Evaluation of Projects Undertaken Under Compensatory Afforestation Fund Management and Planning Authority (CAMPA) in the State of Odisha

(APO Year 2009 – 10 to 2016-17)

Principal Chief Conservator of Forest & HoFF, Aranya Bhawan, Bhubaneswar-23

ANR GAP Plantation - Koraput Circle

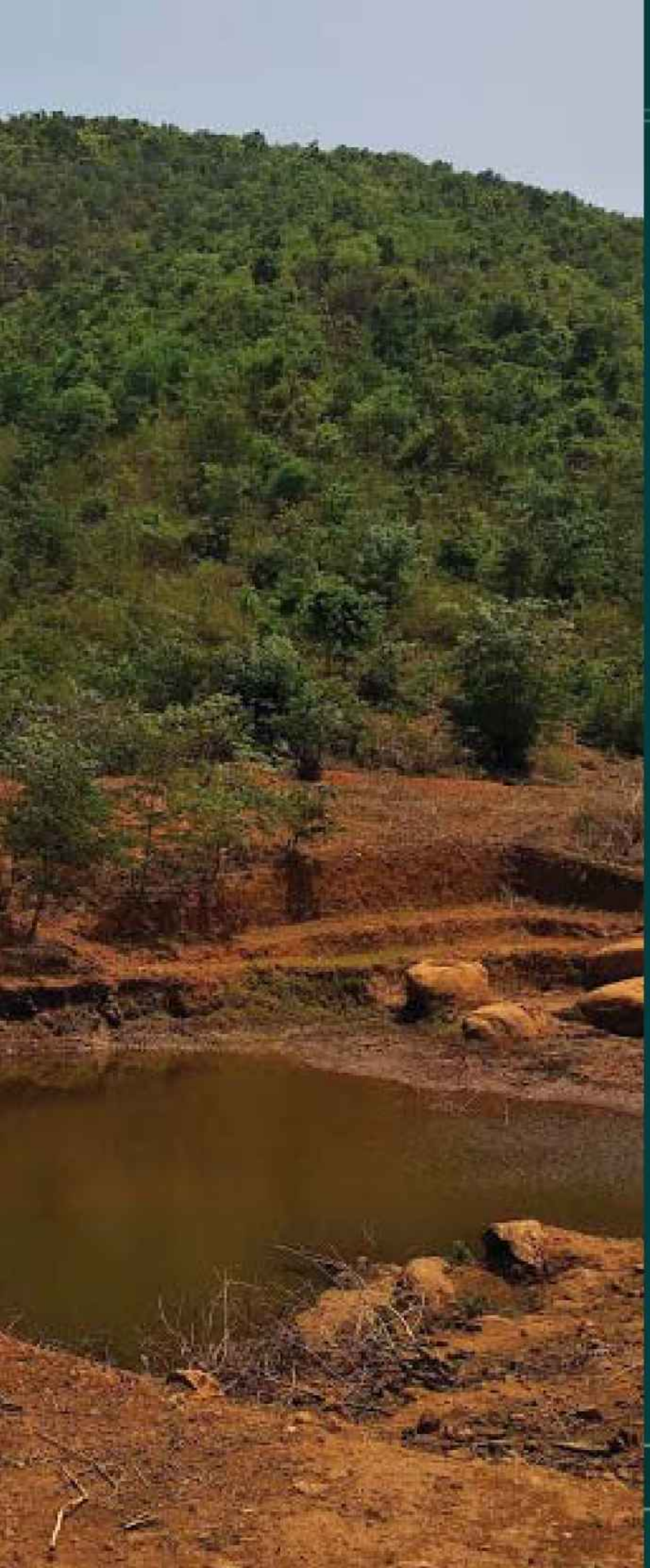
Meadows development - Baripada Circle

Old Teak Management - Rourkela Circle

Bald Hill Plantation - Kalahandi Circle

TABLE OF CONTENTS

Figure 1:1: Forest Co



LIST OF FIGURES

1.0 INTRODUCTION:

Forest of Odisha is well stocked, diverse, multi-storied and dense in nature. Odisha is one of the pioneering States at the national level in implementing Joint Forest Management Programme which strengthen community participation in forest protection. Recorded Forest Area (RFA) in the State is 61,204 sq. km. of which 36,049 sq. km. is Reserved Forest (RF), 25,133 sq. km. is Protected Forest (PF) and 22 sq. km. is Unclassed Forests (UF). The state has raised 6,30,896 ha of plantations in the last two years. Two National Parks and 19 Wildlife Sanctuaries constitute the Protected Area network of the State covering 5.19% of its geographical area. The forest cover in the State is 51,618.51 sq. km. which is 33.15 % of the State's geographical area. In terms of forest canopy density classes, the State has 6,969.71 sq. km. under Very Dense Forest (VDF), 21,551.93 sq. km. under Moderately Dense Forest (MDF) and 23,096.87 sq. km. under Open Forest (OF). Forest Cover in the State has increased by 273.51 sq. km. as compared to the 2017 ISFR assessment (Based on the interpretation of IRS Resources at-2 LISS III satellite data of the period November 2017 to February 2018).

