

EVALUATION OF NATIONAL AFFORESTATION PROGRAMME (NAP)

2013-14 TO 2016-17

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Karnataka Evaluation Authority

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Foreword

Forest resources play a significant role in addressing the challenges of climate change and ensuring environment security. **National Afforestation Programme** is a pivotal programme in this direction. The basic objective of the scheme is sustainable to increase the forest and tree cover through rehabilitation of degraded forests and other areas through decentralised participatory forest management and supplementing the livelihoods of the communities.

The findings of the study are derived from both the primary as well as secondary data. The field data is collected from 61 sample plantations. The major findings include that the achievement in physical targets was 102% and in financial targets it was 85%, majority of the boundary protection works are non-functional (88%) only 33% of the sample works had SMC structure. The overall survival rate of the plantations was 55%. Entry point activities are not based on systematic need assessment, the social mobilisation for management of forest resources is observed only in 41% cases leading vast scope for improvement and efforts for value addition for marketing products of forest based micro enterprises are also inadequate. Thus, the two focus areas of participatory management and supplementing livelihoods have not received adequate attention.

The major recommendations are: Need assessment of forest fringe communities, documentation of public awareness programmes, decentralised planning at circle level, preference to species like Neem, Honge in drought areas, improving survival rate through proper choice of species and maintenance, mixed native species in degraded forest areas and convergence with other schemes, better utilisation of NTFP resources and enhancing social mobilisation.

I expect that the findings and recommendations of the study will be useful to the Government and Karnataka Forest Department in attaining the targets set under SDG-15.

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

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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 (CAMP), Mr. Brijesh Kumar, APCCF (TFC), Mr. R. K. Srivastava, APCCF (NBM), Mr. Hari Kumar Jha, APCCF (EWPRTI/C), Ms. Seema Garg, APPC (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:

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The assignment 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.

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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	13 th Finance Commission
ToR	Terms of Reference
TSP	Tribal Sub Plan
U	Urban
VFC	Village Forest Committee
WF	Wildlife

EXECUTIVE SUMMARY

The Evaluation of National Afforestation Programme (NAP) for the period 2013-14 to 2016-17 was assigned to TERI in August 2019 by Karnataka Evaluation Authority (KEA) at the behest of the Karnataka Forest Department (KFD), Government of Karnataka. 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. The primary data on plantations was gathered using the web based and android application developed by Karnataka Forest Department.

The physical target of plantation activities (raising, maintenance and advance works) was 59,759 ha against which the achievement was 61,044 ha, 102% achievement. The overall financial target was Rs. 5785.32 lakhs against which the achievement was Rs. 4,920.82 lakhs, i.e. 85% achievement. During the period of evaluation, 559 plantations works were carried out, of which 61 plantations across were sampled nine forest circles, covering a gross area of plantation of 1254 ha (average of 20.55 ha/ plantation) and net area of plantation of 1205 ha (average of 19.75 ha/ plantation). The planning process revealed that there was inordinate delay in approving APOs and sanctioning of estimates, wherein 84% were sanctioned after September. The plantation journals were updated in 62% plantations.

During the study period under the scheme, 61,044 ha of low density forests were augmented with 7,987 ha of advance works (13%), 9,460 ha of planting (16%) and 43,597 ha of maintenance of previous years plantations (71%). The different models adopted for the augmentation were: 42% of the area was planted with Assisted natural regeneration (ANR) followed by 32% Artificial regeneration (AR), 2% Silvipasture, 6% bamboo, 7% cane and 11% Non-timber forest produce (NTFP). These afforestation works were in tandem with the

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activities intended to be carried out to obtain the output mentioned in the log frame of the scheme.

Out of 61 plantations sampled, 33% had boundary protection measure, which was also supported by the fact that on an average only 3% of the total cost was expended on boundary protection structures. Among the existing boundary structures, 68% were breached indicating that majority of the protection measures become ineffective within 3-6 years after establishment/ installation.

Details of SMC works carried out under the budget component of Other Activities were not made available. However, among the plantations sampled, 33% had SMC structures with an average expenditure of 2% of the total cost, despite the fact that most models had a budgetary allocation of 14-25%. Among the plantations sampled, 19 (31%) plantations were inspected by a senior officer as recorded in the respective plantation journal.

The overall average survival of the plantations sampled was found to be 55% and 32% seedlings in sample plots were in good condition. Highest survival was found in ANR I (B) 66% and least survival of 15% was found in NTFP Model- III plantations. Amongst the circles, with respect to survival rate, Bengaluru recorded highest (95%), while it was lowest (23%) in Ballari as nearly 81% plantations were damaged due to grazing and fire incidents. *Glyrecedia (Glyrecedia spp)* indicated highest survival at 78%, while Dhoopa (*Vateria indica*) recorded the least at 39%.

Entry Point Activities which were useful for the community at large were undertaken under this scheme without a systematic need assessment; however in some locations village level meetings were conducted. In some cases, activities to promote participation of the communities such as regular meetings with Joint Forest Management Committee (JFMC), involving them in fire management, providing funds for income generation activities were carried out. JFMCs were involved in some planting and maintenance activities in 41% of the cases. It may be inferred that the aim of the project to develop the forest resources through participatory approach has taken a back seat due to inadequate social mobilization.

This scheme has particularly contributed to promote NTFP species such as Nelli, Hunase, Antuwala, Ramapatre, Neem, Dalchini, Honge etc. in various plantations raised. However, efforts for value addition and institutional linkages for marketing products of forest based micro enterprises have not been done, The interaction with the field officers and JFMCs indicated that more priority should be given to awareness, training and linkage with other institutions as specified in the log frame.

The overall project activities and outputs of NAP have been evolved on a larger perspective to accommodate the entire country. However, some of the activities that were not suitable for Karnataka have not been taken up. The concept 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. 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 etc.

Social mobilisation, revitalization and/ or promotion of JFMCs, training needs assessment, livelihood mapping and marketing linkages are crucial steps in this scheme to ensure participation of the communities (especially forest dependent communities) in developing the forest resources as envisaged. Hence, primary focus must be laid on strengthening this aspect in the delivery of the scheme with appropriate support of NGOs, social scientists, extension experts etc.

Five year plan mode could be adopted while planning new plantations with decentralised planning at circle level with approval of annual plan of operations well in advance. Timely approval of estimates coupled with regular monitoring by senior officers will help greatly in raising quality nurseries and plantations.

Evaluation of National Afforestation Programme (NAP)

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 area² 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 2016-17³ 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 India⁴ 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.

The Karnataka Forest Department is implementing various schemes to protect and conserve the forest resources, biodiversity and wildlife across the state. The activities include site specific activities such as safety zone plantation, compensatory afforestation, consolidation

¹<https://www.un.org/development/desa/disabilities/envision2030-goal15.html>

²India 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>

³Annual Reports, 2013-14, 2014-15, 2015-16 and 2016-17 of Karnataka Forest Department

⁴<http://fsi.nic.in/forest-report-2019>

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and protection of forests, consolidation and regeneration of forests, wildlife protection and management, infrastructure development and forest produce saving devices and other activities.

National Afforestation Programme (NAP)

National Afforestation Programme (NAP) continues to be the flagship scheme of National Afforestation and Eco-development Board (NAEB), Ministry of Environment and Forests, Government of India since 2002-03, in so much as it provides support, both in physical and capacity building terms, to the Forest Development Agencies (FDAs) which in turn are the main organs to move forward institutionalization of Joint Forest Management. The FDA was conceived and established as a federation of Joint Forest Management Committees (JFMCs) at the Forest Division level to undertake holistic development in the forestry sector with people's participation. As per the NAEB, of the 42,535 JFMCs under NAP, there were 1560 JFMCs working under NAP in Karnataka⁵.

This is a paradigm shift from the earlier afforestation programs wherein funds were routed through the State Governments. This decentralized three-tier institutional structure (State Forest Development Agency at State level, FDA at forest division level and JFMC at the village level) allows greater participation of the community, both in planning and implementation, to improve forests and livelihoods of the people living in and around forest areas. The village is reckoned as a unit of planning and implementation and all activities under the program are conceptualized at the village level. The two-tier approach, apart from building capacities at the grassroots level, significantly empowers the local people to participate in the decision making process. Under Entry Point Activities, community assets were created with a 'care and share' concept⁶. NAP Scheme was initiated by scaling-up the Samanvit Gram Vanikaran Samridhi Yojana (SGVSY) project experience and converging all afforestation schemes of the 9th Plan period to avoid duplicity or redundancy and at the same time keeping in focus the decentralization agenda of the government. NAP is being operated as a 100% Central Sector Scheme.

⁵http://www.naeb.nic.in/Reports/jfmc_list.pdf

⁶http://www.naeb.nic.in/documents/NAP_intro.htm

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 2030⁷. India has committed to restore 21 million hectares (13 million hectares of degraded land by 2020 and an additional 8 million hectares by 2030)⁸. India has already brought an area of 9.8 million hectares under restoration since 2011⁹. 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 were integrated into the umbrella of Twenty Point Programme 2006, which is being monitored by the Ministry of Statistics and Programme Implementation, Government of India¹⁰. The targets of plantations in NAP were not explicitly aligned to this challenge. These were all included under the umbrella of the Twenty Point Programme.

This study covered the NAP activities of KFD for the years 2013-14 to 2016-17 (4 years)

1.2 Stated Objective of the Programme

The hierarchy of objectives¹¹ of the programme described in the logical framework format is as follows:

Super goal: Sustainable development and management of forest resources

Goal: Increase and/ or improve forest and tree cover

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

The overall objective of the National Afforestation Programme is to develop the forest resources with people's participation, with focus on improvement in livelihoods of the forest-fringe communities, especially the poor.

⁷<https://www.bonnchallenge.org/content/challenge>

⁸ 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

⁹ 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

¹⁰ 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

¹¹ National Afforestation Programme Revised Operational Guidelines 2009, National Afforestation & Eco-development Board, Ministry of Environment Forests, Government of India

Evaluation of National Afforestation Programme (NAP)

The programme aimed to increase/ improve forest and tree cover, rehabilitate degraded forests and other areas by institutionalizing/ participatory forest management and supplementing livelihoods improvement processes.

Table 1: Project Output and Specific Activities

Sl.No.	Outputs	Activities
1)	Improved natural forest stock	Assisted natural regeneration of degraded areas
2)	Increased and improved forest and tree cover	Artificial regeneration and enrichment planting Promotion of Non-timber forest products (NTFPs)
3)	Participatory forest management initiated by supporting the immediate needs to fringe-community	Entry point activities
4)	Long term participation of fringe community in forest management	Participatory micro planning, implementation and monitoring of projects Flexible project design and cost norms
5)	Increased soil and moisture conservation	Biological SMC supplemented by physical SMC treatment as per local site condition
6)	Improved forest/ tree productivity	Promotion and use of improved technologies and high-quality planting material
7)	Increased capacity of fringe community and frontline staff to develop and manage natural resources	Awareness generation, training and linkage with other institutions
8)	Enhanced opportunity for local forest-based micro enterprises	Value addition and marketing of forest produce from project area
9)	Review and independent monitoring processes internalised	Bottom-up internal monitoring of projects and independent third party concurrent and final evaluation of each project
10)	Tree cover in non-forest areas promoted	Agro-forestry on shifting cultivation lands and farm lands Coastal shelter belt and tank foreshore plantations on public and private lands and rehabilitation of mangrove, sacred groves etc.
11)	Problem lands rehabilitated	Additional support for amelioration of soil in alkaline/ saline, ravine, marshy, high-altitude, desert areas etc.

Source: Secondary data from KFD

1.3 Programme Structure

The programme provides for implementation of new projects as well as completion and maintenance of plantations undertaken earlier under the programme as per this guideline. The programme is implemented by a three-tier institutional set-up, namely State Forest Development Agency (SFDA) at the State/UT level, Forest Development Agencies (FDAs) at the forest division level, and Joint Forest Management Committees (JFMCs) or Eco-development Committees (EDCs) at the village level. The focus of the institutional work is regeneration and management of forest resources while strengthening the village level capacity for the same.

1.4 Programme Components

Various components of the scheme are described below:

1. Joint Forest Management (JFM)

JFM is the central and integral part of the projects under the programme. To this end, focused efforts are made at all levels for constitution of JFMC in all potential forest-fringe villages, awareness generation about JFM procedures, including that of benefit-sharing, in the State/UT, PRA-based micro-planning and its implementation, capacity building of JFMC members in specific aspects of JFM-based operations, and participatory monitoring and evaluation.

The FDA draws a 5-year perspective (5-Year Plan) and year-wise Annual Plan of Operation (APO) for treatment of the project areas in consultation with the JFMC/EDC/potential village members.

2. Micro Planning

After the approval of the SFDA's plan by the NAEB, FDAs would undertake JFMC constitution/reconstitution and/or awareness raising activities, followed by detailed PRA-based micro-planning in each project village. The micro-planning starts with preparing baseline information about the condition of the forests under the charge of the JFMC/EDC. The micro-plan is an integrated plan for both village and forest development, comprising of two parts (a) forest development, and (b) village development. It is in consonance with the broad prescriptions of the Forest Working Plan or Wildlife Management Plan of the area.

3. Entry Point Activities

During the preparation of micro-plans, the community identifies the Entry Point Activities (EPA) to be taken up during the project period and the mode of its maintenance. Creation of durable community assets to support improved livelihoods, especially to the marginalized sections of the JFMC (e.g. landless, poor women, primitive tribes, Schedule Caste etc.) is given preference.

4. Plantation Area

The programme is implemented to regenerate, afforest or reforest degraded forests and adjoining lands, under both, public as well private tenure. Due priority is given to the treatment of problem, eco-sensitive and disaster prone areas, such as coastal areas, mangroves, ravines, shifting cultivation areas, cold and hot arid areas, tank foreshore, strips along public infrastructure, etc. Project area is selected in a manner that the major part is forest or public lands.

5. Project Duration and Maintenance of Plantations

Each FDA project may be up to 5 years duration, including 3 years of maintenance of the plantation with a provision that, in case the project period extends into the next Five Year Plan and the NAP scheme is discontinued by the Central Government, the concerned State Government/UT Administration will provide funds to complete the project.

6. Training and Capacity Building

This component aims at providing training to the members of FDAs, JFMCs/ FDCs, and also to build their capacity through organizing linkages with the programmes/schemes of other departmental/organizations in the public and private sector for the furtherance of the objectives of the scheme. Special focus will be given to the needs of the marginalized groups of the village community, the primitive tribal groups and traditional forest-based artisans.

7. Value Addition and Marketing of Forest Produce

This component aims at providing support to the FDAs/JFMCs for taking up Small and Micro Forest Enterprises (SMFEs) based on value addition and marketing of the forest produce. Priority will be given to such SMFEs which relate to the marginalized sections of the JFMCs and forest-dependent artisans.

8. Improved Technologies

Projects under the scheme may include suitable components of improved technologies such as tissue culture, clonal seedlings, root-trainers, rhizobia culture, specialized sivicultural operation, etc.

