)*	107	6
3.	Honge *(Pongamia pinnata)*	106	5
4.	Acacia *(Acacia auriculiformis)*	100	5
5.	Mathi *(Terminalia spp)*	78	4
6.	Dhoopa *(Vateria indica)*	74	4
7.	Nelli *(Emblica officianalis)*	68	4
8.	Honne *(Pterocarpus marsupium)*	65	3
9.	Maavu *(Mangifera indica)*	65	3
10.	Simethangadi *(Cassia siamia)*	54	3
11.	Tare *(Terminalia Belerica)*	49	3
12.	Mahagony *Swietenia mahagoni)*	46	2
13.	Shivane *(Gmelina arboria)*	45	2
14.	Nandi *(Legarstroemia lanceolata)*	41	2
15.	Hebbalasu *(Artocarpus hirsuta)*	38	2
16.	Kindal *(Terminalia paniculata)*	38	2
17.	Bevu *(Azadirachta indica)*	37	2
18.	Sisso *(Dalbargia sisso)*	36	2
19.	Bamboo *(Bambusa spp)*	34	2
20.	Halsu *(Artocarpus integrifolia)*	34	2
21.	Hole mathi *(Terminalia arjuna)*	34	2
22.	Glyrecedia *(Glyrecedia sp)*	31	2
23.	Seemaruba *(Simarouba glauca)*	31	2
24.	Tapsi *(Holoptelia integrifolia)*	30	2
25.	Teak *(Tectona grandis)*	30	2
26.	Eucalyptus *(Eucalyptus globulus)*	25	1
27.	Tamarind *(Tamarindus indica)*	24	1
28.	Dindal *(Anogeissus latifolia)*	21	1
29.	Beete *(Dalbargia latifolia)*	20	1
30.	Bogi *(Hopea parviflora)*	20	1
31.	Hulgal *(Alstonia scholaris)*	20	1
32.	Kamara *(Hardwickia binata)*	20	1
33.	Karadi*(Chukrasia tabularis)*	19	1
34.	Rampatre*(Myristica malabarica)*	18	1
35.	Gulmavu *(Machilus macranta)*	17	1
36.	Kakke *(Cassia fistula)*	17	1
37.	Karijali *(Prosopis juliflora)*	16	1
38.	Sampige *(Michelia champaka)*	16	1
39.	Canes *(Calamus sp)*	15	1
40.	Banyan *(Ficus benghalensis)*	14	1

Sl. No.	Species	Species Count	Per cent
41.	Dalchinni *(Cinnomomum zeylenicum)*	12	1
42.	Holedasavala *(Lagerstromea speciosa)*	12	1
43.	Vaate *(Artocarpus lacucha)*	12	1
44.	Athi *(Ficus racemosa)*	11	1
45.	Hippe *(Bassia latifolia)*	11	1
46.	Muttuga *(Butea monosperma)*	11	1
47.	Garcinia *(Garcinia indica)*	10	1
48.	Sandal *(Santalum album)*	10	1
49.	Bharanigi *(Vitex ultissima)*	8	0
50.	Kaayi mara *(Callophyllum inophyllum)*	8	0
51.	Cashew *(Anacardium occidentale)*	8	0
52.	Kaval *(Careya arborea)*	8	0
53.	Bolpale *(Alstonia scholaris)*	7	0
54.	Murugal *(Garcinia indica)*	7	0
55.	Kandelia candel *(Kandelia candel)*	6	0
56.	Rhizophora apiculata *(Fagara budrunga)*	6	0
57.	Agavu *(Agave americana)*	5	0
58.	Antuvala *(Sapindus emerginatus)*	5	0
59.	Mangrove	5	0
60.	Arali *(Ficus religiosa)*	4	0
61.	Banni *(Prosopis cineraria)*	4	0
62.	Gandagarige *(Alstonia scholaris)*	4	0
63.	Kadu amate *(Spondias pinnata)*	4	0
64.	Seetaphala *(Annona squamosa)*	4	0
65.	Badam *(Terminalia catappa)*	3	0
66.	Gaali mara *(Cassurina equisetifolia)*	3	0
67.	Banpu*(Terminalia tomentosa)*	2	0
68.	Bobbi *(Lophopetalum whitianum)*	2	0
69.	Halmaddi *(Ailanthus malabarica)*	2	0
70.	Uppage *(Garcinia gummi-gutta)*	2	0
	Total	**1941**	**100**

Source: Primary data

Note: Species count – number of plots in which the species has occurred in the sampled plantations

About 110 species of plants were noticed during the study, of which 70 species are listed in the above table in the frequency of occurrence, of which Nerale appears 107 times followed by Honge, Acacia, Mathi and Dhoopa which occurred 106, 100, 78, and 74 times respectively. It may be noted that the native species like Nerale, Honge, Mathi, Dhoopa, Nelli, Honne etc. were the most predominantly planted species but for introduced species like Acacia and Mahagony which were planted on a large scale by Forest Department in earlier days.

Table 20: Circle-wise distribution of Planted Species

(Species count – number of plots in which the species has occurred in the sampled plantations)

Circle	Species Count											
	Acacia *(Acacia auriculiformis)*	Bevu *(Azadirachta indica)*	Dhoopa *(Vateria indica)*	Eucalyptus *(Eucalyptus globulus)*	Glyrecedia *(Glyrecedia spp)*	Honge *(Pongamia pinnata)*	Karadi *(Chukrasia tabularis)*	Nerale *(Sizyzium sps)*	Sisso *(Dalbargia Sisso)*	Others	**Total**	**Per cent**
Ballari		3				13			5	38	**59**	**3**
Belagavi	11	5	11		5	4		11	16	146	**209**	**11**
Bengaluru	5	10				17		5	10	79	**126**	**6**
Chamarajanagara		6			10	13				32	**61**	**3**
Chikkamagaluru	6		14			1		15		123	**159**	**8**
Dharawada	10	10		5	3	8		10		67	**113**	**6**
Hassana	8			15		9				46	**78**	**4**
Kalaburgi					13	8				21	**42**	**2**
Kodagu						5	15	5		145	**170**	**9**
Mangaluru	11		35			6	4	20		237	**313**	**16**
Mysuru	2	3				1		2		9	**17**	**1**
Shivamogga	21		1	5		12		9		78	**126**	**6**
Uttara Kannada	26		13			9		30	5	385	**468**	**24**
Total	**100**	**37**	**74**	**25**	**31**	**106**	**19**	**107**	**36**	**1406**	**1941**	**100**
Per cent	**5**	**2**	**4**	**1**	**2**	**5**	**1**	**6**	**2**	**72**	**100**	

Source: Primary data

Note: 'Others' includes miscellaneous species separately listed in the android and listed in the previous table which have been combined for analysis. The remaining species listed above individually have been chosen based on the highest frequency of occurrence amongst the circles sampled, so as to gain an understanding of the most commonly planted species in each circle.

A wide variety of around 110 species were planted across the plantations sampled, indicating that due importance was given to local species. Among the plantations sampled, across the circles it may be inferred that apart from a combination of about 45-50 combined as 'others', Honge was the most commonly planted species, followed by Nerale and Acacia. Dhoopa, Bevu, Eucalyptus, Glyricidia, Sisso and Karadi constituted a smaller proportion comparatively.

vii. Protection and Maintenance

This section discusses the availability, types and status of protection measures, damages to plantation and their causes, number of years plantation was maintained as against the provision of various models and number of plantations where casualty replacement was done.

Table 21: Details of Boundary Protection Measures

Type of Protection	No. of structures	Status of Protection measures (No. of plantations)			
		Breached/ Filled with vegetation (CPT)	Good	Rusted	Breached
Barbed wire fence with wooden posts	38		3	8	27
Brush wood	7				7
CPT	25	13	12		
Tree guards	1		1		
Total	**71**	**13**	**16**	**8**	**34**
Per cent		**18**	**23**	**11**	**48**

Source: Primary data

The above table helps us understand the types of protection works that were carried out and their condition at the time of study. Just 66 plantations (57%) of the sampled plantations had boundary protection measures, where one plantation had two types of protection. Among these, 23% were good condition, 18% were filled with vegetation at the time of visit, while 48% were breached and 11% were rusted.

Table 22: Circle-wise type of protection

Circle	Barbed wire fence with wooden posts	Brush wood	Cattle proof trench (CPT)	Tree guards	Total
Ballari			3		3
Belagavi	1		1		2
Bengaluru					
Chamarajanagara					
Chikkamagaluru	7	1			8
Dharawada					
Hassana	2		1		3
Kalaburgi			2		2
Kodagu					
Mangaluru	4	2	8	1	15
Mysuru					
Shivamogga	7		3		10
Uttara Kannada	16	2	3		21
Total	**38**	**7**	**25**	**1**	**71**
Percent	**54**	**10**	**35**	**1**	**100**

Source: Primary data

It may be seen from the above table that boundary protection measures were visible at all circles except in Bengaluru, Chamarajanagraa, Dharawada, Kodagu and Mysuru circle as per the records at the time of visit. In Chikkamagaluru, Shivamogga and Uttara Kannada, barbed wire fence with wooden posts were adopted, while the measures adopted in other circles were varied. Apart from barbed wire fencing, cattle proof trenches were the most common boundary protection adopted.

Table 23: Model-wise maintenance of plantations

Plantation Model	Model provisions	No. of years plantation maintained						
		No details	1	2	3	4	5	Total
ANR Model-I(B)	4	3	4	18	22	2		49
AR Model-II(A)	2		3	8	8	1	1	21
AR Model-II(B)	2	1		2	3	2		8
AR Model-II(C)	2			2				2
AR Model-II(D)	2			2	1			3
AR Model-II(F)	2				3			3
AR Model-II(H)-Coastal Zone	2	2	5	2	7			16
ER Model-I(A)	3	1		1	1			3
NTFP Model-III	4			1				1
Roadside Planting Model(RSP)-VII	5				6	2	2	10
Total		**7**	**12**	**36**	**51**	**7**	**3**	**116**
Per cent		**6**	**10**	**31**	**44**	**6**	**3**	**100**

Source: Primary data

Table 24: Circle-wise maintenance of plantations

Circle	No. of years plantation maintained						
	No details	**1**	**2**	**3**	**4**	**5**	**Total**
Ballari				3			3
Belagavi			5	4			9
Bengaluru				2	2		4
Chamarajanagara	1		1	1			3
Chikkamagaluru		2	5	2		1	10
Dharawada			1	2			3
Hassana			1	3	1		5
Kalaburgi		1	1				2
Kodagu		1	4				5
Mangaluru		2	1	18	3	2	26
Mysuru				2			2
Shivamogga	2	1	3	6	1		13
Uttara Kannada	4	5	14	8			31
Total	**7**	**12**	**36**	**51**	**7**	**3**	**116**
Per cent	**6**	**10**	**31**	**44**	**6**	**3**	**100**

Source: Primary data

Among the plantations sampled, 44% were maintained for three years and 31% for two years and 10% for one year. Interestingly, in 6% samples there were no details/ related documents pertaining to maintenance.

Even though ANR Model I (B) provides for maintenance up to four years, only two out of 49 plantations sampled were maintained for four years; AR Model II (A) provides for two-year maintenance, but 8 out of 21 plantations were maintained for three years and one plantation up to 5 years; Road side planting model provides for 5 years maintenance, 6 plantations out of 10 were maintained up to 3 years and 2 plantations up to 5 years. It must be noted that these observations are based on maintenance documents provided at the time of field visit.

Table 25:Circle-wise and Model-wise casualty replacement

Circle	ANR Model-I(B)	AR Model-II(A)	AR Model-II(B)	AR II Model II (C)	AR Model-II(D)	AR Model-II(F)	AR Model-II(H)-Coastal Zone	ER Model-I(A)	NTFP Model-III	Roadside Planting Model(RSP)-VII	Total
Ballari	1	2									3
Belagavi	4										4
Bengaluru	2		2								4
Chamarajanagara	1										1
Chikkamagaluru	6	2			2						10
Dharawada	2							1			3
Hassana	5										5
Kalaburgi		2									2
Kodagu		4									4
Mangaluru	10	1					6			9	26
Mysuru	1	1									2
Shivamogga	2	3	1		1	3			1		11
Uttara Kannada	9	1	3				9	1		1	24
Total plantations where casualty replacement has been done	**43**	**16**	**6**	**0**	**3**	**3**	**15**	**2**	**1**	**10**	**99**
Model wise No. of plantations sampled	**49**	**21**	**8**	**2**	**3**	**3**	**16**	**3**	**1**	**10**	**116**
Per cent	**88**	**76**	**75**	**0**	**100**	**100**	**94**	**67**	**100**	**100**	**85**

Source: Primary data

Among the plantations sampled, casualty replacement was done in 99 plantations (85%). Casualty replacement was done mostly in Uttara Kannada circle and Mangaluru circles.

viii. Success/ Survival

Most evaluation reports brought out earlier by the KFD have explained success of plantations in terms of survival of the plants[14] and in some cases the health of plants such as girth have been considered to rate the performance of plantations[15].

[14] Anonymous. April 2014. Internal Evaluation Report of 2007-08 Works. Karnataka Forest Department.

[15] Anonymous. August 2015. National Bamboo Mission (NBM) Report, Evaluation of Forestry Works 2009-2013, Karnataka Forest Department

Table 26:Circle-wise status of plantations and survival percentage

Circle	No. of plantation sampled	SMC Available		Boundary protection available		Watch and ward		State of Health (% out of seedlings survived)			Survival %
		No. of plantation	%	No. of plantation	%	No. of plantation	%	Good	Satisfactory	Poor	
Ballari	3	2	67	3	100	3	100	3	41	57	37
Belagavi	9		0	2	22	9	100	41	45	14	78
Bengaluru	4	1	25		0	4	100	76	24	0	73
Chamarajanagara	3		0		0	3	100	23	2	57	50
Chikkamagaluru	10	5	50	9	90	10	100	37	33	30	45
Dharawada	3	1	33		0	3	100	93	7	0	85
Hassana	5	1	20	3	60	5	100	95	0	5	97
Kalaburgi	2	2	100	2	100	2	100	91	9	0	52
Kodagu	5	3	60		0	5	100	21	67	11	59
Mangaluru	26	7	27	16	62	26	100	49	37	14	62
Mysuru	2	1	50		0	1	50	6	35	59	26
Shivamogga	13	2	15	10	77	11	85	43	32	24	63
Uttara Kannada	31	3	10	21	68	30	97	32	46	22	47
Total	**116**	**28**		**66**		**112**		**45**	**35**	**20**	**59**
Per cent			**24**		**57**		**97**				

Source: Primary data

It may be inferred from the above table that among the plantations sampled, 24% had SMC structures, boundary protection was available in 57% samples, 97% plantations had watch and ward. Among the seedlings surviving in the sample plots, 45% were found to be in good condition, 35% were satisfactory and 20% were poor. The overall survival percentage across the circles was 59%. Interestingly, the plantation sampled in Hassan had 97% survival, followed by 85% in Dharawada circle. Mysuru circle with two plantations and Ballari circle with three plantations showed poor survival percentage 26% and 37% respectively. Both the circles had Honge and Bevu as main species. They had provided maintenance, watch and ward and boundary protection also, however, breaching and grazing was also recorded which appeared to be the case for low survival percentage. In Hassana circle 95% seedlings were in good health, followed by 93% in Dharawada circle. In Mysuru 59% seedlings were in poor health at the time of field visit, which also reflected in the least survival in this circle. The hypothesis that there is variation in survival percentage of plantations across the different forest circles was found to be true.

Table 27:Model-wise survival percentage

Plantation Model	No. of plantations sampled	Total seedlings Survived	No. of empty pits	Total planted	Survival %
ANR Model-I(B)	49	5364	2633	7997	67
AR Model-II(A)	21	2398	2385	4783	50
AR Model-II(B)	8	994	1085	2079	48
AR Model-II(C)	2	101	126	227	44
AR Model-II(D)	3	69	40	109	63
AR Model-II(F)	3	1052	397	1449	73
AR Model-II(H)-Coastal Zone	16	9260	9221	18481	50
ER Model-I(A)	3	603	217	820	74
NTFP Model-III	1	80	164	244	33
Roadside Planting Model(RSP)-VII	10	4903	1280	6183	79
Total	**116**	**24824**	**17548**	**42372**	**59**

Source: Primary data

It may be observed from the above table that higher survival percentage was found in Roadside plantation (all in Kundapura T and Mangaluru T divisions in Mangaluru circle), followed by Eco-restoration model and ANR Model –I (B). Least survival was observed in NTFP model III, AR Model-II (C) and AR Model –II (B). NTFP Model III was sampled in one plantation at Channagiri T range, Bhadravathi division wherein Acacia, Eucalyptus and Simethangadi were planted in an area of 10 ha.

Table 28: Survival based on progressing age

No. of years maintained	No. of plantation	Survival %
5	3	86
4	7	84
3	51	58
2	36	61
1	12	51
No details*	7	30

Source: Primary data

* Data on maintenance not made available during field visit

The above table indicates that plantations with five years of maintenance had the highest survival rate at 86%, followed by 84% in plantations maintained for four years. The plantations maintained for one year had 51% survival, which is the least.

Table 29: Survival based on year of planting

Year of planting	No. of plantations	Survival %
2010-11	2	37
2011-12	35	48
2012-13	26	58
2013-14	36	71
2014-15	14	80
2015-16	3	78

Source: Primary data

The above table indicates wide variations in the percentages of survival, from 37% for the plantations planted in 2010-11 to 80% for the plantations of 2014-15. Similarly, the subsequent years also indicate variations from 48% to 78%.

Good survival was seen in three plantations of 2015-16 which included, two JFMCs in Sirsi division, Uttara Kannada circle were involved in plantation activities, namely Takeleri Village Forest Committee, Valgod Gram Panchayat, Kyadgi T range and Saraguppa Village Forest Committee, Devanahalli Grama Panchayat, Janmane T range and one plantation in Amarapur, Hullur Gram Panchayat, Shirahatti T range, Gadag Division, Dharawada circle.

Table 30:Species-wise survival percentage

Species	Total Survived	Total Planted	Survival %
Acacia *(Acacia auriculiformis)*	3718	5606	66
Bevu *(Azadirachta indica)*	129	182	71
Dhoopa *(Vateria indica)*	887	1225	72
Eucalyptus *(Eucalyptus spp)*	1198	1228	98
Glyrecedia *(Glyrecedia spp)*	691	1036	67
Honge *(Pongamia pinnata)*	880	1661	53
Karadi*(Chukrasia tabularis)*	14	22	64
Nerale *(Sizyzium sp.)*	286	713	40
Sisso *(Dalbargia sisso)*	41	48	85
Others	16980	30651	55
Total	**24824**	**42372**	**59**

Source: Primary data

The overall survival was 59%. It may be seen from the above table that overall survival of Eucalyptus *(Eucalyptus spp)* was the highest at 98%, followed by 85% survival of Sisso (*Dalbargia sisso)* and 72% survival of Dhoopa *(Vateria indica).* The least survival was seen in *Nerale (Sizyzium sp.)* at 40%. Interestingly, Honge *(Pongamia pinnata)* which was the most common species planted had 53% survival.

