CHAPTER - I

EXECUTIVE SUMMARY

A. Introduction

The CAMPA program is formulated with an objective of raising alternative plantation to compensate the loss of forest area diverted for the purpose of developmental programs under the Forest conservation Act-1980. The program and activities is completely founded from the fees collected from the project proponents as NPV and plantation cost, the main objective of CAMPA is to create additional plantations on the non-forest land acquired from the project proponents or on the degraded forest lands identified for the compensatory plantations. The guidelines to use the CAMPA funds are issued by the Ministry of Environment and Forests from time to time. The Governing council created in the state headed by Chief Secretary is responsible for proper utilization of funds according to the guidelines.

B. Objectives of CAMPA

1. The objectives of CAPMA are to raise the plantations on the non-forests and degraded forests lands to compensate the forests lost due to diversion of forests lands.
2. To take-up departmental works to promote the forest conservation and protection using CAMPA funds.
3. To take-up capacity building works that would contribute for the forest conservation and development.

C. Founding sources

The scheme is provided by the CAMPA funds consolidated by Government of India from the NPV and charges collected from the project proponents for diversion of forests lands for the non-forestry purpose. The funds released year wise to Karnataka forest department is as follows.

D. Models of the CAMPA works

Under CAMPA the following programs and activities are undertaken.

- **Compensatory plantations**: The compensatory plantation is raised on the non-forest lands as well as degraded forests to compensate the forest area lost due to diversion of the forests lands. The fees collected from the project proponents are used for the purpose of raising and maintaining the plantations. The size of the plantations raised under this program varies from1-10 ha.

- **General plantations**: The funds have been used to raise the plantations in the fresh area independent of the compensatory plantations as part of the general Afforestation work.

- **Afforestation on degraded sites**: The plantations have been raised on the degraded forests lands which are assigned against the diversion of forests lands to compensate the area lost by rising one and half a time the area diverted.

- **Boundary consolidation and soil moisture conservation work:** Under CAMPA the funds are used for taking up the boundary consolidation works of the natural forests. The forest area vulnerable for the encroachments are is identified and the boundary consolidation work is being taken-up.

- **Fire protection and fire line formation:** Fire protection is a very important work of the forests conservation and development. The CAMPA funds have been used to meet the additional requirement of the fire protection work.

- **Building works and maintenance:** It is observed that the substantial funds of CAMPA fund has been utilized for the creation of infrastructure including construction of new buildings and the maintenance of the old buildings.

- **Vehicles and Equipments:** It is also observed that, CAMPA funds have been used for the vehicles purchases and equipments purchases.

- **Wildlife works:** The CAMPA funds has been utilized for the protection of wild life by undertaking works like desilting of tanks, salt lick creation, Soil and moisture conservation works, Elephant depredation camps and similar Habitat improvement works.

- **Production of Quality seedlings:** CAMPA funds have been used substantially for the production of quality seedlings at nursery and research stations.

1.1 Results and Analysis of Evaluation

The field data collected through questionnaires were tabulated and analyzed to arrive at the success of the plantations on parameters like survival rate, height and collar diameter. The age of the plantation being very small (1-3 years) the productivity estimation was not attempted, however some rough calculations have been made and discussed in the main part of the report.

1) CAMPA Plantation Evaluation

The plantations selected on the randomized basis were assessed by measuring the growth parameters along with the survival counts. The results are tabulated to estimate the survival percentage for each division. Further the weighted average for the circle was estimated. The plantations were ranked as very good (80% and above), good (60-80%) and average (40-60%). Survival rate less than 40% was grouped as failed and poor. The following results were obtained for different category of the plantations.

Survival Rate Rankings

The following table gives the rankings of plantation in each circle. The overall survival rate was around 78% for all the plantations under CAMPA in Belgaum, Dharwad and Gulbarga circles. As the plantations were very young the success rate was good. However the success rate was relatively low in the third year plantations as compared to first year plantations. The performance of the plantations has been graded according to the success rate showing the following table gives the rankings circle wise.

1. Table showing circle wise success ranking of plantations

Circle	Very Good	Good	Average	Failed
Belgaum	2	3	1	0
Gulbarga	2	7	4	0
Dharwad	1	3	2	0
% rankings	20	52	28	

Grading of plantations: In all the circles, 20% of the plantations were rated as very good and 52% of the plantations as good followed by 28% of the plantations as average plantations where the survival rate is less than 50%. Out of 13 plantations evaluated in Gulbarga, it had two very good plantations, 7 good plantations and 4 average plantations. Similarly of 6 plantations evaluated 2 were very good followed by 3 as good and one as average. Dharwad had one very good plantation followed by three good and two as average.

Fig.1 showing the circle wise success ranking of plantations.

Species survival:

The analysis of species survival rate showed significant difference from species to species. The most common species planted in Gulbarga were Pongamia and Glyricidia and Cassia siamea which have shown more than 75% survival indicating more a good success rate. In Belgaum the most common species planted are Pongamia followed by Holoptelia and Acacia. All have shown more than 75% survival. Dharwad also has shown good survival rate of 75% and the species mix includes Pongamia and cassia and Acacia auriculiformis and *Azadirachta indica*..

Height growth:

The height was measured and tabulated to estimate the growth potential and to project the productivity. The mean height though varied from species to species the mean annual increment was around 0.8 meter for all the species in the high rainfall areas like Belgam and Dharwad. Similarly in the low rainfall areas like Gulbarga, Bagalkot it was slightly lower than 80 cm per year. The slow growing species in the high rainfall areas were comparable with the fast growing species in the low rainfall areas with regard to the height increment. The graph below represents the growth pattern of different species in different divisions.

Collar diameter:

The collar diameter MAI was estimated to project the productivity. The mean collar diameter is 3.3 cm per annum in the high rainfall areas and 2 cm in the low rainfall areas. The increments were varying from species to species and from site to site due to many locality factors.

2) Species wise survival in different divisions

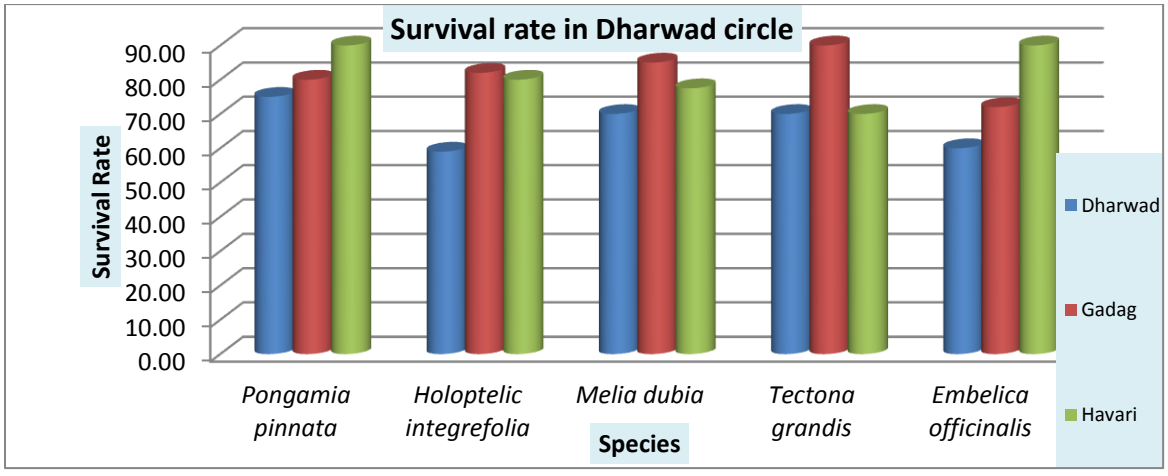
The species wise survival in different models has been represented circle wise for illustration.

In Dharwad circle *Pongamia pinnata* was shown 81.67% survival followed by *Melia dubia* with 77.50 survivals. The weighted average is 76.70%.

2. Table showing survival Rate of different species in Dharwad circle

Species	Divisions			Mean
	Dharwad	Gadag	Haveri	
Pongamia pinnata	75.00	80.00	90.00	**81.67**
Holoptelic integrefolia	59.00	82.00	80.00	**73.67**
Melia dubia	70.00	85.00	77.50	**77.50**
Tectona grandis	70.00	90.00	70.00	**76.67**
Embelica officinalis	60.00	72.00	90.00	**74.00**
Mean	**66.80**	**81.80**	**81.50**	**76.70**
Sem±	**2.7 (b/w species) AND 4.3 (b/w divisions)**			
Cd@5%	**18.5 (b/w species) AND 22.2 (b/w divisions)**			