The State has reported extent of recorded forest area (RFA) of 61,204 sq. km. which is 39.31% of its geographical area. The Reserved, Protected and Unclassed forests are 58.90 percent, 40.75 percent and 0.35 percent of the recorded forest area in the State respectively. However, as the digitized boundary of recorded forest area from the state covers 42,430.50 sq. km.

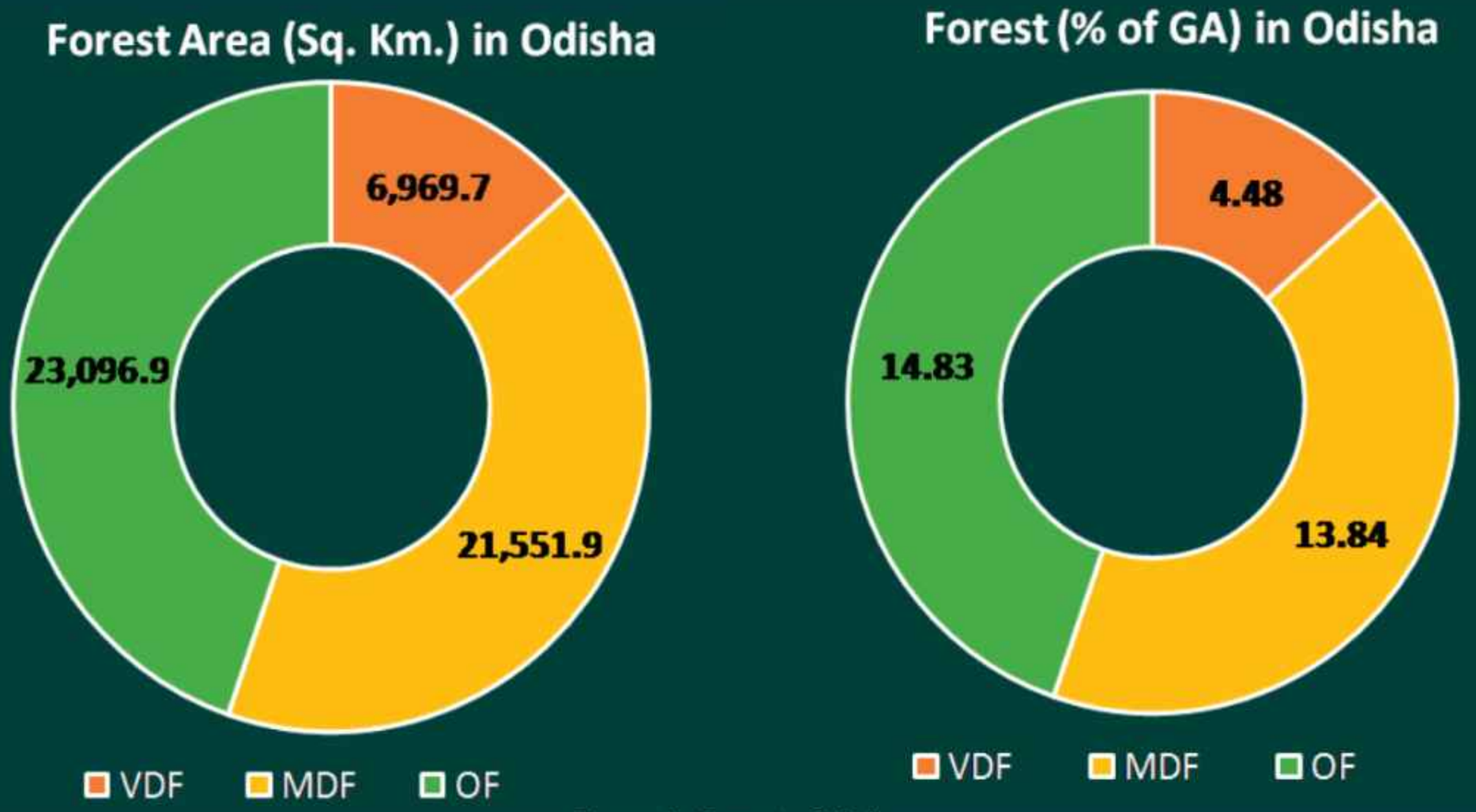


Figure 1: Forest in Odisha

2.0 OBJECTIVES:

The overall objective of the evaluation wad to evaluate different activities implemented under CAMPA by the Department of Forest and Environment in the State of Odisha since 2009-10 to 06-7.The evaluation takes into account the Annual Plan of Operation (APO) formulated from the year 2009-10 to 2016-17 (8 years) and activities implemented accordingly.