Table 31:Circle-wise and species-wise survival percentage

CG – Average Collar girth in cms, H – Average height in mtrs, S% - Survival percentage

Circle		Ballari	Belagavi	Bengaluru	Chamaraja nagara	Chikka magaluru	Dharawada	Hassana	Kalaburgi	Kodagu	Mangaluru	Mysuru	Shivamogga	Uttara Kannada	Total
Acacia (*Acacia auriculiformis*)	CG		18.6	18.2		15.5	5.8	15.6			25.6	0	19.1	15	16.5
	H		3	2.5		2.5	1.8	8.8			6.5	1.5	5.4	3.8	4.3
	S %		95	97		43	85	97			72		66	49	66
Bevu (*Azadirachta indica*)	CG		8	5	0		6					1			4
	H		3	1	0		2					1			1
	S %		84	50	11		83					20			71
Dhoopa (*Vateria indica*)	CG		1			3					9		8	5	6
	H		0			1					2		4	3	2
	S %		100			37					84		100	41	72
Eucalyptus (*Eucalyptus spp*)	CG						22	29							22
	H						4	9							6
	S %						81	99							98
Glyrecedia (*Glyrecedia spp*)	CG				8		13		4						5
	H				3		3		1						2
	S %				69		95		84						67
Honge (*Pongamia pinnata*)	CG	8	2	7	1	0	7	3	6	14	8	3	8	1	6
	H	1	1	1	1	0	2	1	1	1	1	2	1	0	1
	S %	35	24	47	11		85	84	52	57	92	78	66	100	53
Karadi(*Chukrasia tabularis)*	CG									1	1				1
	H									0	0				0
	S %									71	50				64
Nerale	CG		2	0		5				2	3	12	8	3	3

Circle		Ballari	Belagavi	Bengaluru	Chamaraja nagara	Chikka magaluru	Dharawada	Hassana	Kalaburgi	Kodagu	Mangaluru	Mysuru	Shivamogga	Uttara Kannada	Total
(*Syzygium sps*)	H		1	0		2				0	1	2	1	1	1
	S %		83			30				20	63	25	41	34	40
Sisso (*Dalbargia sisso*)	CG	4	2												2
	H	1	1												1
	S %	100	85												85
Others	CG	10	1	6	2	2	3	4	4	2	7	11	6	3	4
	H	1	1	1	1	1	1	1	1	1	2	1	1	1	1
	S %	37	64	80	44	51	83	93	40	59	60	14	59	47	55

Source: Primary data

The above table indicates that Mathi had the highest survival (98%) with an average height of 9.0 mtr in Hassana with an average girth of 29 cms. Sisso with a survival of 85% varied in its collar girth from 2cms (Belagavi) to 4.0cms (Ballari) with an average height of one metre. Honge had the highest average collar girth of 14 cms in Kodagu, while average height was highest in Mysuru at 2 mtrs. Similarly Acacia had the highest average collar girth of 18.6 in Belagavi and average height of 8.8 mtrs in Hassana circle.

Table 32: Details of Rootstock

Circle	Total No. of plots laid	Rootstock available (No. of plots)	Total No. of stems with collar girth 2-10cms	Average No. of stems per plot	Average Collar Girth cms	Average Height mtr
Ballari	13	10	143	14	5	1.0
Belagavi	32	0				
Bengaluru	17	9	26	3	3	0.6
Chamarajanagara	14	6	10	2	2	1.7
Chikkamagaluru	24	23	191	8	4	1.8
Dharawada	18	2	18	9	1	0.3
Hassana	22	17	80	5	5	1.3
Kalaburgi	8	0				
Kodagu	21	0				
Mangaluru	46	32	500	16	3	0.9
Mysuru	3	0				
Shivamogga	35	24	188	8	4	1.3
Uttara Kannada	68	45	637	14	3	1.0
Total	**321**	**168**	**1793**			

Source: Primary data

Overall rootstock was available in 52% of the sample plots laid. The above table reveals that rootstock was nil in Belagavi, Kalaburgi, Kodagu and Mysuru circles in the sampled plots, moderate in Ballari and Hassana circle. The average number of stems per plot ranged from 2 in Chamarajanagara and Dharawada to 16 in Mangaluru circle.

Table 33: Details of Natural trees

Plantation Model	Survival %	Total No. of plots laid	Total No. of stem with GBH above 10 cms	Average No. stems per plot	Average GBH	Average Height (mtrs)
ANR Model-I(B)	66	155	802	5	39	6
AR Model-II(A)	71	64	272	4	18	5
AR Model-II(B)	72	27	191	7	31	6
AR Model-II(C)	98	2	0	0	0	0
AR Model-II(D)	67	7	75	11	77	11
AR Model-II(F)	53	9	153	17	15	5
AR Model-II(H)-Coastal Zone	64	26	18	1	20	2
ER Model-I(A)	40	19	569	30	66	14
NTFP Model-III	85	2	6	3	45	6
Roadside Planting Model(RSP)-VII	55	10	21	2	9	1
Total		**321**	**2107**	**7**	**33**	**6**

Source: Primary data

The average GBH and height in natural trees was highest in ER Model – I (A). It may be inferred from the above table that the presence of natural trees has a direct impact on the survival, i.e. lesser the natural trees per plot, better the survival of planted species.

Photo 5: Kamanahalli plantation, Hangal range, Haveri division, Dharwad circle
Marking corners of sample plot with wooden pegs

Photo 6: Karnedoddi plantation, Cowdally range, Cauvery WL division, Chamarajanagar circle
Measuring and laying sample plots

Photo 7: Amdalli Kantriwada plantation, Karwar range, Karwar division, Uttara Kannada circle
Marking and laying sample plot in mangrove plantation

Photo 8: Somanmaraddi plantation, Devadurga range, Raichur division, Kalaburgi circle
Measuring height of planted saplings

Photo 9: Malllikere Kulashekara plantation, Mangalore range, Mangalore division & circle
Measuring collar girth of seedlings planted on the road side

Percolation trenches when carried out in the appropriate location and in a qualitative manner are effective and modest water conservation techniques and aid in natural regeneration

Photo 10: Surapalli plantation, Bagepalli range, Chikkaballapur division, Bengaluru circle
Percolation trenches filled with water. Stabilised bunds with vegetation

Photo 11: Vilasbandar plantation, Gopshitta range, Karwar division, Uttara Kannada circle
Mangrove plantation

Good variety of local species are planted by the department, thus creating a conducive environment for flora and fauna, enhancing the biodiversity of the location

Photo 12: Shedgali plantation, Khanapur range, Belagavi division and circle
Good variety of local species planted

3.1.2 Planning and Records of Other Works

Records such as the Annual Plan of Operation (APO), Estimate, Field Note Books, Completion certificate were perused to understand the timeliness of approvals and completeness of the records

Table 34: Status of Availability of Annual Plan of Approval

Circle	Details of Records Available during Field visit (% of records available)	
	Work approved in APO	APO date available
APCCF (WP)	100	89
APCCF(HRD)	100	100
Ballari	100	75
Bengaluru	100	0
Chamarajanagara	100	100
Chikkamagaluru	100	100
Dharawada	100	100
Hassana	100	100
Kalaburgi	100	100
Kodagu	100	100
Mangaluru	89	83
Mysuru	100	100
Shivamogga	100	100
Uttara Kannada	100	74
Total	**97**	**88**

Source: Primary data

With regards to the planning process, majority of the works sampled were approved in APOs, while in few cases, APOs were not made available at the time of field visit, especially for four works in Mangaluru circle. Among the APOs available at the time of field visit, 88% of the documents had dates. The timeline of APO approvals is provided in the table below. In some cases in Working plan division, Ballari and Uttara Kannada APOs were available without the covering letter, hence the dates of approval were not clear.

Table 35:Year-wise timeline of APO approvals

Year of planting	APO approvals timeline (no. of works)							Total
	Before Oct	Oct	Nov	Dec	Jan	Feb	Mar	
2013-14	**8**	**12**	**2**	**14**	**6**	**8**	**7**	57
2014-15	**9**	**6**	**11**	**11**	**7**	**7**	**13**	64
Total	**17**	**18**	**13**	**25**	**13**	**15**	**20**	121
Percent	**13**	**15**	**11**	**21**	**11**	**12**	**17**	**100**

Source: Primary data

Among the works sampled, 14% works were approved prior to October which is the middle of the financial year. Nearly 47% works were approved between October to December, while 40% APOs were approved in the last quarter of the financial years. This indicates that approvals were delayed in several cases and works may have been executed prior to APO approvals also.

Table 36: Status of Availability of Field Note Books and Completion Certificates

Circle	Details of Records Available during Field visit (% of records available)	
	Field Note Book with Check measurement date	Completion certificate with date
APCCF (WP)	96	93
APCCF(HRD)	0	0
Ballari	100	0
Bengaluru	0	0
Chamarajanagara	67	0
Chikkamagaluru	67	53
Dharawada	100	0
Hassana	100	100
Kalaburgi	40	0
Kodagu	60	20
Mangaluru	69	49
Mysuru	0	0
Shivamogga	70	30
Uttara Kannada	89	21
Total(No.)	**74**	**45**

Source: Primary data

Field note books (FNB) with check measurement date were available in 74% of the works visited. FNB with check measurement was available for all the works visited in Ballari, Dharwada, and Hassana circles. However, FNB with check measurement was not available for the works visited in APCCF (HRD) and Mysuru circles.

Completion report was available in 45% works sampled. In Hassana circle, the availability of completion certificate was 100%, followed by 93% in APCCF (WP) circle. Completion reports with dates were available for some works in Chikkamagraluru, Kodagu, Mangaluru, Shivamogga and Uttara Kannada circles.

3.1.3 Working Plan activities

A Working Plan is a written document giving guidelines and schedule of prescriptions for a period of 10 years for scientific management of forests. Working Plan Unit is responsible for preparing Working Plans (WP) for each Forest Division of the State with a 10-year periodicity. It is responsible for taking up Survey and Demarcation of the forest areas as and when they are notified as Forests from various categories of lands. The Working Plan wing is also involved in notification of Forests as Reserved Forests, Protected Forests, Deemed Forests, Minor Forests etc., under relevant provisions of various Acts.

Various types of boundary works that were taken up for consolidation and protection of forests were sampled, and are detailed below.

Table 37: Types of Working plan works sampled

Circle	Boundary pillars	Cairns	Survey and Demarcation of Compartment boundary and fixing of GI Plates	Inventory Works	Total
APCCF (WP)	9		19	15	43
Mangaluru	2	3	1		6
Uttara Kannada	6		1		7
Total	**17**	**3**	**21**	**15**	**56**
Per cent	**30**	**5**	**38**	**27**	**100**

Source: Primary data

The working plan division carried out survey and demarcation of compartment boundary and fixing of GI plates and boundary pillars (made of stones or reinforced concrete), formation of cairns and inventory works. Survey and demarcation constituted majority (38%) of the works carried out, followed by boundary works (30%). All the works existed and meet the purpose.

Inventory works

With regards to inventory works, 14 works were sampled, two from Chikkamagaluru working plan division, remaining from Dharwad working plan division. Ten works were executed in 2014-15, remaining in 2013-14. The extent of plantation area varied from 5.90 ha to 41.28 ha. The average size of inventory plot was 0.1 ha. The amount expended for inventory work ranged from Rs.22,140 to Rs.1,62,690.

All works sampled had APO approval with data and estimate. However, none of the plantations had details of the number of seedlings planted. Most of the plantations were pit and stump plantation. Common species planted included Dindal (*Anogeissus latifolia*) – 20%, Mathi (*Terminalia elliptica*) - 11% and Teak (*Tectona grandis*) – 47% and other species such as Akkarkal, Bharangi, Nandi, Neelagiri, Sagade, etc. – 22%. In most plantations sampled, selection felling was done 6-7 times. However, in case of Chakkanakatte plantation in Arasikere range and Bettadapura plantation in Channarayapatna range, Hassan division, Hassan circle, planted species were not visible in the inventory plot sampled since it was extracted by the KFD and Karnataka Forest Development Corporation has planted new plantation of Sarve mara (*Casurina equistifolia*) in Chakkanakatte, while only natural trees were found in Bettadapura plantation.

Table 38:Average GBH and height of tree species in inventory plots sampled

Species Name	Average of Average GBH cms	Average height mtrs	Average Crown width mtrs
Akkarakal (*Linociera malabarica*)	127	11	
Bharanagi (*Clerodendrum serratum*)	110	14	
Dindal (*Anogeissus latifolia*)	49.06	11.14	3.78
Banyan (*Ficus bengaliensis*)	41.5	6.58	
Jamba (*Xylia xylocarpus*)	27.48	9	
Kindal (*Terminalia paniculata*)	49.60	8.75	1.7
Maddale (*Alstonia scholaris*)	0.7	8	
Mathi (*Terminalia tomentosa*)	52.47	10.30	4.42
Nandi (*Lagerstroemia lanceolata*)	45.8	14.05	
Neelagiri (*Eucalyptus spp*.)	59.67	6.58	
Sagade (*Schleichera oleosa*)	80.33	13.67	
Teak (*Tectona grandis*)	47.73	9.64	3
Teak (Coppice)	30.35	6.15	1
Overall Average	**45.66**	**9.28**	**4.46**

Source: Primary data

3.1.4 Boundary consolidation activities

Various types of boundary works that were taken up for consolidation and protection of forests were sampled, and are detailed below.

Table 39: Types of Boundary consolidation and protection works sampled (No.)

Circle	Cattle Proof Trench	D Line maintenance	Fencing/ Chain link mesh	Gate	RF Boards	Total
Ballari	1					1
Bengaluru	1					1
Chikkamagaluru	7				2	9
Hassana	2					2
Kalaburgi	2					2
Kodagu			1			1
Mangaluru	3	2		1	1	7
Mysuru	1					1
Shivamogga	2		1			3
Uttara Kannada	8					8
Total	**27**	**2**	**2**	**1**	**3**	**35**
Per cent	**77**	**6**	**6**	**2**	**9**	**100**

Source: Primary data

Amongst the works sampled, three were maintenance works, while the remaining were fresh works. Majority (77%) of the works sampled included cattle proof trenches which were carried out in forest fringe areas. Reserve Forest boards which were installed to give an identity to the demarcated forest areas constituted 9% of the sample. Similarly, among the samples visited, 26% of the samples were in Chikkamagaluru circle and 23% in Uttara Kannada circle.

Of the 35 works sampled, all works existed at the time of visit, except one. A mesh fence provided to a nursery at Harangi, Kushalanagara T, range, Madikeri T, Kodagu circle was removed since the nursery has been closed. A D-line maintenance work carried out at Byndoor T range, Kundapur T division, Mangaluru circle did not seem to be effective since thick vegetation had covered the work and it was almost non-existent. Local officers opined that the amount fixed for D-line maintenance was not adequate and must be enhanced based on current market rates. Similarly, two cattle proof trenches works, one each in Sringeri T and Koppa T, Koppa, T Division, Chikkamagaluru circle were not effective since they were covered with vegetation. Among the 31 works that existed and being used at the time of visit, all were serving the intended purpose.

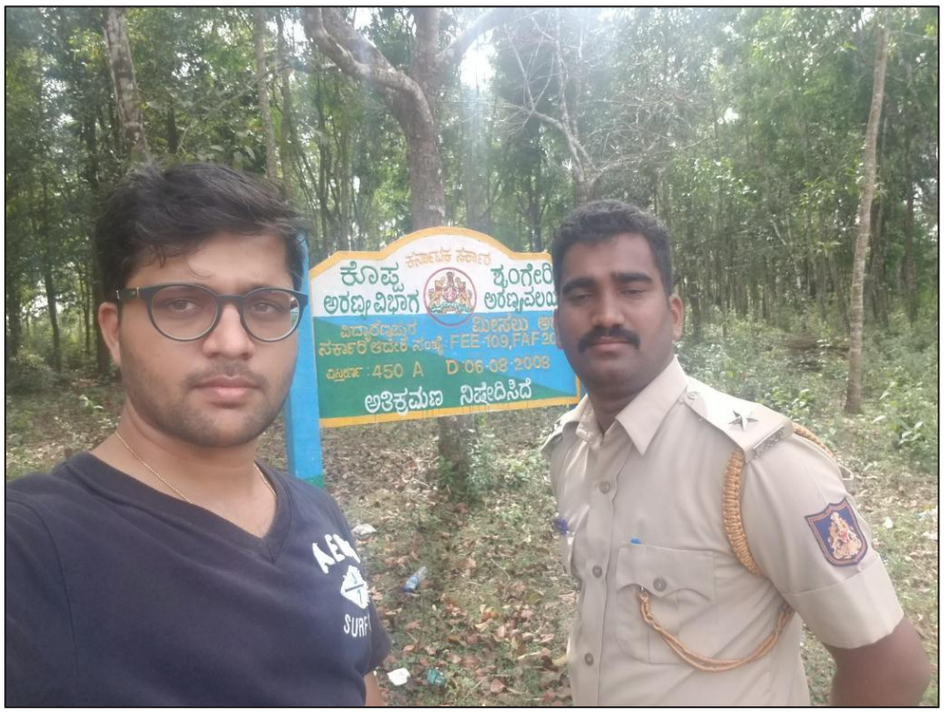

Photo 13: Reserve Forest Board, Sringeri range, Koppa division, Chikkamagalur circle

Consistent efforts to protect the Survey and Demarcate the Forest Boundary in the State are made. Several durable measures like boundary demarcation concrete boards, check gates, RCC carins with appropriate details are installed at critical points.

Photo 14: Check gate, Karkala WL range, Kundapur division, Mangalore circle

Photo 15:Inventory work, Shivamogga range, Shivamogga division and circle

Photo 16: RCC structure for boundary marking, Puttur range, Mangalore division and circle

3.1.5 Infrastructure development (buildings and eco-tourism)

The infrastructure development included construction/ maintenance of Buildings and civil works such as office buildings, residential buildings, training facilities, eco-tourism facilities etc.

Table 40: Infrastructure works sampled

Circle	Eco-tourism facilities	Forest Rest House	Nursery	Office buildings	Others	Residential Buildings	Timber depot	Training facilities	Total
APCCF(HRD)								5	5
Ballari				2				1	3
Chamarajanagara	1								1
Chikkamagaluru		4							4
Dharawada		1		2					3
Kalaburgi		2		1					3
Kodagu		1				1			2
Mangaluru	7	1			1	2	1		12
Shivamogga			4						4
Uttara Kannada				2					2
Total	8	9	4	7	1	3	1	6	39
Per cent	**21**	**23**	**10**	**18**	**3**	**8**	**3**	**14**	**100**

Source: Primary data

The Buildings sampled included 16 (40%) maintenance works, while the remaining were fresh works. The samples included five works of training facilities under the APCCF (HRD) circle. Nearly 23% of the works included forest rest houses, 20% were eco-tourism works and 18% were office buildings. All the works sampled existed at the time of visit, while one residential building, which was intended to be the staff quarters for Deputy Range Forest Officer was vacant at Shankaranarayana range, Kundapura T division, Mangaluru circle since the post was vacant at the time of visit. All the works sampled were found to be serving the intended purpose.

Photo 17: RFO Office at Humnabad range, Bidar division, Kalaburgi circle

Photo 18: Gazebo, Eco-tourism work, Bantwal rage, Mangalore division and circle

Promoting eco-tourism is one of the strategies adopted to ensure public are aware of the importance of forests and the need to conserve the same. Tree parks, eco-tourism facilities at scenic spots are examples of such activities

Photo 19: Tree park, Eco-tourism work, Mangalore range, Mangalore division and circle

Photo 20:Forest Training Centre, Gungargatti, Dharwad

3.1.6 Training activities

The Human Resource Development activities of Karnataka Forest Department were carried out through a well-established network of Training centres. PCCF (E, WP, R &T) was overseeing this activity from KFD Head Quarters, Bangalore. A Director (APCCF) was functioning from Karnataka State Forest Academy, Gungaragatti, Dharwad. Karnataka State Forest Academy has 2 divisions Dharwad and Kadugodi, each headed by a Joint Director (Deputy Conservator of Forest). Dharwad Division has four training centres namely (1) Dharwad Training Centre (2) Chakra (Shimoga) Training Centre (3) Thattihalla Training Centre and (4) Bidar Training Centre. Each of these units were headed by an Assistant Conservator of Forest, except Dharwad Training Centre which was headed by an officer of Deputy Conservator of Forest rank.