Fig.2 showing the survival Rate of different species in Dharwad circle



3. Table showing survival Rate of different species in Gulburga circle

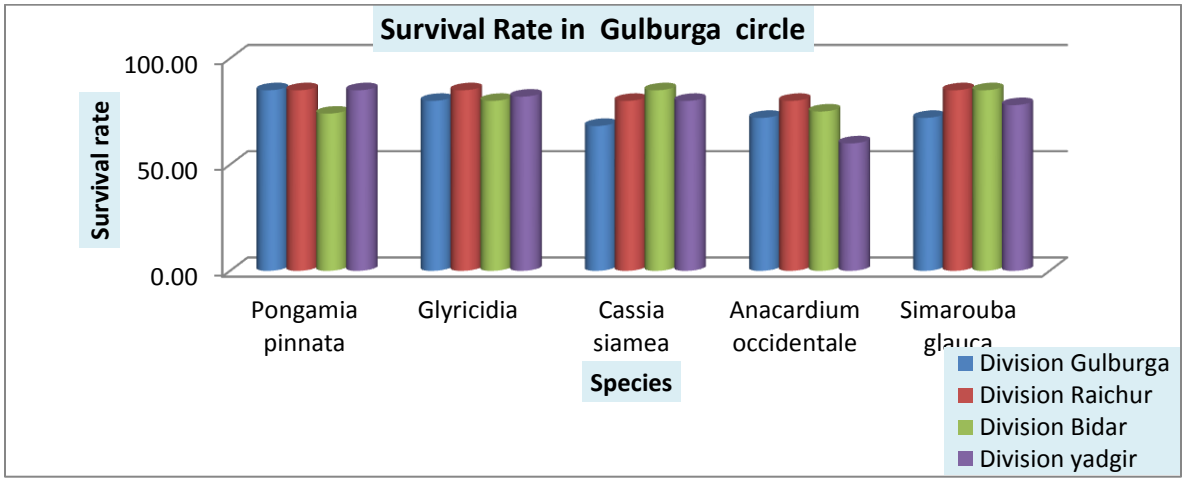
Species	Divisions				Mean
	Gulbarga	Raichur	Bidar	Yadgir	
Pongamia pinnata	85.00	85.00	74.00	85.00	82.25
Glyricidia	80.00	85.00	80.00	82.00	81.75
Cassia siamea	68.20	80.00	85.00	80.00	78.30
Anacardium occidentale	72.00	80.00	75.00	60.00	71.75
Simarouba glauca	72.00	85.00	85.00	78.00	80.00
Mean	75.44	83.00	79.80	77.00	78.81
Sem±	**2.7 (b/w species) AND 3.18 (b/w divisions)**				
Cd@5%	**11 (b/w species) AND 11.9(b/w divisions)**				

In Gulbarga circle the most common species planted are Glyricidia, Pongamia, *cassia siamea* and Simaruba. In few plantations *Hardwickia binata* and *Azadirachta indica* have also been planted. The species wise survival analysis was done through two-way ANOVA and the results are presented in the table above.

It is found that Pongamia was found to have highest survival rate of 82.25 % across divisions followed by Glyricidia with 81.7%. Simaruba was found to have the survival rate of 80%.

Overall mean survival was 78.81 for all the species across all division indicating good success of the plantations in the initial years.

Fig. 3 showing the survival Rate of different species in Gulburga circle

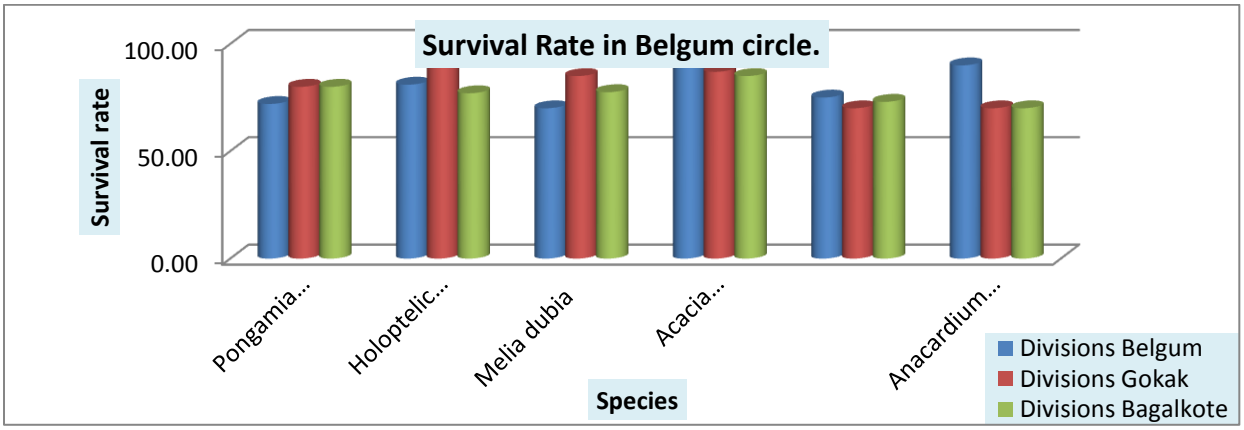


4. Table showing survival Rate of different species in Belgum circle

Species	Divisions			
	Belgaum	Gokak	Bagalkote	Mean
Pongamia pinnata	72.00	80.00	80.00	77.33
Holoptelic integrefolia	81.00	89.40	77.00	82.47
Melia dubia	70.00	85.00	77.50	77.50
Acacia auriculiformis	90.00	87.00	85.00	87.33
Embelica officinalis	75.00	70.00	73.00	72.67
Anacardium occidentale	90.00	70.00	70.00	76.67
Mean	79.67	80.23	77.08	78.99
Sem±	**2.5 (b/w species) AND 4.30 (b/w divisions)**			
Cd@5%	**14.7 (b/w species) AND 17.7 (b/w divisions)**			

In Belgaum the most common species planted are Pongamia pinnata followed by *Holoptelic integrefolia* and Acacia auriculiformis. The other common species planted are *Cassia siamea, Anacardium occidentals and Azdirachta indica*. When the survival rates were analyzed through ANOVA it was found that Acacia auriculiformis had 87.33% survival followed by Holoptelic with 82.47%.

Fig.4 Showing the survival Rate of different species in Belgaum circle



Productivity projection:

The productivity projection was attempted to assess the future potential growth of the plantations. The mean annual increment of the diameter was found to vary between species to species and division to division.

Acacia auriculiformis: The diameter increment was 3.3 cm/year in Belgaum and Yadgir. This indicates a possibility of trees attaining 30 cm diameter at the end of 10 years. The basal area of 7-10 m2/ha/ at 10 year rotation. The height increment is 1 meter per year. At the age of 10, the mean height would be varying between 7-8 meter. The expected biomass would be 70-80 cum/ha. This is the most conservative estimate. Using Acacia as an indicator species the mean productivity of slow growing species could be in the range of 5-6 cum/year.

Holoptelic integrefolia: This is a native species which has been taken as indicator species to project the productivity. The mean annual increment of the diameter is 3.3cm/year. The mean height is 0.8 cm/year. The volume production would be in the range of 5-8 cum/year.

1.2 Fire protection and fire line formations

The works were assessed through verification of records and other proxy evidences. The works were found executed as per the Range records. However their quality and the site specific needs were not assessed which may be necessary as there are sudden increases in the investment on the fire protection from CAMPA.

1.3 Wildlife works

Wildlife works including salt licks, de-silting of water holes, anti-poaching and Elephant depredation camps were assessed and the results are discussed in the main report.

1.4 Building works

New construction of buildings and the maintenance works of older buildings has been done under CAMPA. The evaluations findings are discussed in the main report.

1.5 Vehicles and maintenance

Vehicles purchase and their maintenance has been assessed and the results are tabulated in the main report.

1.6. IMPACT ANALYSIS OF CAMPA SCHEME

The overall performance of the scheme and its impact on the objectives of the programs were assessed based on the survey results. The results are discussed here against objectives.

1. **Compensatory Afforestation:** The compensatory plantation objective is to raise the plantation on the non-forest lands equivalent to the area diverted for the developmental projects and to establish the forests to derive similar forests ecosystem function. The raising of plantation though may not replace the bio-diversity value of the forests that is lost; the man-made forests will meet the other functional requirement of the forests like green cover, carbon sequestration and soil and water conservation etc. Thus the compensatory plantation primary objectives have been served.

2. **Bio-diversity value**: The species chosen in each plantation are limited to very few (less than 10) and therefore there is a limitation of the plantations in achieving the objectives.

3. **Productivity of the plantations**: The productivity has been assessed by measuring the growth parameters. The overall increment in the height is around 0.75 meter/annum and the collar diameter is about 1 cm which is moderate as compared to the growth rates on better soils and high rainfall areas. The extrapolation of the growth parameter will give us approximately 8 cm diameter (DBH) and 6 meter height at the end of 8 years for the fast growing species. The mean basal area will be around 10 m2/ha/ at 10 year. And it may take 40 years to cover the canopy.

4. **Climate change mitigation:** The productivity of the plantation at the rate of 10 m2 /basal area with a mean height of 6 to 7 meter will give approximately 5 to 6 m3/year in the drier areas and 10 to 12 m3 /ha/year in high rainfall areas. This rate of productivity can sequester on an average 2 tons of carbon/ha/year.

5. **Employment generation**: The investment on compensatory plantation has generated (70% plantation cost is labor cost) employment in the rural areas. The 70% of cost of raising plantation goes for employment.

6. **Investment on non-plantation works**: More than 40% of the funds under this scheme has been done on the infrastructure like buildings, Roads, and equipments to strengthen the departmental capacity. This has been difficult to relate to the benefits.

1.7 RECOMMENDATIONS

1. The activities under CAMPA are too many resulting in very thin spread of investment which may not have desirable impact on the departmental programs. It should focus much on the compensatory plantations by spending 70% investment and rest on the natural forests management.

2. Expenditure on the building maintenance and vehicles should not be a major activity.

3. The investment on the research and wildlife is inadequate needs to be balanced.

4. The natural forests, bio-diversity conservation, enrichment planting and research programs needs to be given priority.