3.0 STUDY COVERAGE:

The study covered all the 47 forest divisions of eight forest circles under different components of CAMPA. The forest circles covered are (1) Angul, (2) Baripada, (3) Berhampur, (4) Bhubaneswar, (5) Kalahandi, (6) Koraput, (7) Rourkela and (8) Sambalpur.

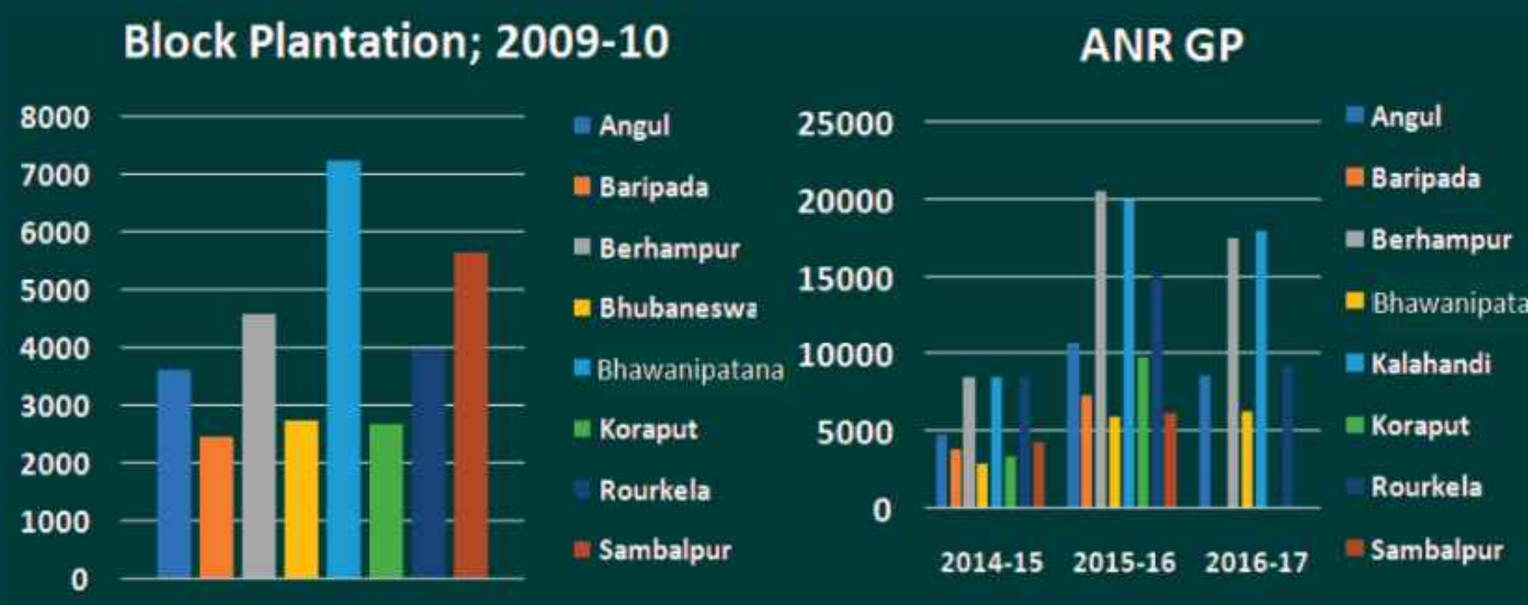
4.0 ACTIVITIES UNDERTAKEN UNDER CAMPA:

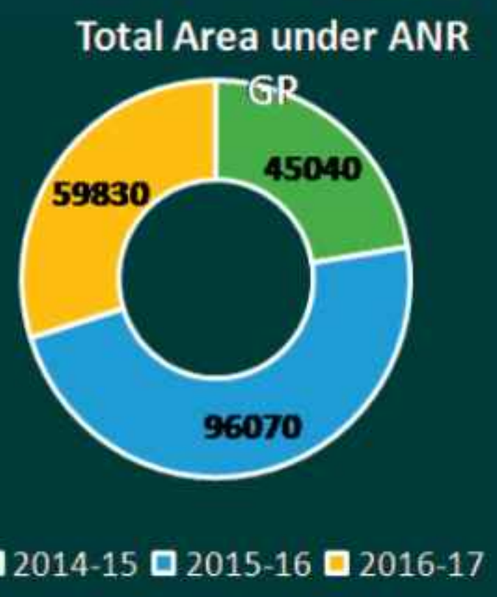
All the activities undertaken under CAMPA are classified as core and non-core activities. The core activities comprise plantation, creation of SMC measures, forest protection, wildlife management, Ama Jungle Yojana and Sacred Groves. The non-core activities cover research and development, capacity building; infrastructure development; forest IT, working plan exercise; monitoring, evaluation and accounting.