Kadugodi Training Division had three training centres namely (1) Kadugodi Training Centre (Bangalore) (2) Ilawala Training Centre (Mysore) and (3) Kushalanagar Training Centre. Ilawala and Kushalanagar Training Centres were headed by one ACF each, while Kadugodi Training Centre was headed by a Deputy Conservator of Forest.

The training institutes impart two kinds of training, namely, induction training and in-service trainings. Induction trainings were conducted for Forest Guards, Deputy Range Forest Officers (DRFO) and Range Forest Officers (RFO). In-service trainings were arranged on need based specific topics such as wildlife management, fire management, accounting procedures, nursery technology etc. for in-service officers including Assistant Conservator of Forests, RFO, DRFO, administrative and support staff.

The Karnataka State Forest Academy, Gungaragatti was imparting training to two batches (4^{th} & 5^{th}) of Range Forest Officers for a duration of 18 months. Fourth batch has 43 Trainees from Maharashtra, Telangana and Madhya Pradesh commencing from 4.2.2019. Fifth batch has 45 members from Madhya Pradesh and Manipur.

Besides the above two batches of Range Forest Officers, one batch of Deputy Range Forest Officers and one batch of Forest Guards were undergoing training in the Academy at the time of study. The Deputy Range Forest Officers module consisted of 12 months training at Karnataka State Forest Academy and 3 months at Survey Training Institute, Mysore/Gulbarga.

Karnataka State Forest Academy, Gungaragatti was well equipped with state-of-the-art equipment and audio visual teaching aids. Well stocked library, well aerated class rooms with CC TV and LED panels, exam halls, multi-utility buildings, swimming pool, gymnasium with latest gadgets, open play ground and computer lab. The trainees Hostel also had well equipped kitchen, spacious rooms and dining hall with reading room.

Training curriculum appeared to be holistic with a judicious mixture of academic/field subjects and ancillary topics such as First Aid, Wireless communication, Weapon training, Fire management, Swimming, Driving, Yoga etc. Besides class room studies in the Academy, the trainees were taken on field tours for 30, 45 and 140 days respectively for Forest Guard, Deputy Range Forest Officer and Range Forest Officer module.

Two training programmes carried out were sampled, of which, details of one programme was not available in Chitradurga range, Chitradurga division and circle. The other training programme sampled at Forest Training Institute, Gungargatti, Dharwad included refresher training programme for staff on various topics such as forest policy, wildlife management, e-timber application, forest boundary survey etc. The participants interviewed opined that the training was useful in understanding the topics well, however more practical sessions would make it more effective.

The staff of Forest Training Centre, Thattihalla expressed shortage of staff quarters but for which all other training units were sufficiently equipped in terms of men and material. The training needs articulated by the field staff and officers are as follows:

- Wildlife management
- Mitigating man-animal conflict
- Weapons training
- Collecting intelligence reports
- Administration training and record keeping
- Modern nursery technologies
- Khajane 2 and GST practical training
- GIS mapping
- Timber identification
- Physical fitness

Photo 21: Forest Training Centre, Thattihalla, Haliyal

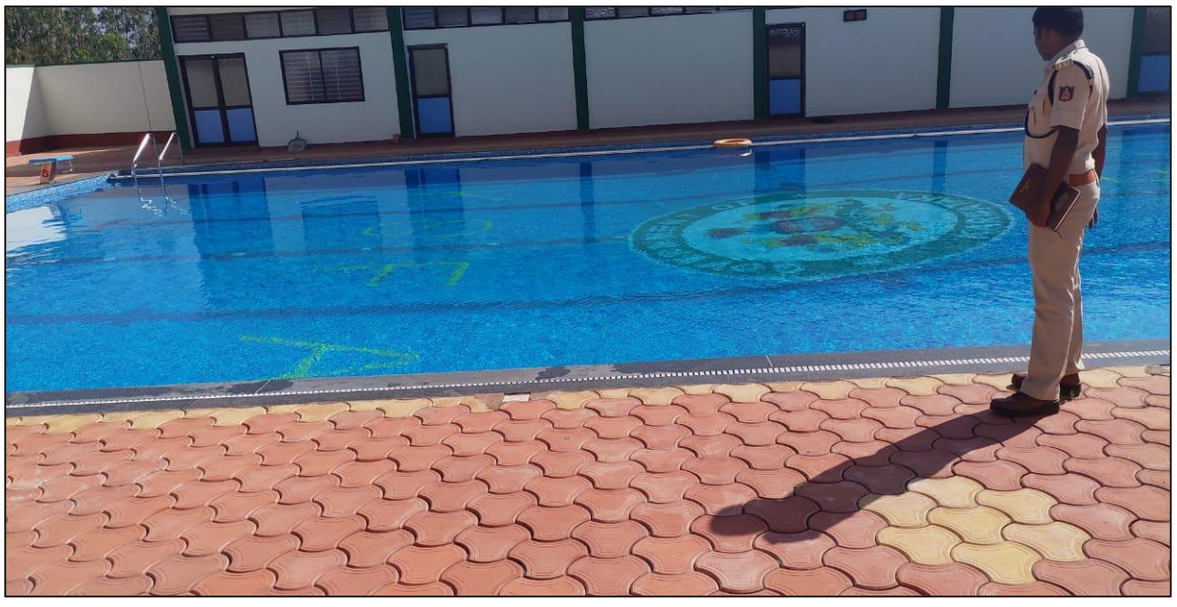

Photo 22: State of the art facilities at Forest Training Centre, Gungargatti, Dharwad

Karnataka Forest Department has one of the best facilities for training staff at Dharwad. This center, along with centres in other locations provide for professional development of the human resource.

3.1.7 Research and utilisation activities

The activities of the research wing included collection of seeds from known sources of plus trees, species trial and vegetative propagation. Species trial of *Casuarina equisetifolia* (Sarve/ Galli/ Chabuka/ Kasrike in Kannada) was ongoing and experiments on alternative bagging material to avoid polythene bags were being done. In addition, clonal orchards and grafted seedlings were being done.

Research studies were allocated to external organization as and when required, however no new research was undertaken and the wing rarely receives requests for research on specific issues. Interaction with the concerned officers of research wing revealed that funds were inadequate for research. More collaborative research could be taken up since all the requisite expertise is not available in the research wing. Hiring Research Assistants to record observations on trial plot is a step towards this. As a step towards providing high quality planting materials, a tissue culture laboratory is being set up in Bengaluru.

Research studies could be initiated in the following:

- Effectiveness of SMC works on water regime for the last five years and micro watershed treatment over the years
- Reasons for drying up of Kamara (Hardwickia binate) in Cauvery WL divisions
- Grasslands and its efficacy during summer
- Palatable species preferred by herbivores
- Identification of fast growing species as alternative to eucalyptus and acacia for agro forestry and forestry plantation
- Propagation of quality seedlings using clonal material from identified sources

Two research works were sampled as per the sampling plan. One was the identification of plus trees in Chakranagara, Shivamogga division, Shivamogga circle. This work was executed in 2013-14 with due APO approval. Field note book with check measurement was available, while completion certificate was not available at the time of visit. The purpose of this activity was seeds collection and vegetative multiplication, which was used for raising

nursery. It was observed that records were not maintained in subsequent years and details of seeds/scions were not available. Annual maintenance of the work seemed lacking.

The other work was the clonal orchards, carried out in Chitta village, Bidar range, Bidar division, Kalaburgi circle, where planting was done in 2013-14 under ANR Model I (B). The gross planted area was 23 ha and net planted area was 10 ha. Planting was done on lateritic soil through pitting (with size 0.75mx0.75mx0.75m) with an espacement of 6m x 6m and a planting density of 278/ ha. The plantation was maintained for 2 years with one watch and ward as per the records provided. Casualty replacement was done in 2014-15 with 278 seedlings.

The total amount expended on this plantation was Rs. 8,18,698, of which 18% was expended towards earthwork, 4% was utilised for raising seedlings, 32% for planting, 4% for soil moisture conservation works and 42% for maintenance.

Percolation ponds were constructed, however it was not put to full use due to scarcity of rainfall. Some damage was observed to the plantation due to wildlife. The plantation journal was available, however it was observed that senior officers had not visited the plantation as per the recordings in the journal.

Two sample plots were laid. Main species planted was Hebbevu *(Melia dubia)*. The survival was found to be 52%, but the health of seedlings was found to be good. Average collar girth was 35 cms and average height was 6.5 mtrs. Natural trees found on the plot included Neem, Kamara and Eucalyptus. Rootstock was not found on the sample plots laid.

Photo 23: Visit to Research and Utilisation Wing, Doresanipalya, Bengaluru

Photo 24: Interaction and data collection at the seeds unit

Karnataka Forest Department is one the few departments in the State that has a well-equipped Research wing with presence in various locations.

3.1.8 ICT and mobility

The Information Communication Technology (ICT) wing of Karnataka Forest Department was involved in development and deployment of ICT initiatives in order to bring about process automation and process re-engineering in the core functioning of the wings of the Department, enhance transparency and efficiency by adopting MIS, GIS and RS technology and to strengthen IT infrastructure and networking in the department.

The ICT wing has supported the functioning of KFD in several ways. The various android applications developed were helpful in ease of functioning, providing fire alerts etc. Software development was being carried out in consultation and requests from various wings of the department. The solutions were developed within the e-governance framework to aid in decision support and management. Major applications developed and deployed by ICT wing include the following:

- Integrated Transit Permit System for Mineral movement from Forest Land
- Android based e-Evaluation of Forest Department works
- E-Timber for Timber depot stock, auction, payments and transit pass
- E-Parihara for sanction of ex-Gratia for Man- animal conflict cases
- E-Nursery for seedling stock management n forest nurseries
- E-Prahari for management of field patrols and works
- Expenditure Monitoring Systems
- IT Inventory Management Systems

The department was also creating Geospatial database of Forest Lands of Karnataka at a cadastral level, in which Regional Remote Sensing Centre, South and Survey Settlement and Land Records Department are part of the project. The project was being implemented under the K-GIS platform and was spearheaded by the Working Plan wing of the department. ICT wing was coordinating this project which was the first of its kind in the country. The website had a user friendly interface and was organized in an accessible manner. As on date 14 applications were available on the website, most of which were for staff of the department. Details of all applications developed may be viewed at https://aranya.gov.in/aranyacms/English/EService.aspx

3.1.9 Publicity and awareness

a) Community Benefits

In terms of community benefits, as per the data provided by the department there were two works:

i. Provision of solar street lights near Venkateshwara temple in Halehalli, Maddur range, Mandya division, Mysuru circle
ii. Provision of dust bins to Venkateshwara temple in Halehalli, Maddur range, Mandya division, Mysuru circle

Focus group discussion was held with the community to understand the usefulness of the assets. It was learned that the dust bins were not given. The site location for the solar street light could have been better. Both the street lights were not functioning at the time of visit. In one unit, the battery and solar panel were missing, while in the other the light was damaged. It may be observed that care and maintenance were not provided to sustain the asset.

Photo 25: Community benefit, Maddur range, Mandya division, Mysuru circle
Damaged solar street light

b) Individual Benefits

As per the data provided by the department, over 1429 beneficiaries benefitted across three circles, i.e. Chamarajanagara, Mysuru and Uttara Kannada circles. Of these, 54 (5%) beneficiaries selected randomly and interviewed. Circle-wise sample of beneficiaries covered under the study is as follows:

Table 41: Circle-wise Number of beneficiaries sampled and Types of benefit extended

Circle	LPG stove	Solar Lantern	Total
Charamarajanagar	16		16
Mysore		6	6
Uttara Kannada	32		32
Total	**48**	**6**	**54**
Percentage	**89**	**11**	**100**

Source: Primary data

Majority, i.e. 76% of the respondents belonged to other backward community, while the remaining belonged to general community. All the respondents, except two were marginal farmers with less than five acres of landholding. The respondents were asked if need assessment was conducted prior to the distribution of benefits. It was found that overall 60% mentioned that need assessment was carried out through meetings/ discussions in the villages, grama sabhas, house visits etc. while 20% stated it was not conducted and 20% were not aware if a need assessment was carried out. In Uttara Kannada circle need assessment was carried out as mentioned by all respondents. Beneficiaries were selected through the recommendation of local elected representatives.

Usage and Advantages of the Benefits

a) LPG cylinder and cook stove

LPG was used regularly by 96% of the respondents, while 2% stated they used it occasionally and 2% never used it (one respondent in Chamarajanagara circle). Solar lantern given in Mysuru circle was used regularly by 50% respondents and as and when required by the remaining 50% respondents.

Table 42: Advantages of using LPG

Circle	Faster cooking	Less smoke	Easy to use	No Carbon deposited	Easily available	More cost effective	Reduces the dependence on fuel wood	Reduces drudgery of women for collection and processing of fuel wood
Charamarajanagar	11	12	9		1	2	5	1
Uttara Kannada	32	31	16	30	9	12	30	21
Total	**43**	**43**	**25**	**30**	**10**	**14**	**35**	**22**
Per cent	**90**	**90**	**52**	**63**	**21**	**29**	**73**	**46**

Source: Primary data

The respondents articulated various advantages of using LPG, most commonly faster cooking, less smoke compared to conventional cook stoves and reduced dependency on fuel wood. It was noted that just 21% mentioned easy availability indicating that there were some bottlenecks in easy access for refilling. The higher cost of LPG compared to other fuel choices was evident in the fact that just 29% stated it was cost effective.

a) Solar Lantern

Solar lantern was distributed only in Mysuru circle to six beneficiaries. Half of the respondents (50%) claimed to use the lantern every day, while the remaining stated that it was used only when required/ during power cuts. Regarding the advantages of using the solar lantern, all of them responded that it saved kerosene and provided clean light. About 33% stated that using this light reduced eye irritation as compared to kerosene light and 17% felt it reduced headache. Seventeen per cent also expressed that the lantern is portable which is useful.

3.2 Forestry/ Wildlife Protection Component

3.2.1 Soil and moisture conservation (SMC) works

Among the 14 circles sampled for evaluating other works, SMC works were sampled in four circles as per the sampling plan provided by KEA.

Table 43: Circle-wise Soil Moisture Conservation Works Sampled

Row Labels	Desilting of tank	Gully checks	Percolation ponds/ trench	Total
Hassana			1	1
Mangaluru	3	2		5
Shivamogga	1			1
Uttara Kannda			2	2
Total	**4**	**2**	**3**	**9**
Percentage	**45**	**22**	**33**	**100**

Source: Primary data

It was intended that the SMC works will help in improving the growth of vegetation in forest areas, besides providing water for the wild animals. The improved growth of grass and herbs will encourage multiplication of herbivores, thereby augmenting the food chain.

Among the SMC works sampled, desilting of existing tanks constituted 45% indicating these were maintenance works. The remaining 45% constituted fresh works such as other SMC works percolation ponds/ and gully checks. All the works existed at the time of visit and were put to use. However, one gully check work was not serving the intended purpose since it was damaged due to rains at Kudremukha WL range, Karkala WL division, Mangaluru circle.

Visible impact of SMC on vegetation was perceived, but a detailed study could be undertaken to understand this aspect better. Land Resource Inventory (LRI) developed by the Watershed Development Department has detailed information site specific information, which helps evolve location specific soil and water conservation measures, package of practices, provide datasets and inputs needed for planning, implementation and monitoring all land-based developmental programmes in the state. Currently this is available for 11 districts across Karnataka. Nearly 65% of the supervisory level officers interviewed were aware of this. However, the policy level officers interviewed were not aware of this and it was not being adopted by the department at the time of this study.

Photo 26: Desilting of tank, Hanur WL range, MM Hills division, Chamarajanagar circle

Photo 27: Gully checks damaged, Kudremukha WL range, Karkala WL division

3.2.2 Wildlife Protection Works

Five National Parks, 30 Wildlife Sanctuaries, 15 Conservation Reserves and one Community Reserve constitute the Protected Area network of the State covering 5.33% of its geographical area. Karnataka supports about 10% of total tiger population and 25% of elephant population of the country. All protected areas have approved management plans. Several activities such as solar fencing, elephant proof trenches, railway barricades etc. have been taken up to mitigate human animal conflict. While habitat improvement measures such as formation of new waterholes, desilting of existing tanks/ ponds/ waterholes, filling of waterholes in summer months with borewells fitted with solar pumps were carried out. Wildlife protection and forest conservation measures such as anti-poaching camps (APCs) and fire protection camps were established.

Table 44: Wildlife Protection Works sampled

Circle	Anti Poaching Camp/Forest Protection Camp	Elephant proof barricade	Waterholes	Total
Chamarajanagara	1		1	2
Chikkamagaluru	2			2
Kodagu	1	1		2
Mangaluru	2		1	3
Shivamogga	2			2
Total	**8**	**1**	**2**	**11**
Percentage	**73**	**9**	**18**	**100**

Source: Primary data

Wildlife protection and management measures included elephant proof barricades, waterholes and anti-poaching camps. The sampled works included maintenance of two anti-poaching camps, while the remaining were fresh works. Two works did not exist at the time of visit, one is a waterhole in Bantwal range, Mangaluru division and circle and another is anti-poaching camp at Kushalanagara T range, Madikeri T division, Kodagu circle. Apparently, the waterhole was not constructed. The anti-poaching camp was functional for one year after construction, and then destroyed by landslide as informed by the staff. Among the works that existed, one work, which was the provision of borewell facilities for anti-poaching camp in Cowdalli range, Cauvery WL division, Chamarajanagara circle was not being used since sulphur content was found to be high in the water. The remaining nine works were serving the intended purpose.

Interaction with officers revealed that most APCs have adequate staff, while they were not equipped with modern equipment for communication and modern weapons. Some of the suggestions for strengthening anti-poaching camps are as follows:

- Ensuring water (for drinking and domestic usage) and sanitation facilities at all APCs
- Pest resistant food containers and safety grill doors
- Modern arms/ weapons (e.g. rifles/ slide action guns)
- Modern communication equipment, including wireless sets
- Uninterrupted power supply to operate communication equipment. Small towers could be constructed wherever signals are an issue
- Air blowers, powerful long range torches, night vision binoculars and weed cutters
- Upgradation and maintenance of EPTs and CPTs
- Maintenance for old APCs that require repair
- Mapping the requirement of new APC (e.g. in Chikkabargi beat, Hediyala range, Bandipur division an additional APC will enhance the effectiveness of patrolling considering the vast area
- Providing seasonal clothing to all watchers

Two road related works were sampled in Karkala WL division, Mangaluru circle. One was a construction of culvert at Kerekatte WL range and another was a construction of causeway at Kudremukha WL range. Both were fresh works, and were found to be serving the intended purpose of patrolling.

Presence of Anti-poaching camps has enabled effective patrolling, thus contributing to reduction in the instances of forest related crimes

Photo 28: Anti-poaching camp, Balehonnur range, Koppa division, Chikkamagalur circle

Photo 29: Elephant proof spike barricade, Makutta range, Madikeri WL division

4 FINDINGS

Based on the evaluation study, the following inferences are drawn vis-à-vis the objectives of the Thirteenth Finance Commission:

1. To increase forest cover of the state

The Karnataka Forest Department has evolved Species and Planting Technique Models primarily based on agro-climatic zones and site quality for the State through a series of consultations, workshops and symposiums at various levels since 2010. The final version of the same is being adopted in the department as General guidelines, 2012. The guidelines briefly outline the suitable species, planting density, soil moisture conservation works, duration of maintenance and cost norms.

As per the 20 Point Programme Progress reports of 2013-14 and 2014-15, Ministry of Statistics and Programme Implementation, Government of India[16], the afforestation (in public and forest lands) target for Karnataka was 1,26,760 ha, while achievement was 1,35,730 ha (107%).