9. Problem areas/situations for watering, additional fencing etc

Problem areas are characterised by constraints that call for additional resources for treatment and may include cold and hot arid areas, rain shadow areas, areas subjected to heavy browsing or grazing pressure, sheet rock areas, highly refractory, alkali or acidic lands, cold alpine areas, mining areas, chemically polluted areas, areas requiring change of soil, critical (survival) irrigation supplements, etc. Additional funds, up to above limits, are provided for such specialized treatments.

10. Monitoring

Each project under the Scheme is monitored by the SFDA and the State/UT Forest Department Officials through field inspections and otherwise. The FDA has to maintain a record of the central geographical coordinates of each NAP plantation plot so that sampling of the areas for the monitoring of young plantations could be done in a more scientific manner. Such a record would be compatible to GIS analysis and obviate the occurrence of overlap or duplication of efforts of plantation.

11. Evaluation

The SFDA will commission independent evaluation of each FDA project twice during the project cycle. The first Concurrent Evaluation, was to be done in the 24-36 months of project operation. The first Concurrent Evaluation was to focus on assessment of the degree of peoples' participation in the functioning of JFMCs, in particular during micro-planning and implementation of initial project activities. The second evaluation will be the Final Evaluation of the project, to be done after 3 years of the last tranche of tree planting in the project. The final evaluation will focus on the quality of peoples' participation, success of regeneration, in terms of expansion and improvement in vegetation, and poverty impacts of the project.

12. Use of Remote Sensing and Geographic Information Systems for planning and subsequent project monitoring

Efforts are to be made to gradually build capacity and utilize the existing resource maps prepared by utilizing remote sensing technologies, for example by Forest Survey of India,

Space Application, Centre, National Remote Sensing Agency, State Forest Departments, etc. and to prepare digitized maps during the micro-planning.

1.5 Performance of the Programme

As per the 20 point programme Progress reports of 2013-14, 2014-15, 2015-16 and 2016-17 and 2017-18, Ministry of Statistics and Programme Implementation, Government of India¹², the afforestation (in public and forest lands) target of area covered under plantation for Karnataka was 2,33,850 ha, while achievement was 2,66,503 ha (114%).

Table 2: 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%
2015-16	42959000	43538000	101%	66090	69093	105%
2016-17	26650000	54700000	205%	41000	61680	150%
Total	165753000	227884000	137%	233850	266503	114%

Source: Secondary data given by KFD

T=Target, A=Achievement

The physical target of plantation activities (raising, maintenance and advance works) was 59,759 ha against which the achievement was 61,044 ha, 102% achievement. The overall financial target was Rs. 5785.32 lakhs against which the achievement was Rs. 4,920.82 lakhs, i.e. 85% achievement. In the case of other activities, physical targets were not made available, while the financial achievement was 107%. Various types of activities were undertaken during the period of evaluation under this programme. Under Plantation Development, the cumulative progress for the period of evaluation included 7,987 ha of advance works (106% achievement), 9,460 ha of creation of plantation (104% achievement) and 43,597 ha of maintenance of plantations (101% achievement).

¹² http://mospi.nic.in/sites/default/files/twenty_point_programme_2006/annual_report_of_tpp2006/QPR%20of%20TPP.pdf

The various types of plantations raised during the period of evaluation included, 17,405 ha of plantation under Aided/ Assisted Natural Regeneration, 14,368 ha under Artificial regeneration, 775 ha under Silvipasture, 3100 ha under Bamboo plantation, 3034 ha under cane plantation, 4645 ha of mixed plantation of trees having minor forest produce and medicinal value and 270 ha of regeneration of perennial herbs and shrubs of medicinal values.

The other activities carried out include soil moisture conservation activities, awareness programmes, entry point activities, micro planning and fencing, for which physical targets and achievements were not made available.

One evaluation study was carried out for the works implemented from 2009-10 to 2012-2013 (4 years) by two external agencies, where 63 afforestation plantations covering an extent of 1992.18 ha has been evaluated. As many as 65 other works which mostly included SMC were evaluated.

The plantation survival were 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 74.66%. Of the plantations sampled, 50.35 % plantations were graded very good (above 80% survival of seedlings), 34.61% as good (survival rate 61-80%), 11.69% as average (survival rate 41-60%), 17.39% as poor (survival rate 21-40%) and there were no failure (survival rate below 10%).

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Among the 65 SMC works evaluated, 57 were graded as good, 6 as satisfactory and 2 as poor. In terms of functioning of VFCs, they were involved in raising plantation activities with fodder/ fuel wood species; it was observed that participation of members ranged between 45-90%. However, all VFCs were not involved in raising the plantations. All VFCs have created assets. Participation of women, SC and ST did not seem adequate. Few VFCs conducted meetings regularly and many VFCs had not prepared micro plans. Training programs were not held in many VFCs.

Table 3: Physical Targets and Achievements 2013-14 to 2016-17

Note: PT –Physical target, PA – Physical achievement

Sl. No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		PT	PA	PT	PA	PT	PA	PT	PA	PT	PA	
I	AIDED NATURAL REGENERATION (200 plants / ha.)											
a	Advance Work.	160	140	1,450	1,450	1,410	1,410	-	-	3,020	3,000	99%
b	Creation (Spillover).	740	740	-	-	1,400	1,400	1,410	1,410	3,550	3,550	100%
c	Advance work (Monsoon work)	675	850							675	850	126%
d	Creation (Monsoon)	675	850	140	100					815	950	117%
e	Maintenance of I year old Pltn.	3,485	3,660	1,415	1,415	190	190	1,400	1,400	6,490	6,665	103%
f	Maintenance of II years old Plantations.	-	-	3,660	3,560	1,340	1,340	190	190	5,190	5,090	98%
g	Maintenance of III years old Plantations.	775	775	-	-	3,535	3,535	1,340	1,340	5,650	5,650	100%
	Sub-total	6,510	7,015	6,665	6,525	7,875	7,875	4,340	4,340	25,390	25,755	101%
II	ARTIFICIAL REGENERATION (1100 plants / ha)											
a	Advance Work.	160	140	725	725	855	855	-	-	1,740	1,720	99%
b	Creation (Spillover).	410	398	-	-	725	725	855	855	1,990	1,978	99%
c	Advance work (Monsoon work)	365	597							365	597	164%

Evaluation of National Afforestation Programme (NAP)

Sl. No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		PT	PA	PT	PA	PT	PA	PT	PA	PT	PA	
d	Creation (Monsoon)	365	597	140	120					505	717	142%
e	Maintenance of I year old Pltn.	3,220	3,495	775	775	120	120	725	725	4,840	5,115	106%
f	Maintenance of II years old Plantations.	-	-	3,495	3,395	775	775	120	120	4,390	4,290	98%
g	Maintenance of III years old Plantations.	793	793	-	-	3,395	3,395	775	775	4,963	4,963	100%
	Sub-total	5,313	6,020	5,135	5,015	5,870	5,870	2,475	2,475	18,793	19,380	103%
III	SILVI PASTURE (400 plants / ha)											
a	Advance Work.	30	30	-	-	50	50	-	-	80	80	100%
b	Creation (Spillover).	-	-	-	-	-	-	50	50	50	50	100%
c	Advance work (Monsoon work)									-	-	
d	Creation (Monsoon)	-	-	30	15					30	15	50%
e	Maintenance of I year old Pltn.	115	240	-	-	15	15	-	-	130	255	196%
f	Maintenance of II years old Plantations.	-	-	240	215	-	-	15	15	255	230	90%
g	Maintenance of III years old Plantations.	75	75	-	-	215	215	-	-	290	290	100%
	Sub-total	220	345	270	230	280	280	65	65	835	920	110%
IV	BAMBOO PLANTATION (625 plants / ha)											
		-	-							-	-	

Introduction

Sl. No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		PT	PA	PT	PA	PT	PA	PT	PA	PT	PA	
a	Advance Work.	35	35	-	-	70	70	-	-	105	105	100%
b	Creation (Spillover).	210	210	-	-	-	-	70	70	280	280	100%
c	Advance work (Monsoon work)	215	240							215	240	112%
d	Creation (Monsoon)	215	240	35	-					250	240	96%
e	Maintenance of I year old Pltn.	525	550	425	425	-	-	-	-	950	975	103%
f	Maintenance of II years old Plantations.	-	-	550	525	425	425	-	-	975	950	97%
g	Maintenance of III years old Plantations.	225	225	-	-	525	525	425	425	1,175	1,175	100%
	Sub-total	1,425	1,500	1,010	950	1,020	1,020	495	495	3,950	3,965	100%
V	CANE PLANTATION (625 plants / ha)	-	-							-	-	
a	Advance Work.	15	-	150	150	50	50	-	-	215	200	93%
b	Creation (Spillover).	205	205	-	-	150	150	50	50	405	405	100%
c	Advance work (Monsoon work)	220	220							220	220	100%
d	Creation (Monsoon)	220	220	-	-					220	220	100%
e	Maintenance of I year old Pltn.	475	513	425	425	60	60	150	150	1,110	1,148	103%
f	Maintenance of II years old Plantations.	-	-	513	513	325	325	60	60	898	898	100%

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Sl. No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		PT	PA	PT	PA	PT	PA	PT	PA	PT	PA	
g	Maintenance of III years old Plantations.	200	200	-	-	463	463	325	325	988	988	100%
	Sub-total	1,335	1,358	1,088	1,088	1,048	1,048	585	585	4,056	4,079	101%
VI	MIXED PLANTATION OF TREES HAVING MFP & MEDICINAL VALUES (1100 plants / ha)	-	-							-	-	
a	Advance Work.	105	95	575	575	145	145	-	-	825	815	99%
b	Creation (Spillover).	100	100	-	-	575	575	145	145	820	820	100%
c	Advance work (Monsoon work)	100	150							100	150	150%
d	Creation (Monsoon)	100	150	95	75					195	225	115%
e	Maintenance of I year old Pltn.	875	1,090	200	200	75	75	575	575	1,725	1,940	112%
f	Maintenance of II years old Plantations.	-	-	1,090	1,015	200	200	75	75	1,365	1,290	95%
g	Maintenance of III years old Plantations.	225	200	-	-	1,015	1,015	200	200	1,440	1,415	98%
	Sub-total	1,505	1,785	1,960	1,865	2,010	2,010	995	995	6,470	6,655	103%
VII	REGENERATION OF PERENNIAL HERBS & SHRUBS OF MEDICINAL VALUES (2000 plants / ha)	-	-							-	-	
a	Advance Work.	10	10	-	-	-	-	-	-	10	10	100%

Sl. No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		PT	PA	PT	PA	PT	PA	PT	PA	PT	PA	
b	Creation (Spillover).	-	-	-	-	-	-	-	-	-	-	
c	Advance work (Monsoon work)									-	-	
d	Creation (Monsoon)	-	-	10	10					10	10	100%
e	Maintenance of I year old Pltn.	25	50	-	-	10	10	-	-	35	60	171%
f	Maintenance of II years old Plantations.	-	-	50	50	-	-	10	10	60	60	100%
g	Maintenance of III years old Plantations.	100	100	-	-	50	50	-	-	150	150	100%
	Sub-total		135	160	60	60	60	10	10	265	290	109%
VIII	OTHER ACTIVITIES											
	Soil and Moisture Conservation	-	-							-	-	
	Awareness	-	-							-	-	
	EPA (Rs.4000/ ha)	-	-							-	-	
	Micro Planning	-	-							-	-	
	Fencing	-	-							-	-	
	Monitoring & Evaluation	-								-	-	
	Overheads	-								-	-	

Evaluation of National Afforestation Programme (NAP)

Sl. No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		PT	PA	PT	PA	PT	PA	PT	PA	PT	PA	
	Committed Liabilities (2012-13)									-	-	
	Committed Liabilities (2013-14)									-	-	
	Sub-total		-	-	-	-	-	-	-	-	-	
	Flexi Funds									-	-	
	Grand Total	16,443	18,183	16,188	15,733	18,163	18,163	8,965	8,965	59,759	61,044	102%

Source: Secondary data given by KFD

Table 4: Financial Targets and Achievements 2013-14 to 2014-15

Note: FT – Financial target, FA – Financial achievement

Sl.No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		FT	FA	FT	FA	FT	FA	FT	FA	FT	FA	
I	AIDED NATURAL REGENERATION (200 plants / ha.)											
a	Advance Work.	12.14	-	125.43	125.43	131.52	-	-	131.52	269.09	256.95	95%
b	Creation (Spillover).	57.09	41.56	-	-	132.89	108.89	141.18	163.47	331.16	313.92	95%
c	Advance work (Monsoon work)	51.23	51.25							51.23	51.25	100%
d	Creation (Monsoon)	52.08	36.53	12.31	8.79					64.38	45.32	70%
e	Maintenance of I year old Pltn.	153.93	128.26	79.95	77.97	11.60	5.87	90.16	84.62	335.64	296.72	88%
f	Maintenance of II years old Plantations.	-	-	191.24	186.01	75.72	39.00	11.33	43.67	278.29	268.68	97%
g	Maintenance of III years old Plantations.	15.97	11.09	-	-	199.76	93.86	79.89	105.90	295.63	210.86	71%
	Sub-total	342.45	268.70	408.91	398.20	551.50	247.62	322.56	529.19	1,625.42	1,443.70	89%
II	ARTIFICIAL REGENERATION (1100 plants / ha)	-	-							-	-	
a	Advance Work.	32.08	-	165.59	165.59	210.93	-	-	210.93	408.60	376.52	92%
b	Creation (Spillover).	50.84	34.26	-	-	110.60	91.49	137.60	156.70	299.03	282.45	94%
c	Advance work (Monsoon work)	73.19	73.17							73.19	73.17	100%
d	Creation (Monsoon)	45.26	33.50	19.78	16.95					65.04	50.45	78%

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Sl.No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		FT	FA	FT	FA	FT	FA	FT	FA	FT	FA	
e	Maintenance of I year old Pltn.	241.50	193.97	66.19	66.19	11.07	6.26	70.56	70.50	389.31	336.92	87%
f	Maintenance of II years old Plantations.	-	-	258.46	251.06	61.89	28.23	10.11	38.91	330.46	318.20	96%
g	Maintenance of III years old Plantations.	28.67	20.32	-	-	217.21	100.02	52.31	117.19	298.19	237.53	80%
	Sub-total	471.54	355.22	510.01	499.79	611.70	226.01	270.57	594.23	1,863.82	1,675.24	90%
III	SILVI PASTURE (400 plants / ha)	-	-	-	-	-	-	-	-	-	-	
a	Advance Work.	3.43	-	-	-	7.04	-	-	7.04	10.47	7.04	67%
b	Creation (Spillover).	-	-	-	-	-	-	5.10	5.10	5.10	5.10	100%
c	Advance work (Monsoon work)	-	-	-	-	-	-	-	-	-	-	
d	Creation (Monsoon)	-	-	2.68	1.34	-	-	-	-	2.68	1.34	50%
e	Maintenance of I year old Pltn.	5.78	5.06	-	-	0.94	0.53	-	-	6.72	5.59	83%
f	Maintenance of II years old Plantations.	-	-	12.52	11.21	-	-	0.89	0.54	13.41	11.75	88%
g	Maintenance of III years old Plantations.	1.76	1.23	-	-	12.11	6.85	-	5.26	13.87	13.34	96%
	Sub-total	10.98	6.29	15.20	12.55	20.09	7.38	5.99	17.93	52.25	44.16	85%
IV	BAMBOO PLANTATION (625 plants / ha)	-	-	-	-	-	-	-	-	-	-	
a	Advance Work.	-	-	-	-	-	-	-	-	-	-	71%