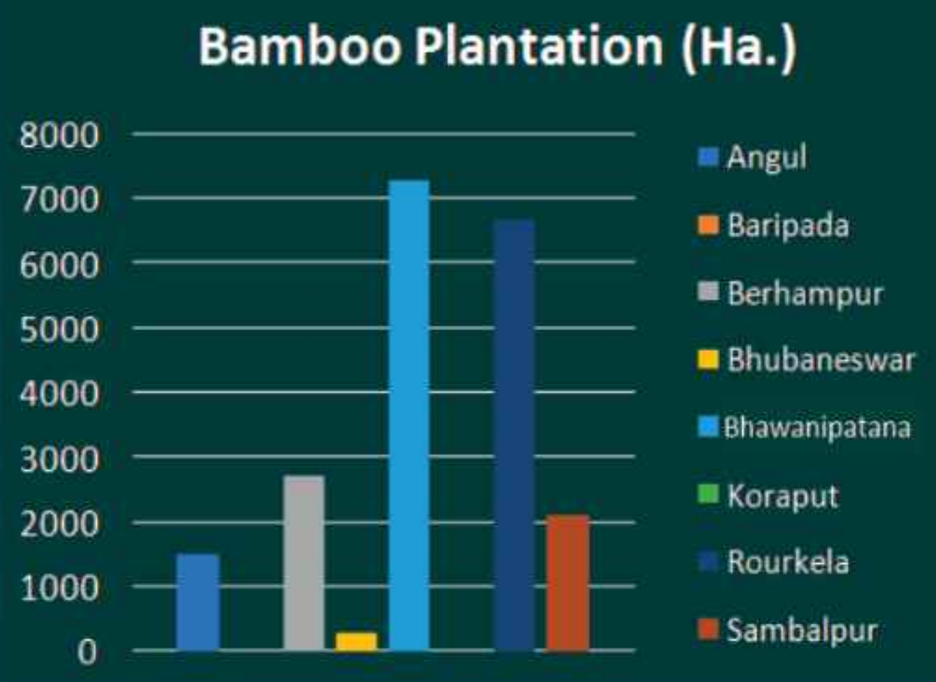
4.1 Plantation:

Key plantation activities that have been taken up in the circles are block plantation (32,884 ha.), ANR with enrichment planting (2,00,940 Ha.), bald hill plantation (2,112 Ha.), bamboo plantation (20594 Ha.) and CA PCA (28,326 Ha.).