Forest Cover in the State was 38,575.48 km^2 which is 20.11% of the State's geographical area. The forest cover in Karnataka has increased by 1025.48 km^2 as per the India State of Forest Report, Forest Survey of India, 2019, Ministry of Environment, Forest and Climate Change, Government of India[17] as compared to the previous report in 2017. Tree cover in Karnataka was 6, 257 km^2 which has increased by 544 km^2 as compared to the previous assessment report of 2017, which may be attributed to afforestation in non-forest areas.

Various schemes for public like Krishi Aranya Prothsaha Yojane (KAPY) and Raising of Seedlings for Public Distribution (RSPD), Daivivana, Talukigondu Hasiru Grama Yojana, Jillegondu Kaadu Nirmana, Maguvigondu Mara Shaalegondu Vana, Vana Nirmala in gomal areas etc. have helped in increasing the tree cover in non-forest areas.

During the period of evaluation Rs.11020.76 lakhs was the financial target of which Rs. 11091.74 lakhs was expended, i.e. 101% achievement. In terms of plantation activities (raising, maintenance and advance works), 47,539.31 ha was the target against which the

[16] http://mospi.nic.in/sites/default/files/twenty_point_programme_2006/annual_report_of_tpp2006/QPR%20of%20TPP.pdf
[17] http://fsi.nic.in/forest-report-2019

achievement was 61,388.61 ha (129%). During the period of study, an area of 18083.6 ha of new plantations was raised, exceeding the target (160%), besides, road side plantations of 42 km. This was in addition to maintenance of 38,850 ha old plantations and carrying out preliminary works of 4,455 ha for next year's planting. In addition, 1.5 lakh seedlings were raised for these planting activities as an auxiliary to increase forest cover and 1,125 sample plots were laid to assess the quality of vegetation as a prelude to preparing working plans.

During the evaluation study 1,168 plantations works were carried out, out of which 116 plantations were sampled across thirteen forest circles, covering a gross area of plantation of 1641 ha (average of 14.14 ha/ plantation) and net area of plantation of 1533 ha (average of 13.22 ha/ plantation).

Among the plantations sampled, Annual Plan of Operations (APOs) with approved dates was available at the time of visit in 36 (31%) samples. Of these, 67% APOs were sanctioned after planting season, i.e. after September. There appears a general practice of splitting the estimates (70% out of 114 estimates had more than one estimate) to suit the financial year of accounting and there is also considerable delay in sanctioning the estimates, which was illustrated by the fact that 79% estimates were sanctioned after September.

It appeared that less than 2% of the total expenditure was invested on an average for SMC works, indicating low priority for these works. This was corroborated by the fact that only 24% of the plantations had SMC works. Among the structures observed, three structures were damaged and not serving the intended purpose, while the others were found to be useful. The construction quality in 56% of structures were satisfactory, 37% of structures were good, while 7% were not satisfactory. It was observed that, in majority of the cases, the tanks/ percolation ponds were filled with silt from adjoining areas since desilting was usually carried out once in 4-5 years, hence sufficient water could not be stored for longer period. It was observed that the gully checks were also filled with silt. Visible impact of SMC on vegetation may be perceived, but a detailed study could be undertaken to understand this aspect better.

With regard to monitoring mechanisms adopted, 50% of plantation journals had notes recorded by ACFs and 13% were recorded by DCF and none by other senior officers. There is a need for documentation of observations by senior officers.

There is a government order which specifies the guidelines for promoting VFCs in Karnataka. Among the sampled plantations, even though 23 plantation areas had JFMCs, only 8 plantations were raised in JFM area of which merely two plantations were actually raised by involving JFMCs. This shows that there is more scope for involvement of JFMCs and to raise plantations in the JFPM areas wherever feasible. The local officers opined that the VFCs participate well when usufructs from plantations were available for sharing.

It was observed that ANR Model I (B) was adopted in majority (42%) of the sampled plantations, followed by AR Model II (A) in 18% of plantations and AR Model II (H) was followed in 14% of plantations.

About 110 species of plants were noticed during the study, of which Nerale was the most frequently occurring species followed by Honge, Mathi, Dhoopa, Honne, Nelli etc. all of which were native species, in addition to introduced species like Acacia and Mahogany. It is noteworthy to mention here that the department is making an earnest attempt to encourage mixed plantations of native species which is a welcome change. Growing of mixed native species in the forests will enhance the biodiversity value of the forest and its intangible benefits to the environment.

Even though 57% of the sampled plantations had boundary protection measures, only 23% of them were in good condition, while the remaining were filled with vegetation/ breached/ rusted. This shows that majority of the protection measures were becoming ineffective within 3-6 years after establishment/ installation.

In earlier evaluation studies and as per the evaluation wing, performance of plantations based on survival percentage were assessed as follows: very good: 81% and above, Good: 61-80%, Average: 41-60%, Poor: 21-40% and Failure: below 20%.

Among the 116 plantations sampled, the overall survival observed was 59%, ranging from 97% in Hassan circle to 26% in Mysuru circle. Out of the sampled plantations, 28% plantations were damaged by grazing, wildlife and fire which maybe the cause of low survival percentage in some cases. This could also be attributed to the fact that only 57% plantations had boundary protection of which 77% were ineffective. Among the seedlings surviving in the sample plots, 45% were found to be in good condition, 35% were satisfactory and 20% were poor.

Roadside planting model-VII showed highest percentage of survival (79%) mainly due to constant watching, watering and maintenance. Lowest survival of NTFP model III was mainly due to lopping and smuggling of planted species for firewood purpose by the local inhabitants.

There is a direct correlation between the number of years of maintenance and the survival percentage as evidenced – one year maintained plantations have shown 51% survival, followed by 61%, 58%, 84% and 86% survival as against 2, 3, 4 and 5 years maintained plantations respectively.

Eucalyptus *(Eucalyptus spp)* recorded the highest percentage of survival 98%, followed by 85% survival of Sisso (*Dalbargia sisso),* 72% Dhoopa *(Vateria indica)* and Bevu *(Azadirachta indica)* 71% , whereas, least survival of 40% was recorded in *Nerale (Syzygium sp)*.

As expressed by the officers, common challenges in protecting plantations included grazing, lopping, adverse climatic conditions, fire, encroachment, anthropogenic pressures etc. In addition, scarcity of labour for plantation works, high labour wage rates, inadequate supply of high quality seedlings were challenges in promoting plantations.

Various types of other works such as working plan works, research works, training, infrastructure, ICT etc were evaluated. Approved APOs were present in 97% of the other works sampled, however, the date of approval indicates that 40% of the works were

sanctioned between January and March, indicating delay in sanctioning process. Scrutiny of field note books and completion certificates indicated that check measurement with date in the field note books were not available in 26% of works and 55% of works did not have completion certificates.

As per the data provided by the Working plan wing, the total forest area in the State was 32,12,848.18 ha, of which 19,27,708.90 ha (60%) was surveyed and the balance to be surveyed is 12,85,139 ha (40%). Out of 39 divisions, 38 working plans were approved, one working plan i.e. Koppal division was pending for approval.

During the period of evaluation 9,209 km of forest boundary was protected by exceeding (251%) the target with 7,779 M^3 of boundary structures (131% of target) by expending Rs.973.76 lakhs. Similarly, 1,773.5 km (85%) of forest boundary was fire protected against a target of 2081 km. RF boundary of 669.49 km was surveyed and demarcated by fixing 8,846 number of stones and cairns.

The objectives, guidelines and working modules of specialized works of training, research and wildlife wings were included in the working plans. The working plans were available for all divisions, however it was not accessible to public. The working plan divisions undertake periodic inventory plots to monitor the quality of flora and fauna, while the framework and benchmarks for assessing plantations were done by the evaluation and research wings. Interaction with field officers revealed that, in Cauvery WL division, Chamarajanagara circle, survey work was completed but demarcation pillars are yet to be erected. Nearly 633 forest blocks belonging to Shivamogga and Mangaluru circles were to be re-surveyed.

Human Resource Development activities of Karnataka Forest Department were carried out through a well-established network of Training centres located across the state. Training wing of the department was well equipped with state of the art equipment and technology to impart induction and on-the-job trainings. However, Thattihalla Forest Training Centre needs additional staff quarters. Training curriculum appeared to be holistic with a judicious mixture of academic/field subjects and ancillary topics. Although the training wing was conducting

several campaigns and public awareness programmes on importance of forests and environment, the details were not readily available at the time of visit. A comprehensive training needs assessment, a crucial step in human resource development, does not seem to be a systemic process of the training wing.

At the time of study, the research wing was not being utilised to its optimum potential. There is much scope to provide comprehensive support to the functioning and execution of planting related activities of the KFD. It appears that the research wing is working in silos, but for the activities related to seed collection.

2. To improve the infrastructure of the department especially for the front line staff

Construction and maintenance of buildings for office and staff as well as forest protection camps was the major activity under this objective. About 229 buildings and 605 protection camps were constructed/ maintained during the study period with an expenditure of Rs. 1408 lakhs and Rs. 1410 lakhs respectively by utilising 100% of the allocation.

Infrastructure works of the KFD served various purposes such as office, residential quarters for staff, training facilities, forest rest houses, eco-tourism, nursery sheds etc. It was learnt that the green building code was not followed in the planning and design phase. Among the infrastructure works sampled, 40% were maintenance works indicating that repair and maintenance was an ongoing process in the department. All the works sampled were in functional condition at the time of visit and serving the intended purpose.

3. To improve the mobility of the field staff through induction of vehicles

Funds were utilized for purchasing two wheelers and four wheelers for improving mobility of forest staff. An amount of Rs.363.67 lakhs was spent on procuring 66 vehicles to meet this objective of the scheme. Even though Rs. 460 lakhs were provided for this activity, only 71% of the funds were utilised for the purpose. The reasons for underutilisation were not forthcoming.

4. Use of modern technology like GIS through ICT

It was observed that the ICT wing had put in tremendous efforts to digitize and automate data and processes, which is one of the kinds in the country. The ICT wing had supported the functioning of KFD in several ways. The various android applications developed were helpful in ease of functioning, providing fire alerts, simplifying processes, monitoring work of the staff, etc. The website had a user friendly interface and was organized in an accessible manner. Software development was being carried out in consultation and requests from various wings of the department. The solutions were developed within the e-governance framework to aid in decision support and management.

During the period of study, Rs. 93.58 lakhs was spent on procuring high resolution satellite imageries, but the physical target and achievements were not made available. It was observed that the ICT wing has several RFOs, along with programmers/ developers who are outsourced from Keonics. However, it was observed that the presence of a senior, experienced IT Developer would be helpful in blending the user requirements, technical architecture and development process.

5. Enhance protection mechanism for forest and wildlife

Protected areas were managed in accordance with the approved management plans. Solar fencing, elephant proof trenches, railway barricades etc. were installed in appropriate locations to mitigate human animal conflict. However, much work needs to be done to reduce further conflicts. Habitat improvement works were also being undertaken. Wildlife protection and forest conservation measures such as anti-poaching camps (APCs) and fire protection camps were established.

It was observed that in majority of the cases, the waterholes were filled with silt from adjoining areas since desilting was usually carried out once in 4-5 years, hence sufficient water could not be stored for longer period.

Interaction with officers revealed that APCs were immensely effective in controlling poaching and smuggling which have led to perceived increase in wildlife numbers and

protecting valuable tree species. Similarly, fire protection camps were helpful in controlling forest fires over the years.

With the limited prescribed sample size it was understood that anti-poaching camps were located in vantage points, had adequate staff, but need modern communication devices, arms and ammunition and higher capacity battery back-up for effective functioning. The field staff articulated that uniform amenities need to be provided to APCs in tiger reserves and other protected areas. Mapping the requirement of new APCs (e.g. in Chikkabargi beat, Hediyala range, Bandipur division) will enhance the effectiveness of patrolling considering the vast area.

To reduce the dependency of forest fringe communities on firewood, public awareness programmes on the importance of forests along with distribution of energy saving devices were carried out to benefit over 600 people during the period of evaluation. It was noticed that the physical achievement was 46% of the target, while expenditure under this head was 123% indicating a mismatch between planning and execution.

Proper need assessment was not done prior to distributing individual benefits. For the LPG stove and solar lanterns given, proper documentation was not available at the time of visit in most locations. The LPG stoves and cylinders distributed to individual beneficiaries were used regularly by 96% of the recipients and they articulated various benefits of the same. In case of solar lanterns, only 50% of the beneficiaries were using it regularly. There were no systems in place for repair and maintenance of the lanterns which has led to disuse of the device in some cases. The community benefits sampled had not served the purpose since it was not given after due consultation with the community and there was no proper mechanism for repair and maintenance.

5 RECOMMENDATIONS

This study aimed to evaluate four schemes within a limited time frame and resources. Hence it will be useful to have a separate detailed study for each scheme to arrive at a more comprehensive assessment. Based on this evaluation study, the following recommendations are offered for consideration:

Short term

1. The department may develop comprehensive definition, benchmarks and rating indices to determine the success and performance of plantations. Survival may be specified and linked to growth of the plants.
2. Cost norms of plantation models may be redesigned based on field realities.
3. Details of all campaigns and public awareness programmes may be documented adequately and the plan and progress may be displayed on the department website..
4. Participatory need assessment may be carried out involving the beneficiaries/ community prior to distributing/ identifying the benefit. To reduce the dependency of forest fringe communities on firewood, distribution of alternative fuels like LPG could be continued, while facilitating access to sustained use.
5. Upgradation and modernisation of the mobility infrastructure, arms and ammunition and communication devices may be taken up with optimal fund utilisation.
6. A workshop could be conducted by involving officers from all levels to brainstorm on the process automation possibilities in the forest department which the ICT wing may take up. It is recommended that the new software/ applications developed by ICT wing may be more user friendly and tested at remote corners of the forest/ range devoid of mobile/ internet connectivity with the device currently used by the field staff in the presence of the developers so that they get a clear idea of the field realities.
7. The KFD website may include:
    a. Details of all the schemes implemented by the forest department
    b. Details of public benefit schemes, including criteria for beneficiary selection, procedures for applying, application forms which could be filled online, timelines for application and receiving benefits, incentives, if any etc.
    c. Working plans

d. Details about the protected areas
e. Contact list of officers of all levels
f. State of the forest report
g. Eco-tourism facilities available for public and making reservations for the same etc.

8. The APOs and estimates may be approved during the first quarter of the financial year to enable proper planning of works at the field level. Mechanisms may be developed by ICT for APOs, estimates and other relevant documents, which could be sanctioned online/ offline and uploaded to central database.
9. Department may evolve a system wherein the verification of works by DRFO, RFO and ACF and supervisory comments of DCF, CF and other senior officers whether in plantation journals or in their respective tour diaries are made available as a single document helping to properly assess the progress of activities in a plantation.

Medium term

1. Provision can be made to clear lantana and other invasive weeds from proposed plantation areas as part of advance works. In areas prone for encroachment and grazing, more intensive planting activity may be undertaken with permanent boundary demarcation structures. Additional watering may be provided for plantations in dry and arid zones, wherever feasible. Similarly, additional watch and ward can be provided for plantations in town areas and areas of human animal conflict. The casualty replacement may be done in all the years of maintenance based on the actual requirement. Maintenance may be provided for a minimum of 5 years across all models of plantations.
2. The concept of augmenting mixed native species in degraded natural forests may be encouraged in all future afforestation activities of the department.
3. Waterholes/ tanks/ percolation ponds and other SMC structures may be maintained every alternate year, based on the site conditions. The utility of the existing SMC structures in the forest areas may be studied in detail to assess their efficacy.
4. It is recommended to take up soil moisture conservation works based on watershed approach in collaboration with Watershed Development Department (WDD) and to extend Land Resource Inventory (LRI) works in the forest areas also.

5. It is recommended to involve forest dependent communities in forestry operations. Benefits to communities and individuals can be dovetailed and converged with other ongoing government schemes/ programmes such as MGNREGS, Watershed Development Programmes, Krishi Bhagya, Ujwala etc.
6. Infrastructure such as buildings, roads, camp sheds etc. may be periodically maintained at regular intervals for effective utilisation. Additional staff quarters could be constructed at Thattihalla Training Centre after assessing the actual need.
7. Training needs assessment may be done in a systematic manner and all staff to be trained on relevant issues (not just selected staff). Appropriate boarding and lodging may be provided to the in-service trainees as an incentive, free of cost.
8. The functioning of the research wing can further be strengthened with adequate funding, recruitment of qualified manpower and continuous collaboration with other wings of the forest department.
9. A qualified and experienced User interface and User experience Engineer could be helpful, in increasing the usability and efficiency of the functioning of IT wing.
10. The ICT wing could provide data support on identifying low canopy density areas, encroachments, locating all assets created, provide maps where forestry features have been over laid on Survey of India topo sheets etc.
11. Some of the suggestions for mitigating human animal conflict are as follows:
    - Upgradation/ maintenance of EPTs and CPTs on regular basis
    - Erecting railway barricades for all forest boundaries in a phased manner where the incidences of conflicts are high
    - Regular maintenance of solar fences
    - Ensuring water sources inside the forest
    - Providing capturing cages for all wildlife ranges
    - Ensuring adequate frontline staff
    - Encroachments should be evicted
    - A veterinary doctor to be posted in each wildlife circle
12. Apart from identifying and establishing new APCs, the existing ones are to be upgraded with adequate manpower, basic facilities, higher capacity battery backup, well equipped with modern arms, ammunition, communication devices and night vision binoculars.

13. Decentralised planning at circle level on five year mode would be useful in taking a customized approach which is more appropriate to the diverse needs of each division.

Long term

1. The pending forest boundary to be surveyed and demarcated is 1285139 ha, which has to be demarcated with proper permanent boundary structures at the earliest on war footing in order to prevent encroachment.
2. The research wing may be adequately equipped in a phased manner to supply high quality planting material for all plantations across the state.
3. The research wing can be entrusted to undertake research activities to address the problems faced in the field by the executives.
4. The possibility of establishing ICT units at circle level may be explored so that all field staff can be easily trained.
5. A system of imprest allocation of finances to carry out committed seasonal works may be considered to improve the operational efficiency of KFD.
6. Proper transfer policies can be developed to retain the trained specialist personnel in appropriate wings at least for three years tenure after completion of training.

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ANNEXURE

TERMS OF REFERENCE
FOR THE STUDY

EVALUATION OF FORESTRY WORKS UNDER COMPENSATORY AFFORESTATION FUND MANAGEMENT & PLANNING AUTHORITY (CAMPA), 2013-14 to 2015-16 13THfiNANCE COMMISSION (TFC) 2013-14 to 2014-15, NATIONAL AFFORESTATION PROGRAMME (NAP) 2013-14 to 2016-17 & NATIONAL BAMBOO MISSION (NBM) 2013-14 to 2016-17

1. TITLE OF THE STUDY:

The study is titled as Evaluation of Forestry Works under Compensatory Afforestation Fund Management & Planning Authority (CAMPA), 2013-14 to 2015-16 13th Finance Commission (TFC) 2013-14 to 2014-15, National Afforestation Programme (NAP) 2013-14 to 2016-17 & National Bamboo Mission (NBM) 2013-14 to 2016-17.

2. DEPARTMENT IMPLEMENTING THE SCHEME

Karnataka Forest Department, Government of Karnataka

3. BACKGROUND AND CONTEXT:

Compensatory Mforestation Fund Management & Planning Authority (CAMPA):

The *Forest (Conservation) Act of 1980* governs diversion or use of forest land for non-forest purposes such as industrial or developmental projects. Since forests are an important natural resource and provides us with a variety of ecological services, the Forest (Conservation) _!\ct of 1980 mandates that non-forest land, equal to the size of the forest being diverted be afforested. But, since afforested land cannot become a forest overnight, loss of goods and services like timber, bamboo, fuelwood, carbon sequestration, soil conservation, water recharge, and seed dispersal are still experienced. Moreover, the newly afforested land will take around 50 years to start delivering the comparable goods and services which the diverted land gave just before diversion. To compensate the losses suffered in the interim, the *Net Present Value (NPV)* of the diverted forest are computed for a period of 50 years, and recovered from the "user agency" that is diverting the forests.