5. **Plantation size**: Many compensatory plantations have been raised are very small in size (less than 5 ha). This may not be viable to maintain and protect. It is better to aggregate the smaller units into a viable size of at least 10 ha to raise plantations.

6. The plantation on degraded sites must be well defined as in many places well stocked areas have been planted up.

7. The site clearance for raising plantation was noticed in some areas which need to be avoided.

8. **Choice of species**: The species choice was very mechanical and there was no effort to match the sites.

9. Acacia auriculiformis is planted as core species in many compensatory plantations in high rainfall areas which may be completely avoided. Native species mix is the best option.

10. The SMC works are done very unscientifically. A guideline may be necessary to design and structure the works by estimating the quantum of water that could be impounded is to be done. The contour maps are to be used to locate the structure. The planning processes to regulate the SMC works are necessary.

11. The protection measures were not effective in many places. It is essential to provide maintenance provisions for five years so that the purpose is well achieved.

12. **Plantation care:** The plantation care and maintenance needs to be done for minimum five years. The investment must be done to ensure success of the plantations.

13. CAMPA must set a very successful model of plantation through innovations and higher investment as there is no cap on the unit cost.

14. Three year assessment is too early to judge the success. There should be five years interval evaluation twice to make a meaningful evaluation.

15. **Internal evaluation:** The internal evaluation needs to be strengthened and the database must be established to monitor the changes.

CHAPTER – II

INTRODUCTION

The CAMPA program is formulated with an objective of raising alternative plantation to compensate the loss of forest area diverted for the purpose of developmental programs under the Forest conservation Act-1980. The program and activities is completely founded from the fees collected from the project proponents as NPV and plantation cost, the main objective of CAMPA is to create additional plantations on the non-forest land acquired from the project proponents or on the degraded forest lands identified for the compensatory plantations. The guidelines to use the CAMPA funds are issued by the Ministry of Environment and Forests from time to time. The Governing council created in the state headed by Chief Secretary is responsible for proper utilization of funds according to the guidelines.

2.1 Objectives of CAMPA

1. The objectives of CAPMA are to raise the plantations on the non-forests and degraded forests lands to compensate the forests lost due to diversion of forests lands.
2. To take-up departmental works to promote the forest conservation and protection using CAMPA funds.
3. To take-up capacity building works that would contribute for the forest conservation and development.

2.2. Funding sources

The scheme is provided by the CAMPA funds consolidated by Government of India from the NPV and charges collected from the project proponents for diversion of forests lands for the non-forestry purpose. The funds released year wise to Karnataka forest department is as follows.

2.3. Models of the CAMPA works

Under CAMPA the following programs and activities are undertaken.

2.3.1 Compensatory plantations

The compensatory plantation is raised on the non-forest lands as well as degraded forests to compensate the forest area lost due to diversion of the forests lands. The fees collected from the project proponents are used for the purpose of raising and maintaining the

plantations. The size of the plantations raised under this program varies from One to Ten Ha, and many a times on the highly degraded sites. However from raising the plantations the CAMPA funds also is used for the Boundary consolidation and infrastructure development works.

2.3.2 General plantations

The funds have been used to raise the plantations in the fresh area independent of the compensatory plantations.

2.3.3 Afforestation on degraded sites

The plantations have been raised on the degraded forests lands which are assigned against the diversion of forests lands to compensate the area lost by rising one and half a time the area diverted.

2.3.4 Boundary consolidation and soil moisture conservation work

Under CAMPA the funds are used for taking up the boundary consolidation works of the natural forests. The forest vulnerable for the encroachments are is identified and the boundary consolidation work is taken-up.

2.3.5 Fire protection and fire line formation

Fire protection is a very important work of the forests conservation and development. The CAMPA funds have been used to meet the additional requirement of the fire protection work.

2.3.6 Building works and maintenance

It is noticed that the substantial funds of CAMPA fund has been utilized for the creation of infrastructure including construction of new buildings and the maintenance of the old buildings.

2.3.7 Vehicles and Equipments

It is also observed that, CAMPA funds have been used for the vehicles purchases and equipments purchases.

2.3.8 Wildlife works

The CAMPA funds has been utilized for the protection of wild life by undertaking works like desilting of tanks, salt lick creation, soil and moisture conservation works, elephant depredation camps and similar habitat improvement works.

2.3.9 Production of Quality seedlings

CAMPA funds have been used substantially for the production of quality seedlings at nursery and research stations.

1.4 Evaluation Objectives of CAMPA

The CAMPA work has been awarded for the evaluation work in two units of the State. Each unit is composed of group of circles comprising of 11 divisions in each Unit. The following objectives have been listed as the Terms of Reference.

A) Physical verification

- To measure the extent to which the works were carried out for each of the schemes.

B) Impact assessment

- To measure the efficiency and effectiveness of the schemes

C) Gaps in implementations

- To identify the key issues and gaps in implementation and recommendations which could improve the quality of implementations

CHAPTER – III

SAMPLE WORK

The data was grouped into activities like plantation, Fire protection, Building maintenance, Survey and Demarcation, Equipments and vehicles, Re-vitalization of VFC which includes supply of energy saving devices. In each year the data was sorted out into divisions. Using probabilistic sampling method 10% sampling was done. It was further ensured to cover at least one activity in each Range.

6. Table showing the number of samples selected for evaluation under CAMPA unit I

Sl. No.	Activities	Total activities					Samples selected				
		09-10	10-11	11-12	12-13	Total	09-10	10-11	11-12	12-13	Total
1	**Plantations**	19	38	97	128	**282**	2	4	10	13	**29**
2	**Building Construction and Maintenance**	77	44	18	0	**139**	8	5	2	0	**15**
3	**Survey and Demarcation**	95	76	94	69	**334**	10	8	10	7	**35**
4	**Vehicles and Equipments**	91	66	17	0	**174**	9	7	2	0	**18**
5	**Fire protection**	53	95	0	0	**148**	6	10	0	0	**16**
6	**Supply of energy saving devices and Revitalization of old defunct VFC**	33	75	0	0	**108**	4	8	0	0	**12**
7	**Nursery and Production planting Materials**	17	16	12	4	**49**	2	3	1	1	**7**
8	**Wild life protection**	4	6	5	7	**22**	1	1	1	1	**4**
	Total	**389**	**416**	**243**	**208**	**1256**	**42**	**46**	**26**	**22**	**136**

Fig.5 Numbers of activities done in 2009-10 to 2012-13 in CAMPA Unit

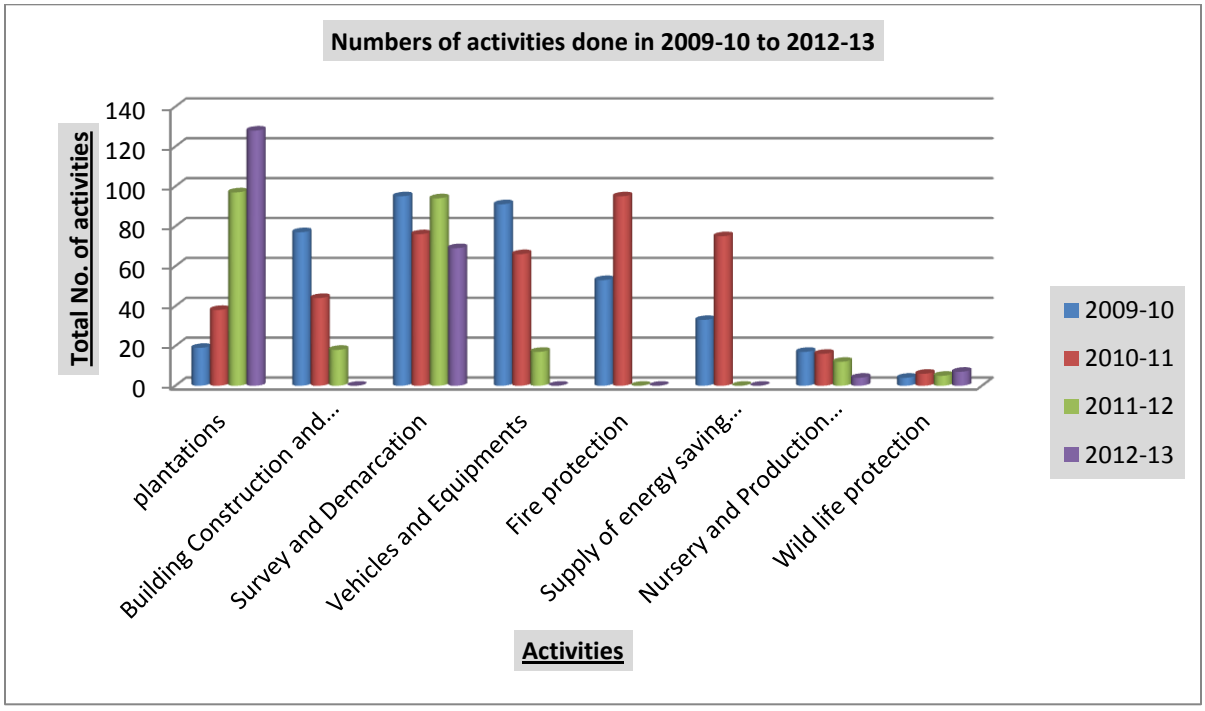
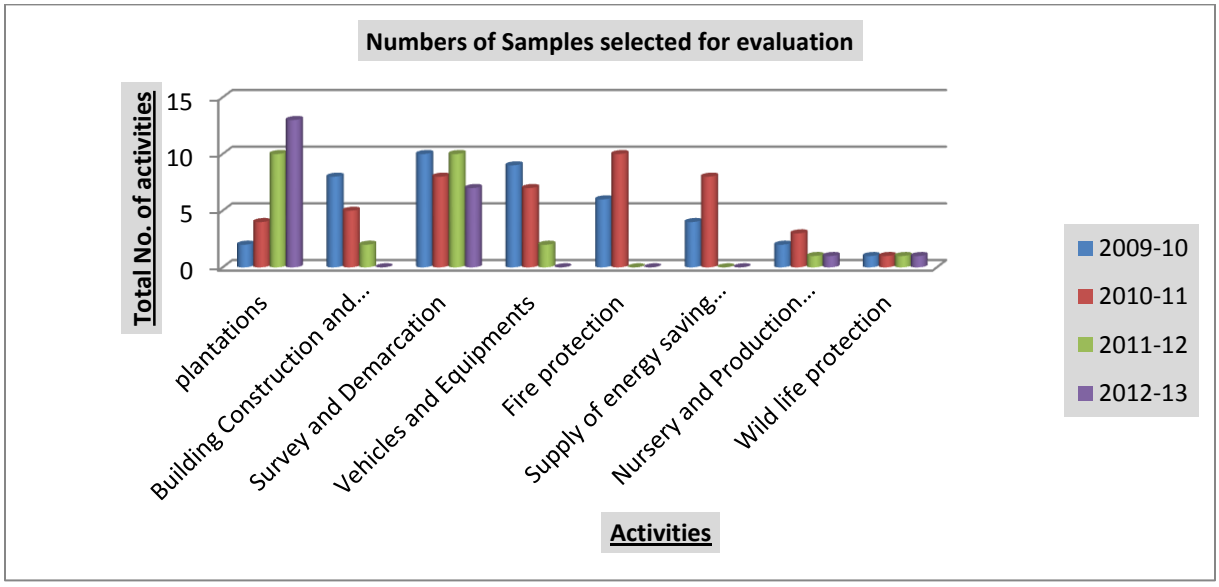