Sl.No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		FT	FA	FT	FA	FT	FA	FT	FA	FT	FA	
		3.22	-	-	-	7.93	-	-	7.93	11.15	7.93	
b	Creation (Spillover).	17.00	11.53	-	-	-	-	7.35	7.35	24.35	18.89	78%
c	Advance work (Monsoon work)	19.79	19.79							19.79	19.79	100%
d	Creation (Monsoon)	17.40	13.57	3.23	-					20.63	13.57	66%
e	Maintenance of I year old Pltn.	22.12	19.76	26.63	26.63	-	-	-	-	48.74	46.39	95%
f	Maintenance of II years old Plantations.	-	-	21.89	20.90	18.30	10.35	-	7.95	40.19	39.19	98%
g	Maintenance of III years old Plantations.	4.02	2.49	-	-	11.54	6.53	9.85	5.01	25.41	14.03	55%
	Sub-total	83.55	67.14	51.75	47.52	37.76	16.88	17.21	28.24	190.27	159.78	84%
V	CANE PLANTATION (625 plants / ha)	-	-							-	-	
a	Advance Work.	1.72	-	19.55	19.55	7.05	-	-	7.05	28.31	26.59	94%
b	Creation (Spillover).	16.23	11.50	-	-	14.61	12.29	5.37	7.69	36.20	31.48	87%
c	Advance work (Monsoon work)	25.19	25.19							25.19	25.19	100%
d	Creation (Monsoon)	17.41	13.07	-	-					17.41	13.07	75%
e	Maintenance of I year old Pltn.	23.88	22.22	24.54	24.54	3.93	2.22	10.83	12.94	63.19	61.93	98%
f	Maintenance of II years old Plantations.	-	-	26.75	24.15	18.07	10.22	3.68	10.07	48.50	44.44	92%

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Sl.No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		FT	FA	FT	FA	FT	FA	FT	FA	FT	FA	
g	Maintenance of III years old Plantations.	4.69	3.43	-	-	24.58	13.91	19.04	10.67	48.31	28.01	58%
	Sub-total	89.13	75.41	70.84	68.23	68.22	38.64	38.92	48.42	267.11	230.71	86%
VI	MIXED PLANTATION OF TREES HAVING MFP & MEDICINAL VALUES (1100 plants / ha)	-	-							-	-	
	Advance Work.	21.05	-	131.33	131.33	35.76	-	-	35.76	188.15	167.09	89%
	Creation (Spillover).	12.40	8.59	-	-	87.68	70.63	23.32	40.37	123.40	119.59	97%
	Advance work (Monsoon work)	20.05	20.05							20.05	20.05	100%
	Creation (Monsoon)	12.40	9.42	13.42	10.59					25.82	20.02	78%
e	Maintenance of I year old Pltn.	67.78	54.95	17.08	17.08	6.92	2.87	55.96	50.28	147.74	125.18	85%
f	Maintenance of II years old Plantations.	-	-	80.61	75.06	15.96	9.03	6.31	9.73	102.88	93.82	91%
g	Maintenance of III years old Plantations.	8.13	3.77	-	-	65.13	35.04	13.54	30.10	86.81	68.90	79%
	Sub-total	141.81	96.78	242.43	234.06	211.45	117.57	99.14	166.24	694.83	614.65	88%
VII	REGENERATION OF PERENNIAL HERBS & SHRUBS OF MEDICINAL VALUES (2000 plants / ha)	-	-							-	-	
	Advance Work.	2.57	-	-	-	-	-	-	-	2.57	-	0%

Sl.No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		FT	FA	FT	FA	FT	FA	FT	FA	FT	FA	
b	Creation (Spillover).	-	-	-	-	-	-	-	-	-	-	
c	Advance work (Monsoon work)											
d	Creation (Monsoon)	-	-	2.20	2.20					2.20	2.20	100%
e	Maintenance of I year old Pltn.	1.95	1.37	-	-	0.96	0.54	-	0.42	2.91	2.33	80%
f	Maintenance of II years old Plantations.	-	-	3.04	3.04	-	-	0.69	0.42	3.74	3.46	93%
g	Maintenance of III years old Plantations.	3.45	1.81	-	-	2.15	1.21	-	0.93	5.60	3.96	71%
	Sub-total	7.97	3.18	5.24	5.24	3.10	1.76	0.69	1.77	17.01	11.94	70%
VIII	OTHER ACTIVITIES	-	-							-	-	
	Soil and Moisture Conservation	13.31	13.31				49.30	-	-	13.31	62.61	470%
	Awareness	-	-				3.46	-	-	-	3.46	
	EPA (Rs.4000/ ha)	6.06	6.06	9.00	9.00		54.00	-	-	15.06	69.06	459%
	Micro Planning	-	-				-	-	-	-	-	
	Fencing	0.38	0.38				-	-	-	0.38	0.38	101%
	Monitoring & Evaluation	25.31	-	1.07			-	-	-	26.38	-	0%
	Overheads	33.32	33.08	5.78	5.35		34.58	-	-	39.10	73.01	187%
	Committed Liabilities (2012-13)											87%

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Sl.No.	Items	2013-14		2014-15		2015-16		2016-17		Total		Progress
		FT	FA	FT	FA	FT	FA	FT	FA	FT	FA	
				300.78	262.75			300.78	262.75			
	Committed Liabilities (2013-14)			300.27	269.38			300.27	269.38			90%
	Sub-total	78.38	52.83	616.90	546.47	-	141.33	-		695.27	740.64	107%
	Flexi Funds			213.47		165.87		379.34	-			0%
	Grand Total	1,225.80	925.56	2,134.74	1,812.07	1,669.69	797.18	755.08	1,386.01	5,785.32	4,920.82	85%
	Achievement		76%		85%		48%		184%		85%	

Source: Secondary data given by KFD

1.6 Scope of the Evaluation

The Energy and Resources Institute (TERI) was entrusted by Karnataka Evaluation Authority (KEA) to carry out the task of Evaluation of Compensatory Afforestation Fund Management and Planning (CAMPA) 2013-14 to 2015-16, 13th Finance Commission 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 NAP, 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 NAP and propose suggestions based on the observations to enhance effectiveness in delivery of the programme

1.6.2 Objectives of the Evaluation

To evaluate the works under NAP 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 the programme.
- To assess the efficiency and effectiveness of the programme and the ability of the works executed to meet the intended objectives of the programme.
- 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 programme 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 programme 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.

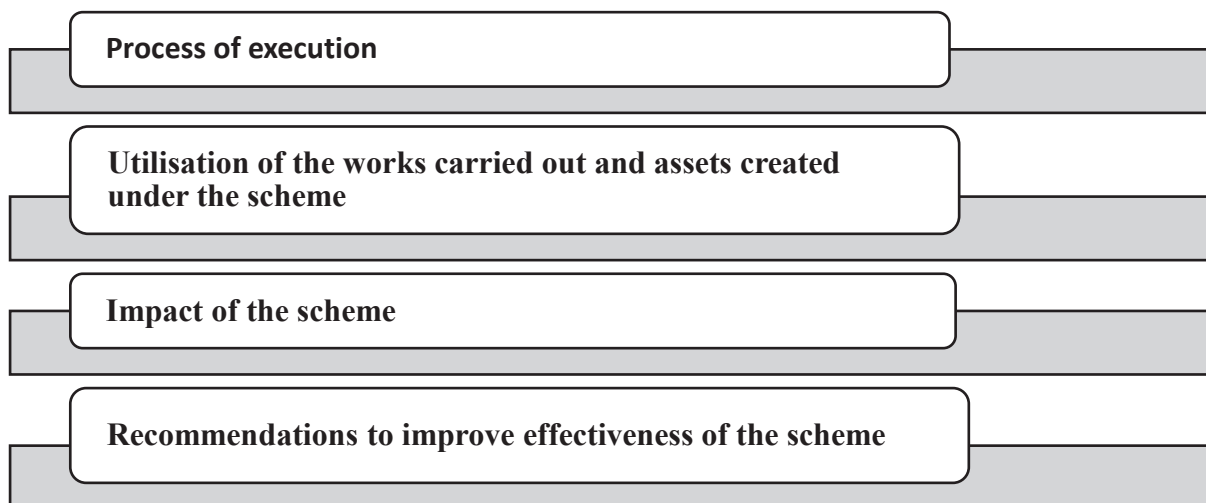


Figure 1: Major Components of Evaluation

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 are tabulated to gain an understanding of the work already done in this direction.

Table 5: 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.	Anonymous. 2008. Mid-term evaluation of National Afforestation Programme (NAP) schemes implemented through forest development Agency (FAD). Indian Council of Forestry Research and Education submitted to	The communities feel that the scheme has contributed to an increase in tangible benefits and increased fuel wood availability by 22%, fodder by 28% and NTFP by 40.8%.

Sl. No.	Study	Highlights
	National Afforestation and Eco-development Board. Accessed at https://naeb.nic.in/MTE-Complete_Report.pdf	
4.	Anonymous. 2nd July 2008. Report on First Concurrent Evaluation of Projects under NAP scheme being implemented through FDA, Teliamura (Jhum), West Tripura, Tripura State. National Resources India Foundation (NRIF). Accessed at https://www.nrif.org.in/wp-content/themes/soundblast/pdf/Eval%20Report - Teliamura%20FDA%20Tripura%20for%20NRIF%20web.pdf	<p>The overall grading of the project is outstanding based on the grading parameters provided under project guidelines. Maintenance of plantations and measures taken to build the capacity of the JFMC members were slightly lacking compared to other parameters. Till date 308 ha. of area have been brought under treatment. All the treatments have been made on forest lands. The entry point activities (EPAs) included creation of village level micro-enterprises for processing and value addition of bamboo, medicinal plants, sal leaf plate making, fruit processing micro-enterprises based on pineapple.</p> <p>In terms of rehabilitation of the degraded jhum and forest lands the site selections have been excellent. Majority of the sites selected are either sodic /alkaline or partly fertile land with poor soil depth. Incidences of heavy occurrence of soil erosion are also visible. Almost all the sites were treated with contour trenches with direct sowing on them the trenching may be a natural phenomenon due the site being earlier a jhum land. The planting materials used have been of good quality. The plants particularly Muli bamboo have attained excellent health. The project has been adequately successful in awareness creation among the people. The excellent staff-community interaction has further accelerated the community interest in the project and they were found to be highly motivated by the interventions. The project is benefiting both the community and environment in multiple ways. The Jhum areas which were subjected to shifting cultivation have been brought under vegetation. This will not only reclaim the lost soil but also check the soil erosion. The vegetation will further have its own impact on environmental upgradation. The species selected are of income generation capabilities which will provide a sustainable income to the community. Teliamura, Jhum FDA is an excellent example of successful case study of its implementation in a professional manner.</p>

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Sl. No.	Study	Highlights
5.	Anonymous. Species and Planting Technique Models. 2012. General Guidelines 2012. Karnataka Forest Department. Government of Karnataka.	<p>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:</p> <ul style="list-style-type: none"> • 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. August 2015. National Afforestation Programme (NAP) Report, Evaluation of Forestry Works 2009-13. Karnataka Forest Department.	<p>One evaluation study has been carried out for the works implemented from 2009-10 to 2012-2013 (4 years) by two external agencies, where 63 afforestation plantations covering an extent of 1992.18 ha has been evaluated. As many as 65 other works which mostly included SMC were evaluated.</p> <p>The overall average survival was found to be 74.66%. Plantations were also graded as very good, good, average, poor and failed. Of the plantations sampled, 50.35 % plantations were graded very good (above 80% survival of seedlings), 34.61% as good (survival rate 61-80%), 11.69% as average (survival rate 41-60%), 17.39% as poor (survival rate 21-40%) and there were no failure (survival rate below 10%) .</p> <p>Among the 65 SMC works evaluated, 57 were graded as good, 6 as satisfactory and 2 as poor. In terms of functioning of VFCs, they were involved in raising plantation activities with fodder/ fuel wood species; it was observed that participation of members ranged between 45-90%. However, all VFCs were not involved in raising the plantations. All VFCs have created assets. Participation of women, SC and ST did not seem adequate. Few VFCs conducted meetings regularly and many VFCs had not prepared micro plans. Training programs were not held in many VFCs.</p>
7.	Anonymous. National Afforestation Programme. Swaniti Initiative. Accessed at http://www.swaniti.com/wp-content/uploads/2014/05/National-Afforestation-Programme_proofread.pdf	This document gives a brief overview of the scheme, cost norms worked out for various types of planting interventions and two case studies.

Source: Secondary data given by KFD

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.