As per the act, the CAMPA funds can be used for the following purposes:

- Artificial regeneration (plantation)

- Assisted natural regeneration
- Forest management
- Forest protection
- Infrastr ucture development
- Wildlife protection and management
- Supply of wood
- Other forest produces saving devices.

The main works taken up under State CAMPA are:-

Project Specific Activities:-

A. Compensatory Mforestation (CA), Additional CA (ACA) &Penal CA (PCA):

i) In Forest Land

ii) In Non-Forest Land

B. Site Specific Activities:

i) Safety Zone plantation

ii) Planting in degraded forest area (1 ½ times of safety zone)

iii) Fencing

iv) Catchment Area Treatment Plan (CATP)

v) Planting Dwarf Species

vi) Medicinal plantation

vii) Soil & Moisture Conservation works

viii) Providing LPG connection to local villagers etc.,

C. Activities for Utilization of NPV:

I. Consolidation and protection of Forests:

a. Survey and demarcation of Forests

b. Forest boundary consolidation through Cattle Proof Trench (CPT)

c. Fire protection

d. Creation of lung spaces by pr<rtection and consolidation of valuable forest areas in the city's urban areas and developing them as Tree Parks.

II. Consolidation and Regeneration of Forests:

a. Assisted Natural Regeneration (ANR)
b. Promotion of Sandal Regeneration on estate management concept.
c. Production of Quality Planting Materials, collection of quality seeds and other Research activities.
d. Integrated plan for Conservation and Development of biodiversity, forests and ecology in the forest areas of coastal zone (HasiruKavacha)

III. **Wildlife Protection and Management:**

a. D-line clearance
b. Development & maintenance of road network in protected areas.
c. Elephant Human conflict mitigation measures (Areas outside & inside protected areas)
    i. Elephant Proof Trench (EPT)
    n. Solar Fencing
    iii. Assistance to Bannerghatta Biological Park
d. Wildlife Habitat Improvement & Management for individual Protected Area's (PA's)
    1. Creation of new water holes
    ii. De-silting of tanks
    iii. Soil &Moisture Conservation (SMC) works
    iv. Providing Salt licks
    v. Elephant depredation camps/ Anti-poaching camps (APC's)

IV. Infrastructure Development:

a. Strengthening and augmenting digitization and Communication network;

i. Cell Phones

ii. Computers

iii. Laptop

iv. Xerox Machines

v. GPS

vi. Digital Cameras

vii. Personal Digital Assistance (PDA)

b. New Buildings (Staff Quarters)

c. Building maintenance

d. Strengthening of Forest Institutes for capacity building.

e. Purchase of vehicles (Two Wheelers for Forests and Four Wheelers for Officers)

V. Forest Produce Saving devices & other activities:

a. Supply of energy saving devices at subsidized cost to forest fringe villages.

b. Maintenance of WP Samples Plots

c. Repair, Maintenance, & Office Expenditure (RMOE), Travelling Expenses (TE) etc.

Other Schemes

There are other schemes implemented by the forest Department under which the works undertaken are also of similar nature as that of CAMPA. Hence, Karnataka Forest Department (KFD) intends to appraise itself of the outcome of implementation of works under the other schemes as mentioned in the title of this Terms of Reference (ToR) for the period beside each scheme as follows;

i. 13th Finance Commission (TFC)[Q013-14 and 2014-15]

ii. National Mforestation Program(NAP)[2013-14 to 2014-17]

iii. National Bamboo Mission (NBM)[2013-14 to 2014-17]

Many of the work taken up under all the above schemes are in the nature of plantations, other works like buildings, infrastructure development, soil and moisture conservation works and beneficiary-oriented works. In order to avoid the Consultants crisscrossing the whole state separately for each scheme, works under all the above schemes shall be evaluated simultaneously once the evaluation team visits a particular division. This will not only reduce the financial cost of the evaluation in respect of travel expenses, but will also cover all sampled works in a division in one visit. It also helps to make a comparative analysis across the Schemes.

Sampling of works shall be done scheme-wise. Thus, 4 State level evaluation reports i.e one for each scheme as mentioned above have to be submitted separately.

4. EVALUATION SCOPE, PURPOSE AND OBJECTIVES:

4.1 Forestry works carried out in Karnataka Forest Department under above mentioned schemes broadly fall under following categories:

1. Raising & Maintenance of plantations.
2. Seedling Distribution to Public
3. Soil moisture conservation works
4. Specialized works of Wildlife
5. Specialized works of Working Plan
4. Specialized works of Research & Utilization
7. Specialized works of Training wing
8. Construction and maintenance of buildings, Roads &other infrastructure
9. Providing individual/ community benefits

Generally, in any Scheme of KFD, the works may include either or all the works as listed above. Hence, the activities to be evaluated will invariably fall in one of the

above categories. The list of works and other project documents are provided by the APCCF (CAMPA) for the scheme (i), APCCF (Projects) for scheme (ii), APCCF (NAEP-BM) for schemes (iii) & (iv) through their implementing Forest Circles, Divisions and Units. The purpose of evaluation is to assess the implementation process and analyse the impact of them on environment and society.

The field data has to be analysed with respect to the scheme objectives and evaluation issues. The findings have to be reported along with recommendations for improvement as a separate chapter in the final evaluation report of each scheme. A separate evaluation report has to be submitted for each scheme.

4.2 EVALUATION OBJECTIVES:

- To evaluate the works under the above 4 schemes that were carried out by Territorial, Wildlife, Research, Working Plan and Training wings of the Karnataka Forests Department.
- To assess whether the desired impact on natural and social environment is achieved and or undesirable impact is avoided UNDER CAMPA and other schemes.
- To assess the efficiency and effectiveness of the schemes and the ability of the works executed to meet the jntended objectives of the Schemes.
- To assess the performance of the works under different categories and across the divisions.

  To Examine the requirement of Works executed under all above schemes, whether these works to be continued or closed.
- To assess whether the existing arrangements of accounting and reporting are adequate and transparent.
- To analyze whether the grants under the scheme were utilized for the intended objectives/ purposes.
- To examine the quality of works and the final success rates are satisfactory etc.
- To examine the impact of beneficiary schemes on the households.

5. EVALUATION QUESTIONS:

The Proposed evaluation has multiple objectives. Inter alia, this evaluation is expected to examine the following questions and file their succinct findings and conclusions. The Questions of Part (A) & (I) are common and should be answered for all 4 schemes as mentioned in the title of this ToR. The questions from the remaining sections (B) to (H) should be answered based of implementation of that particular component of work in a scheme.

(A) For Raising & Maintenance of Plantations: -Under all the Schemes to be analysed from scheme perspectives and separate analysis for each scheme.

i. What is the success rate of departmental plantations under respective scheme in terms of the following?

a. Overall and Species-wise survival rates with progressing age across the regions.

b. Species-wise performance in terms of girth, height and vigor.

c. Compatibility of planted species with the local biodiversity.

d. Consistency in performance across Forest Divisions and Circles in the state.

e. Potential to contribute to the tree cover in the state in the long run?

f. How does the overall survival percentage compare with those observed in the evaluation of previous years?

ii. What factors contribute to mortality of seedlings in plantations? How can they be addressed across the regions to reduce mortality?

iii. What measures/interventions have been made to improve the survival percentage of plantations over the years since evaluation of plantations has commenced? What has been their actual impact in improving survival percentage?

1. How can the quality and performance of departmental plantations be enhanced?

n. Whether plantation models differ across different schemes. Examine the sustainability of these models.

iii. What is the existing status of forest/ plantation protection and conservation works carried out under these schemes?

iv. What is their effectiveness in conserving the forests/ plantations and enhancing the productivity?

v. Whether the Plantation programme under CAMPA and other schemes has been able to cover the forest cover lost? If not, what is the gap?

vi. Assess whether the desired impact on natural and social environment is achieved and or undesirable impact is avoided.

vii. Assess the adequacy, regularity and utilisation of funds for plantation activity.

(B) For Soil & Moisture Conservation (SMC) Works:

i. What is the present condition of SMC works carried out in the plantations and other forest areas? Do they exist? Make observations for each scheme separately.

ii. In case of water harvesting structures, are they capable of holding water to the designed potential now? If not, why so?

iii. Is there any visible impact of SMC activity on the vegetation? Assess the impact across the regions.

(C) **For Specialized works of Wildlife**

ı. What is the impact of Anti-Poaching Camps (APC) on the forests and Wildlife of the area? Assess across the circles and divisions under each scheme.

ii. Are the APC's sufficiently equipped with staff and modern equipment's for protection activities?

iii. What are the other infrastructures required for strengthening APC's?

iv. What are the instances in numbers and intensity of occurrence of Forest Fires in the area? Have Fire Protection Camps (FPC) helped to prevent, contain and douse forest fires?

v. What is the status of effectiveness()£ the activities taken up for mitigating man-animal conflict?

(D) For Specialized works of Working Plan

1. What is the status of survey and demarcation of forest areas (RF's) in the state?

n. What is remaining area which needs to be demarcated? What is the amount required for a 100% survey & demarcation of RF'sin the state?

iii. What is the condition of Cairns, RCC boundary pillars and RF stones? What is the percentage of missing, not visible and damaged boundary demarcation cairns/ pillars/ stones?

(E) For Specialized works of Research:

1. Are the research activities like collection of seeds from plus trees, raising & maintenance of Romets; Rare, Endangered &Threatened (RET) seedlings &Quality Planting material (QPM) etc being done annually in the Research Units throughout the state? Which species are commonly done under each of the above component i.e. Seed collection, Romets, RET & QPM.

ii. To what extent the research activity has contributed to promote the broad objectives of forest policy. What are the suggestions to strengthen and improve the research activities in Karnataka Forest department?

(F) For Specialized works of Training?

1. What is the kind of infrastructure developed in the training wing of KFD under these schemes? How they have been maintained? To what extent the gaps are addressed?

ii. What kind of training is supported under these schemes in various training centers in the state?

(G) Other Infrastructure works of KFD

i. What is the present condition of forest infrastructure created during the evaluation period? What are the different types of works undertaken? Whether

they are as per requirements of local conditions and are completed within the scheduled plan period?

n. Are they being properly utilized? If yes, to what extent and if no, why?

iii. What is the status of maintenance of buildings, roads and other infrastructure?

iv. Is the ICT wing of department sufficiently modernized? What are the gaps which need to be filled in order to make KFD as one of the best digital department in the state?

(H) Providing individual/ community benefits

1. What kind of individual and Community benefits has been provided by KFD under the 4 schemes being evaluated?

n. What is the impact of the schemes on livelihood and living conditions of the beneficiaries?

ii. What is the nature of benefits and assets provided to the beneficiaries? Examine their suitability and functional status.

(I) General Issues:

i. Evaluate the quality of the Works/ Assets with reference to the sanctioned estimate, utility, functionality, usage, usefulness and appropriateness etc.

ii. Whether Third Party Monitoring is introduced under CAMPA? What are the monitoring arrangements for the scheme works?

iii. To what extent the works undertaken under each of these schemes serve the objectives of respective schemes? Which objectives have been fully addressed, which partly and which not at all?

iv. Evaluate specific achievements failures and gaps of each scheme.

v. Does the works carried out in the evaluation period under each scheme collectively contribute to the objectives of forest policy?

6. EVALUATION METHODOLOGY:

Sampling Design:

Forest Department in general has Territorial, Social Forestry and Wild life Divisions. Apart from this there are specialized wings like Working Plan & Research which are not divided as divisions but as units. The Training wing has a state Academy with several institutes spread across the state. A multi stage sampling method is adopted to draw the final sample.

- At first stage, the Division/unit wise work list as provided by respective APCCF for a particular scheme will be compiled for the whole state in the forest department.
- Then from this state level work list of a particular scheme, sorting of various types of works into 9 categories shall be done. This will be the second stage of clustering being done at the Department level.
- From this, the sample work the list for evaluation will be generated for each scheme by random sampling of 10% of works from each category (type) of work in that particular scheme covering all the circles in the State. This will be done by Karnataka Evaluation Authority.

Thus, the method followed is basically a multi stage sampling in which the first stage of cluster formation is at division/ unit level and second stage is at type of work level and 10 % Works are identified randomly at KEA.

Sample across the categories of works- CAMPA

CAMPA	Total	Sample (10%)
Plantations	578	58
Other works		
Boundary	730	73
Other works	92	9
Other civil works	28	3
Camp	101	11
Building	37	4
Training	93	9
Desilting	155	15
General	34	4
Road	161	16
SMC	98	10
RF Board	314	30
Total	2412	242

Source: Forest Department GoK

Sample across the categories of works under 13th Finance, NAP &NBM Schemes

Sl.no.	Particulars	13th Finance Total	Sample (10%)	NAP FDA Total	Sample (10%)	NBM Total	Sample (10%)
1.	Plantations	1088	110	579	58	248	25
	Other works						
2.	Boundary	651	65				
3.	Inventory	151	15				
4.	Other works (including General)	44	4				
5.	Other Civil Works	109	10				
6.	Camp	281	28				
7.	Building	170	17				
8.	Training	13	2				
9.	Desilting of tanks	25	3				
10.	Other research work	13	2				
11.	Road	24	2				
12.	SMC	56	5				
13.	RF Board	07	1				
	Total	2646	264	579	58	248	25

Source: Forest Department GoK

- The sample to cover all the Circles and all the categories of works implemented in a circle.
- The RF Board works may be observed on the way while visiting the sample works.
- The sample of works will be randomised by KEA.

Collection of primary data:

- The Consultant is expected to visit all the work spots sampled and provided to them by Karnataka Evaluation Authority for CAMPA, TFC, NAP and NBM schemes. Works once selected for sampling shall not be changed. Location of each sample work should be geo-referenced using GPS (Global Positioning System).
- The Consultant is required to collect the field data on the Android Application developed by ICT wing of Karnataka Forest Department for 'Third Party Evaluation'. Training shall be provided to the successful consultant about the use of the app. The consultant is expected to use the mobile app and capture the evaluation

data through his own device (tabs/ " mart phone) on the spot along with geo-referenced and annotated photos ef the works and upload them to the forest Dept. and KEA website as soon as the internet connectivity is available. The Client may suggest common configuration to all the Consultants for compatibility purpose which the Consultants must reekon. The backend application software, evaluation formats, basic information about the selected samples etc., will be hosted on the web site. The Consultant will be given privileged access to the sampled data relevant to him on the website. Client will not supply the android equipment. Consultants must arrange for the same.

- **Form-1** of the app should be used if the work evaluated is a **Plantation.** The Consultant should collect all the details as required in the above format which may include the diverse species used in planting, survival percentage of the planted seedlings, their vigor, level of protection available, prospects of becoming a fully stocked plantation etc. All the fields in the above format should be filled and no field should be kept blank. The sampling intensity for plantations shall be 2% irrespective of the extent of plantation. This works out to have a sample plot for every 5 hectares of plantation, but in case where the extent of block plantation is less than 5 hectares, one sample plot shall be laid compulsorily. The size of each sample plot shall be 1000 square meters- (0.1 hectares), having a measurement of 31.42 meters X 31.42 meters, laid at random intervals with a random start, in the block plantation selected for evaluation. In case of plantations like Roadside, Greening of urban areas, Institutional plantations etc. and the whole plantation has to be considered as one sample and 100% evaluation has to be done for such plantations.
- The boundaries of plantation selected for evaluation shall be geo referenced and a plantation sketch prepared. Grids of 5 hectares or 0.1 hectares (1,000 square meters) shall be plotted on this sketch and the required number of sample plots shall be selected randomly. The sampling intensity shall not be less than 2%. The sampling intensity can be a little more than 2% to round off the decimals that are likely to

arise as the plantations are of various sizes. The evaluation shall include, among other, information on suitability of species planted, survival percentage, growth conditions, health of surviving plants, species wise girth at collar region, average height of the plants, quality of the work, with reference to the sanctioned estimate, carried out, etc. The sample plots laid for assessing the performance of the plantations shall be geo referenced with the help the GPS.

- Form-3 pertains to evaluation of 'Other works' like building & road construction, Soil and Moisture Conservation works, Boundary consolidation works, specialized works of Wildlife, Working Plan, Research & Training wings apart from purchase of equipment/ vehicles etc.

- Fonb-4 relates to works of extending individual or community benefits to the beneficiaries under various schemes. The Consultant should examine relevant expenditure related documents, visit the work spots, examine the overall usage and its impact on the beneficiary, interact with the beneficiaries and record their satisfaction level apart from uploading details in the app.

- Sample data shall be collected in quantitative form generally. Where appropriate, it may be qualitative or mixed. No field in the digital forms of the android app should be left vacant while uploading the data.

- As per requirement Focus Group Discussions and in depth Interviews of implementing and monitoring officers at various levels are to be conducted.

- Secondary data related to different schemes may be collected from the Forest department.

7. DELIVERABLES AND TIMELINES:

The whole study is to be completed within 6 months from date of getting confirmed evaluation assignment. The evaluating agency is expected to adhere to the following time lines and deliverables

Deliverables and time schedule

1. Work plan submission/Inception report	:One month after signing the agreement
2. Field Data Collection	: Two – three months
3. Draft report submission	: One month after Field Data Collection
4. Final report submission	:One month after Draft report submission
5. Total Duration	: 6 Months

8. QUALITIES EXPECTED FROM THE REPORT:

The evaluation report should generally confirm to the United Nations Evaluation Guidelines (UNEG) "Standards for Evaluation in the UN System" and "Ethical Standards of Evaluations".

a) The results should correspond to the ToR. In the results chapter, each question of the ToR should be answered. The overall results to be analysed in an integrated way to draw the conclusions.

b) The report should be complete and logically organized in a clear but simple language. Evaluation report should confirm to the standard report writing style and structure.

c) The report should present a comprehensive review of the Scheme/ programme in terms of the content, implementation process, adequacy, information and access to beneficiaries.

d) The Report should provide a scientific assessment of the impact of the works under the CAMPA and other schemes in Forest Department in Karnataka. It should assess the impact in terms of the increase in forest cover, Soil moisture, Infrastructure development research and training and find out as to what extent the scheme objectives are attained. The qualitative data should be used in an unbiased manner to support or for further analysis of and reflections from the quantitative data. The analysis should provide adequate space for assessing the variations across the regions and categories. Case studies to be presented to bring out the realities at the local level.

e) With regard to recommendations, the number of recommendations is not a measure of the quality of evaluation. The report should come out with specific recommendations

based on adequate field evidence for any modifications in the programme design, content, implementing procedures, and any other modifications to improve the access and impact of the Scheme/Programme. The recommendations should be short term to bring in mid course corrections and the long term to bring about modifications/ change in the policy.

Structure of the report:

The following are the points, only inclusive and not exhaustive, which need to be mandatorily followed in the preparation of evaluation report:

By the very look of the evaluation report it should be evident that the study is that of Forest Department, Government of Karnataka and Karnataka Evaluation Authority (KEA) which has been done by the Evaluation Consultant Organization. The report should be complete and logically organized in a clear but simple language. Besides conforming to the qualities covered in the Terms of Reference, report should be arranged in the following order:

1. Title and Opening Page
2. Index
3. List of acronyms and abbreviations
4. Executive Summary- A stand alone section that describes the program, purpose and scope of evaluation, research design and methodology, key findings, constraints and recommendations. It should be brief and precise not exceeding 4-7 pages.
5. Background- A section that briefly covers the history or genesis of the sector under which the programme/ scheme being evaluated covered. It should give recent fact sheets taken from reliable and published sources.
6. Objectives and performance of the program being evaluated- This section will include the stated objectives of the programs and the physical and financial achievements of the selected program in the period of evaluation. It should cover the description of the target group, aim of the program and method of selection of

beneficiaries.