Figure 2: Assessment Coverage







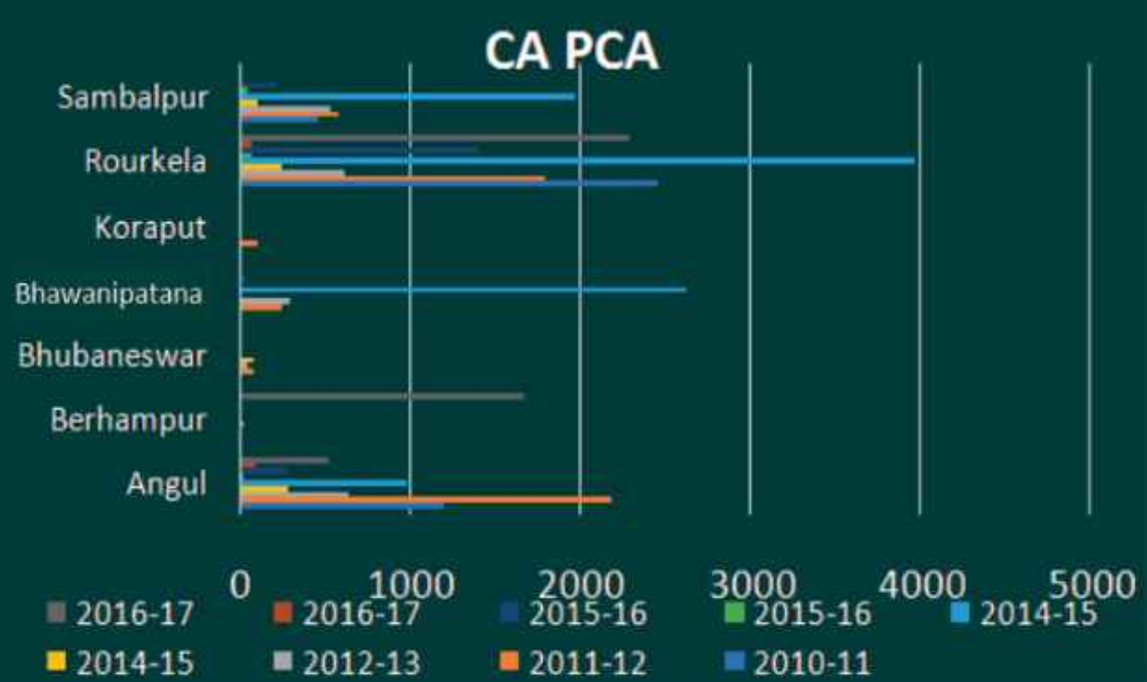
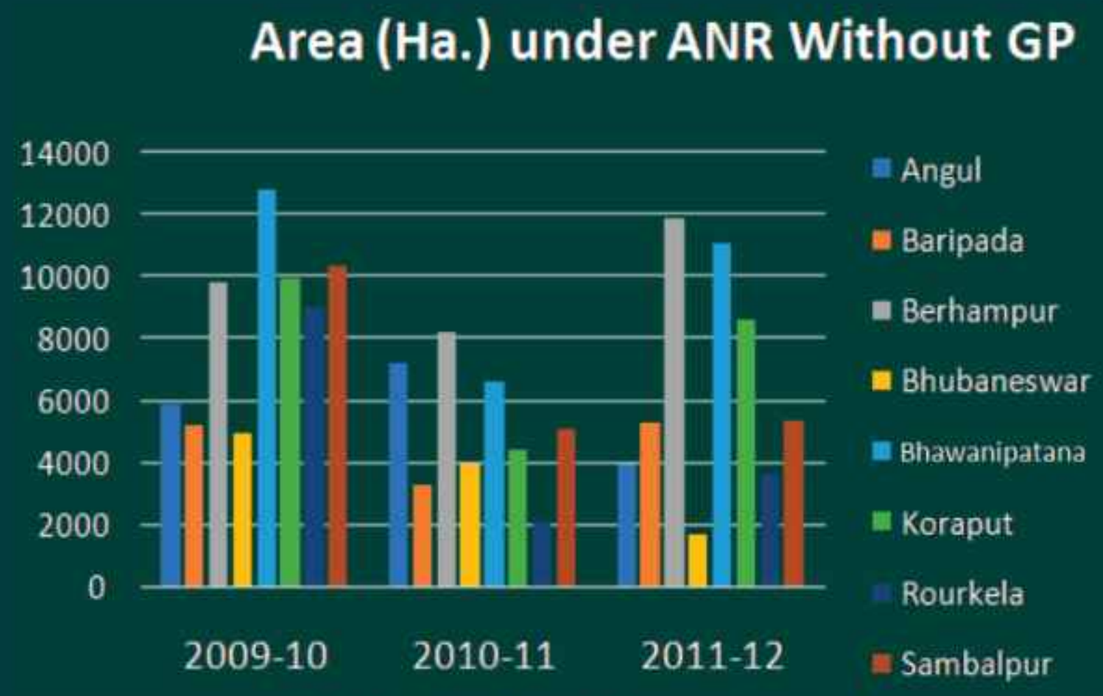


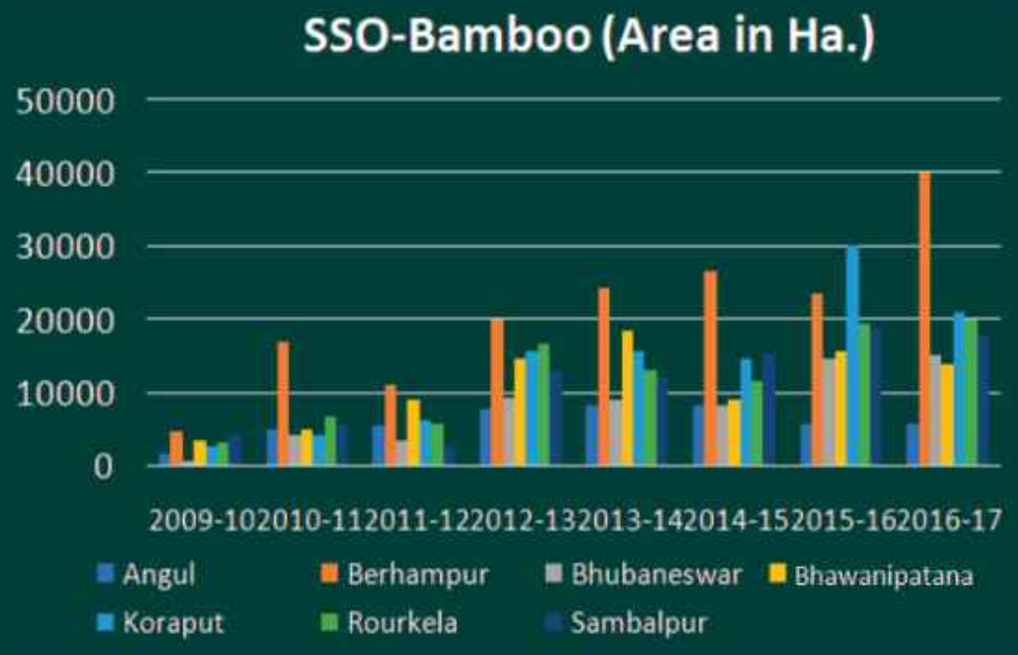
Figure 3: Plantation Activities
Source: Forest & Environment Dept.