The approach process and methods that were used are as below:

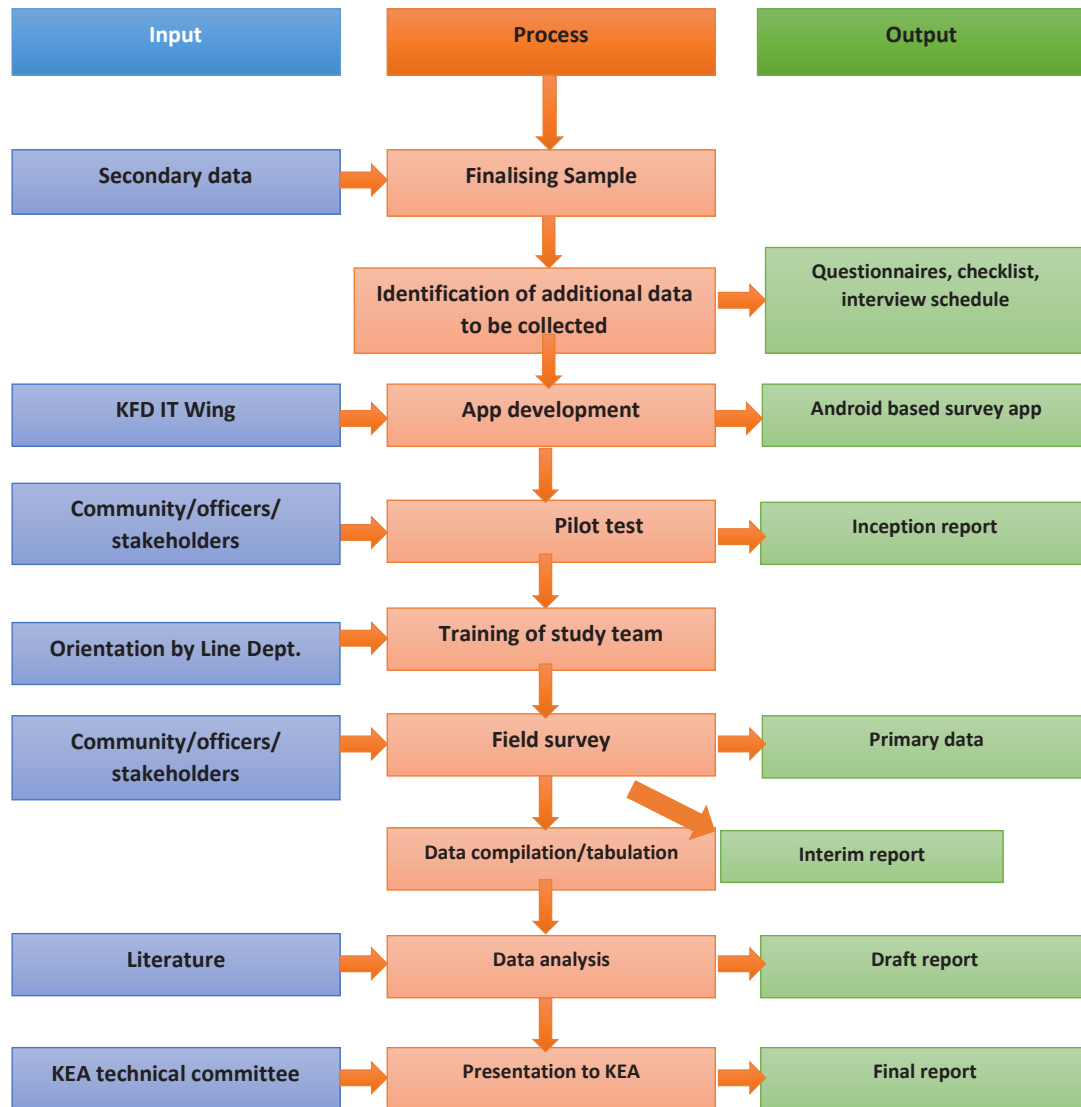


Figure 2 :Approach for the evaluation study

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 6: Theory of Change

Resources/ Inputs	Activities	Outputs	Outcomes	Impact
Policies Schemes Objectives Guidelines Budget Manpower Knowledge Infrastructure	Raising of nursery, plantations and bamboo plantations	<ul style="list-style-type: none"> No. of nurseries and seedlings raised No. of Plantations raised No. of Bamboo plantations raised Area covered by plantation 	<ul style="list-style-type: none"> Species-wise survival rate Improved forest tree cover Increased area under bamboo plantation Reduced dependency on forest for fuel wood and maintenance 	<ul style="list-style-type: none"> Improved environment in the areas planted Increased biodiversity Reduced emission of greenhouse gases Reduced erosion and pollution Enhanced livelihood of bamboo artisans
Requisite materials	Soil moisture conservation works	<ul style="list-style-type: none"> No. of SMC works undertaken 	<ul style="list-style-type: none"> Better moisture and soil retention in plantations Enhanced survival of plantations Enhanced water availability in summer months for wildlife Better wildlife conservation and management 	<ul style="list-style-type: none"> Increased soil and moisture conservation in the watershed & forests Enhanced flora and fauna and biodiversity conservation

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Resources/ Inputs	Activities	Outputs	Outcomes	Impact
	Specialised works of Wildlife	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Enhanced flora, fauna and biodiversity conservation Enhanced participation of communities in wildlife protection and management
	Specialised works of Working Plan	<ul style="list-style-type: none"> No. of survey and demarcation works undertaken No. of boundary works undertaken 	<ul style="list-style-type: none"> No. of working and management plans prepared and being implemented Area of forest boundary demarcated Reduction in encroachment cases Forest land protected from encroachment 	<ul style="list-style-type: none"> Preservation of diverse flora relevant to different forest locations
	Specialised works of Research and Utilisation	<ul style="list-style-type: none"> No. of activities taken up under the research wing No. of research/ preservation plots maintained 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Research activity is contributing to the broad objectives of forest policy

Resources/ Inputs	Activities	Outputs	Outcomes	Impact
	Specialised works of Training wing	<ul style="list-style-type: none"> No. of training programmes conducted for department staff No. of awareness programmes conducted No. of infrastructure created/enhanced for training purpose 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> No. of buildings, roads and infrastructure developed No. of works undertaken/equipment procured to improve digitization and communication network 	<ul style="list-style-type: none"> Percentage of assets/ infrastructure is being utilised for the said purpose Latest technology/ software and equipment being used 	<ul style="list-style-type: none"> Department efforts towards forest conservation and protection is strengthened and augmented Department is modernised by using latest It technologies
	Providing individual/community benefits	<ul style="list-style-type: none"> No. of people benefitting from LPG connections and continued usage No. of people benefitting from bamboo plantations 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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)¹³ 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.

¹³ 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).¹⁴

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.

2.3.3 Sample size

Sixty-one plantations were selected for sampling out of 559 plantations raised/ maintained during the period of evaluation. The circle-wise population and samples for the study are as follows:

Table 7: Circle-wise and Division-wise Plantations Sampled

Circle	Division	No. of plantation works	No. of plantations sampled
Ballari		156	16
	Ballari T	6	2
	Chitradurga T	3	2

¹⁴Given. Lisa. M. , The SAGE Encyclopaedia of Qualitative Research Methods. (Vol. 1-0).Thousand Oaks, CA. SAGE Publications. 2008

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Circle	Division	No. of plantation works	No. of plantations sampled
	Davangere T	138	10
	Koppal T	9	2
Belagavi		86	12
	Bagalkote T	28	3
	Belagavi T	58	9
Bengaluru		36	4
	Chikkaballapura T	8	1
	Kolar T	23	2
	Ramanagara T	5	1
Chikkamagaluru		16	2
	Koppa T	16	2
Dharwada		42	4
	Dharawada T	17	1
	Gadag T	18	2
	Haveri T	7	1
Hassana		13	1
	Hassana T	8	1
	Tumkur T	5	0
Kalaburgi		48	5
	Kalaburgi T	22	3
	Raichur T	13	1
	Yadgir T	13	1
Mangaluru		37	4
	Kundapura T	10	1
	Managaluru T	27	3
Uttara Kannada		125	13
	Dandeli WL	23	2
	Haliyala T	32	5
	Karwar T	18	2
	Sirsi T	14	1
	Yellapura T	38	3
Total		559	61

Source: Terms of Reference

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.

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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.

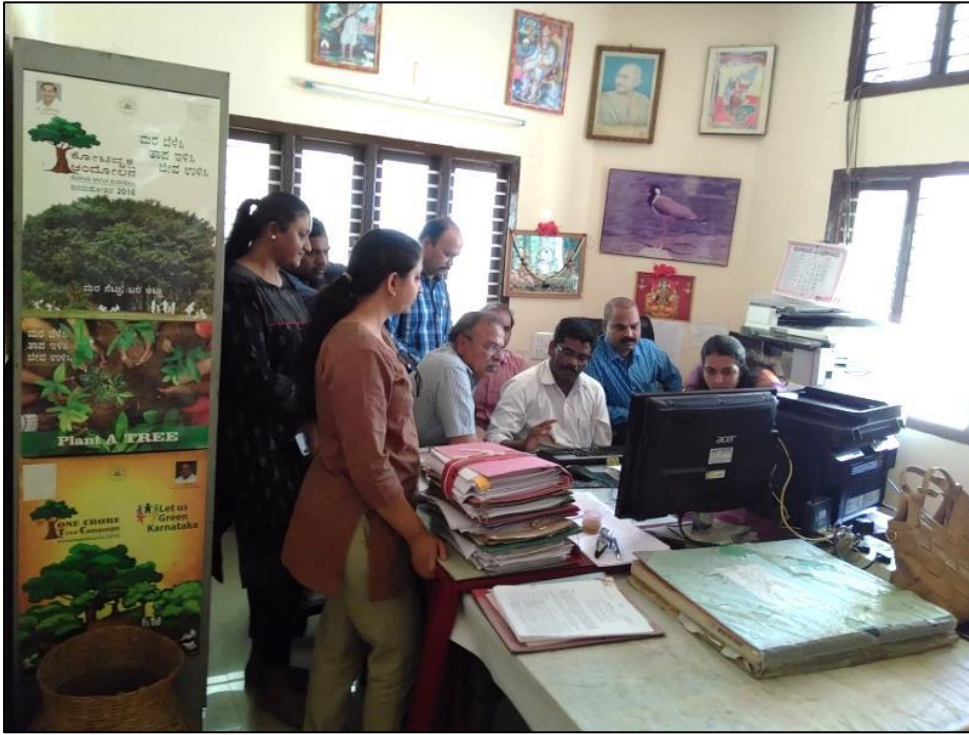


Photo 1: Secondary data entry at Chickballapur Range Office



Photo 2: Pilot test at Cubbon park

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Photo 3: Devanahalli range, Bangalore Rural division



Photo 4: 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

The NAP has focused its thrust on rehabilitation of degraded forests and other areas by institutionalizing decentralized/ participatory forest management and supplementing livelihoods improvement processes. The NAP guidelines provide a broad framework for implementation. While an output and activities framework has been prescribed by the NAP guidelines, 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.

In the evaluation of NAP, as per the ToR, plantations were sampled, while other works were not part of the design. However, interaction was held with members of Joint Forest Management Committee (JFMCs)/ Village Forest Committee (VFCs), Paddapalle Hobli, Bagepalli Range, Chikkaballapura Division, Bengaluru rural circle to understand the extent of their involvement in the planning, plantation, maintenance and to elicit suggestions to make the deliverables of the scheme more meaningful.

3.1 Plantation Development

This activity was undertaken to address the objective of ‘Increase and/ or improve forest and tree cover’.

Among the 61 plantations sampled, gross area of plantation is 1254 ha (average of 20.55 ha/ plantation) and net area of plantation is 1205 ha (average of 19.75 ha/ plantation). The NAP 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 performance¹⁵

¹⁵Anonymous. August 2015. National Afforestation Programme (NAP) Report, Evaluation of Forestry Works 2009-13. Karnataka Forest Department..

3.1.1 Planning process

Plantations were raised mostly in forest areas in the plantations sampled, with the highest net planted area in Ballari (29%), followed by Uttara Kannada (23% each), and 22% in Belagavi circle.

Among the plantations sampled, Annual Plan of Operations (APOs) with approved dates was available at the time of visit in 18 (30%) samples. Of these, 17% were approved before October, 55% were approved between Oct – Dec and 29% were approved after January. It may be inferred that 84% APOs were sanctioned after planting season, i.e. after September.

Late sanctioning of APOs may lead to delay in implementation of works; hence it calls for intervention at policy level 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.

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	
2010-11				1				1
2012-13			2	1	1		1	5
2013-14	3	1	1	2				7
2014-15		1	1				1	3
2015-16						1	1	2
Total	3	2	4	4	1	1	3	18
Per cent	17	10	22	22	6	6	17	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	
Ballari		2	1		1		1	5
Belagavi						1		1
Dharwada	1			1				2
Hassana				1				1
Kalaburgi			1				1	2
Mangaluru							1	1
Uttara Kannada	2		2	2				6
Total	3	2	4	4	1	1	3	18
Percent	17	10	22	22	6	6	17	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	52	9	1	0	2	1	2	0	3	9
			11%	0%	22%	11%	22%	0%	33%	100%
Raising Seedling	50	11	1	0	3	2	0	0	5	11
			9%	0%	27%	18%	0%	0%	45%	100%
Planting	46	15	11	0	0	1	0	1	2	15
			73%	0%	0%	7%	0%	7%	13%	100%
Total	148	35	13	0	5	4	2	1	10	35
Percent	81	19	37	0	14	11	6	3	29	100

Source: Primary data

Estimates were available at the time of visit in 60 (98%) samples, and not available in one case in Kolar T range, Kolar division, Bengaluru circle. Of these, 34 (57%) plantations had more than one estimate. Out of the total 183 estimates available, 35 (19%) had sanction dates, while 148(81%) did not have dates. Overall, it was observed that 38% of the estimates were sanctioned between January – March. Among the samples that had estimates with dates, it was noticed that 11% estimates for earth work and 9% estimates for raising seedlings were approved before October, while 55% estimates for earth work and 45% estimates for raising seedlings were approved after January. In case of planting works, 73% of the estimates

available with date were approved before October, while 20% were approved after January. 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

3.1.2 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 Plantation Sampled

Details	Expenditure as per records provided (Rs.)	Percent of expenditure or each activity out of total planting cost (Rs.)	Average expenditure per ha (Rs.)
Earthwork (Rs.)	8407860	22	6977
Raising Seedlings (Rs.)	2753865	7	2285
Planting Cost (Rs.)	10880189	28	9029
Boundary protection (Rs.)	1143957	3	949
Soil Moisture Conservation Works (Rs.)	790591	2	656
Maintenance (Rs.)	14745293	38	12237
Total	38721755	100	32134

Source: Secondary data from KFD

The average expenditure per hectare was Rs. 32,134 as revealed by the records made available at the time of field visit. However, expenditure per hectare ranged from Rs. 12,641 to Rs. 1,16,661.

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

Circle	No. of plantations sampled	Net area of the plantations sampled (ha)	Earth work	Raising Seedling	Planting	Boundary protection	SMC Work	Maintenance	Total	Average expenditure per hectare
Ballari	16	355	2985893 21%	1050274 7%	4194220 29%	487522 3%	305150 2%	5282100 37%	14305159 100%	40296
Belagavi	12	252	1359388 17%	648487 8%	1760175 22%	36656 0%	NA 0%	4281541 53%	8086247 100%	32088
Bengaluru	4	100	769310 32%	87500 4%	667369 28%	NA 0%	57350 2%	844825 35%	2426354 100%	24264
Chikkamagaluru	2	13	55025 14%	24222 6%	105550 28%	42553 11%	NA 0%	154195 40%	381545 100%	29350
Dharawada	4	85	435939 18%	165532 7%	749816 32%	39632 2%	NA 0%	976641 41%	2367560 100%	27854
Hassana	1	25	158000 24%	0 0%	229400 35%	NA 0%	NA 0%	271200 41%	658600 100%	26344
Kalaburgi	5	80	843899 22%	291650.2 8%	915723 24%	34256 1%	297132 8%	1436476 38%	3819136 100%	47739
Mangaluru	4	35	101137 18%	55043 10%	227026 40%	NA 0%	13638 2%	171230 30%	568074 100%	16231
Uttara Kannada	13	260	1699269 28%	431157 7%	2030910 33%	503338 8%	117321 2%	1327085 22%	6109080 100%	23496
Total	61	1205	8407860	2753865	10880189	1143957	790591	14745293	38721756	32134
Per cent			22	7	28	3	2	38	100	

Source: Secondary data from KFD Note: NA – Details not available during field visit. In some cases, documents were not available at the time of visit, hence average may not be comprehensive

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Analysis of the activities in raising plantations in the study period indicated that Bengaluru circle invested 32% of the total cost on earthwork whereas Chikkamagaluru, and Belagavi showed the least (14% and 17% respectively). Mangaluru circle spent 10% of the total cost for raising the seedlings, whereas, Bengaluru and Chikkamagaluru indicated only 4% and 6% respectively. Similarly, planting cost varied from 40% in Mangaluru to 22% in Belagavi circle. Likewise, boundary protection was at the cost of 8% in Uttara Kannada, and negligible in other circles. Cost of maintenance was highest in Belagavi circle, i.e. 52% and lowest in Uttara Kannada, i.e. 22%. Overall soil moisture conservation works seemed to be the least priority (2% expenditure), while 8% was spent in Kalaburgi circle.