Fig.6 Numbers of Samples selected for evaluation in CAMPA Unit 1



CHAPTER – IV

MATERIAL AND METHODS

The present work was carried out to evaluate the forestry work done under CAMPA, during the year 2009-10 to 2012-13 in unit - 1. Details of material used and methodology followed and observations recorded during the course of investigation are detailed here under.

4.2 Evaluation methods and techniques

4.2.1 Plantations

Evaluation method: as per the terms of reference, 10 % of total numbers of plantations were randomly selected from each division and in each year. The selected samples were later evaluated with 2% intensity. For every 5 ha of plantation one sample plot of 0.1 ha was randomly selected using GPS to measure parameters like height survival rate, collar diameter and vigor of the plantations. The general observations were also selected with respect to biodiversity, soil moister conservation work etc.

Procurer to select plots in plantations

The plantations were divided in to 5 ha gird on the map. Depending on the size of the plantation the number of sample plots was selected as follows.

(1) <5 Ha - one sample plot
(2) <10 Ha - two sample plot
(3) <15 Ha - three sample plot
(4) < 20 Ha - four sample plot
(5) >20 Ha – one sample plot for every 5 Ha
(6) Sample plot size – 1000 m^2 (31.62 m × 31.62 m)
(7) GPS point: please record the GPS point.

Selecting 0.1 ha in 5 ha gird: in a 5 ha gird the plots are divided into 7*7 rows and columns as shown in fig below. Further the procedure to select plots for deferent size plantation is given well in advance as shown in below.

1	2	3	4	5	6	7
2						
3						
4						
5						
6						
7						

1) 5 ha -4th row 6th Colum - (1 sample plot)
2) 10 ha -3rdrow 7th Colum – (I and 2 sample plot)
3) 15ha -2nd row 2ndColum (1, 2 and 3 sample plot)
4) 20 ha -5th row 4thColum (1,2, 3and 4 sample plot)
5) 25 ha -1strow 6th Colum (1,2,3,4 and 5 sample plot)
6) 30 ha -6th row 3rdColum (1,2, 3,4,5 and 6 sample plot)

(e) Regarding virtual demarcation of sub plots of 0.1 Ha. One need not physically divide the subplots on the ground. For example 4throw 6th Colum means we take 31 × 4 meters (124 meters) from the corner main plot to the point on 4th row and then from the marked point, measure 6×31 meters to reach the 6th Colum (horizontally) . Follow same procedure for all other rows and columns.

Measurements

a) Survival counts: The total number of plants planted in the sample plot of 0.1 ha was manually counted by counting the pits/trenches. Later the plants surviving were counted to calculate the survival %.

b) Height: In each sample plot height was measured for 2% of the total plants using the calibrated pole or the tape.

c) Collar diameter: The collar diameter was measured for those plants which were measured for the height in cm. (girth was measured and converted to diameter).

d) Counting the natural plants in the area: The plants that were found naturally were counted for the purpose of bio-diversity.

4.2.2 Fire protection

Fire line Formations was physically checked and Fire Protection work is difficult to verify. But using proxy methods like alter Fire protections were effective or not. (The questioner is appended in the annexure)

4.2.3 Boundary consolidation

The GPS was used to record the perimeter. Randomly the measurements can be recorded. The quality of the work regarding the effectiveness may be recorded as Good. Satisfactory, Poor with any other field observations.

4.2.4 Vehicles and Equipments

Vehicles and equipments verified through frequency of use, checking the stock book, brand/company, Check log book.

3.2.5 Wildlife works

The quality of the work for its effective use or abandoned and its impact on the objective was recorded. Verification of the wildlife crimes caught by the camp personnel in the corresponding year, Increase or decrease in the crimes in the corresponding year was recorded and Salt licks are difficult to verify but use proxy indicators if any like pits or animal sighting records if available as they are maintained in the parks.

4.2.6 Building works and maintenance

The quality and usefulness was the criteria to judge the work of building maintenance and for the roads physical quantity like length, width and depth at random places was measured.

CHAPTER - V

ANALYSIS AND EVALUATION RESULTS

The results of the CAMPA works evaluated *viz.*, plantation, Fire protection, Building maintenance, Survey and Demarcation, Equipments and vehicles evaluated in unit 3 are presented in this chapter.

5.1 Plantations

Under the CAMPA compensatory plantations have been raised in Gulbarga, Belgaum and Dharwad circles. In additions to the compensatory plantation, the funds have been used to raise the plantations in the degraded forests as part of the Afforestation program. These works have been evaluated with 10% sampling and the results are discussed year wise.

7. Table showing the survival rate and growth parameters of plantation raised under CAMPA. (2008-09)

Sl. No.	Division	Location	Extent	Species	Survival Rate	Mean Height	CD (in cm)
1	Yadagir	Wadnalli	25	Pongamia, Cassia, Glyricidia	82	1.4	2.58

5.1.1 Survival rate:

The plantation raised in Yadgir under CAMPA has shown 82% survival after third year of raising which is very impressive under the arid climatic conditions. The mean height is 1.4 meters and the collar diameter is 2.58 cm indicating the good potential of the plantation to reach 10 m2 basal areas in about ten years of age. The species chosen are Pongamia, *Cassia siamea* and Glyricidia which are drought resistant and have good carbon sequestrations potentials.

7. Table showing the survival rate, mean height, Collar diameter of the plantations raised under CAMPA. (2010-11)

Sl. No	Division	Location	Extent	Species	Survival %	Mean height	Mean CD (cm)
1	Raichur	Lingsugur	8.16	Pongamia, Cassia	85	2.6	3.3
2	Gokak	Soundatti	10	Pongamia, Emblica	84.6	1.2	1.5g
3	Gadag	Julwadgi	25	Neem, Pongamia	42	0.7	0.04
4	Belgaum	Katarki	25	Neem	73	1.2	0.6

5.1.2 Survival Rate

The survival rates of plantation raised under CAMPA during 2010-11 has shown survival rate varying between 42-84.6% in different divisions. Gadag division where Pongamia and Neem were the main species planted has shown 42% survival after two years of age. However the survival rate in Raichur, Gokak and Katarki has shown 85, 84.6 and 73 % survival rate respectively. The Neem and Pongamia are good species which have both high bio-diversity and drought resistant values. The low survival rate in Gadag is very poor with just 42% despite planting Neem.

5.1.3 Growth potentials

The growth measurement of these plantations for height and collar diameter has shown very moderate growth as the height is varying between 0.7 -2.6 meters. Gadag has recorded very poor growth where as Raichur has shown very good height increment which is a good sign of the future growth. The growth has indicated a modest growth potential for the plantations with 8-10 M2/ha basal area at the age of 10 years.