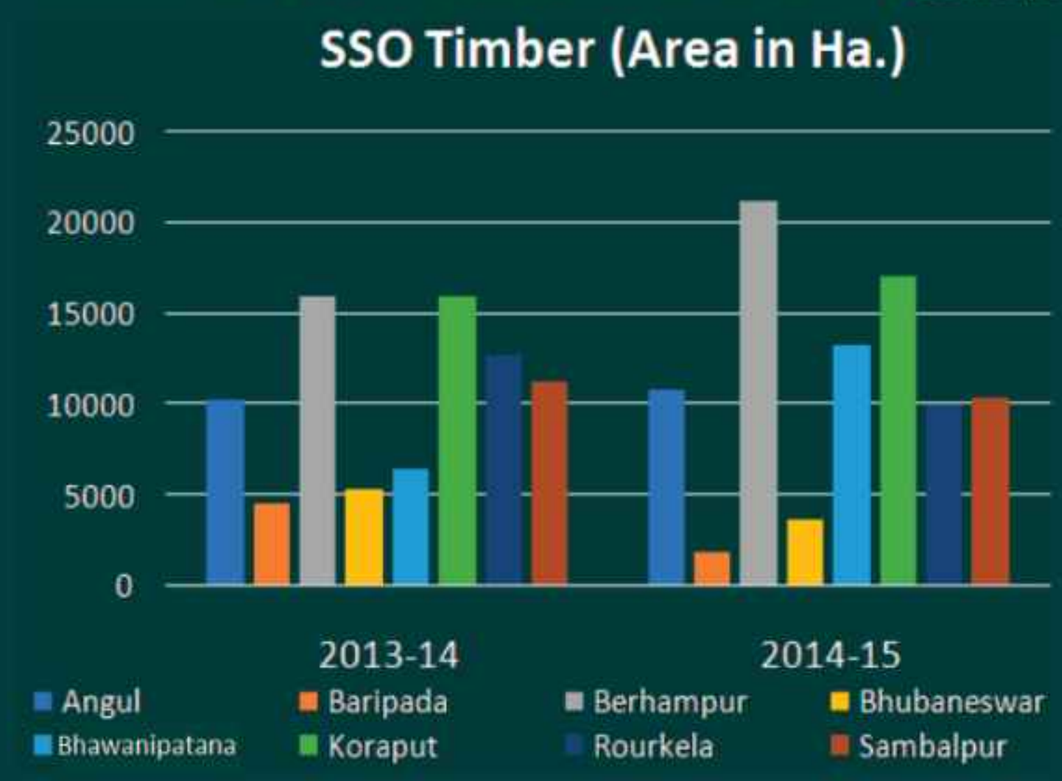
Year on Year (YOY) growth in area coverage under ANR with gap plantation shows a positive trend in all the forest circles (2015-16). Area covered under bald hill plantation reflects a positive area coverage trend during the period 2011-12 to 2012-13 and 2012-13 to 2015-16.

4.2 CRM and Silvicultural Operation:

Under CRM (Conservation, Regeneration and Management) and silvicultural operations (9,95,789 Ha.), activities taken up are like SSO Bamboo (6,56,240 Ha.), SSO-timber (1,69,862 Ha.), ANR without gap plantation (1,59,934 Ha.) and management of old Teak plants (9,754 Ha.). Apart from these, silvicultural operations / maintenance works were taken up for the area covered under plantation in different years, along with replacement for dead plants.