Table 15: Cost Norms for Planting Technique Models for Various Agro-Climatic zones¹⁶

Planting Technique Model	Advance works (Rs. Per ha)	Planting Cost (Rs. Per ha)	Details					
			Maintenance (Rs/ ha)					Total
			1	2	3	4	5	
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
NTPF Model-III (all zones) 100 plants	23300	14100	-	3570	3260	3260	3260	50750
NTPF 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

¹⁶Anonymous. 2012. Species and Planting Technique Models. General Guidelines 2012. Karnataka Forest Department., Government of Karnataka.

Table 16: Average expenditure per ha as per plantations sampled

Plantation Model	No. of plantation	Net plantation area (ha)	Advance work/ha (earthwork, raising seedlings, Boundary cost and SMC Work)	Planting work/ha	Maintenance/ha	Total
ANR Model-I(B)	35	723	8911	8283	8205	25399
AR Model-II(A)	19	323	14041	9310	19824	43175
AR Model-II(B)	3	90	10067	6804	11523	28394
AR Model-II(G)	1	10	9300	7715	11301	28316
NTFP Model-III	3	60	18844	20065	21235	60144
Total	61	1205				

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.

3.1.3 Soil Moisture Conservation

Among the plantations sampled, 20 (33%) 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, all structures were serving the intended purpose. The construction quality of 9 (53%) structures were satisfactory, 7 (41%) structures were good, while one was not satisfactory.

Table 17: Details of SMC works in Sample Plantations (n = 61)

Type of structure	No. of structure	Average cost per structure (Rs.)
Gully checks/plugs	1	18475
Percolation ponds	12	39041
Rain water harvesting trenches	4	75906

Source: Primary data



Photo 5: Hyrada Block 2 Plantation, Hadagali range, Ballari division & circle
Percolation pit filled with water having stabilised bund indicating appropriate location

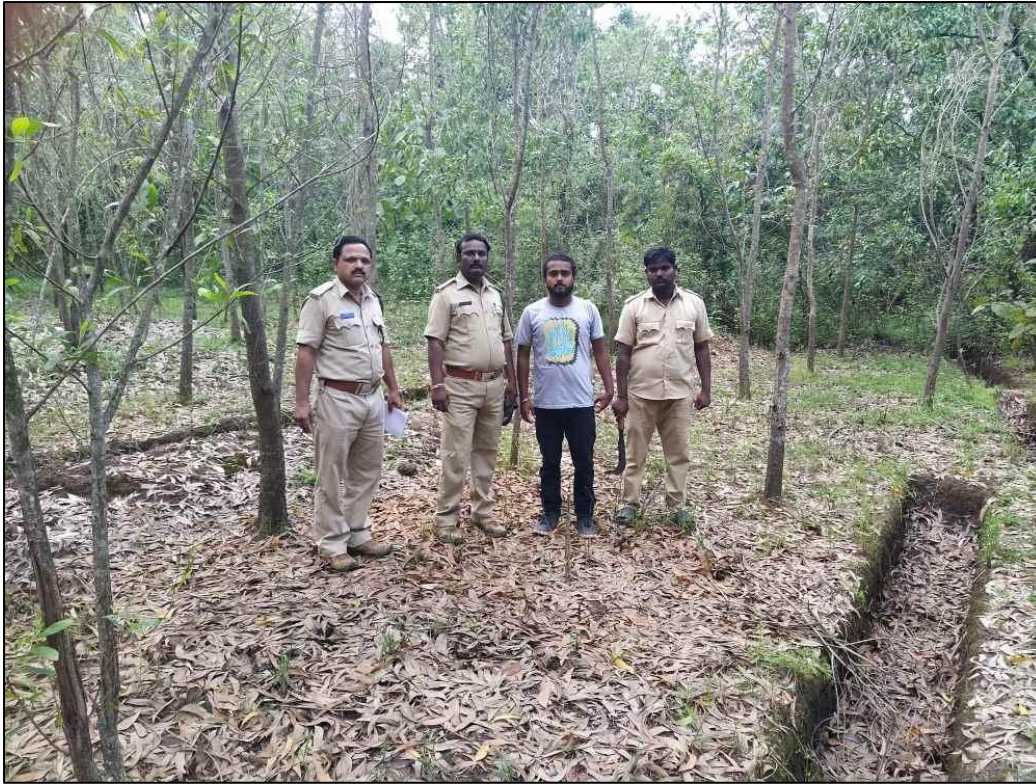


Photo 6: Diggegal Plantation, Londa range, Belagavi division, Belagavi circle
Percolation trench, appropriate location and stabilised structure

3.1.4 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 Additional Principal Chief Conservator of Forests (APCCF).

Plantation journals were available in 55 (90%) samples and 59 (97%) samples had field note book at the time of visit. Among these, 11 (18%) had partial details, 42 (69%) samples had complete details, while 8(13%) had no details.

Among the plantations sampled, 19 (31%) plantations were inspected by a senior officer as recorded in the respective plantation journal. Among the 19 plantations, all were visited by ACFs and two were visited by DCFs. This indicates that there is a need to document the visits with recommendations of senior level officers for effective implementation in the plantation journals.

3.1.5 Involvement of Community

Among the 61 plantations sampled, 57 (93%) had Joint Forest Management Committee (JFMCs), while the details of JFMCs were not available in the remaining four plantations sampled. This includes Gudnapur in Banavasi T, Sirsi division, Diggegali in Londa T, Belagavi division, Haradagatti in Shirahatti T range, Gadag division and Gangawali in Kankumbi T range, Belagavi division.

Among the plantations where details of JFMC were available, only 36 (63%) plantations were raised in JFM area. Among these 36 plantations, JFMCs were involved in some of the planting and maintenance activities in 25 (69%) plantations. The JFMCs were involved in various stages of plantation as shown in the table below. This shows that there is more scope for involvement of JFMCs and to raise plantations in the JFPM areas wherever feasible.

Table 18: Involvement of JFMCs in various stages of plantation

Activity / Stage of involvement	No. of plantations
Involvement in micro plan preparation stage	25
Advance work stage	23
Planting stage	22
Maintenance stage	24
Post maintenance stage	23
Approval of planting work proposal	23
Provided labour force	22
Supervised planting work	22

Source: Primary data

Focus Group Discussion was held with Devaraja Palli JFMC, Paddapalle Hobli, Bagepalli Range and Chikkaballapura Division, Bengaluru circle. This VFC was registered on 31.12.1998. The area has an average rainfall of 700 mm and average temperature of 22-40° C. As per the Panchayat Development Officer, the village approximately has 337 men and 340 women.

Cooking gas was given to 18 members as part of Entry Point Activity. A 25 ha mixed plantation was raised in the degraded forest land in the vicinity of the village. Main species planted included Kamara, Honge, Glyricidia, Mavu, etc. in pits of 50 cm x 50 cm x 50 cm. A total of 28,000 plants were raised with the following expenditure: Pre-planting Rs.4.77 lakh (2014-15), Nursery-Rs.0.52 lakh, SMC Rs.0.57 lakhs, Earth work & pitting Rs.3.29 lakh, I

year Maintenance Rs.2.43 lakh, II year Maintenance Rs.1.12 lakh and III year Maintenance Rs.1.83 lakh.

At the time of visit, the plantation was performing well. The members were happy with the co-operation of KFD and promised to protect the adjoining forests from grazing and forest fire as they had already joined hands with KFD in these tasks.

The members expressed that (1) the existing small farm pond in the plantation had to be desilted and its capacity for storing more water (2) An additional 50 ha of forest land available near the present plantation could be given to VFC for afforestation (3) About 30 more families in the village were depending on fuel wood for their energy needs and they should be given cooking gas (4) They were also aware of the fact that they were going to be benefitted in future. They quoted the example of Gummaragatta palya VFC which had received Rs.40,000 through collection of usufructs from 40 Tamarind trees.



Photo 7 :Focus Group Discussion at Paddapalle Hobli, Bagepalli Range, Chikkaballapura Division, Bengaluru circle
Interaction with members of Devaraja Palli JFMC

3.1.6 Planting Models and Species Planted

Table 19: Circle-wise and Model-wise plantations sampled

Circle	ANR Model- I(B)	AR Model- II(A)	AR Model- II(B)	AR Model- II(G)	NTFP Model- III	Total
Ballari	9	3	1		3	16
Belagavi	6	6				12
Bengaluru	2		2			4
Chikkamagaluru		1		1		2
Dharawada	3	1				4
Hassana	1					1
Kalaburgi	2	3				5
Mangaluru	2	2				4
Uttara Kannada	10	3				13
Total	35	19	3	1	3	61
Percent	57	31	5	2	5	100

Source: Primary data

It may be observed from the above table that ANR Model I (B) was the model used in majority (57%) of the plantations sampled, followed by AR Model II (A) in 31% plantations, while the other planting models were used in very few plantations. Promotion of Non-timber forest products (NTFPs) plantations to benefit the communities was one of the activities of this scheme which was seen in three plantations in Ballari circle, namely, Methgal, Koppala T range, Koppal division, Kankuppe, Jagaluru T range and Kanchikere, Harapanahalli T range in Davangere division.

The above result shows that 57% of plantations were planted as per ANR model which promotes the scheme output of improving natural forest stock. Similarly, 38% were planted under various AR models and 5% were planted as per NTFP model which promote the output of increasing and improving forest and tree cover as per the log frame of the scheme.

Table 20: Planted species in the scheme
Listed in order of highest occurrence in sample plots

Sl. No.	Species	Count of species	Percent
1.	Honge (<i>Pongamia pinnata</i>)	171	12%
2.	Tapsi (<i>Holoptelia integrifolia</i>)	88	6%
3.	Seemaruba (<i>Simarouba glauca</i>)	66	5%
4.	Others	64	5%
5.	Nelli (<i>Emblica officianalis</i>)	63	4%
6.	Nerale(<i>Syzgium sp.</i>)	61	4%
7.	Kamara (<i>Hardwickia binata</i>)	60	4%
8.	Mathi (<i>Terminalia alata</i>)	53	4%
9.	Simethangadi (<i>Cassia siamia</i>)	50	4%
10.	Nandi (<i>Legarstro emialanceolata</i>)	46	3%
11.	Kindal (<i>Terminalia paniculata</i>)	42	3%
12.	Bevu (<i>Azadirachta indica</i>)	40	3%
13.	Honne (<i>Pterocarpus marsupium</i>)	38	3%
14.	Shivane (<i>Gmelina arborea</i>)	37	3%
15.	Glyrecedia (<i>Glyrecedia spp</i>)	34	2%
16.	Bamboo (<i>Bambusa spp</i>)	33	2%
17.	Tare (<i>TerminaliaBelerica</i>)	28	2%
18.	Udaya (<i>Ficusracemosa</i>)	27	2%
19.	Sisso (<i>DalbargiaSisso</i>)	26	2%
20.	Teak (<i>Tectona grandis</i>)	26	2%
21.	Cashew (<i>Anacardium occidentale</i>)	25	2%
22.	Kaval (<i>Careya arborea</i>)	25	2%
23.	Acacia (<i>Acacia auriculiformis</i>)	24	2%
24.	Ficus (<i>Ficus religiosa</i>)	23	2%
25.	Banyan (<i>Ficus benghalensis</i>)	19	1%
26.	Canes (<i>Calamus spp</i>)	19	1%
27.	Dhoopa (<i>Vateria indica</i>)	19	1%
28.	Seetaphala (<i>Annona squamosa</i>)	15	1%
29.	Hole mathi (<i>Terminalia arjuna</i>)	14	1%
30.	Maavu (<i>Mangifera indica</i>)	14	1%
31.	Basari (<i>Ficus virens</i>)	13	1%
32.	Hale (<i>Writia tinctoria</i>)	13	1%
33.	Muthuga (<i>Butea monosperma</i>)	12	1%
34.	Halasu (<i>Artocarpus heterophyllus</i>)	11	1%
35.	Hippe (<i>Bassia latifolia</i>)	10	1%
36.	Mahogany (<i>Swietenia mahagoni</i>)	10	1%
37.	Tamarind (<i>Tamarind sp</i>)	9	1%
38.	Garcinia (<i>Garcinia indica</i>)	8	1%

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Sl. No.	Species	Count of species	Percent
39.	Kakke (<i>Cassia fistula</i>)	8	1%
40.	Jambe (<i>Xylia xylocarpa</i>)	7	0%
41.	Bharanige (<i>Vitex altissima</i>)	6	0%
42.	Bage (<i>Albizia lebbeck</i>)	5	0%
43.	Eucalyptus (<i>Eucalyptus globulus</i>)	5	0%
44.	Red sandal (<i>Pterocarpus santalinus</i>)	5	0%
45.	Bogi (<i>Hopea parviflora</i>)	4	0%
46.	Hebbalasu (<i>Artocarpus shirsuta</i>)	4	0%
47.	Antuvala (<i>Sapindus emarginatus</i>)	3	0%
48.	Beete (<i>Dalbergia latifolia</i>)	3	0%
49.	Bolpale (<i>Alstonia scholaris</i>)	3	0%
50.	Gulmavu (<i>Machilus macranta</i>)	3	0%
51.	Hulgal (<i>Alstonia scholaris</i>)	3	0%
52.	Karijale (<i>Prosopis juliflora</i>)	3	0%
53.	Rampatre (<i>Myristica malabarica</i>)	3	0%
54.	Ashwagandha (<i>Withania somnifera</i>)	2	0%
55.	Bael fruit (<i>Limonium acidissima</i>)	2	0%
56.	Dalchinni (<i>Cinnomomum zeylenicum</i>)	2	0%
57.	Ekke (<i>Calotropis gigantea</i>)	2	0%
58.	Garige (<i>Mimus opselengi</i>)	2	0%
59.	Maruva (<i>Origanum majorana</i>)	2	0%
60.	Haritaki (<i>Terminalia chebula</i>)	1	0%
	Total	1414	100%

Source: Primary data

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

Table 21: Circle-wise distribution of Planted Species

Species	Circle	Belagavi	Bengaluru	Chikkamagaluru	Dharawada	Hassana	Kalaburgi	Mangaluru	Uttara Kannada	Total	Percent
<i>Acacia (Acacia auriculiformis)</i>		6		1		5			12	24	2
<i>Dhoopa (Vateria indica)</i>		9		2				8		19	1
<i>Glyrecedia (Glyrecedia spp)</i>		10	5				19			34	2
<i>Halasu (Artocarpus heterophyllus)</i>				3					8	11	1
<i>Honge (Pongamia pinnata)</i>	69	42	22		17		14		7	171	12
<i>Kindal (Terminalia paniculata)</i>		15							27	42	3
<i>Nerale (Syzgium sp)</i>	18	16	7	3	6			1	10	61	4
Others	303	274	38	20	71	5	34	40	153	938	66
<i>Tapsi (Holoptelia integrifolia)</i>	37	14	5		18		8		6	88	6
<i>Teak (Tectona grandis)</i>									26	26	2
Total	427	386	77	29	112	10	75	49	249	1414	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.