8. Table showing the survival rate, mean height, Collar diameter of the plantations raised under CAMPA (2011-12)

Sl. No.	Division	Location	Extent	Species	Survival %	Mean height	Mean CD
1	Gokak	Raibagh	10	Sandal	54	2.6	3.3
2	Gokak	Raibagh	6	Sandal	62	2.6	3.3
3	Gokak	Soundatti	3.75	Jack D. sissoo	65.8	0.6	0.8
4	Gokak	Soundatti	9.48	Pongamia. Neem	71	0.84	0.84
5	Bidar	Humnabad		Pongamia Glyricidia	68.05	0.8	1.3
6	Bagalkote	Bilagi	25	Pongamia Glyricidia	80.04	0.9	1.2
7	Belgaum	Golihalli	25	Terminalia Adina	75	0.6	1.2
8	Belgaum	Nesargi	50	Neem Ficus	72.0	1.2	1.0
9	Belgaum	Nesargi	47	Acacia	91.4	4.2	2.7
10	Belgaum	Nesargi	36.04	Acacia	94	1.23	1

5.1.4 Survival rate of plantations

The overall survival of the plantation is 86% of all the divisions. However the survival rate varied between 54-94 across divisions after two years of rising. Gokak had very moderate survival in two plantations with sandal species as the main species planted next to a nursery in Gokak. However the root suckers of sandal wood is also very impressive as observed by the field evaluation officers. The highest survival was observed in Belgaum in Nesargi division with 94%.

Gokak division: The two sandalwood plantations are having survival rate 54 and 62% which should be rated as good for the sandal species. The suckers also coming up naturally this needs good protection beyond three years. The other two plantations where Atocarpus and *Dalbergia sissoo* are having moderate survival rate of 71 and 65 %.

The mean height in Gokak division was found varying between 0.6-2.6 meters Sandalwood has attained the maximum growth of 2.6 meters. The species like Neem and ficus have shown very moderate height increment of 0.84 meters in other two plantations. The sandal wood plantations have a very promising growth of attaining 5-8 m2 Basal area/ha.

Belgaum Division: The survival rate in Belgaum is better as compared to Gokak where the range is between 72-94%. The species mix is quite large in Belgaum comprising of *Terminalias* and *Adina cordifolia* and other species.

The mean height in Belgaum division is found varying between 1.2-4.2 meters which has very high productivity potentials. It is roughly projected that with 2 meters height increment and 2 cm diameter increment the productivity will be 20m3/ha at the end of ten years which is very good for the hardwood species.

9. Table showing the survival rate, mean height, Collar diameter of the plantations raised under CAMPA (2012-13)

Sl. No.	Division	Location	Extent	Species	Survival %	Mean height(m)	Mean CD(cm)
1	Yadgir	Halgera	25	Pongamia	82	1.5	2.58
2	Yadgir	Sharper	25	Pongamia	85		
3	Raichur	Idapnur	25	Pongamia, Neem	79	1.1	1.3
4	Gadag	Shirahatti	25	Pongamia, Thespesia	82	0.45	1.27
5	Gadag		25	Pongamia, Thespesia	71.6	0.7	1.1
6	Bidar	Guntapur	25	Pongamia, Seemaruba	85.8	1.2	1.1
7	Haveri	Hangal	50	Pongamia, Thespesia	92	1	1.5
8	Belgaum	Nesargi	50	Neem, Thespesia, Ficus	72	1.2	1
9	Belgaum	Nesargi	15	Acacia	72.46	0.9	1.3
10	Dharwad	Kandhi	25	Terminalia	69.82	0.5	1
11	Dharwad	Dharwad	25.44				
12	Dharwad	Dharwad	25				
13	Dharwad	Dharwad	124	Teak	49.66	0.8	5.1

5.1.5 Survival Rate:

The evaluation of plantation for the year 2012-13 after one year of planting has shown survival rate varying from 69-85.8%. The division wise breakups are discussed below.

Yadgir: Two plantations in Yadgir have shown 82 and 85 % survival rate which is encouraging under arid climatic conditions. The species chosen is Pongamia which is drought resistant. The mean height is 1.5m which is very good for one year old plantation.

Raichur: Raichur division had one plantation which 79% survival at the end of one year low. However in the subsequent years the survival rate may further get reduced due to arid climatic conditions prevailing throughout the year. The mean height is 1.1 m with 1.3 cm collar diameter indicating moderate growth under arid climatic conditions.

Gadag: Gadag division had survival percentage of 82 and 71.6 in two plantations after two years of age indicating the moderate survival rate. The height increment was very low ranging between 0.45-0.7 cm which is very low for a one year plantation indicating the poor productivity.

Bidar: Bidar plantation was found to have 85.8% survival with mean height of 1.2 meter which is very moderate and indicate good productivity f 6-8 m2/ha basal area.

Belgaum: Belgaum division has recorded very moderate survival rate of 72 and 69 % survival. The Species planted in Nesargi are Acacia which should have shown higher survival rate. However the growth indicators like height and girth has also been very modest suggesting a moderate productivity potential of the plantation.

Dharwad: In Dharwad the survival rate is 69% after the completion of one year which is very low as it may be further reduced as the age of the plantation progresses. The height and girth measurements are also very moderate as the species planted are hardwood species like Terminalia which are slow growers.

5.1.6 Overall performance of the plantations

The first years of the plantation is normally very protective and are intensely managed with replacement provisions of mortality. Here the evaluation is showing the average survival rate ranging between 69-95% with the aggregate mean of 76.9%.

Mean height increment

The mean height of the plantations of one year age varied between 0.45-1.5 meters. The lowest mean height was recorded in Gadag where the Pongamia and The species were planted and the highest was in Haveri with 92%. The height is an indicator of future productivity and as such 0.45-1.2 meter mean height represents very moderate productivity in next ten years.

10. **Table showing circle wise success ranking of plantations**

Circle	Very Good	Good	Average	Failed
Belgaum	2	3	1	0
Gulbarga	2	7	4	0
Dharwad	1	3	2	0
% rankings	20	52	28	

Fig.7 showing the circle wise success ranking of plantations.

Belgaum: Belgaum circle had 40% of the plantations under very good category and 60% under good category and 10% under average category. Belgaum had better performance than Dharwad marginally and significantly higher than the Gulbarga circle.

Gulbarga: Gulbarga out of 13 plantations evaluated has shown one plantation under very good category which is around 8% and the 55% plantations under Good category and 33% under average category. Due to planting of Glyricidia and Neem the success rate is good. However still average plantations are around 33% indicating the need to safeguard the plantations against the failures.

Dharwad: Dharwad circle has shown remarkable success rate of the plantations due to favorable climatic conditions and appropriate species choices. Out of 5 plantations evaluated one falls in the Good category. Whereas 50% of the plantations are ranked as good plantations, 33% are average plantations.

5.1.7 Species wise survival in different divisions

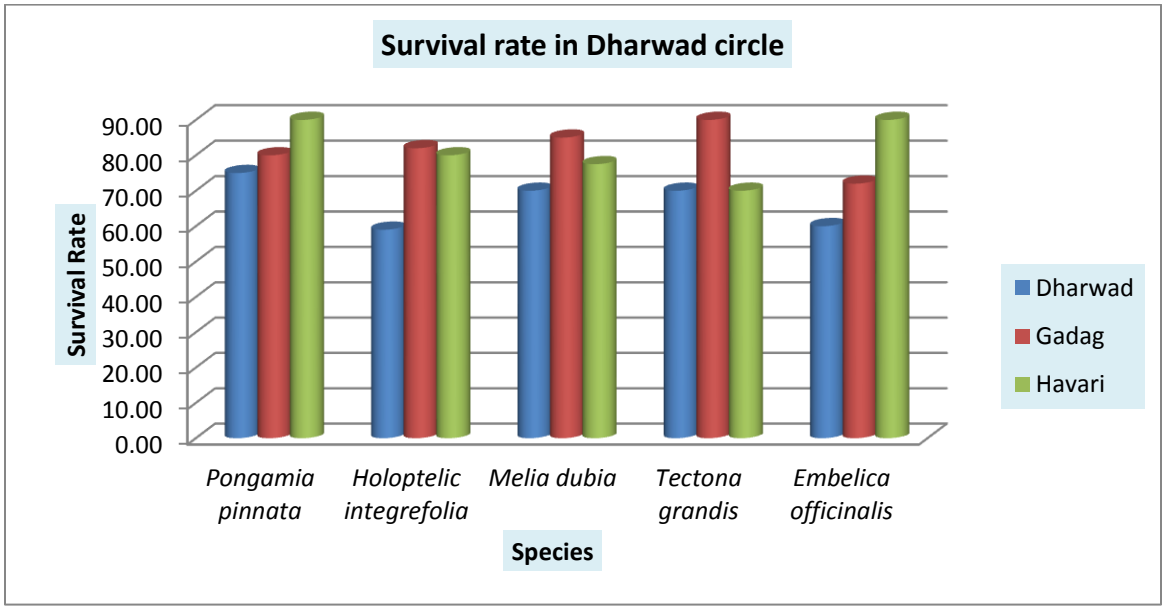
The species wise survival in different models has been represented circle wise for illustration.

In Dharwas circle, *Pongamia pinnata* was shown 81.67% survival followed by *Melia dubia* with 77.50 survivals. The weighted average is 76.70%.