7. Review of literature/ past evaluati n reports.
8. Evaluation Methodology - This should include research design, sample design and size, questionnaire design and pilot test, data collection and quality assurance plan.
9. Findings of the evaluation study.
10. Case Studies, Best Practices
11. Limitations/ constraints in the evaluation study.
12. Recommendations that flow from the evaluation.

Annexures-

1. Sanctioned Terms of Reference of the study.
2. urvey tools and questionnaires
3. List of persons interviewed.
4. Place, date and number of persons covered by Focus Group Discussion.
5. Additional documents

9. ADMINISTRATIVE ARRANGEMENTS:

The Forest Department and KEA will provide the necessary information pertaining to the study and also co-operate with the consultant organization in completing the assignment task within the stipulated time period. The forest department will provide all the details of the works undertaken in four schemes at various levels till the village level and the list of beneficiaries. The concerned district and taluk officials will be instructed by the Forest Department for providing the required information/ data at the taluk and GP levels.

It is expected to complete the present study in 6 months time line, excluding the time taken for approvals at KEA.

QUALIFICATION OF THE CONSUL'FANTS:

Consultant Organizations are expected to have at least minimum 5 years of experience in undertaking evaluation studies in Forest/Natural Resource management area. They should have the following key professional staff in their team:

S. No	Subject Experts Requirement	Experience
1.	**Principal Investigator:** Retired Forest official (not below the rank of Chief Conservator of Forests)/ First class MSc Life Sciences/ Forestry/. Ph. Dis preferable.	With at least 05 years of field experience in evaluation of Forestry works
2.	1st Core Team Member: B E (Civil) Engineer	With at least 3 years of field experience in related field
3	2nd Core team member First Class Post graduate in Sociology/ Social Work/ Rural Development.	With at least 3 years of field experience in related field
4.	3rdCore Team Member: Resource Analyst /Chartered Accountant/ Data Analyst with Post Graduate degree in Statistics/ Computer Science.	With at least 3 years of field experience

10. COST SCHEDULE OF BUDGET RELEASE :

Output based budget release will be as follows;

1. The first instalment of consultation fee amounting to 30% of the total fee shall be payable as advance to the consultant after the approval of the inception report, but only on execution of a bank guarantee of a scheduled nationalised bank, valid for a period of at least 12 months from the date of issuance of advance.

2. The second instalment of consultation fee amounting to 50% of the total fee shall be payable to the consultant after approval of the draft report.
3. The third and final instalment of consultation fee amounting to 20% of the total fee shall be payable to the consultant after the receipt of the hard and soft copies of the

final report in such format as prescribed in the agreement along with all original documents containing primary and secondary data, processed data outputs study report and soft copies of all literature used in the final report.

4. Taxes will be deducted from each payment as per rates in force. In addition the evaluating agency/ consultant is expected to pay service tax as their end.

11. SELECTION OF CONSULTANT AGENCY FOR EVALUATION:

The selection of evaluation agency shall be finalized as per provisions of KTPP Act and rules without compromising on the quality.

12. Contact person for further details:

- Nodal Officer, Forest Department, Government of Karnataka.
- Consultant (Evaluation) KEA

-Sd-
Chief Evaluation Officer
Karnataka Evaluation Authority

(Acl\,o. " '-"" -
ToR Prepared by
(Dr. Chaya Degaonkar)

Annexure-1

DETAILS OF SCHEMES TO BE EVALUATED

SCHEME-I: COMPENSATORY AFFORESTATION FUND MANAGEMENT & PLANNING AUTHORITY (CAMPA)

1. Introduction:

CAMPA has been constituted in pursuance of the Hon'ble Supreme Court's order dated 30-10-2002 in lA No.544, in Writ Petition(Civil) No. 202 of 1995 for the purpose of management of money collected towards Compensatory Afforestation (CA), Net Present Value (NPV) and any other money recoverable in pursuance of the Hon'ble Supreme Court's Order to this regard.

Ministry of Environment, Forest and Climate Change, (MOEFCC) Government of India has issued guidelines for operating the funds under State Compensatory Afforestation Fund Management and Planning Authority (CAMPA) for preservation of natural forests, management of wildlife, infrastructure development and other allied works.

The State CAMPA would administer the amount received from the Ad-hoc CAMPA and utilize the amount collected for undertaking Compensatory Afforestation, assisted natural regeneration, conservation and protection of forests, infrastructure development, wildlife c;_onservation and protection and other related activities and for matters connected therewith or incidental thereto.

2. The Major objectives of the State CAMPA Projects:

As per guidelines issued by the Ministry of Environment and Forests, Government of India, the State CAMPA shall seek to promote:

(a) Conservation, Protection, Regeneration and Management of existing natural forests;

(b) Conservation, Protection, and Management of wildlife and its habitat within and outside Protected Areas including the consolidation of the protected areas.

(c) Compensatory Afforestation

(d) Environmental services, which include:-

(i) Provision of goods such as wQod, non-timber forest products, fuel, fodder and water and provision •of services such as grazing, tourism, wildlife protection and life support;

(ii) Regulating Services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes;

(iii) Non-material benefits obtained from ecosystems, spiritual, recreational, aesthetic, inspirational, educational, symbolic and

(iv) Supporting such other services necessary for the production of ecosystem services, biodiversity, nutrient cycling and primary production.

(v) Research, training and capacity buildings. The project is implemented in all districts of the State. With the release of funds from Ad-hoc CAMPA, Government of India, the State CAMPA has embarked on a mission mode to take up Project Specific Activities i.e., Compensatory Afforestation & other Site-Specific Activities and Activities for utilization of NPV amount like Consolidation, Protection, Regeneration in natural Forests Wildlife Protection and Management activities, Infrastructure Development etc.

As envisaged by the Hon'ble Supreme Court of India and as per guidelines issued by the Ministry of Environment and Forests, Government of India, the main works taken up under State CAMPA are: -

3. Project Specific Activities:-

A. Compensatory Mforestation (CA), Additional CA (ACA) &Penal CA (PCA)

i) In Forest Land

ii) In Non-Forest Land

B. Site Specific Activities:

i) Safety Zone plantation

ii) Planting in degraded forest area (1½ times of safety zone)

iii) Fencing

iv) Catchment Area Treatment Plan (CATP)

v) Planting Dwarf Species

vi) Medicinal plantation

vii) Soil & Moisture Conservation works

viii) Providing LPG connection to local villagers etc.,

C. Activities for Utilization of NPV:-

I. Consolidation and protection of Forests:

a. Survey and demarcation of Forests

b. Forest boundary consolidation through Cattle Proof Trench (CPT)

c. Fire protection

d. Creation of lung spaces by protection and consolidation of valuable forest areas in the city's urban areas and developing them as Tree Parks.

II. Consolidation and Regeneration of Forests:

a. Assisted Natural Regeneration (ANR)

b. Promotion of Sandal Regeneration on estate management concept.

c. Production of Quality Planting Materials, collection of quality seeds and other Research activities.

d. Integrated plan for Conservation and Development of biodiversity, forests and ecology in the forest areas of coastal zone (HasiruKavacha)

III. Wildlife Protection and Management:

a. D-line clearance

b. Development & maintenance of road network in protected areas.

c. Elephant Human conflict mitigation measures (Areas outside & inside protected areas)

d. Elephant Proof Trench (EPT)

e. Solar Fencing

f. Assistance to Bannerghatta Biological Park

g. Wildlife Habitat Improvement & Management for individual Protected Area's (PA's)

i. Creation of new water holes

ii. De-silting of tanks

iii. Soil &Moisture Conservation (SMC) works

iv. Providing Salt licks

v. Elephant depredation camps/ Anti-poaching camps (APC's)

IV. Infrastructure Development:

a. Strengthening and augmenting digitization and Communication network;

i. Cell Phones

ii. Computers

iii. Laptop

h. Xerox Machines

i. GPS

j. Digital Cameras

k. Personal Digital Assistance (PDA)

b. New Buildings (Staff Quarters)

c. Building maintenance

d. Strengthening of Forest Institutes for capacity building.

e. Purchase of vehicles (Two Wheelers for Forests and Four Wheelers for Officers)

V. Forest Produce Saving devices & other activities:

a. Supply of energy saving devices at subsidized cost to forest fringe villages.

b. Maintenance of WP Samples Plots

c. Repair, Maintenance, & Office Expenditure (RMOE), Travelling Expenses (TE) etc.

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SCHEME- 2:13TH FINANCE COMMISSION (TFC)

1. Introduction:

Karnataka is pioneer in implementation of various Forestry Programs. The successful implementation of various programs with the assistance of State Government, Central Government and Externally Aided projects has added fillip to its efforts done so far in this field. Appreciating the implementation of these programs and preparation of working plan the Government of India under '13th Finance ' has come forward to support the Forest Department of Karnataka. The project is implemented in all districts of the State. With this assistance from the Government of India, the Forest Department has embarked on a mission mode to expand the Forest cover and strengthen the infrastructure of the department in all districts of the state.

2. The Major objectives of the 13th Finance projects:

The broad objectives of the grant-in-aid for forests are to provide the wherewithal for preservation, so as to halt and reverse past declines in the quantum and quality of area under forest: and to provide fiscal resources by which the state can enable alternative economic activities as a substitute for economic disability imposed by forest cover.

i. To increase the Forest Cover of the state
ii. To improve the infrastructure of the department especially for front line staff
iii. To improve the mobility of the Field Staff through induction of vehicles
iv. Use of modern technology like GIS through ICT (Information, Communication &Technology) etc)
v. Enhance protection mechanism for forest & wildlife

3. Project Specific Activities:

1. Advance works for Plantation

2. Raising of Plantation

3. Maintenance of Plantation

4. Development of Central Nursery

5. Development & maintenance of Sandal & Medicinal Plant Estate

4. Habitat Improvement

7. Support to ANR to Special such as Dindiga/ Caned regeneration

8. Raising/Maintenance of Seedlings of Polythene Bags (PBs)

9. Eco-Tourism Development

10. KaravaliHasiruKavachaYojane

11. Renewable Energy

12. Research & Utilization Activities

13. Training activities for forest staff

14. ICT, Mobility, Publicity & Other Infrastructure Developments in HQs

15. Building infrastructure development works (Civil Works)

14. Publicity, Awareness, Training, etc.,

17. Working Plan Activities

18. Fixing/Creating/Formations Cairns

19. Establishment & Maintenance of Protection Camps like Forest PC, Anti-Poaching C mps, Anti-Smuggling Camps, Anti-depredation camps etc

20. Boundary Consolidation including D-line clearance, CPT and Boundary Walls.

21. Vehicle Maintenance.

22. Purchase of Laptop, Desktops, related accessories and other ICT Requirements

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SCHEME-3 :NATIONAL AFFORESTATION PROGRAM-FOREST DEVELOPMENT AGENCY (NAP- FDA)

Objectives of the Scheme

i. **Goal:**

Increase and/ or improve Forest and Tree cover (FTC)

ii. **Purpose:**

Rehabilitation of degraded forests and other areas by institutionalizing decentralized/ participatory forest management and supplementing livelihoods improvement processes.

iii. The activities involved and the outputs of NAP-FDA scheme are as follows;

Outputs	Activities
(a) Improved natural forest stock	Assisted natural regeneration of degraded areas
Increased and improved FTC	(a)Artificial regeneration and Enrichment planting. (b) Promotion of Non-Timber forest Products (NTFPs)
(c)Participatory forest management initiated by supporting the immediate needs of fringe-community	Entry Point Activities
(d)Long -term participation of fringe-community in forest management	(a)Participatory-micro-planning, implementation and monitoring of projects (b) Flexible project design and cost Norms
(e)Increased Soil and Moisture Conservation (SMC)	Biological SMC supplemented by physical SMC treatment as per local site condition.
(f) Improved forest/ tree productivity	Promotion and use of improved technologies and high-quality planting material.
(g)Increased capacity of fringe community and frontline staff to develop and manage natural resources	Awareness generation, training and linkage with other institutions
(h)Enhanced opportunity for local forest-based micro enterprises	Value-addition and marketing of forest produce from project area
(i) Review and independent monitoring processes internalized	Bottom-up internal monitoring of projects and independents third party concurrent and final evaluations of each project
G)Tree cover in non-forest areas promoted	(a) Agro-forestry on bunds and farmlands (b)Coastal shelterbelt and tank foreshore plantations on public and private lands.

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SCHEME-4: NATIONAL B MBOO MISSION (NBM)

Mission Objectives:

- To promote the growth of the bamboo sector through an area based regionally differentiated strategy
- To increase the coverage of area under bamboo in potential areas, with suitable species to enhance yields.
- To promote marketing of bamboo and bamboo- based handicrafts.
- To establish convergence and synergy among stakeholders for the development of bamboo.
- To promote, develop and disseminate technologies through a seamless blend of traditional wisdom and modern scientific knowledge.
- To generate employment opportunities for skilled and unskilled persons, especially unemployed youths.

Strategy:

To achieve the above objectives, the mission would adopt the following strategies:

- Adopt a coordinated approach covering production and marketing to assure appropriate returns to growers/ producers.
- Promote Research and Development (R&D) of genetic superior clones of suitable species and technofogies for enhanced production.
- Enhance acreage (in forest and non-forest areas) and productivity of bamboo through species change and improved cultural practices.
- Promote partnership, convergence and synergy among R&D and marketing agencies in public as well as private sectors, at all levels.
- Promote where appropriate, cooperatives and self-help groups ensure support and adequate returns to farmers.
- Facilitate capacity-building and Human Resources Development.
- Set up National, State and sub State Level Structures, to ensure adequate returns for the produce of the farmers and eliminate middlemen, to the extent possible.

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Annexure -2

List of Plantations

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
1	BALLARI	CHITRADURGA T	CHITRADURGA T	MOLAKALMURU T	Abbenahalli Plantation	2011-12	25
2	MANGALURU	KUNDAPURA T	MOODABIDRE T	KARKALA T	Raising of byloor Mansoon Roadside Plantation of Bailoor Guddeyangady road 3 Km	2014-15	3
3	MANGALURU	KUNDAPURA T	KUNDAPURA T	SHANKARANARAYANA T	hale amasebailu	2011-12	25
4	MANGALURU	KUNDAPURA T	KUNDAPURA T	KUNDAPUR T	kadhrihaklu 7 ha 2012-13 fuelweood plantation	2012-13	7
5	MANGALURU	KUNDAPURA T	KUNDAPURA T	KUNDAPUR T	hilkodu 10 ha fuelwood plantation 2011-12	2011-12	10
6	MANGALURU	KUNDAPURA T	KUNDAPURA T	KUNDAPUR T	ergi 10 ha fuelwood plantation 2013-14	2012-13	10
7	MANGALURU	KUNDAPURA T	KUNDAPURA T	BYNDOOR T	vasre hulkadki road side plantation	2013-14	1
8	MANGALURU	KUNDAPURA T	MOODABIDRE T	MOODABIDRE T	Kadandalaje	2013-14	12
9	MANGALURU	KUNDAPURA T	MOODABIDRE T	HEBRI T	onikal	2013-14	10
10	MANGALURU	KUNDAPURA T	MOODABIDRE T	HEBRI T	Kalthuru-Cherkady-Brahmavara Roadside Plantation	2014-15	5

Annexure

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
11	SHIVAMOGGA	SHIVAMOGGA T	AYANUR T	RIPPANPET T	Beede Sy.No.9	2012-13	10
12	MANGALURU	MANGALURU T	SUBRAMANYA T	SULLIA T	KANAKURU	2012-13	10
13	SHIVAMOGGA	SAGARA T	SAGARA T	SAGARA T	laviggere sno 78,82	2013-14	15
14	CHIKKAMAGALURU	KOPPA T	KOPPA T	KOPPA T	Maritotlu and Tanudi	2014-15	10
15	BALLARI	KOPPAL T	GANGAVATHI T	KOPPALA T	Bukkanahatti	2011-12	15
16	CHIKKAMAGALURU	CHIKKAMAGALURU T	MOODIGERE T	ALDUR T	saragoduSy.no124 Gap Planting in kabbinahara area	2012-13	25
17	CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	KALASA T	Idukani	2011-12	10
18	CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	KALASA T	Kalkodu	2011-12	15
19	CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	SRINGERI T	Asagodu plantation	2013-14	5
20	MANGALURU	MANGALURU T	MANGALURU T	MANGALURU T	Mangrove Plantation	2011-12	5
21	MANGALURU	MANGALURU T	MANGALURU T	MANGALURU T	Shivabhag Mallikatte and Kulashekara Roadside	2013-14	4
22	MANGALURU	MANGALURU T	MANGALURU T	MANGALURU T	Sasihithlu	2011-12	10
23	MANGALURU	MANGALURU T	SUBRAMANYA T	PANJA T	2011-12 Kebbodi PLantation, Yenekal RF	2012-13	10
24	CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	KALASA T	Javali	2014-15	4

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
25	CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	BALEHONNUR T	Huigere sy no.83,84	2014-15	15
26	CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	BALEHONNUR T	Halasur sy.no.96	2013-14	15
27	CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	BALEHONNUR T	Muduguni sy no.68,39	2013-14	10
28	BELAGAVI	BELAGAVI T	KHANAPUR T	KHANAPUR T	Shedegali sy no 4 5	2012-13	10
29	BELAGAVI	BELAGAVI T	KHANAPUR T	KHANAPUR T	Savaragali FS no 24/p	2012-13	20
30	SHIVAMOGGA	SHIVAMOGGA T	THIRTHAHALLI T	THIRTHAHALLI T	Neralumane Sy.No.7	2011-12	10
31	SHIVAMOGGA	SHIVAMOGGA T	THIRTHAHALLI T	THIRTHAHALLI T	ANDAGERE SY NO115	2011-12	10
32	SHIVAMOGGA	SHIVAMOGGA T	THIRTHAHALLI T	THIRTHAHALLI T	virupapura sy no74	2011-12	10
33	SHIVAMOGGA	SAGARA T	SAGARA T	KARGAL T	KATTINAKARU HOGEVADDI BLOCK 2	2014-15	9
34	SHIVAMOGGA	SAGARA T	SAGARA T	ANANDPURA T,CHORADI	Iruvakki	2012-13	20
35	SHIVAMOGGA	BHADRAVATHI T	CHANNAGIRI T	BHADRAVATHI T	maintenance of one year old Pit plantation (ANR Model)	2013-14	10
36	BENGALURU	KOLAR T	KOLAR T	SRINIVASAPURA T	Dalasanur	2013-14	25
37	SHIVAMOGGA	SHIVAMOGGA T	THIRTHAHALLI T	AGUMBE T	Kasaravalli AR Plantation	2011-12	10
38	DHARWADA	DHARWADA T	DHARWADA T	HUBLI T	Rayanal,krishnapur	2013-14	50
39	UTTARA KANNADA	HONNAVARA T	KUMTA T	KUMTA T	Hegde Fsy 391	2013-14	3