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

A wide variety of around 60 species were planted across the plantations sampled, indicating that importance has been given to local species. Among the plantations sampled, across the circles it may be inferred that apart from a combination of about forty species combined as ‘others’, Honge is the most commonly planted species, followed by Tapsi and Nerale. Kindal, Dhoopa, Acacia, Glyricidia, Halasu and Teak constitute a smaller proportion comparatively.

3.1.7 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 plantation where casualty replacement was done.

Table 22: Details of Boundary Protection Measures

Type of protection	No. of structures	Status of Protection Measures			
		Breached/ filled with vegetation (CPT)	Good	Breached	Rusted
Barbed wire fence with wooden posts	6			3	3
Brush wood	7		3	4	
CPT	9	5	4		
Total	22	5	7	7	3
Per cent		22	32	32	14

Source: Primary data

The above table helps us understand the types of protection works that were carried out and their present condition. Just 20 plantations (33%) of the plantations sampled had boundary protection measures, where one plantation had two types of protection. Among these, 32% were in good condition, 22% were filled with vegetation at the time of visit, while 32% were breached and 14% are rusted. This shows that majority of the protection measures become ineffective within 3-6 years after establishment/ installation.

Table 23: Circle-wise type of boundary protection measures

Circle	Barbed wire fence with wooden posts	Brush wood	CPT	Total
Ballari			3	3
Belagavi	1	2		3
Bengaluru				
Chikkamagaluru	1			1
Dharawada			1	1
Hassana				
Kalaburgi			1	1
Mangaluru				
Uttara Kannada	4	5	4	13
Total	6	7	9	22
Percent	27	32	41	100

Source: Primary data

It may be seen from the above table that boundary protection measures were visible at all circles except in Bengaluru, Hassana and Mangaluru circles as per the records at the time of visit. In Uttara Kannada circle, barbed wire fence with wooden posts were adopted, while cattle proof trenches were the most common boundary protection adopted, followed by brush wood.

Table 24: Model-wise maintenance of plantations

Plantation Model	Model provision	No. of years plantation maintained				Grand Total
		No details	1	2	3	
ANR Model-I(B)	4	9	8	10	8	35
AR Model-II(A)	2	1		7	11	19
AR Model-II(B)	2	1		2		3
AR Model-II(G)	2			1		1
NTFP Model-III	5			1	2	3
Total		11	8	21	21	61
Per cent		18	14	34	34	100

Source: Primary data

Table 25: Circle-wise maintenance of plantations

Circle	No. of years plantation maintained				Total
	No details	1	2	3	
Ballari	2		8	6	16
Belagavi		2	4	6	12
Bengaluru	1	2	1		4
Chikkamagaluru			1	1	2
Dharawada			2	2	4
Hassana				1	1
Kalaburgi		1	2	2	5
Mangaluru	1	2		1	4
Uttara Kannada	7	1	3	2	13
Total	11	8	21	21	61
Per cent	18	14	34	34	100

Source: Primary data

Among the plantations sampled, 34% were maintained for three years, same percentage was maintained for two years and 14 % for one year. In 18% samples there were no details/ related documents pertaining to maintenance. It may be noted that ANR I (B) model provides maintenance for four years, Assisted Regeneration models provide for two years and NTFP III model prescribes maintenance for five years and these norms were not followed.

Table 26: Circle-wise and Model-wise casualty replacement

Circle	ANR Model-I(B)	AR Model-II(A)	AR Model-II(B)	AR Model-II(G)	NTFP Model-III	Total
Ballari	8	3	1		3	15
Belagavi	6	5				11
Bengaluru	1					1
Chikkamagaluru				1		1
Dharawada	2					2
Hassana	1					1
Kalaburgi	2	3				5
Mangaluru	2	2				4
Uttara Kannada	4	1				5
Total	26	14	1	1	3	45
No. of plantations sampled	35	19	3	1	3	61
Per cent	58	31	2	2	7	100

Source: Primary data

Among the plantations sampled, casualty replacement was done in 45 plantations (74%). Casualty replacement was done mostly in Ballari and Belagavi circles. It was observed that in the AR Model II (G) and NTFP Model III, casualty replacement was done in all the plantations visited, whereas in Ballari circle in the AR Model II (B) plantations visited, casualty replacement was done in 33% plantations.

3.1.8 Success/ Survival

Most evaluation reports brought out earlier by the KFD have explained success of plantations in terms of survival of the plants¹⁷ and in some cases the health of plants such as girth were considered to rate the performance of plantations¹⁸.

¹⁷Anonymous. April 2014. Internal Evaluation Report of 2007-08 Works. Karnataka Forest Department.

¹⁸Anonymous. August 2015. National Afforestation Programme (NAP) Report, Evaluation of Forestry Works 2009-13. Karnataka Forest Department.

Table 27: Circle-wise status of plantation and survival percentage

Circle	No. of plantation	SMC Available		Boundary protection available		Watch and ward		State of Health (% out of seedlings survived)			Overall Survival %
		No. of plantation	%	No. of plantation	%	No. of plantation	%	Good	Satisfactory	Poor	
Ballari	16	8	50	3	19	16	100	6	32	62	23
Belagavi	12	2	17	4	33	9	75	43	42	15	88
Bengaluru	4	1	25			4	100	46	39	15	95
Chikkamagaluru	2			1	50	2	100	0	18	82	79
Dharawada	4					4	100	82	18	0	86
Hassana	1					1	100	100	0	0	91
Kalaburgi	5	4	80	1	20	5	100	43	57	0	71
Mangaluru	4	2	50			4	100	6	72	22	40
Uttara Kannada	13	3	23	13	100	13	100	17	66	17	29
Total	61	20		22		58		33	43	24	55
Per cent of total plantations			33		36		95				

Source: Primary data

It may be inferred from the above table that among the plantations sampled, 33% had SMC structures, boundary protection was available in 36% samples, 95% plantations had watch and ward. Among the seedlings surviving in the sample plots, 33% were found to be in good condition, 43% were satisfactory and 24% were poor. The overall survival percentage across the circles was 55%. Interestingly, the plantation sampled in Bengaluru circle had 95% survival followed by Hassan which had 91% survival and 88% in Belagavi circle. Least survival was seen in Ballari at 23% and Uttara Kannada 29%, despite having SMC, boundary and watch and ward. In Hassana circle 100% seedlings were in good health, followed by 82% in Dharawada circle. In Chikkamagaluru 82% seedlings were in poor health at the time of field visit, followed by 62% in Ballari circle. The hypothesis that there is variation in survival percentage of plantations across the different forest circles was found to be true.

Table 28: Model-wise survival percentage

Plantation Model	No. of plantations sampled	Total seedlings Survived	Total No. of Empty pits	Total Planted	Survival %
ANR Model-I(B)	35	3491	1816	5307	66
AR Model-II(A)	19	3656	2569	6225	59
AR Model-II(B)	3	181	805	986	18
AR Model-II(G)	1	21	16	37	57
NTFP Model-III	3	183	1007	1190	15
Total	61	7532	6213	13745	55

Source: Primary data

It may be observed from the above table that higher survival percentage was found in ANR Model I (B), i.e. 66% followed by 59% in AR Model II (A) and this was closely followed by 57% in AR Model II(G). Least survival of 15% was seen in NTFP Model III plantations sampled in Ballari circle and AR Model II (B) of which two were in Bengaluru circle and one in Ballari circle.

Table 29: Survival based on progressing age

No. of years maintained	No. of plantation	Survival %
No details*	11	40
1	8	84
2	21	41
3	21	60
Total	61	55

Source: Primary data

* Data on maintenance not made available during field visit

The above table indicates that plantations with one year of maintenance had the highest survival rate at 84%, followed by 60% in plantations maintained for three years. The plantations maintained for two years had 41% survival. This shows that the survival rate is not directly proportional to the number of years of maintenance.

Table 30: Survival based on year of planting

Year of planting	No. of plantation	Survival %
2010-11	2	13
2011-12	5	20
2012-13	14	45
2013-14	18	44
2014-15	9	64
2015-16	8	91
2016-17	5	38
Total	61	55

Source: Primary data

The above table indicates wide variation in the percentages of survival, from 13% for the plantations planted in 2010-11 to 91% for the plantations of 2015-16.

Table 31: Species-wise survival percentage

Species	Total Survived	Total Planted	Survived %
Acacia (<i>Acacia auriculiformis</i>)	383	967	40
Dhoopa (<i>Vateria indica</i>)	26	67	39
Glyrecedia (<i>Glyrecedia spp</i>)	613	790	78
Halasu (<i>Artocarpus heterophyllus</i>)	22	30	73
Honge (<i>Pongamia pinnata</i>)	1243	3066	41
Kindal (<i>Terminalia paniculata</i>)	180	440	41
Nerale (<i>Syzizium spp</i>)	193	254	76
Others	4369	7148	61
Tapsi (<i>Holoptelia integrifolia</i>)	361	702	51
Teak (<i>Tectona grandis</i>)	142	281	51
Total	7532	13745	55

Source: Primary data

The overall survival was 55% among the plantations sampled. It may be seen from the above table that overall survival of Glyrecedia (*Glyrecedia spp*) was the highest at 78%, followed by 76% survival of Nerale (*Syzizium spp*) and 73% survival of Halasu (*Artocarpus heterophyllus*). The least survival was seen in Dhoopa (*Vateria indica*) at 39% and 40% in Acacia (*Acacia auriculiformis*). Interestingly, Honge (*Pongamia pinnata*) which was the most common species planted had 41% survival.

Table 32: 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	Chikkamagaluru	Dharawada	Hassana	Kalaburgi	Mangaluru	Uttara Kannada	Total
Acacia (<i>Acacia auriculiformis</i>)	CG		11.5		35.0		20.0			17.5	17.3
	H		3.2		10.0		4.4			3.3	3.8
	S%		91		87		92			3	40
Dhoopa (<i>Vateria indica</i>)	CG		0.3						6.1		2.7
	H		0.4						1.9		1.0
	S%		70						33		39
Glyrecedia (<i>Glyrecedia spp</i>)	CG		0.7	3.2				5.5			3.8
	H		1.2	0.4				1.0			1.0
	S%		100	94				77			78
Halasu (<i>Artocarpus heterophyllus</i>)	CG										2.3
	H									3.1	0.5
	S%									0.6	73
Honge (<i>Pongamia pinnata</i>)	CG	5.1	2.0	6.3		3.9		2.8		1.3	4.0
	H	0.5	0.9	0.9		0.9		1.2		0.3	0.7
	S%	18	75	96		84		75		100	41
Kindal (<i>Terminalia paniculata</i>)	CG		4.5							4.1	4.2
	H		2.2							0.8	1.3
	S%		88							31	41
Nerale (<i>Syzgium sps.</i>)	CG	2.0	0.8	1.7	6.7	0.3			4.0	3.6	2.0
	H	17.3	1.0	1.1	1.7	0.3			0.6	0.6	5.7
	S%	50	79	94	50	100			50	51	76
Tapsi (<i>Holoptelia integrifolia</i>)	CG	2.4	0.6	3.2		4.7		2.3		1.3	2.5
	H	0.3	0.4	1.1		1.6		0.3		0.3	0.6
	S%	23	52	76		88		71		100	51
Teak (<i>Tectona grandis</i>)	CG									3.6	3.6
	H									0.9	0.9
	S%									51	51
Others	CG	2.1	1.6	5.0	1.4	5.2	0.0	3.5	4.8	2.4	2.5
	H	2.5	0.9	2.4	0.4	1.7	0.0	0.4	1.1	0.5	1.5
	S%	28	91	95	64	86	0	60	43	32	61

Source: Primary data

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The above table indicates that Glyricidia had the highest survival (78%) with an average height of 1.0 mtr in Kalaburgi with an average girth of 5.5cms. Nerale with a survival of 76% recorded highest collar girth of 6.7cms (Chikkamagaluru) with an average height of 17.3 mtr in Ballari circle. Honge which was the most commonly occurring species had the highest average collar girth of 6.2cms in Bengaluru, while average height was highest in Kalaburgi at 1.2mtrs

Table 33:Details of Rootstock

Circle	Total no. of plots laid	Rootstock available (no. of plots)	Total No. of stems with collar girth 2-10 cms	Average no. of stems per plot	Average Collar Girth	Average Height
Ballari	71	56	551	7.8	11	2
Belagavi	52	6	9	0.2	5	2
Bengaluru	20	12	95	4.8	7	1
Chikkamagaluru	3	3	39	13.0	7	2
Dharawada	17	3	37	2.2	5	2
Hassana	5	2	15	3.0	5	2
Kalaburgi	17	0				
Mangaluru	7	7	436	62.3	3	1
Uttara Kannada	52	34	782	15.0	6	2
Total	244	123	1964	8.0	8	2

Source: Primary data

Overall rootstock was available in 50% of the sample plots laid. The above table reveals that rootstock was nil in Kalaburgi circle in the sample plots, and highest in Ballari circle, followed by Uttara Kannada circle. The average number of stems per plot ranged from 0.2 in Belagavi to 62.3 in Mangaluru circle.

Table 34: Details of Natural trees

Plantation Model	Survival %	Total No. of plots laid	Total No. of Stems with Collar above 10cm	Average No. of stems per plot	Average GBH	Average Height (mtr)
ANR Model-I(B)	66	145	556	4	52	7
AR Model-II(A)	59	67	305	5	45	14
AR Model-II(B)	18	18	76	4	28	3
AR Model-II(G)	57	2	3	2	40	6
NTFP Model-III	15	12	18	2	17	2
Total	55	244	958	4	47	8

Source: Primary data

The average GBH and height in natural trees was highest in ANR Model I (B). It may be inferred from the above table that the presence of natural trees has no direct impact on the survival in the sample plots.

3.2 Other Activities

As per the data provided by the concerned section of the KFD, physical achievements for the other activities carried out were not made available. However, the expenditure statement for the period of evaluation shows that Rs. 62.61 lakhs was expended for soil and moisture conservation, Rs. 3.46 lakhs for awareness programmes, Rs. 69.06 lakhs for Entry Point Activities, and Rs. 0.38 lakhs for fencing. It was observed that there was no expenditure under the head Micro Planning, which was one of the crucial steps in this scheme.