11. Table showing survival Rate of different species in Dharwad circle

Species	Divisions			Mean
	Dharwad	Gadag	Haveri	
Pongamia pinnata	75.00	80.00	90.00	**81.67**
Holoptelic integrefolia	59.00	82.00	80.00	**73.67**
Melia dubia	70.00	85.00	77.50	**77.50**
Tectona grandis	70.00	90.00	70.00	**76.67**
Embelica officinalis	60.00	72.00	90.00	**74.00**
Mean	**66.80**	**81.80**	**81.50**	**76.70**
Sem±	**2.7 (b/w species) AND 4.3 (b/w divisions)**			
Cd@5%	**18.5 (b/w species) AND 22.2 (b/w divisions)**			

Fig.8 Showing the survival Rate of different species in Dharwad circle



12. Table showing survival Rate of different species in Gulburga circle

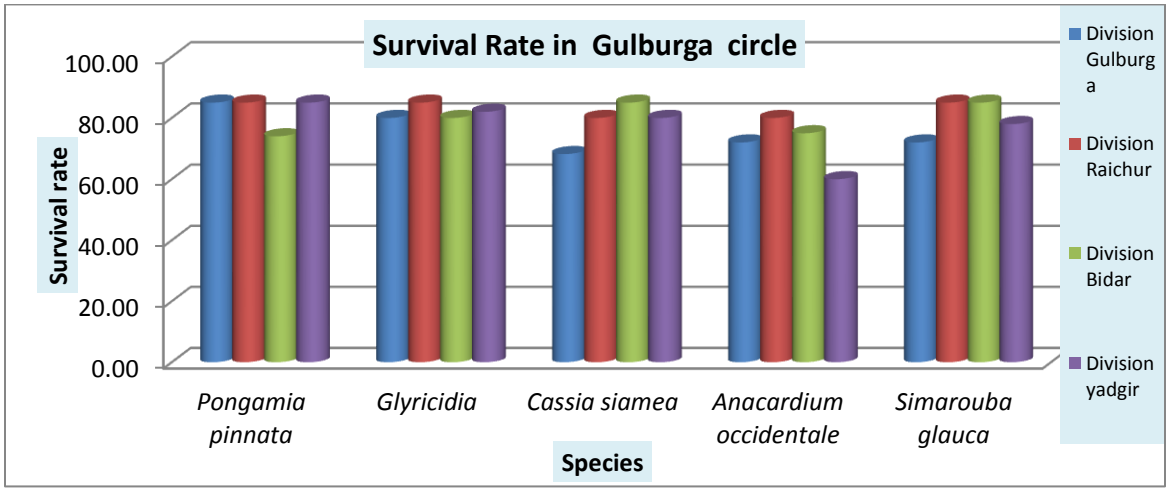
Species	Divisions				Mean
	Gulbarga	Raichur	Bidar	Yadgir	
Pongamia pinnata	85.00	85.00	74.00	85.00	82.25
Glyricidia	80.00	85.00	80.00	82.00	81.75
Cassia siamea	68.20	80.00	85.00	80.00	78.30
Anacardium occidentale	72.00	80.00	75.00	60.00	71.75
Simarouba glauca	72.00	85.00	85.00	78.00	80.00
Mean	75.44	83.00	79.80	77.00	78.81
Sem±	**2.7 (b/w species) AND 3.18 (b/w divisions)**				
Cd@5%	**11 (b/w species) AND 11.9(b/w divisions)**				

In Gulbarga circle the most common species planted are Glyricidia, Pongamia, *Cassia siamea* and Simaruba. In few plantations Hardwickia binata and *Azadirachta indica* have also been planted. The species wise survival analysis was done through two way ANOVA and the results are presented in the table above.

It is found that Pongamia was found to have highest survival rate of 82.25 % across divisions followed by Glyricidia with 81.7%. Simaruba was found to have the survival rate of 80%.

Overall mean survival was 78.81 for all the species across all division indicating good success of the plantations in the initial years.

Fig. 9 showing the survival Rate of different species in Gulburga circle

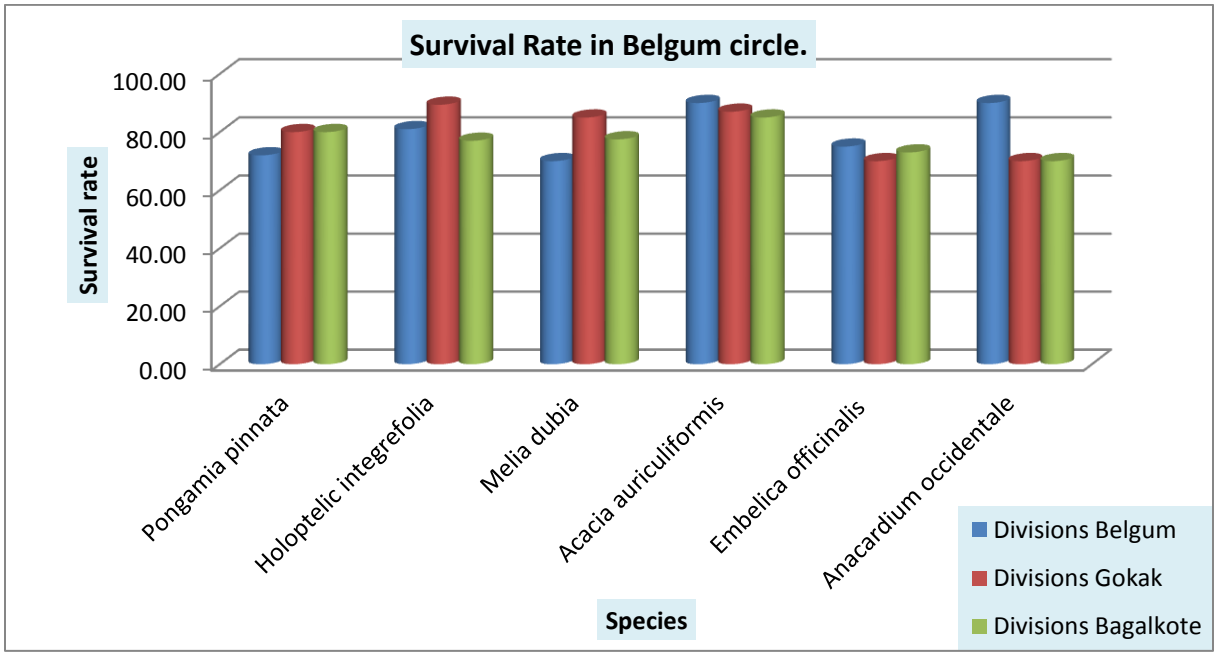


13. **Table showing survival Rate of different species in Belgum circle**

Species	Divisions			Mean
	Belgaum	Gokak	Bagalkote	
Pongamia pinnata	72.00	80.00	80.00	77.33
Holoptelic integrefolia	81.00	89.40	77.00	82.47
Melia dubia	70.00	85.00	77.50	77.50
Acacia auriculiformis	90.00	87.00	85.00	87.33
Embelica officinalis	75.00	70.00	73.00	72.67
Anacardium occidentale	90.00	70.00	70.00	76.67
Mean	79.67	80.23	77.08	78.99
Sem±	**2.5 (b/w species) AND 4.30 (b/w divisions)**			
Cd@5%	**14.7 (b/w species) AND 17.7 (b/w divisions)**			

In Belgaum the most common species planted are *Pongamia pinnata* followed by Holoptelia *integrefolia* and *Acacia auriculiformis*. The other common species planted are *Cassia siamea*, *Anacardium occidentalis* and *Aadirachta indica*. When the survival rates were analyzed through ANOVA it was found that *Acacia auriculiformis* had 87.33% survival followed by Holoptelia with 82.47%.

Fig.10 showing the survival Rate of different species in Belgaum circle



Productivity projection

The productivity projection was attempted to assess the future potential growth of the plantations. The mean annual increment of the diameter was found to vary between species to species and division to division.

Acacia auriculiformis: The diameter increment was 3.3 cm/year in Belgaum and Yadgir. This indicates a possibility of trees attaining 30 cm diameter at the end of 10 years. The basal area of 7-10 m2/ha/ at 10 year rotation. The height increment is 1 meter per year. At the age of 10, the mean height would be varying between 7-8 meter. The expected biomass would be 70-80 cum/ha. This is the most conservative estimate. Using Acacia as an indicator species the mean productivity of slow growing species could be in the range of 5-6 cum/year.

Holoptelia integrefolia: This is a native species which has been taken as indicator species to project the productivity. The mean annual increment of the diameter is 3.3cm/year. The mean height is 0.8 cm/year. The volume production would be in the range of 5-8 cum/year.

5.2. Wildlife Protection

Under the wildlife protection works like water hole creation and Anti poaching camps were evaluated for their efficacy and specifications for physical verifications. The following observations were made.

14. Table showing the quality of the Wild life protection Activities under CAMPA between 2009-10 to 2012-13

Sl, No.	Year	Division	Activity	Location	Physical Quantity	Field Measurement	Remarks
1	2009-10	Wildlife Ranebennur	Creation of new water holes	Baramagudu sara Jalimatti sara	2	918m3	Effective
2	2010-11	Wildlife Ranebennur	Salt licks	Amarada & Devuli	2	-	Not visible
3	2011-12	Belgaum	Anti-poaching camps	Kumbarda Fs.No. 25	1 No's	1 No's	Effective
4	2012-13	Gadag	Percolation ponds		17227 Cum	Work done	Effective

Percolation tanks

The percolation tanks works have been taken-up using CAMPA funds by investing Rs 13.29 lakhs at Kalkeri in Gadag division. The works are verified and found as per the specifications. The visual impression was also recorded as effective.

Anti-poaching camps

The anti-poaching camp work done at Nagargali was verified with vouchers and spot inspection. It was observed as effective without any evidence.