Annexure

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
40	UTTARA KANNADA	HONNAVARA T	KUMTA T	KUMTA T	casurina Plantation	2011-12	3
41	BELAGAVI	BELAGAVI T	NAGARGALI T	NAGARGALI T	Chinchewadi fs no 23	2013-14	6
42	BELAGAVI	BELAGAVI T	NAGARGALI T	NAGARGALI T	Balagunda fs no 121 124	2011-12	7
43	BELAGAVI	BELAGAVI T	NAGARGALI T	GOLIHALLI T	Surapur FS no 77	2012-13	10
44	MANGALURU	MANGALURU T	MANGALURU T	MANGALURU T	Mangrove Block 1	2011-12	5
45	CHAMARAJANAGARA	CAUVERY WL	HANUR WL	COWDALLY WL	Karnedoddi	2013-14	20
46	CHAMARAJANAGARA	CAUVERY WL	HANUR WL	COWDALLY WL	Gowdana Kere Bayalu	2013-14	25
47	DHARWADA	HAVERI T	HANAGAL T	HANAGAL T	Kamanahalli F.Sy.No-60	2013-14	15
48	CHAMARAJANAGARA	CAUVERY WL	HANUR WL	HANUR WL	Managalli Dam	2014-15	25
49	MANGALURU	KARKALA WL	SIDDHAPURA WL	SOMESHWARA WL	odur gap Plantation	2011-12	25
50	KALABURGI	RAICHUR T	RAICHUR T	DEVADURGA T	Somanamaradi	2011-12	12
51	BALLARI	BALLARI T	HOSPETE T	HOSPETE T	Shivapura RF (Thimmappanagudi)	2011-12	25
52	BENGALURU	CHIKABALLAPURA T	CHINTAMANI T	BAGEPALLI T	Surappalli	2013-14	25
53	BENGALURU	CHIKABALLAPURA T	CHINTAMANI T	BAGEPALLI T	Vandaman (Suganampalli)	2011-12	25
54	SHIVAMOGGA	BHADRAVATHI T	CHANNAGIRI T	SHANTHISAGARA T	Saidarakallalli Sy No.31	2013-14	25
55	BENGALURU	BENGALURU RURAL T	DODDABALLAPURA T	DEVANAHALLI T	Akkupete plantation	2013-14	10
56	UTTARA KANNADA	KARWAR T	KARWAR T	KADRA T	Kadra FS No 12	2014-15	10

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
57	UTTARA KANNADA	KARWAR T	KARWAR T	KARWAR T	Amdalli 481A1 489	2012-13	10
58	KALABURGI	BIDAR T	BASAVAKALYANA T	HUMNABAD T	Mustari and udbal	2013-14	25
59	UTTARA KANNADA	KARWAR T	KARWAR T	KARWAR T	sunkeri island mangrove	2012-13	2
60	UTTARA KANNADA	KARWAR T	KARWAR T	KARWAR T	Amdalli kantriwada island	2012-13	10
61	MYSURU	HUNSUR T	HUNSUR T	K.R NAGARA T	Malali plantation	2012-13	5
62	UTTARA KANNADA	SIRSI T	SIRSI T	SIRSI T	Halkani	2010-11	15
63	UTTARA KANNADA	HONNAVARA T	KUMTA T	KATGAL T	Malavalli Fs No 50	2011-12	1.2
64	UTTARA KANNADA	SIRSI T	SIRSI T	BANAVASI T	Huldevinasara FSNo 11	2011-12	15
65	UTTARA KANNADA	SIRSI T	SIRSI T	BANAVASI T	Kogod Fsy 10	2011-12	10
66	UTTARA KANNADA	HONNAVARA T	HONNAVARA T	GERUSOPPA T	Mahime-190	2011-12	3
67	UTTARA KANNADA	HONNAVARA T	HONNAVARA T	GERUSOPPA T	Mahime-179	2011-12	2.5
68	UTTARA KANNADA	HONNAVARA T	HONNAVARA T	HONNAVARA T	Nilkod FS.No42APart II	2011-12	1.75
69	HASSANA	HASSANA T	HASSANA T	ALUR T	Samadale - Karuvally Plantation	2014-15	12.5
70	HASSANA	HASSANA T	CHANNARAYAPATTANA T	HOLENARASIPURA T	kolalubore- block-IV	2014-15	25
71	HASSANA	HASSANA T	CHANNARAYAPATTANA T	HOLENARASIPURA T	Kolalbore Block Ii	2014-15	25
72	HASSANA	HASSANA T	CHANNARAYAPATTANA T	CHANNARAYAPATNA T	Kuri Kaval Block II	2011-12	16
73	UTTARA KANNADA	YELLAPUR T	YELLAPUR T	KIRWATTI T	Holeyankatta Bl.No.XV-09	2014-15	25
74	UTTARA KANNADA	YELLAPUR T	YELLAPUR T	KIRWATTI T	Andramkoppa Bl.No.16&18	2013-14	23

Annexure

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
75	UTTARA KANNADA	HONNAVARA T	KUMTA T	KATGAL T	Anegundi Fs No 19	2012-13	10
76	UTTARA KANNADA	YELLAPUR T	MANCHIKERI T	IDUGUNDI T	2012 Rains plantation	2012-13	20
77	UTTARA KANNADA	KARWAR T	ANKOLA T	ANKOLA T	Harwada Callopyllum	2011-12	5
78	UTTARA KANNADA	KARWAR T	ANKOLA T	ANKOLA T	Honnebail callophyllum	2013-14	5
79	UTTARA KANNADA	YELLAPUR T	MANCHIKERI T	IDUGUNDI T	Targar 2012 Rains Plantation	2012-13	20
80	UTTARA KANNADA	HONNAVARA T	KUMTA T	KUMTA T	Kumta Mangrove Deemed forest	2012-13	20
81	BELAGAVI	GOKAK T	RAMDURGA T	RAMDURGA T	Katakol	2011-12	25
82	UTTARA KANNADA	SIRSI T	SIDDAPUR T	KYADGI T	Talekeri	2015-16	10
83	KODAGU	MADIKERI T	MADIKERI T	SAMPAJE T	Ballekolly	2013-14	25
84	KODAGU	MADIKERI T	MADIKERI T	SAMPAJE T	Kammadi	2013-14	25
85	KODAGU	MADIKERI T	MADIKERI T	SAMPAJE T	Arekallu RF	2011-12	5
86	HASSANA	TUMKUR T	TIPTUR T	TIPTUR T	Chowdlapura	2013-14	25
87	UTTARA KANNADA	SIRSI T	JANMANE T	JANMANE T	Saraguppa	2015-16	10
88	MANGALURU	KUNDAPURA T	KUNDAPURA T	BYNDOOR T	kambadakone Road Side plantation	2013-14	1
89	MANGALURU	KUNDAPURA T	MOODABIDRE T	MOODABIDRE T	moodbidri muncipal area road side plantation	2012-13	4
90	MANGALURU	MANGALURU T	MANGALURU T	BELTHANGADY T	2013 Rains ANR Plantation	2013-14	5

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
91	MANGALURU	MANGALURU T	MANGALURU T	BELTHANGADY T	2013 Rains ANR Plantation (Nidigal)	2013-14	5
92	MANGALURU	MANGALURU T	MANGALURU T	BELTHANGADY T	2012 Rains ANR Plantation (Kombinadka)	2012-13	10
93	MANGALURU	KUNDAPURA T	KUNDAPURA T	BYNDOOR T	Sarpanamane Road Side Plantation	2013-14	1
94	MANGALURU	KUNDAPURA T	MOODABIDRE T	VENOOR T	ANR Platation	2011-12	10
95	KODAGU	MADIKERI T	SOMAWARAPETE T	SOMAWARAPETE T	Hebbala plantation	2013-14	25
96	KODAGU	VIRAJPETE T	THITHIMATHI T	THITHIMATHI T	Tattahally	2013-14	25
97	MANGALURU	MANGALURU T	MANGALURU T	MANGALURU T	Baikampady industrial area Roadside	2013-14	2
98	MANGALURU	MANGALURU T	MANGALURU T	MANGALURU T	Surathkal NITK Roadside	2012-13	3
99	MANGALURU	MANGALURU T	MANGALURU T	MANGALURU T	KOTEMALE (DASANAKAJE)	2013-14	10
100	SHIVAMOGGA	BHADRAVATHI T	CHANNAGIRI T	CHANNAGIRI T	JAMMAPURA(JAYAPURA) SY NO 10	2012-13	10
101	SHIVAMOGGA	BHADRAVATHI T	CHANNAGIRI T	CHANNAGIRI T	RANGAYYANGIRI SF KALKERE SY NO 4 & 8	2012-13	10
102	CHIKKAMAGALURU	KOPPA T	KOPPA T	KOPPA T	Guddetota	2014-15	10
103	UTTARA KANNADA	KARWAR T	KARWAR T	KARWAR T	Nakodmulla	2012-13	5
104	UTTARA KANNADA	HONNAVARA T	HONNAVARA T	HONNAVARA T	Revised Kharwato Mudkani	2011-12	5

Annexure

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
105	UTTARA KANNADA	HONNAVARA T	HONNAVARA T	HONNAVARA T	Revised Nagare FS No-115	2011-12	2.5
106	UTTARA KANNADA	SIRSI T	SIRSI T	SIRSI T	Revised Girgadde plantation 2010-11	2011-12	20
107	UTTARA KANNADA	SIRSI T	SIRSI T	SIRSI T	Revised Girgadde 2010-11	2010-11	15
108	UTTARA KANNADA	KARWAR T	ANKOLA T	ANKOLA T	Revised Bogribail FS No42	2013-14	20
109	SHIVAMOGGA	BHADRAVATHI T	TARIKERE T	AJJAMPURA T	Revised Haralahalli plantation	2013-14	25
110	BELAGAVI	BELAGAVI T	NAGARGALI T	GOLIHALLI T	Revised Haralahalli plantation	2011-12	25
111	DHARWADA	GADAG T	GADAG T	SHIRAHATTI T	Revised amarapur fsy.61,62	2015-16	25
112	UTTARA KANNADA	KARWAR T	KARWAR T	GOPSHITTA T	Revised Vilasbandar island	2012-13	5
113	UTTARA KANNADA	KARWAR T	KARWAR T	KARWAR T	kodibag FS no 108A	2011-12	7
114	MYSURU	HUNSUR T	HUNSUR T	PERIYAPATTANA T	kaggundi	2012-13	10
115	BELAGAVI	BELAGAVI T	NAGARGALI T	GOLIHALLI T	Chincavadi fs no 25,42	2014-15	25
116	BELAGAVI	GOKAK T	RAMDURGA T	SOUNDATTI T	Budigoppa fs no 45,46	2013-14	25

Annexure 3

List of Other Works

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
1	Bengaluru	Bengaluru Rural T	Doddaballapura T	Devanahalli T	Cattle Proof Trench	B.S.Gidakaval	2014-15
2	APCCF (WP)	CCFWP BANGALORE	CFWP SHIVAMOGGA	NA		Mandekolu RF	2014-15
3	Apccf (Wp)	Ccfwp Bangalore	Cfwp Belgaum	Dcfwp Belgaum	Boundary Pillars	Gorabal And Taradkop	2014-15
4	Mangaluru	Mangaluru T	Subramanya T	Subramanya T		Kombar Rf	2014-15
5	Chamarajanagara	Cauvery Wl	Hanur Wl	Cowdally Wl	Others	Karikallugudda	2013-14
6	Chamarajanagara	Cauvery Wl	Hanur Wl	Hanur Wl	Others	Neralemarada Konchalu	2013-14
7	Chamarajanagara	Cauvery Wl	Kanakapura Wl	Halagur Wl	Others	Bhemeshwari Nature Camp	2013-14
8	Mysuru	Hunsur T	Hunsur T	Hunsur T	Cattle Proof Trench	Kolaghatta	2014-15
9	Apccf (Wp)	Ccfwp Bangalore	Cfwp Mysuru	Magadi T	Boundary Pillars	Magadi Savanadurga A	2014-15
10	Apccf (Wp)	Ccfwp Bangalore	Cfwp Mysuru	Magadi T	Boundary Pillars	Magadi Manchinabele Abc	2014-15
11	Mangaluru	Mangaluru T	Mangaluru T	Bantwala T	Cattle Proof Trench	Panjikal, Rayee, Veerakamba	2014-15
12	Mangaluru	Mangaluru T	Mangaluru T	Bantwala T	Others	Verrakamba Rf And Kodyamale Rf (5 Each)	2013-14
13	Mangaluru	Mangaluru T	Mangaluru T	Bantwala T	Others	Karinja Temple, Kodyamale Rf	2014-15
14	Mangaluru	Mangaluru T	Mangaluru T	Bantwala T	Others	Construction Of Paragola - One @ Karinja, Kodyamale Rf	2014-15
15	Mangaluru	Mangaluru T	Mangaluru T	Bantwala T	Others	Planting Of Sacred Plants Along Swasthya Patha Near Karinja Temple, Kodyamale Rf	2014-15
16	Mangaluru	Mangaluru T	Mangaluru T	Bantwala T	Others	Providing Of Tree Guards @ Karinja Temple, Kodyamale Rf	2014-15
17	Mangaluru	Mangaluru T	Mangaluru T	Bantwala T	Waterholes	Construction Of Water Holes @ Bantwal	2014-15

Annexure

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
18	Mangaluru	Mangaluru T	Puttur T	Puttur T	Residential Buildings	Construction Of Watcher Shed @ Puttur Range Jurisdiction	2013-14
19	Mangaluru	Mangaluru T	Puttur T	Puttur T	Others	Preparation And Fixing Of Name Boards Of Older Plantation & Rf Areas @ Anegundi & Kelanjimane	2013-14
20	Mangaluru	Mangaluru T	Puttur T	Puttur T	Others	Formation Of Cairns In Rf Boundry Bajathur, Narimogeru, Kalanjimale Rf	2013-14
21	Mangaluru	Mangaluru T	Puttur T	Puttur T	Cattle Proof Trench	Excavation Of Cpt @ Bantaje Rf	2014-15
22	Mangaluru	Mangaluru T	Mangaluru T	Mangaluru T	Forest Rest House	Construction Of Forest Rest House At Bengrare Of Mangalore Range - Balance Works	2014-15
23	Mangaluru	Mangaluru T	Mangaluru T	Mangaluru T	Others	Installation Of Gate Way To Enter Beach Area @ Bengare - Thannirbhavi	2014-15
24	Mangaluru	Mangaluru T	Puttur T	Uppinangady T	Boundary Pillars	Construction Of Cairns 08 Neranki Male Rf 08 No Nindle Block And 07 Nos At Mogru Block, Uppinangady Range	2013-14
25	Mangaluru	Kundapura T	Kundapura T	Kundapur T	Cattle Proof Trench	Formation Of Cpt At Hosuru Block & Bellala Block	2013-14
26	Mangaluru	Kundapura T	Kundapura T	Shankaranarayana T	Others	Construction Of Compound Wall To Timber Depot At Hardalli, Mandalli	2013-14
27	Mangaluru	Kundapura T	Kundapura T	Byndoor T	Others	Maintenance Of D Line, Reclearing Of D Line Heaping And Burning All Along The Line 6m Width In Evergreen Forest Areas At Karnigadde Rf Extension Block, Byndoor Rf	2014-15
28	Mangaluru	Kundapura T	Kundapura T	Udupi T	Others	Maintenance Of D Line @ Havanje Block Bit 1 & 2 Kadoor Block, Heggunje, Yadthady, Varvady, Emalpade, Badagabettu, Pilaru And Other Rf Area	2014-15

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
29	Mangaluru	Kundapura T	Kundapura T	Shankaranarayana T	Residential Buildings	Building Maintenance- Extension Work Of Deputy Rfo Qtrs At Shankarnarayana	2013-14
30	Mangaluru	Kundapura T	Moodabidre T	Hebri T	Boundary Pillars	Boundary Consolidation Of Permanent Cairons At Ballebailu, Marihonda, Hoigebellar	2013-14
31	Mangaluru	Karkala Wl	Kudremukh Wl	Karkala Wl	Desilting Of Tank	Desilting Of Water Tank At Periyakatta	2013-14
32	Mangaluru	Karkala Wl	Kudremukh Wl	Karkala Wl	Desilting Of Tank	Desilting Of Water Tank At Abbaskatting	2013-14
33	Mangaluru	Karkala Wl	Kudremukh Wl	Karkala Wl	Others	Providing Unmanned Gate At Sunkadakatte	2014-15
34	Mangaluru	Karkala Wl	Kudremukh Wl	Karkala Wl	Anti Poaching Camp/Forest Advprotection Camp	Construction Of Apc Structure At Mutlupady	2014-15
35	Mangaluru	Karkala Wl	Kudremukh Wl	Karkala Wl	Others	Construction Of Cairns At Haradi	2014-15
36	Mangaluru	Karkala Wl	Kudremukh Wl	Karkala Wl	Others	Construction Of Vehicle Shed At Karkala Wl	2014-15
37	Mangaluru	Karkala Wl	Kudremukh Wl	Kerekatte Wl	Gully Checks	Construction Of Gully Checks At Hulugaru Bailu (Village)	2013-14
38	Mangaluru	Karkala Wl	Kudremukh Wl	Kerekatte Wl	Desilting Of Tank	Desilting Of Water Tanks At Kadekal Hadi Village	2013-14
39	Mangaluru	Karkala Wl	Kudremukh Wl	Kerekatte Wl	Na	Construction Of Culverts At Ganapathikatte Mudsaru	2014-15
40	Mangaluru	Karkala Wl	Kudremukh Wl	Kudremukh Wl	Gully Checks	Construction Of Gully Checks At Mining Area, Gogudda	2013-14
41	Mangaluru	Karkala Wl	Kudremukh Wl	Kudremukh Wl	Na	Construction Of Cause Way At Avanthige Gudda (Singsar)	2014-15
42	Mangaluru	Karkala Wl	Kudremukh Wl	Kudremukh Wl	Anti Poaching Camp/Forest Advprotection Camp	Construction Of Apc At Lakya Backwater	2014-15

Annexure

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
43	Mangaluru	Karkala Wl	Kudremukh Wl	Kerekatte Wl	Others	Signage At Hanumangundi	2014-15
44	Mangaluru	Mangaluru T	Mangaluru T	Bantwala T	Others	Eatablishing Water Supply Facility From Pond To Water Tank Near Parvathi Temple Including Pipe Line And Fixtures At Kodyamale- Karinja	2014-15
45	Kodagu	Virajpete T	Thithimathi T	Thithimathi T	Forest Rest House	Repairs Of Forest Guest House @ Thitimathi	2014-15
46	Kodagu	Virajpete T	Virajpete T	Makutta T	Residential Buildings	Construction Of Barracks To Ksrp At Matre Ksrp Camp @ Matre	2013-14
47	Kodagu	Virajpete T	Virajpete T	Makutta T	Others	Elephant Proof Barricade By Installation Of Special Structures At Manjandikundu, Watekolly Section	2014-15
48	Kodagu	Madikeri T	Somawarapete T	Kushalanagara T	Anti Poaching Camp/Forest Advprotection Camp	Construction Of Anti Poarching Camp @ Dubare	2013-14
49	Kodagu	Madikeri T	Somawarapete T	Kushalanagara T	Others	Mesh Fence And Other Works @ Harangi, Bagamandala	2013-14
50	Shivamogga	Bhadravathi T	Channagiri T	Umblebylu T	Others	Kakanahasudi Nursery	2014-15
51	Shivamogga	Bhadravathi T	Channagiri T	Umblebylu T	Anti Poaching Camp/Forest Advprotection Camp	Kaithotlu	2014-15
52	Shivamogga	Shivamogga T	Ayanur T	Rippanpet T	Cattle Proof Trench	Demlapura	2013-14
53	Shivamogga	Bhadravathi T	Tarikere T	Tarikere T	Others	Bavikere	2014-15
54	Shivamogga	Bhadravathi T	Tarikere T	Lakkavalli T	Others	Hunasanahalli	2014-15
55	Shivamogga	Bhadravathi T	Tarikere T	Lakkavalli T	Anti Poaching Camp/Forest Advprotection Camp	Gurupura	2014-15
56	Shivamogga	Shivamogga Wl	Shivamogga Wl	Shivamogga Wl	Cattle Proof Trench	Kanakana Kere To Kanihala	2014-15
57	Shivamogga	Shivamogga Wl	Shivamogga Wl	Hanagere Wl	Desilting Of Tank	Masarur. Kudi Sf	2013-14