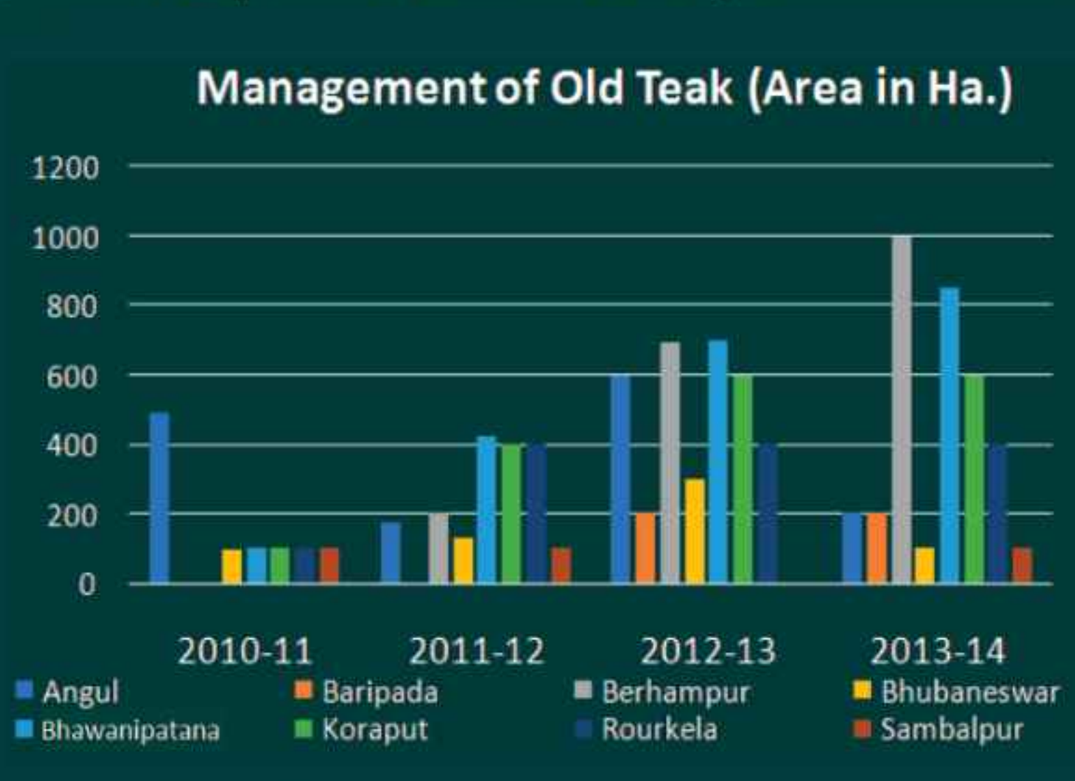


Figure 4: CRM & Silvicultural Operations
Source: Forest & Environment Dept.

4.3 Creation of SMC Structure

With the objective of arresting soil erosion and increasing moisture stress in the forest area and plantation sites, SMC structures have been created. The various SMC structures done CAMPA include loose boulder structures, check dams, contour trenches, gully plugging etc.