Photo 8: Suganalli plantation, Shirahatti range, Gadag division, Dharwad circle
Marking sample plots with wooden pegs

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Photo 9: Deshanur plantation, Nesargi range, Belagavi division and circle
Measuring and laying sample plots



Photo 10: Keshawar plantation, Yadgir range, Yadgir division, Kalaburgi circle
Measuring height of planted seedlings



Photo 11: Sakalbena plantation, Ankola range, Karwar division, Uttara Kannada circle
Plantation with durable board



Photo 12: UbaradkaMittur plantation, Sullia range, Mangalore division and circle
Good example of mixed local species planted

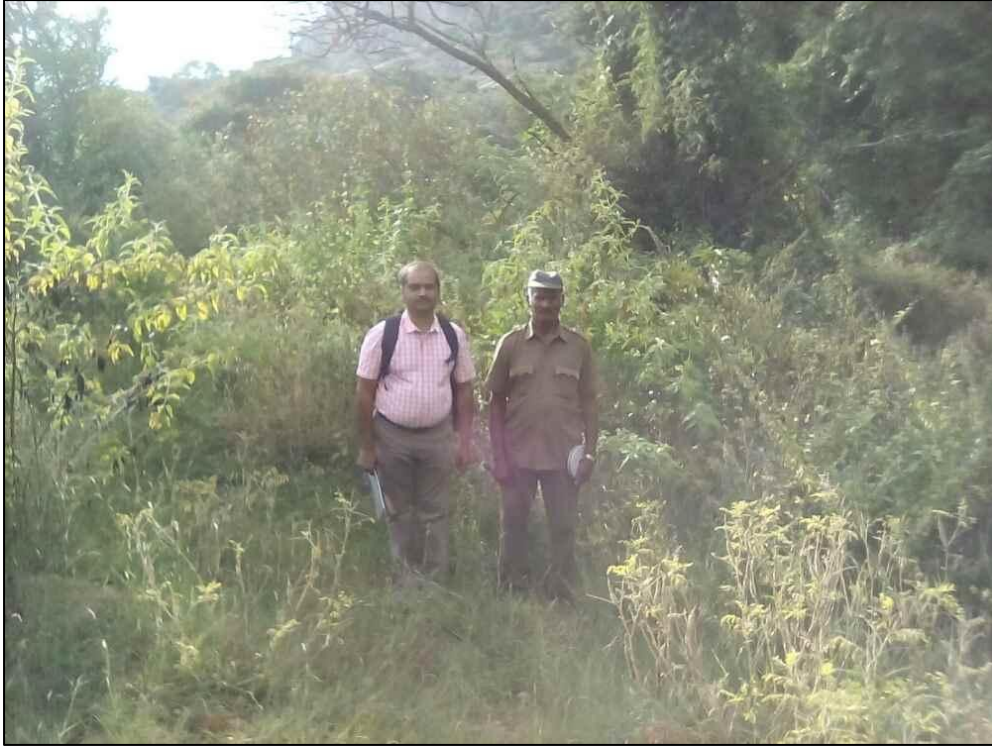


Photo 13: KV Matta plantation, Magadi range, Ramanagara division, Bengaluru circle
Good instance of Assisted Natural Regeneration model

4 FINDINGS

Based on the evaluation study, the following inferences may be drawn vis-à-vis the objectives and outputs of the National Afforestation Programme:

1. Improved natural forest stock and increased and improved forest and tree cover

The physical target of plantation activities (raising, maintenance and advance works) was 59,759 ha against which the achievement was 61,044 ha, 102% achievement. The overall financial target was Rs. 5785.32 lakhs against which the achievement was Rs. 4,920.82 lakhs, i.e. 85% achievement. During the study period under the scheme, 61,044 ha of low density forest was augmented with 7,987 ha of advance works, 9,460 ha of planting and 43,597 ha of maintenance of previous years plantations. The different models adopted for the augmentation are 42% of the area was planted with Assisted natural regeneration (ANR) followed by 32% Artificial regeneration (AR), 2% Silvi pasture, 6% bamboo, 7% cane and 11% Non-timber forest produce (NTFP). These afforestation works were in tandem with the activities intended to be carried out to obtain the output mentioned in the log frame of the scheme.

This is corroborated by the 20 Point Programme Progress reports of 2013-14, 2014-15, 2015-16 and 2016-17 and 2017-18, Ministry of Statistics and Programme Implementation, Government of India¹⁹, the afforestation (in public and forest lands) target of area covered under plantation for Karnataka was 2,33,850 ha, while achievement was 2,66,503 ha (114%).

During the period of evaluation, 559 plantation works were carried out, of which 61 plantations across were sampled nine forest circles, covering gross area of plantation of 1254 ha (average of 20.55 ha/ plantation) and net area of plantation of 1205 ha (average of 19.75 ha/ plantation).

¹⁹http://mospi.nic.in/sites/default/files/twenty_point_programme_2006/annual_report_of_tpp2006/QPR%20of%20TPP.pdf

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Among the plantations sampled, Annual Plan of Operations (APOs) with approved dates was available at the time of visit in 30% samples. It was inferred that 84% APOs were sanctioned after planting season, i.e. after October.

Estimates were available at the time of visit in 98% samples, and not available in one case in Kolar T range, Kolar division, Bengaluru circle. Of these, 63% estimates were sanctioned after October, indicating that the sanctioning process had delays especially in advance works which affects the quality of seedlings, which may adversely affect the quality of the plantation. Plantation journals were available in 90% samples and 97% had field note books at the time of visit. Among these, 69% journals had complete details, while 18% had partial details

About 100 species chosen for planting were indigenous species, except a few like Acacia, Eucalyptus and Mahagony. Honge is the most commonly planted species, followed by Tapsi and Nerale. Majority of the indigenous species are also a source of NTFP, which provides livelihood opportunities for forest fringe communities.

Just 33% of the plantations sampled had boundary protection measures, which was also supported by the fact that, on an average only 3% of the total cost was expended on boundary protection structures. Of these, 32% structures were in good condition, while the remaining 68% were breached/ rusted/ filled with vegetation. This shows that majority of the protection measures become ineffective within 3-6 years after establishment/ installation

The overall survival percentage across the circles was 55%. The plantations sampled in Bengaluru circle had 95% survival followed by 91% in Hassan circle and 88% in Belagavi circle. Among the surviving seedlings in the sample plots, 33% were found to be in good condition, 43% were satisfactory and 24% were poor. Least survival was seen in Ballari circle at 23% and Uttara Kannada circle at 29%, despite having SMC, boundary protection and watch and ward. This is a paradox in which a dry zone area like Ballari circle and high rainfall area like Uttara Kannada circle, wherein maximum numbers of plantations were sampled, 16 and 13 respectively, have shown low percentage of survival. On close scrutiny, it was found that 50% of the plantations sampled in Uttara Kannada circle and 81% in Ballari circle were damaged due to heavy grazing and fire incidents.

Three plantations in Ballari were raised under NTFP Model-III with Honge and Neem which have recorded only 15% survival due to extensive grazing. ANR Model I(B) was found in 35 plantations sampled recording highest survival rate of 66%, wherein more than 10 mixed indigenous species were planted in all the circles. The study revealed that Glyricidia had recorded highest percentage of survival (78%) followed by Nerale (76%) and Halasu (73%) across the circles. Least survival, i.e. 39% was recorded by Dhoopa, followed by Acacia (40%). The reason for low performance of Acacia has to be ascertained in a detailed study.

2. Participatory forest management initiated by supporting the immediate needs to fringe-community and long term participation of fringe community in forest management

Interaction with the field officers revealed that needs assessment of the forest fringe communities were not done in a formal manner as a mandate, however they have assessed their requirement in some locations through village level meetings and meetings of JFMCs. Entry Point Activities which were useful for the community at large and address their immediate needs were undertaken under this scheme which include LPG cylinders with stoves, astra ole (improved cook stove), gobar gas units, community hall, SMC works and utensils for VCFs. In some cases, activities to promote participation of the communities such as regular meetings with JFMCs, involving them in fire management, providing funds for income generation activities (as seen in M.M. Hills division, Chamarajanagara circle) were carried out.

Among the 61 plantations sampled, 93% had Joint Forest Management Committee (JFMCs), of which 41% were involved in some planting and maintenance activities. Even though there is involvement of JFMCs to some extent, their participation in all stages of planting, starting from micro planning is wanting. It may be inferred that the aim of the project to develop the forest resources through participatory approach has taken a back seat due to inadequate social mobilization.

3. Increased soil and moisture conservation

Details of SMC works carried out under the budget component of other Activities were not made available. However, among the plantations sampled, 28% had SMC structures despite the fact that most models had a budgetary allocation for SMC work. Even though the model guidelines provide for 14-25% of the advance work cost allocated per hectare for SMC works, an average of 2% of the total cost was expended on SMC works in the plantations sampled. The construction quality of 53% structures were satisfactory, 41% were good, while 6% were not satisfactory.

4. Improved forest/ tree productivity

A standard procedure prevailing in the department of procuring good quality seeds through the Research wing of KFD was followed. These seeds were used to raise seedlings in the nurseries which were utilised for planting.

5. Increased capacity of fringe community and frontline staff to develop and manage natural resources

Even though Rs. 3.46 lakhs have been expended under the other activities component, physical target and achievement was not made available. However, the interaction with the field officers and JFMCs indicated least priority was given to awareness, training and linkage with other institutions as specified in the log frame.

6. Enhanced opportunity for local forest-based micro enterprises

This scheme has particularly contributed to promote NTFP species such as Nelli, Hunase, Antuwala, Ramapatre, Neem, Dalchini, Honge etc. in various plantations raised. However, efforts for value addition and institutional linkages for marketing products of forest based micro enterprises have not been done in any location, except in M.M. Hills Division, Chamarajanagara circle, where forest dependent communities have been linked to Large-Scale Adivasi Multi-Purpose Societies (LAMP) Society for sale of NTFPs collected by the tribal communities.

7. Review and independent monitoring processes internalised

Interaction with KFD officers revealed that there was a system in place wherein routine monitoring of plantations was done by Range Forest Officer and periodic inspection visits were made by officers of the rank of ACF and above. However, more systematic documentation of suggestions of senior officers would be helpful.

8. Tree cover in non-forest areas promoted

Enhancing tree cover in non-forest areas was not taken up with special focus under this scheme. From 2012 to 2016-17, a total of 2,82,389 hectares of degraded land was restored and afforested under NAP in India²⁰. The policy level officers expressed that the forest cover in Karnataka increased by 1025.48 sq. km as per the India State of Forest Report, Forest Survey of India, 2019, Ministry of Environment, Forest and Climate Change, Government of India²¹ as compared to the previous report in 2017. Tree cover in Karnataka is 6,257 sq. kms and 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. Various other schemes for public like Krishi Aranya Prothsaaha Yojane (KAPY) and Raising of Seedlings for Public Distribution (RSPD), Daivivana, Talukigonda Hasiru Grama Yojana, Jillegonda Kaadu Nirmana, Maguvigonda Mara Shaalegonda Vana, Vana Nirmala in gomal areas etc. have helped in increasing the tree cover in non-forest areas.

9. Problem lands rehabilitated

Specific activities were not taken up to address this output. However, the policy level officers have expressed that the overall project activities and outputs of NAP were evolved on a larger perspective to accommodate the entire country. All the activities/ outputs were not suitable/ required for all the States and hence certain activities under the umbrella of NAP were not covered in Karnataka.

²⁰Bonn 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

²¹<http://fsi.nic.in/forest-report-2019>

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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. Cost norms of plantation models may be redesigned based on field realities.
2. Need assessment of the forest fringe communities may be done in a participatory manner prior to taking up entry point activities
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. 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.
5. 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. Species which perform best in drought conditions include Neem, Acacia, Hebbavu, Honge, Mahogany, Rakta chandan, Nelli, Nerale, Tapasi, Tamarind, Kamara etc. may be preferred.

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3. The concept of augmenting mixed native species in degraded natural forests may be encouraged in all future afforestation activities of the department.
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. A regular provision for maintaining SMC works may be provided.
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. Social mobilisation, revitalization and/ or promotion of JFMCs, along with livelihood mapping, training needs and marketing linkages are a crucial step in this scheme to ensure participation of the communities (especially forest dependent communities) in developing the forest resources as envisaged. The forest fringe communities may be trained in sustainable harvesting, value addition and marketing of NTFPs. Hence, primary focus can be laid on strengthening this aspect in the delivery of the scheme. Support of local NGOs, Social scientists, extension experts etc. may be taken appropriately.
7. KFD could establish community storage and marketing facility for NTFPs at appropriate locations based on the need
8. The usufructs rights may be clearly established to ensure that the NTFP resources are optimally utilised by forest dependent communities to improve their livelihood.
9. The ICT wing could provide data support on identifying low canopy density areas, identifying encroachments, locating all assets created, provide maps where forestry features have been overlaid on Survey of India topography sheets etc.
10. 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. Good quality planting material can be produced and supplied by research wing of KFD through tissue culture or any other appropriate technology
2. A system of imprest allocation of finances to carry out committed seasonal works may be considered to improve the operational efficiency of KFD.

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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 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

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 Afforestation 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) Act 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
- Infrastructure 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 1/2 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)
 - i. Elephant Proof Trench (EPT)
 - ii. Solar Fencing
 - iii. Assistance to Bannerghatta Biological Park
- d. 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
 - 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 intended 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

- i. 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 of the activities taken up for mitigating man-animal conflict?

(D) For Specialized works of Working Plan

- i. What is the status of survey and demarcation of forest areas (RF's) in the state?
- ii. What is remaining area which needs to be demarcated? What is the amount required for a 100% survey & demarcation of RF's in 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:

- i. 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?

- i. 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	13 th 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 (tablet/ smart phone) on the spot along with geo-referenced and annotated photos of 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 reckon. The backend application software, evaluation formats, basic information about the selected samples etc., will be hosted on the website. 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 evaluation 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. Survey 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 CONSULTANTS:

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.	3rd Core 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

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

-Sd-
Chief Evaluation Officer
Karnataka Evaluation Authority

Annexure-1

DETAILS OF SCHEMES TO BE EVALUATED

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

1. Introduction:

CAMP A has been constituted in pursuance of the Hon'ble Supreme Court's order dated 30-10-2002 in 1A 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 (CAMP A) for preservation of natural forests, management of wildlife, infrastructure development and other allied works.

The State CAMP A would administer the amount received from the Ad-hoc CAMP A 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 CAMP A Projects:

As per guidelines issued by the Ministry of Environment and Forests, Government of India, the State CAMP A 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 wood, 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 building. 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 Afforestation (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.

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
113. 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 Camps, 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

**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) Entry Point Activities
(c)Participatory forest management initiated by supporting the immediate needs of fringe-community	
(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.

SCHEME-4: NATIONAL BAMBOO 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 technologies 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.