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
58	Shivamogga	Sagara T	Hosanagara T	Nagara T	Others	Construction Of Water Tank And Installation Of Pipeline @ Hullikal Nursery, Nagara Range, Hosanagar	2014-15
59	Shivamogga	Sagara T	Hosanagara T	Hosanagara T	Others	Chainlink Mesh Fencing/ Watchman Shed/ Store Room @ Hosanagara	2014-15
60	Chikkamagaluru	Koppa T	Balehonnur T	Sringeri T	Others	Providing And Fixing Of Boards At Vidyaranyapura Block 1 To 4 Rf	2014-15
61	Chikkamagaluru	Koppa T	Balehonnur T	Sringeri T	Cattle Proof Trench	Forest Boundary Consolidation Through Cpt At Kunimakki Survey No 30 And 56	2013-14
62	Chikkamagaluru	Koppa T	Koppa T	Koppa T	Cattle Proof Trench	Excavation Of Cpt At Survey No 22 And 17 Of Thalamakki Village	2014-15
63	Chikkamagaluru	Koppa T	Balehonnur T	Balehonnur T	Cattle Proof Trench	Huigere Sy No.84	2013-14
64	Chikkamagaluru	Koppa T	Balehonnur T	Balehonnur T	Cattle Proof Trench	Excavation Of Cpt On Sy No.195 Of B.Kanabur Village	2014-15
65	Chikkamagaluru	Koppa T	Balehonnur T	Balehonnur T	Others	Providing And Fixing New Boards At Halsur State Forest	2014-15
66	Chikkamagaluru	Koppa T	Balehonnur T	Balehonnur T	Anti Poaching Camp/Forest Advprotection Camp	Construction Of Shed For Apc At Karki-Bannur	2014-15
67	Chikkamagaluru	Koppa T	Balehonnur T	Balehonnur T	Anti Poaching Camp/Forest Advprotection Camp	Repairs Of Old Shed And Others Work At Apc Kabbinamane	2014-15
68	Chikkamagaluru	Koppa T	Balehonnur T	Balehonnur T	Forest Rest House	Repairs And Improvement Of Frh	2013-14
69	Chikkamagaluru	Koppa T	Balehonnur T	Kalasa T	Cattle Proof Trench	Forest Boundary Consolidation On Through Cpt At Hemavathi Notified Block Javali Syno.133, 134, 136, 162, 164 And Kelaguru Sy No.41	2013-14
70	Chikkamagaluru	Koppa T	Koppa T	Koppa T	Cattle Proof Trench	Forest Boundary Consolidation Of Cpt At Thalamakki	2014-15

Annexure

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
71	Chikkamagaluru	Chikkamagaluru T	Chikkamagaluru T	Chikkamagaluru T	Forest Rest House	Repair Work For Mate Quarters At Mattavara	2013-14
72	Chikkamagaluru	Chikkamagaluru T	Chikkamagaluru T	Chikkamagaluru T	Forest Rest House	Proposed Kitchen At Mattavara Guest House	2013-14
73	Chikkamagaluru	Chikkamagaluru T	Chikkamagaluru T	Chikkamagaluru T	Forest Rest House	Construction Of Dining Hall And Guest Room To Existing Ib At Mattavara	2013-14
74	Chikkamagaluru	Chikkamagaluru T	Chikkamagaluru T	Chikkamagaluru T	Cattle Proof Trench	Excavation Of Cpt From Hebballi To Arashinaguppe	2013-14
75	Apccf (Wp)	Ccfwp Bangalore	Cfwp Chikkamagaluru	Tumkur T	Others	Hutridurga Rf, Kunigal Range	2013-14
76	Apccf (Wp)	Ccfwp Bangalore	Cfwp Chikkamagaluru	Kunigal T	Boundary Pillars	Srinivasagiri Rf Kunigal Range	2014-15
77	Apccf (Wp)	Ccfwp Bangalore	Cfwp Chikkamagaluru	Kunigal T	Others	Ujjani Rf Extension, Kunigal Range	2014-15
78	Hassana	Tumkur T	Tiptur T	Tiptur T	Cattle Proof Trench	Chowdlapura	2013-14
79	Hassana	Tumkur T	Tiptur T	Chikkanayakanahalli T	Cattle Proof Trench	Thirtharamapura Nw Extension	2014-15
80	Hassana	Tumkur T	Tiptur T	Chikkanayakanahalli T	Others	Thirtharamapura Nw Extention	2014-15
81	Uttara Kannada	Sirsi T	Sirsi T	Banavasi T	Percolation Ponds	Huladevana Sar	2014-15
82	Uttara Kannada	Sirsi T	Sirsi T	Sirsi T	Office Buildings	Repair & Maintenance Of Acf Office & Survey Wing	2014-15
83	Uttara Kannada	Sirsi T	Janmane T	Janmane T	Percolation Ponds	Badagi F. Sy. No. 28	2013-14
84	Uttara Kannada	Honnavara T	Honnavara T	Honnavara T	Cattle Proof Trench	Cpt At Salkod -184	2014-15
85	Uttara Kannada	Honnavara T	Honnavara T	Honnavara T	Boundary Pillars	Contruction Of Rcc Pillars In Arolli-Mundagod-31, Hosakulli-86	2014-15
86	Uttara Kannada	Honnavara T	Honnavara T	Gerusoppa T	Boundary Pillars	Adkar-27 And Mahime-28	2013-14
87	Uttara Kannada	Yellapur T	Manchikeri T	Manchikeri T	Cattle Proof Trench	Kerehosalli Road Teak Plantation	2014-15
88	Uttara Kannada	Karwar T	Karwar T	Gopshitta T	Cattle Proof Trench	Cpt Work @ Ghadsai Fs No 142	2013-14

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
89	Uttara Kannada	Karwar T	Karwar T	Kadra T	Cattle Proof Trench	Cpt Work @ Devkar Fs 23, Kaiga Fs 105a, Virje Fs 97 & 76a1	2014-15
90	Uttara Kannada	Karwar T	Karwar T	Gopshitta T	Cattle Proof Trench	Cpt Work @ Hotegali Fs 260 A	2014-15
91	Uttara Kannada	Honnavara T	Kumta T	Hiregutti T	Boundary Pillars	Gokarna Fs 1269	2013-14
92	Uttara Kannada	Yellapur T	Yellapur T	Yellapur T	Office Buildings	Dcf Office	2013-14
93	Uttara Kannada	Yellapur T	Yellapur T	Yellapur T	Cattle Proof Trench	Sahasralli	2013-14
94	Uttara Kannada	Honnavara T	Kumta T	Kumta T	Boundary Pillars	Chandavar Fs 211	2014-15
95	Uttara Kannada	Honnavara T	Kumta T	Kumta T	Boundary Pillars	Aghanashini	2014-15
96	Uttara Kannada	Honnavara T	Kumta T	Kumta T	Cattle Proof Trench	Divalli-48	2013-14
97	Uttara Kannada	Honnavara T	Kumta T	Kumta T	Cattle Proof Trench	Holavalli -35	2013-14
98	Uttara Kannada	Honnavara T	Bhatkala T	Bhatkala T	Boundary Pillars	Construction Of Rcc Pillars In Hadvalli Fs.16	2014-15
99	Dharwada	Dharwada T	Dharwada T	Dharwada T	Forest Rest House	Construction, Repair & Equiping Quarters/ Office/ Ib	2013-14
100	Dharwada	Dharwada T	Dharwada T	Dharwada T	Office Buildings	Construction, Repair & Equipping Office, Dcf Office, Division Office	2013-14
101	Dharwada	Dharwada T	Dharwada T	Dharwada T	Office Buildings	Construction, Repair & Equipping Acf Office, Dharwad	2013-14
102	Apccf(Hrd)	Dcf Training Gungaragatti	Acf Ta Gungaragatti	Acf Training Gungaragatti 1	Others	Construction Of Store Room & Library At Fti Gungaragatti	2014-15
103	Apccf(Hrd)	Dcf Training Gungaragatti	Acf Ta Gungaragatti	Acf Training Gungaragatti 1	Others	Construction Of 2 Dormitores Block @ Fti Gungaragatti	2014-15
104	Apccf(Hrd)	Dcf Training Gungaragatti	Acf Ta Gungaragatti	Acf Training Gungaragatti 1	Others	Renovation Of Dormitories, Block 8 & 9, Toilets, Bathroom & Tiles @ Fti Gungaragatti	2014-15
105	Apccf(Hrd)	Dcf Training Gungaragatti	Acf Ta Gungaragatti	Acf Training Gungaragatti 1	Others	Renovation Of Dormitories, Block 6& 7, Toilets, Bathroom & Tiles	2014-15
106	Apccf(Hrd)	Dcf Training Gungaragatti	Acf Ta Gungaragatti	Acf Training Gungaragatti 1	Others	Construction Of Grill & Renovation Of Dormitories, Block 9	2014-15

Annexure

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
107	Kalaburgi	Kalaburgi T	Kalaburgi T	Chincholi Wl	Others	Construction Of Mist Chamber, Vermi Compost Pits, Oht And Laying Of Pipes @ Chincholi Frh	2014-15
108	Kalaburgi	Kalaburgi T	Kalaburgi T	Chincholi Wl	Forest Rest House	Maintenance Of Frh @ Chindanoor (Painting)	2014-15
109	Kalaburgi	Kalaburgi T	Kalaburgi T	Chincholi Wl	Cattle Proof Trench	Excavation Of Cpt @ Manikpur Sy No 21, Chincholi	2013-14
110	Kalaburgi	Bidar T	Basavakalyana T	Humnabad T	Cattle Proof Trench	Excavation Of Cpt @ Molkera	2013-14
111	Kalaburgi	Bidar T	Basavakalyana T	Humnabad T	Office Buildings	Repair & Renovation @ Rfo Humnabad Office	2014-15
112	Ballari	Chitradurga T	Chitradurga T	Chitradurga T	Training/Meeting Hall	Vana Vignana Kendra Jogimatti	2013-14
113	Ballari	Chitradurga T	Chitradurga T	Chitradurga T	Office Buildings	Division Office Records Room And Toilets	2013-14
114	Ballari	Chitradurga T	Chitradurga T	Chitradurga T	Cattle Proof Trench	Jogimatti Rf Kakkeharavu Hosuru	2014-15
115	Ballari	Ballari T	Ballari T	Ballari T	Office Buildings	Guest House In Ccf Office Compound	2014-15
116	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Manchikeri Range Block Xxix-27	2013-14
117	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Manchikeri Range Block Xxviii-38	2013-14
118	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Mundgod Range Block Xxiii-11	2013-14
119	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Mundgo Range Block Xxiii-9	2013-14
120	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Kirwatti Range Block Xxiii-58	2013-14
121	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Mundgod Range Block Xxiii-5	2013-14
122	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Mundgod Range Block Xxiii-24	2013-14
123	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Manchikeri Range Block Xxix-24	2013-14
124	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Manchikeri Range Block Xxix-21	2013-14
125	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Mundgod Range Block Xxiii-44	2013-14
126	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Mundgod Range Block Xxiii-12	2013-14
127	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Manchikeri Range Block Xxviii-52	2013-14

Sl. No.	Circle	Division	Sub-division	Range	Work Name	Work Location	Execution year
128	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Idagundi Range Block Xxxiii-16	2014-15
129	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Idagundi Range Block Xxxiii-18	2014-15
130	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Idagundi Range Block Xxxiii-14	2014-15
131	Apccf (Wp)	Ccfwp Bangalore	Cfwp Dharwad	Dcfwp Dharwad	Others	Katur And Manchikeri Range Block Xxix-16	2013-14
132	Uttara Kannada	Haliyal T	Haliyal T	Haliyal T	Others	Jatga Hosur Village Of Sambrani Range	2014-15
133	Apccf (Wp)	Ccfwp Bangalore	Cfwp Ballari	Na	Others	Tamallihalli Of Jagalur	2014-15
134	Apccf (Wp)	Ccfwp Bangalore	Cfwp Ballari	Na	Others	Magadi Of Jagaluru Range	2014-15
135	Apccf (Wp)	Ccfwp Bangalore	Cfwp Ballari	Na	Others	Gudekote Fs No-642	2014-15
136	Apccf (Wp)	Ccfwp Bangalore	Cfwp Ballari	Na	Others	Ucchngidurga (Kanchikere) Of Harapanahalli Range	2013-14
137	Apccf (Wp)	Ccfwp Bangalore	Cfwp Ballari	Na	Others	Anagodu Of Davanagere	2013-14

Annexure -4

List of SMC Works sampled

CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION
BALLARI	CHITRADURGA T	CHITRADURGA T	MOLAKALMURU T	Abbenahalli Plantation
MANGALURU	KUNDAPURA T	KUNDAPURA T	SHANKARANARAYANA T	hale amasebailu
MANGALURU	KUNDAPURA T	KUNDAPURA T	KUNDAPUR T	ergi 10 ha fuelwood plantation 2013-14
MANGALURU	KUNDAPURA T	MOODABIDRE T	MOODABIDRE T	Kadandalaje
MANGALURU	KUNDAPURA T	MOODABIDRE T	HEBRI T	onikal
SHIVAMOGGA	SHIVAMOGGA T	AYANUR T	RIPPANPET T	Beede Sy.No.9
CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	KALASA T	IDAKANI
CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	KALASA T	KALKODU
CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	SRINGERI T	Asagodu plantation
CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	BALEHONNUR T	Halasur sy.no.96
CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	BALEHONNUR T	Muduguni sy no.68,39
DHARWADA	DHARWADA T	DHARWADA T	HUBLI T	Rayanal,krishnapur
MANGALURU	KARKALA WL	SIDDHAPURA WL	SOMESHWARA WL	odur gap Plantation
KALABURGI	RAICHUR T	RAICHUR T	DEVADURGA T	Somanamaradi
BALLARI	BALLARI T	HOSPETE T	HOSPETE T	Shivapura RF (Thimmappanagudi)
BENGALURU	CHIKABALLAPURA T	CHINTAMANI T	BAGEPALLI T	Surappalli
KALABURGI	BIDAR T	BASAVAKALYANA T	HUMNABAD T	Mustari and udbal
MYSURU	HUNSUR T	HUNSUR T	K.R NAGARA T	Malali plantation
UTTARA KANNADA	YELLAPUR T	YELLAPUR T	KIRWATTI T	Holeyankatta Bl.No.XV-09
UTTARA KANNADA	YELLAPUR T	YELLAPUR T	KIRWATTI T	Andramkoppa Bl.No.16&18
UTTARA KANNADA	SIRSI T	SIDDAPUR T	KYADGI T	Talekeri
KODAGU	MADIKERI T	MADIKERI T	SAMPAJE T	Ballekolly
KODAGU	MADIKERI T	MADIKERI T	SAMPAJE T	Kammadi
KODAGU	MADIKERI T	MADIKERI T	SAMPAJE T	Arekallu RF
HASSANA	TUMKUR T	TIPTUR T	TIPTUR T	Chowdlapura
MANGALURU	MANGALURU T	MANGALURU T	BELTHANGADY T	2013 Rains ANR Plantation
MANGALURU	MANGALURU T	MANGALURU T	BELTHANGADY T	2013 Rains ANR Plantation (Nidigal)
SHIVAMOGGA	BHADRAVATHI T	TARIKERE T	AJJAMPURA T	Revised Haralahalli plantation

Annexure -5

List of Species planted

Sl. No.	Species
1.	Acacia *(Acacia auriculiformis)*
2.	Agavu *(Agave americana)*
3.	Antuvala *(Sapindus emerginatus)*
4.	Arali *(Ficus religiosa)*
5.	Athi *(Ficus racemosa)*
6.	Badam *(Terminalia catappa)*
7.	Bamboo *(Bambusa spp)*
8.	Banni *(Prosopis cineraria)*
9.	Banpu*(Terminalia tomentosa)*
10.	Banyan *(Ficus benghalensis)*
11.	Beete *(Dalbargia latifolia)*
12.	Bevu *(Azadirachta indica)*
13.	Bharanigi *(Vitex ultissima)*
14.	Bobbi *(Lophopetalum whitianum)*
15.	Bogi *(Hopea parviflora)*
16.	Bolpale *(Alstonia scholaris)*
17.	Canes *(Calamus sp)*
18.	Cashew *(Anacardium occidentale)*
19.	Dalchinni *(Cinnomomum zeylenicum)*
20.	Dhoopa *(Vateria indica)*
21.	Dindal *(Anogeissus latifolia)*
22.	Eucalyptus *(Eucalyptus globulus)*
23.	Gaali mara *(Cassurina equisetifolia)*
24.	Gandagarige *(Alstonia scholaris)*
25.	Garcinia *(Garcinia indica)*
26.	Glyrecedia *(Glyrecedia sp)*
27.	Gulmavu *(Machilus macranta)*
28.	Halmaddi *(Ailanthus malabarica)*
29.	Halsu *(Artocarpus integrifolia)*
30.	Hebbalasu *(Artocarpus hirsuta)*
31.	Hippe *(Bassia latifolia)*
32.	Hole mathi *(Terminalia arjuna)*
33.	Holedasavala *(Lagerstromea speciosa)*
34.	Honge *(Pongamia pinnata)*
35.	Honne *(Pterocarpus marsupium)*
36.	Hulgal *(Alstonia scholaris)*
37.	Kaayi mara *(Callophyllum inophyllum)*
38.	Kadu amate *(Spondias pinnata)*
39.	Kakke *(Cassia fistula)*

Sl. No.	Species
40.	Kamara *(Hardwickia binata)*
41.	Kandelia candel *(Kandelia candel)*
42.	Karadi*(Chukrasia tabularis)*
43.	Karijali *(Prosopis juliflora)*
44.	Kaval *(Careya arborea)*
45.	Kindal *(Terminalia paniculata)*
46.	Maavu *(Mangifera indica)*
47.	Mahagony *Swietenia mahagoni)*
48.	Mangrove
49.	Mathi *(Terminalia spp)*
50.	Murugal *(Garcinia indica)*
51.	Muttuga *(Butea monosperma)*
52.	Nandi *(Legarstroemia lanceolata)*
53.	Nelli *(Emblica officianalis)*
54.	Nerale *(Syzygium sp)*
55.	Rampatre*(Myristica malabarica)*
56.	Rhizophora apiculata *(Fagara budrunga)*
57.	Sampige *(Michelia champaka)*
58.	Sandal *(Santalum album)*
59.	Seemaruba *(Simarouba glauca)*
60.	Seetaphala *(Annona squamosa)*
61.	Shivane *(Gmelina arboria)*
62.	Simethangadi *(Cassia siamia)*
63.	Sisso *(Dalbargia Sisso)*
64.	Tamarind *(Tamarindus indica)*
65.	Tapsi *(Holoptelia integrifolia)*
66.	Tare *(Terminalia Belerica)*
67.	Teak *(Tectona grandis)*
68.	Uppage *(Garcinia gummi-gutta)*
69.	Vaate *(Artocarpus lacucha)*

Annexure 6

EVALUATION TEAM

Core Team

- Dr. B. Shivaraju, IFS, APCCF (Rtd.), Principal Investigator
- Dr. Lasya Gopal, Co- Principal Investigator
- Dr. Nagraj Patil, Civil Engineering Expert
- Dr. Krishnamurthy, Statistician
- Mr. Ashwathaiah, DCF (Rtd.), Team Member
- Mr. Nagesh I. V DCF (Rtd.), Team Member
- Mr. H.H. Ninga Setty, Team Member
- Mr. Yabbati Nagaraju, Team Member
- Dr. Sridar Babu M. N, Team Member
- Mr. Hara Kumar Verma, Team Member
- Mr. Arjun Shetty, Team Member
- Dr. Veerabaswant Reddy, Team Member
- Mr. Kiriti Sahoo, Team Member
- Mr. ManjunathJadhav, Team Member
- Mr. Mahendra Math, Team Member

IT and Secretarial Support

- Mr. T. Saravana, IT Manager
- Ms. Shobha M.P., Executive Secretary
- Ms. Jyothi. S., Secretary
- Ms. Manjula, Secretary
- Ms. Christina Preethi, Secretary