5.3 Fire protection

The fire protection work was a major activity under taken by CAMPA in Gulbarga, Belgaum and Dharwad circles. The works were evaluated after three years of the execution using proxy indicators as explained in the methodology indicating effectiveness of the works based on the fire occurrence or not.

15. Table showing the quality of the Fire protection Activities under CAMPA between 2009-10 to 2012-13

Sl. No.	Year	Division	Location	Physical Quantify	Field Measurements	Remarks
1	2009-10	Belgaum	Savergali Fs.No.24	10 km	Work done	Effective
2	2009-10	Bidar	Circle Office, Belgaum			KFD to verify the work
3	2009-10	Dharwad	Kalkeri, Bl No VII & VIII		Location not provided by the staff	KFD may verify the work.
4	2009-10	Dharwad	Hasarambi Bl.No.II	25	Work done	
5	2009-10	Gokak	Bendur/ Karoshi /Tangyankudi	35 km	No fire lines could be traced	KFD to verify the work
6	2009-10	Gulbarga		Records not produced	Not found	KFD may verify the work
1	2010-11	Belgaum	Kirhalashi VFC	1 km		Effective
2	2010-11	Belgaum	Gharli VFC	1 km	work done	Effective
4	2010-11	Bagalkote	Hosur Fs No. 3	12 km	work done	Effective
5	2010-11	Bagalkote	Petlur FS No. 99	5 km	work done	Effective
6	2010-11	Dharwad	Ichanalli Bl.IX	31.km	Fire lines not visible	No fire damage
7	2010-11	Gadag	Kabulayatkatti	15 km	work done	Effective
3	2010-11	Gokak	Telasang 757 & 729, Sankonatti 1138	41 km	work done	Effective
8	2010-11	Haveri	Negalur	5 km	work done	Effective
9	2010-11	Haveri	G. Madapur	6 km	work done	Effective
10	2010-11	Haveri	Galaginakatti	3 km	work done	Effective

The firework evaluated in different years has been presented in the table. As the works were three year old, therefore the physical verification was difficult. Further some of the works were not verifiable due to reasons explained against each work.

Dharwad: The work taken up at Kalakeri block to an extent of 60 km was not evaluated as the work location was not traced by the staff due to some communication gap between the evaluation team and the staff members. The work could have been easily located if the Divisional office staff had verified the list of works undertaken by Dharwad division during 2009-10. The Department may please verify the work.

Bidar: In Bidar firework has been shown as circle office. This work may be verified by the KFD.

Belgaum: In Chikodi, the fire works for 35 km were charged under CAMPA. However the fire lines were not visible therefore forest department may please verify the works.

Haveri: The works were inspected and found effective as verified by the secondary evidences like rank growth and other proxy parameters.

Recommendations: The fireworks are to be checked and inspected verified by the third party on annual basis. Evaluation after one year does not give any indication of effectiveness or not.

5.4 Building construction and maintenance

Under the scheme many works related to infrastructure like building constructions and maintenance were taken up. The following table gives the investment pattern of the building works and maintenance.

16. **Table showing the quality of the Building Construction and Maintenance Activities under CAMPA between 2009-10 to 2012-13**

Sl. No.	Year	Division	Activity	Location	Specification	Field Measurement	Remarks
1	2009-10	Belgaum	Building maintenance	Residential	Painting & other works	Work done	Good
2	2009-10	Bidar	Building maintenance	Humnabad	Painting works	Work done	Good
3	2009-10	Dharwad	Building maintenance	Forest Guard quarters at			
4	2009-10	Dharwad	Building maintenance	Forest Guard quarters at Sangatikoppa			
5	2009-10	Gokak	Building maintenance	Painting to Division office	Painting of Division office	Work done	Good
6	2009-10	Gokak	Building maintenance	Ramdurg	Painting & other works	Work done	Good
7	2009-10	Gulbarga	Building maintenance	Chithapura	Painting & other works	Work done	Good
8	2009-10	Haveri	Building maintenance	Hanagal	Maintenance (3 Nos)	Work done	Good
1	2010-11	Belgaum	Maintenance of staff quarters	Kakati	Painting (4 No's)	work done	Good
4	2010-11	Bagalkote	Maintenance of staff quarters	Supporting Staff Qtrs,			
2	2010-11	Gokak	Maintenance of staff quarters	Gokak	Maintenance	work done	Good
3	2010-11	Gokak	Maintenance of staff quarters	Gokak	Supporting Staff Qtrs	work done	Good
5	2010-11	Raichur	Construction of staff quarters	Construction of Forest Staff	Building construction	work done	Good
1	2011-12	Gungaragatti	Strengthening of Training Institutes for capacity building	Departmental officers			Not visited
2	2011-12	FTS, Tattihalla.	Strengthening of Training Institutes for capacity building	Construction of Septic Tank to Qtrs. No. 32-35			Not visited

The building works undertaken under CAMPA were evaluated. The physical verifications were made and checked against the specifications and the observations are recorded in the table.

Most of the building maintenance works includes painting and white washing and other similar repairs works. Most of these works were not verifiable due to passage of time. Therefore the records were verified and assessments were made.

5.5 Vehicles and equipments

The vehicle purchase like two wheelers, four wheelers, has been done under the scheme CAMPA. Similarly the equipments like GPS, computer, Copier and Installation of Boards has also been undertaken. The following table gives the pattern of investment on different items is given in the table below.

17. Table showing the quality of the Vehicles and Equipments Activities under CAMPA between 2009-10 to 2012-13

Sl. No.	Year	Division	Activity	Location	Physical Quantity (Nos)	Field Measurement	Remarks
1	2009-10	Bagalkote	GPS	Yalligutti FS No. 118	5.	5.	Effective and used
2	2009-10	Bidar	GPS	Humnabad	5.	5.	Effective and used
3	2009-10	Dharwad	Supply of 4 Wheelers (CAR)	Kalghatagi	1	1	Effective and used
4	2009-10	Gadag	RF Boards/hoardings etc.,	Attikatti	1.	1.	Effective and used
5	2009-10	Gadag	RF Boards/hoardings etc.,	Doni	1.	1.	Effective and used
6	2009-10	Gulburga	RF Boards/hoardings etc.,	Chithapapur	1.	1.	Effective and used
7	2009-10	Haveri	RF Boards/hoardings etc.,	G. Madapur	1.	1.	Effective and used
8	2009-10	Haveri	RF Boards/hoardings etc.,	Jonkahal	1.	1.	Effective and used
9	2009-10	Wildlife Ranebennur	Supply of 4 Wheelers (Jeep)	RFO, Ranibennur WL	1	1	Effective and used

Sl. No.	Year	Division	Activity	Location	Physical Quantity (Nos)	Field Measurement	Remarks
2	2010-11	Bagalkote	Supply of 2 Wheelers (Hero Honda Drum Self)	Jamkhandi	4.	4.	Effective and used
6	2010-11	Bidar	Desk Top Computer	BIDAR	1.	1.	Effective and used
1	2010-11	Bijapur	Digital Copier (Xerox Machine)	Bijapur	1.	1.	Effective and used
3	2010-11	Dharwad	Digital Copier (Xerox Machines)	Dharwad	2.	2.	Effective and used
5	2010-11	Gulbarga	Supply of 2 Wheelers (Hero Honda Glamour Drum Self)	Gulbarga	4.	4.	Effective and used
4	2010-11	Wildlife Ranebennur	Supply of 2 Wheelers (Hero Honda Glamour Drum Self)	Amarada & Devuli	2	2	Effective and used
7	2010-11	Yadgir	Desk Top Computer	Yadgir	1.	1	Effective and used
1	2011-12	Gadag	Supply of 2 Wheelers (Hero Honda)	Kerehalli	2	2	Effective and used
2	2011-12	Raichur	Supply of 2 Wheelers (Hero Honda)	Bhogapur	2	2	Effective and used

GPS: The GPS sets supplied to Bagalkot and Bidar divisions were inspected and found to be in good conditions.

Two wheelers: Two wheelers supplied to Gadag, Raichur Wild life wing Ranebennur, Gulbarga and Bagalkote were in good conditions. The specifications were verified with the vouchers and were found to be correct.

Desktop computer: The desk top computer supplied to Yadgir was checked and found to be as per the specifications. The computer was also found used by the office.

Four wheelers: The four wheelers car supplied to the Dharwad circle was found to be as per the specifications. One jeep supplied to Ranebennur is also verified and is in accordance with the specifications. The vehicle is currently used.

Digital copier: The digital copier supplied to Bijapur and Dharwad is found to be as per the specifications and is being used in the office.

RF Boards: The funds have been used for the boards and displays. They were checked in Haveri, Gadag and Gulbarga and found to be as per the specifications. The works were checked at Mundargi (Dhoni and Attikatte) and other places.

5.5 Survey and Demarcation work

The survey and demarcation work has been taken up as a part of the boundary consolidation work of the forest area under this scheme. The pattern of investment is given in the table below. Cattle proof trench work was intended at reducing the cattle grazing in the forests areas.