Annexure -2

List of Plantations sampled

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
1	BALLARI	CHITRADURGA T	CHITRADURGA T	CHITRADURGA T	Jogimatti Plantation	2015-16	25
2	BALLARI	KOPPAL T	GANGAVATHI T	KOPPALA T	Kholihal	2013-14	15
3	BALLARI	KOPPAL T	GANGAVATHI T	KOPPALA T	Metthgal / hossoru	2014-15	20
4	BELAGAVI	BELAGAVI T	BELAGAVI T	BELAGAVI T	Dhamane plantation	2015-16	25
5	BELAGAVI	BELAGAVI T	BELAGAVI T	NESARGI T	DESHANUR FS no 177	2016-17	25
6	BELAGAVI	BELAGAVI T	BELAGAVI T	NESARGI T	Hanabaratti fs no 290	2013-14	13
7	CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	KALASA T	Horanadu	2013-14	10
8	BELAGAVI	BELAGAVI T	BELAGAVI T	NESARGI T	Hanabaratti fs no 290	2014-15	12
9	MANGALURU	MANGALURU T	SUBRAMANYA T	SULLIA T	Manjikana, Poomale RF (Ubaradka mithur VFC)	2012-13	10
10	BELAGAVI	BELAGAVI T	KHANAPUR T	KHANAPUR T	Koundal 6 99	2012-13	25
11	BALLARI	DAVANAGERE T	DAVANAGERE T	DAVANAGERE T	Nirthadi Sy no 86	2013-14	20
12	BALLARI	DAVANAGERE T	DAVANAGERE T	DAVANAGERE T	Hiregonegere	2014-15	25
13	BALLARI	DAVANAGERE T	DAVANAGERE T	HARAPPANAHALLI T	Kanivehalli Sy.No. 172	2013-14	10
14	BALLARI	DAVANAGERE T	DAVANAGERE T	HARAPPANAHALLI T	Nichchavvanahalli Sy.No. 267	2013-14	20
15	BALLARI	DAVANAGERE T	DAVANAGERE T	JAGALURU T	Jayaramanahalli Sy.No. 2 & 10	2013-14	15

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATI ON AREA HA
16	BENGALURU	KOLAR T	KOLAR T	KOLAR T	Theralli	2011-12	25
17	BENGALURU	KOLAR T	KOLAR T	KOLAR T	Thondala	2014-15	25
18	BELAGAVI	BELAGAVI T	KHANAPUR T	LONDA T	Kapoli FS no 93	2015-16	25
19	DHARWADA	DHARWADA T	KALAGHATAGI T	KALAGHATAGI T	Gasarambi	2013-14	15
20	BALLARI	BALLARI T	KUDLIGI T	KUDLIGI T	Creation of Plantation	2016-17	25
21	BALLARI	BALLARI T	HOSPETE T	HADAGALI T	Hyarada RF Sy No.321 Block-II	2016-17	25
22	BENGALURU	RAMANAGARA T	RAMANAGARA T	MAGADI T	Savanadurga SF K V Matta VFC	2013-14	25
23	DHARWADA	HAVERI T	HANAGAL T	HIREKERUR T	Guddadamadapur	2014-15	25
24	KALABURGI	RAICHUR T	RAICHUR T	DEVADURGA T	Mudaragi	2012-13	25
25	BENGALURU	CHIKABALLAPURA T	CHINTAMANI T	SHIDLAGHATTA T	G G Halli	2015-16	25
26	UTTARA KANNADA	KARWAR T	KARWAR T	KADRA T	Hartuga FS No 48	2016-17	10
27	KALABURGI	KALABURGI T	KALABURGI T	ALAND T	Advance work plantation during 2013-14 at Gola	2014-15	15
28	KALABURGI	KALABURGI T	KALABURGI T	ALAND T	Maintenance of 1 year old plantation during 2016-17 at Sangunda block-I	2015-16	12.5
29	KALABURGI	KALABURGI T	KALABURGI T	ALAND T	Maintenance of 1 year plantation during 2016-17 at Sangunda Block-II	2015-16	12.5
30	KALABURGI	YADGIRI T	YADGIRI T	YADGIRI T	keshwar	2014-15	15

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SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATI ON AREA HA
31	UTTARA KANNADA	SIRSI T	SIRSI T	BANAVASI T	Gudnapur	2013-14	15
32	HASSANA	HASSANA T	HASSANA T	HASSANA T	HONGERE	2010-11	25
33	UTTARA KANNADA	KARWAR T	ANKOLA T	ANKOLA T	Sakalbena	2014-15	10
34	UTTARA KANNADA	YELLAPUR T	MANCHIKERI T	IDUGUNDI T	2012 rains plantation	2012-13	10
35	BELAGAVI	BAGALKOTE T	JAMAKANDI T	JAMAKANDI T	Jagadal sy no 35	2015-16	25
36	UTTARA KANNADA	DANDELI WL	DANDELI WL	GUNDA WL	Yarmukh MAINTENANCE OF TWO YEAR OLD PLANTATION AT X-18	2012-13	25
37	BELAGAVI	BAGALKOTE T	JAMAKANDI T	JAMAKANDI T	Siddapur sy no 73/1	2015-16	25
38	UTTARA KANNADA	YELLAPUR T	YELLAPUR T	YELLAPUR T	Gotguli	2013-14	15
39	UTTARA KANNADA	DANDELI WL	ANSHI WL	ANSHI WL	MAINTENANCE OF SECOND YEAR OLD PLANTATION AT BADPOLI FSY NO.21	2013-14	25
40	UTTARA KANNADA	YELLAPUR T	MANCHIKERI T	MANCHIKERI T	bharani 2012	2012-13	25
41	UTTARA KANNADA	HALIYALA T	HALIYALA T	HALIYALA T	Bamboo	2012-13	25
42	UTTARA KANNADA	HALIYALA T	HALIYALA T	SAMBRANI T	Mixed Species Plantation	2013-14	25
43	UTTARA KANNADA	HALIYALA T	HALIYALA T	HALIYALA T	Tatwanagi FS 98	2016-17	25
44	UTTARA KANNADA	HALIYALA T	HALIYALA T	HALIYALA T	Teganli FS 87	2010-11	25
45	UTTARA KANNADA	HALIYALA T	HALIYALA T	SAMBRANI T	ANR Plantation	2013-14	25

SL-NO	CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION	YEAR OF PLANTING	NET PLANTATION AREA HA
46	BELAGAVI	BAGALKOTE T	JAMAKANDI T	JAMAKANDI T	Mantur	2013-14	15
47	CHIKKAMAGALURU	KOPPA T	KOPPA T	KOPPA T	Yadadanti	2011-12	3
48	BALLARI	DAVANAGERE T	DAVANAGERE T	HONNALI T	Palavanahalli Sy.No. 61	2011-12	25
49	BALLARI	DAVANAGERE T	DAVANAGERE T	JAGALURU T	Kanakuppe Sy.No. 98	2011-12	25
50	BALLARI	DAVANAGERE T	DAVANAGERE T	JAGALURU T	Malemahikere Sy.No. 37	2011-12	25
51	BALLARI	DAVANAGERE T	DAVANAGERE T	HARAPPANAHALLI T	Neelagunda Sy.No. 237 & Ittigudi Sy.No. 221, 222, 223	2014-15	25
52	MANGALURU	MANGALURU T	MANGALURU T	BELTHANGADY T	2012 Rains ANR Plantation (Kaikamba)	2012-13	5
53	MANGALURU	KUNDAPURA T	MOODABIDRE T	VENOOR T	Bamboo Plantation	2012-13	10
54	MANGALURU	MANGALURU T	SUBRAMANYA T	SUBRAMANYA T	NUCHILA-BASAVANAMULE ANR	2012-13	10
55	BALLARI	DAVANAGERE T	DAVANAGERE T	HARAPPANAHALLI T	Revised Kanchikeri Sy.No. 3A	2013-14	15
56	BELAGAVI	BELAGAVI T	KHANAPUR T	LONDA T	Deggegal revice	2013-14	12
57	BELAGAVI	BELAGAVI T	KHANAPUR T	LONDA T	Deggegal fs no 13,49 (revise)	2012-13	25
58	DHARWADA	GADAG T	GADAG T	SHIRAHATTI T	Revised haradagatti fsy 42,&52	2013-14	25
59	BELAGAVI	BELAGAVI T	KHANAPUR T	KANAKUMBI T	Gangawali haruri fs no 53,28,31 (revise)	2012-13	25
60	DHARWADA	GADAG T	GADAG T	SHIRAHATTI T	Revised sugnali fsy. 75	2012-13	20
61	BALLARI	CHITRADURGA T	HIRIYUR T	HOSADURGA T	MADIHALLI PLANTATION	2012-13	40

Annexure -3**List of SMC works sampled**

CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION
BALLARI	CHITRADURGA T	CHITRADURGA T	HOLALKERE T	Thodarnal Campa Plantation
MANGALURU	KUNDAPURA T	MOODABIDRE T	HEBRI T	ANR
SHIVAMOGGA	SAGARA T	SAGARA T	ANANDPURA T, CHORADI	Yadehalli Thavarehalli
BALLARI	KOPPAL T	GANGAVATHI T	GANGAVATHI T	Kanneramadu
CHIKKAMAGALURU	CHIKKAMAGALURU T	CHIKKAMAGALURU T	CHIKKAMAGALURU T	Kalasapura SF-Shettykere Block
CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	SRINGERI T	Addagadde-kavalakodige block
MANGALURU	MANGALURU T	SUBRAMANYA T	PANJA T	ANR plantation of 2015(Misc.)
SHIVAMOGGA	SAGARA T	SAGARA T	KARGAL T	kudururu sy 280,502
SHIVAMOGGA	BHADRAVATHI T	CHANNAGIRI T	BHADRAVATHI T	kottadal campa platation
BENGALURU	KOLAR T	KOLAR T	SRINIVASAPURA T	Jinagalakunte
DHARWADA	DHARWADA T	KALAGHATAGI T	KALAGHATAGI T	campa siddanabavi
BALLARI	BALLARI T	KUDLIGI T	KUDLIGI T	Advance works
BENGALURU	KOLAR T	BANGARPET T	MALUR T	Palamadagu
BALLARI	BALLARI T	KUDLIGI T	GUDEKOTE T	
BALLARI	BALLARI T	BALLARI T	BALLARI T	Kudutini Sy No. 1251
DHARWADA	RANEBENNUR WL	RANEBENNUR WL	RANEBENNUR WL	gudagur
BALLARI	BALLARI T	BALLARI T	BALLARI T	Nadavi Sy no. 397, 521 & 522
KALABURGI	KALABURGI T	KALABURGI T	KALABURGI T	Raising of plantation ANR Model
KALABURGI	KALABURGI T	KALABURGI T	CHINCHOLI T	kodli
UTTARA KANNADA	HALIYALA T	HALIYALA T	BHAGAWATI T	campa ssa model
UTTARA KANNADA	KARWAR T	ANKOLA T	MASTIKATTA T	Hebbul Eco-Restortion Model-I
UTTARA KANNADA	YELLAPUR T	MANCHIKERI T	MANCHIKERI T	bendigeri sno. 17
UTTARA KANNADA	YELLAPUR T	YELLAPUR T	YELLAPUR T	chikkamavalli
KODAGU	MADIKERI T	SOMAWARAPETE T	KUSHALANAGARA T	Bendebetta Beat , Bollur
MANGALURU	KARKALA WL	SIDDHAPURA WL	SIDDHAPURA WL, HEBRI	yellabere bit 3.baregundi
MANGALURU	MANGALURU T	SUBRAMANYA T	SUBRAMANYA T	Puttige-Udane

CIRCLE	DIVISION	SUBDIVISION	RANGE	PLANTATION
CHIKKAMAGALURU	CHIKKAMAGALURU T	MOODIGERE T	ALDUR T	Kundur Sy.no.225 Battaragadde block-2
SHIVAMOGGA	BHADRAVATHI T	CHANNAGIRI T	BHADRAVATHI T	Dodderi
BALLARI	BALLARI T	BALLARI T	BALLARI T	Revised Thumati 106 C/2
CHIKKAMAGALURU	KOPPA T	BALEHONNUR T	KALASA T	BALIGE KADIVE
BALLARI	BALLARI T	BALLARI T	BALLARI T	Revised Mincheri RF

List of Species planted

Sl. No.	Species
1.	Acacia (<i>Acacia auriculiformis</i>)
2.	Antuvala (<i>Sapindus emarginatus</i>)
3.	Ashwagandha (<i>Withania somnifera</i>)
4.	Bael fruit (<i>Limonia acidissima</i>)
5.	Bage (<i>Albizia lebbek</i>)
6.	Bamboo (<i>Bambusa spp</i>)
7.	Banyan (<i>Ficus benghalensis</i>)
8.	Basari (<i>Ficus virens</i>)
9.	Beete (<i>Dalbergia latifolia</i>)
10.	Bevu (<i>Azadirachta indica</i>)
11.	Bharanige (<i>Vitex altissima</i>)
12.	Bogi (<i>Hopeapar viflora</i>)
13.	Bolpale (<i>Alstonia scholaris</i>)
14.	Canes (<i>Calamus spp</i>)
15.	Cashew (<i>Anacardium occidentale</i>)
16.	Dalchinni (<i>Cinnomom umzeylenicum</i>)
17.	Dhoopa (<i>Vateria indica</i>)
18.	Ekke (<i>Calotropis gigantea</i>)
19.	Eucalyptus (<i>Eucalyptus globulus</i>)
20.	Ficus (<i>Ficus religiosa</i>)
21.	Garcinia (<i>Garcinia indica</i>)
22.	Garige (<i>Mimu sopselengi</i>)
23.	Glyrecedia (<i>Glyrecedia spp</i>)
24.	Gulmavu (<i>Machilus macranta</i>)
25.	Halasu (<i>Artocarpusheterphyllus</i>)
26.	Hale (<i>Writiatintoria</i>)
27.	Haritaki (<i>Terminaliachebula</i>)
28.	Hebbalasu (<i>Artocarpus hirsuta</i>)
29.	Hippe (<i>Bassia latifolia</i>)
30.	Hole mathi (<i>Terminalia arjuna</i>)
31.	Honge (<i>Pongamia pinnata</i>)
32.	Honne (<i>Pterocarpus marsupium</i>)
33.	Hulgal (<i>Alstonia scholaris</i>)
34.	Jambe (<i>Xyliaxylo carpa</i>)
35.	Kakke (<i>Cassia fistula</i>)
36.	Kamara (<i>Hardwickia binata</i>)
37.	Karijali (<i>Prosopi sjuliflora</i>)
38.	Kaval (<i>Careya arborea</i>)
39.	Kindal (<i>Terminalia paniculata</i>)
40.	Maavu (<i>Mangifera indica</i>)

Sl. No.	Species
41.	Mahogany (<i>Swietenia mahagoni</i>)
42.	Maruva (<i>Origanum majorana</i>)
43.	Mathi (<i>Terminalia alata</i>)
44.	Muthuga (<i>Butea monosperma</i>)
45.	Nandi (<i>Legarstroemia lanceolata</i>)
46.	Nelli (<i>Emblica officianal</i>)
47.	Nerale(<i>Sizyzium sp</i>)
48.	Rampatre(<i>Myristica malabarica</i>)
49.	Red sandal (<i>Pterocarpus santalinus</i>)
50.	Seemaruba (<i>Simaroubaglauca</i>)
51.	Seetaphala (<i>Annona squamosa</i>)
52.	Shivane (<i>Gmelina arboria</i>)
53.	Simethangadi (<i>Cassia siamia</i>)
54.	Sisso (<i>Dalbargia Sisso</i>)
55.	Tamarind (<i>Tamarind sp</i>)
56.	Tapsi (<i>Holoptelia integrifolia</i>)
57.	Tare (<i>Terminalia Belerica</i>)
58.	Teak (<i>Tectona grandis</i>)
59.	Udaya (<i>Ficus racemosa</i>)

EVALUATION TEAM

Core Team

- Dr. B. Shivaraju, IFS, APCCF (Rtd.), Principal Investigator
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- Dr. Nagraj Patil, Civil Engineering Expert
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- 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