The works like CPT and Boundary consolidation works were evaluated for their physical execution and quality (specifications) along with effectiveness. The following observations have been made. The results of the sampled works are given in table below

18. Table showing the quality of the Survey and Demarcation Activities under CAMPA between 2009-10 to 2012-13

Sl. No	Year	Division	Location	Physical Quantity	Field Measurement	Remarks
1	2009-10	Bagalkote	Mullur FS No. 52	2 km	2.2 km (1m * 1.5m*1 m)	Good
2	2009-10	Dharwad	Kademani to Baichwad	0.8 km	0.8 km	Good
3	2009-10	Gadag	Hirewaddatti	2 km	2 km	Good
4	2009-10	Gokak	Konnur FS 679	1.4 km	1.4 km	Good
5	2009-10	Gokak	Chilmur FS 216, 249	0.6 km	0.6 km	Good
6	2009-10	Gokak	Byakud FS 247, 248,	1.78 km	1.78 km	Good
7	2009-10	Gokak	Karimani FS 12 P	1 km	1 km	Good
8	2009-10	Gokak	Mekhali FS 241	2 km	2 km	Good
9	2009-10	Haveri	Dasarathakoppa	2.5 km	2.6 km (1m * 1.5m*1 m)	Good
10	2009-10	WP Dharwad	Majali T1, T2	17.7 km	17.7 km	Good
1	2010-11	Belgaum	Hanarhatti & Gajamanal Fs.No. 290	0.73 km	0.73 km	Good
2	2010-11	Belgaum	Gunji Fs. No. 51	3 km	3 km	Good
3	2010-11	Bagalkote	Budangad FS No. 53	5 km	5 km	Good

Sl. No	Year	Division	Location	Physical Quantity	Field Measurement	Remarks
4	2010-11	Wp Belgaum		123.3 km		
5	2010-11	Gadag	Kusalapur	3 km	3 km	Good
6	2010-11	Bidar	Mangalore	3 km	3 km	Good
7	2010-11	Raichur	Undraldoddi	10 km	10 km (1m * 1.7m*1 m)	Good
8	2010-11	Yadgir	Hebbal K	2 km	2 km	Good
1	2011-12	Belgaum	Halsal Fs. No. 19,7,84	2 km	2 km	Good
2	2011-12	Belgaum	Tummarguddi & Chandur Fs.No. 136,148,154	10 km	10 km	Good
3	2011-12	Gokak	Kalmad FS 55	1 km	1 km	Good
4	2011-12	Gokak	Chippalakatti	2 km	2 km	Good
5	2011-12	Bagalkote	Badagi FS.No.288	5 km	4.5 km (0.98m * 1.8m*1 m)	Good
6	2011-12	Dharwad	Holtikoti Bl.No.III, C.No.34	2 km	2 km	Good
7	2011-12	Gadag	Kalkeri	3.5 km	3.5 km	Good
8	2011-12	Haveri	Yettinahalli Sy.No.135 to 140	1.2 km	1.2 km	Good
9	2011-12	Bidar	Bemalkheda	5 km	5 km	Good
10	2011-12	Gulbarga	Lachmasagar	2km	2km	Good
1	2012-13	Gokak	Murgod	2.25 km	2.25 km	Good
2	2012-13	Dharwad	Dharwad	17 No's	17 No's	Good
3	2012-13	Gadag	Doni	5 km	5 km	Good
4	2012-13	Haveri	Narayanpur Sy. No. 134 194	4.384	4.384	Good
5	2012-13	WP Dharwad	Nujji T4	204 No's		
6	2012-13	Gulbarga	Kadatal	5 km	5 km	Good
7	2012-13	Raichur	Maliyabad	2.5 km	2.5 km	Good

2009-10

The works taken up are cattle proof trench with the specification size of 1*1.5*1 meter in different divisions. The work size varied from 0.8 km to 18 km taken up to consolidate and protect the forests from encroachments. Gokak had more works with the size varying from 0.8 km to 3 km in each location. Five sample plots were inspected in Gokak and were found to be as per the specifications.

Working plan Dharwad at Gopisatha. The CPT work taken-up by the working plan Dharwad with 17 km length was the largest of the work during that year. The inspection was done to verify the specifications and was found in order.

2010-11

Working plan Belgaum (Boundary stone fixing)

The Boundary consolidation work taken up by the Working plan Belgaum covering 123 km length by fixing the stones was checked and found to be in accordance with the specifications.

CPT works: The cattle proof trench works have been taken-up in Belgaum Bagalkote and Bidar for the purpose of boundary consolidation work was inspected and found in accordance with the specifications. The observations are recorded in the table above.

2011-12

The boundary consolidation works taken-up in different divisions varying from 2 -4 km of 1x1.5x1 meter in Belgaum, Bagalkote, Dharwad, Gadag, Bidar, Gulbarga and Haveri were inspected and the specifications were measured as per the approved estimate. The observations are recorded in the table.

2012-13

The boundary consolidation works taken-up in Bidar Gokak, Gadag, Haveri, Dharwad were inspected and the specifications were checked in accordance with the estimates sanctioned. The observations are recorded in the table above.

5.6 Village Forest Committees

Under CAMPA Village forest committees were provided with the funds to take-up entry point activities and income generation activities. The works were selected through probabilistic sampling methods and the works were evaluated as per the sampled list.

Eight VFCs were identified where Rs 55000 was sanctioned to take-up plantation and any other support activity. The results are tabulated below with observations.

1. **Babanagar in Bijapur Division**: The VFC was traced by the Field officer in charge of evaluation.

2. **Veerapur in Haveri Division**: The work undertaken is capacity building by spending Rs 25,000/. The output of the training could not be verified.

3. **Belur in Bagalkote**: The plantation of 1 ha has been raised by spending Rs64045/ha. The other details are not available.

4. **Kutakanakeri in Bagalkote**: The VFC has spent money by purchasing Kitchen articles for community use.

5. **Mulawada in Bijapur division**: The VFC has spent money for raising plantation in one hectare area.

CHAPTER – VI

OBESERVATIONS AND IMPACT ANALYSIS

The overall performance of the scheme and its impact on the objectives of the programs were assessed based on the survey results. The results are discussed here against objectives.

1. **Compensatory Afforestation.** The compensatory plantation objective is to raise the plantation on the non-forest lands equivalent to the area diverted for the developmental projects and to establish the forests to derive similar forests ecosystem function. The raising of plantation though may not replace the bio-diversity value of the forests that is lost; the man-made forests will meet the other functional requirement of the forests like green cover, carbon sequestration and soil and water conservation etc. Thus the compensatory plantation primary objectives have been served.

2. **Bio-diversity value**. The species chosen in each plantation are limited to very few (less than 10) and therefore there is a limitation of the plantations in achieving the objectives.

3. **Productivity of the plantations**. The productivity has been assessed by measuring the growth parameters. The overall increment in the height is around 0.75 meter/annum and the collar diameter is about 1 cm which is moderate as compared to the growth rates on better soils and high rainfall areas. The extrapolation of the growth parameter will give us approximately 8 cm diameter (DBH) and 6 meter height at the end of 8 years for the fast growing species. The mean basal area will be around 10 m2/ha/ at 10 year. And it may take 40 years to cover the canopy.

4. **Climate change mitigation**. The productivity of the plantation at the rate of 10 m2 /basal area with a mean height of 6 to 7 meter will give approximately 5 to 6 m3/year in the drier areas and 10 to 12 m3 /ha/year in high rainfall areas. This rate of productivity can sequester on an average 2 tons of carbon/ha/year.

5. **Employment generation**. The investment on compensatory plantation has generated (70% plantation cost is labour cost) employment in the rural areas. The 70% of cost of raising plantation goes for employment.

6. **Investment on non-plantation works**. More than 40% of the funds under this scheme has been done on the infrastructure like buildings, Roads, and equipments to strengthen the departmental capacity. This has been difficult to relate to the benefits.

CHAPTER – VII

RECOMMENDATIONS

1. The activities under CAMPA are too many resulting in very thin spread of investment which may not have desirable impact on the departmental programs. It should focus much on the compensatory plantations by spending 70% investment and rest on the natural forests management.
2. Expenditure on the building maintenance and vehicles should not be a major activity.
3. The investment on the research and wildlife is inadequate needs to be balanced.
4. The natural forests, bio-diversity conservation, enrichment planting and research programs needs to be given priority.
5. **Plantation size**: Many compensatory plantations have been raised are very small in size (less than 5 ha). This may not be viable to maintain and protect. It is better to aggregate the smaller units into a viable size of at least 10 ha to raise plantations.
6. The plantation on degraded sites must be well defined as in many places well stocked areas have been planted up.
7. The site clearance for raising plantation was noticed in some areas which needs to be avoided.
8. **Choice of species**: The species choice was very mechanical and there was no effort to match the sites.
9. Acacia auriculiformis is planted as core species in many compensatory plantations in high rainfall areas which may be completely avoided. Native species mix is the best option.
10. The SMC works are done very unscientifically. A guideline may be necessary to design and structure the works by estimating the quantum of water that could be impounded is to be done. The contour maps are to be used to locate the structure. The planning processes to regulate the SMC works are necessary.
11. The protection measures were not effective in many places. It is essential to provide maintenance provisions for five years so that the purpose is well achieved.
12. **Plantation care:** The plantation care and maintenance needs to be done for minimum five years. The investment must be done to ensure success of the plantations.
13. CAMPA must set a very successful model of plantation through innovations and higher investment as there is no cap on the unit cost.
14. Three year assessment is too early to judge the success. There should be five years interval evaluation twice to make a meaningful evaluation.
15. **Internal evaluation:** The internal evaluation needs to be strengthened and the database must be established to monitor the changes.