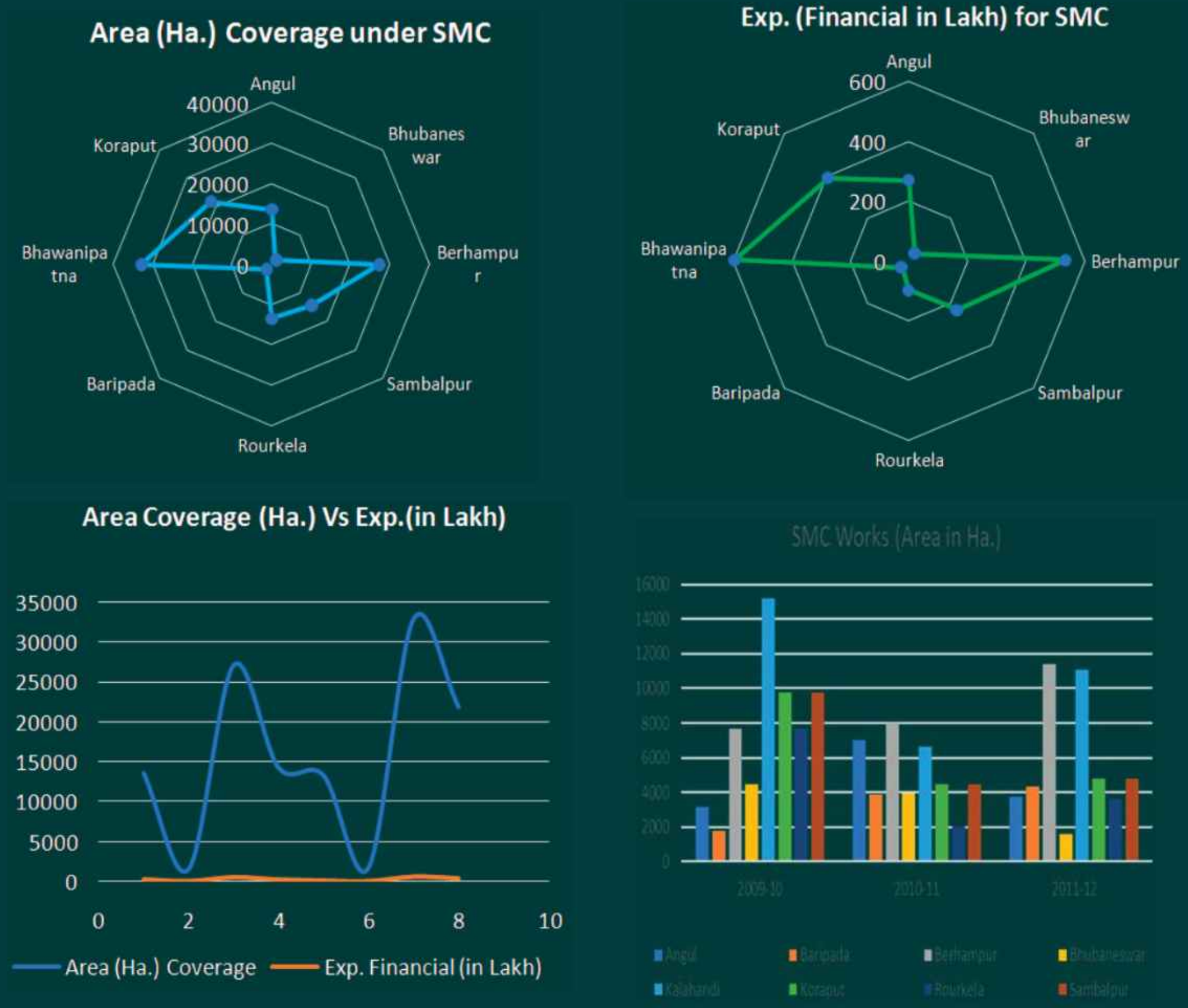
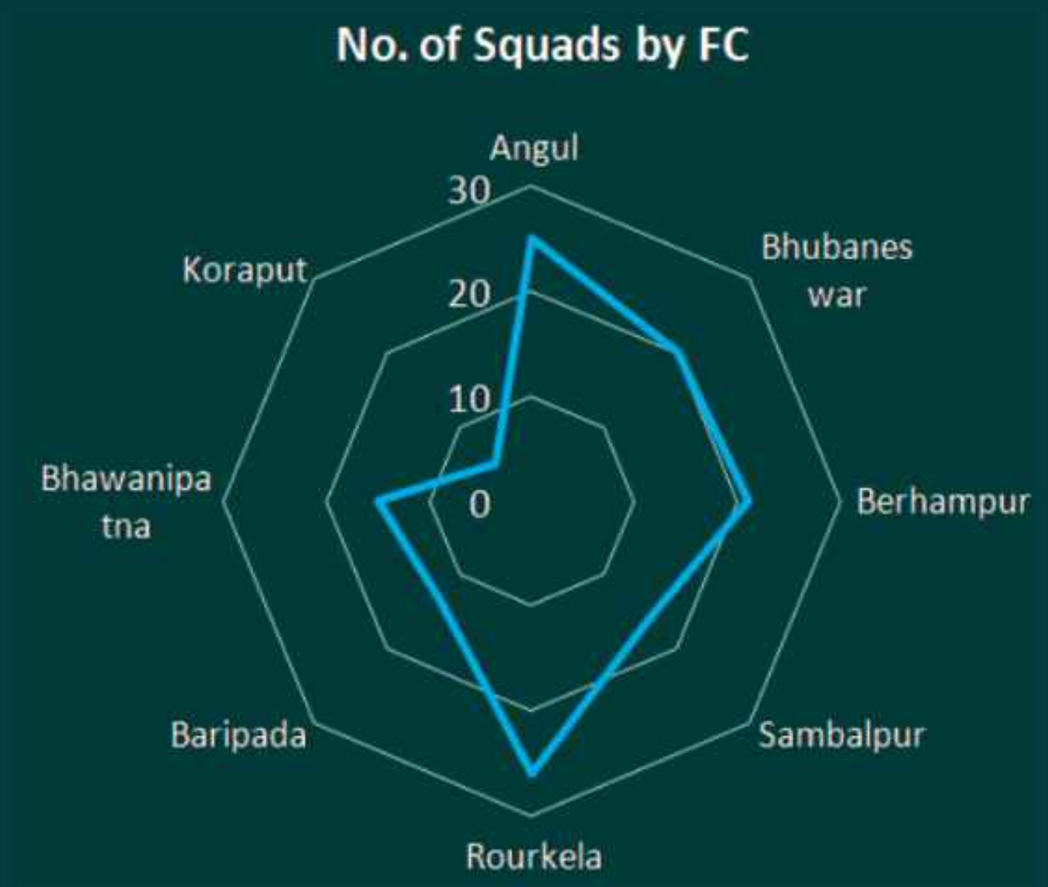


Figure 5: SMC Structures

4.4 Forest Protection

Forest protection constitutes to be an essential activity in the overall management of forests. The annual plan of operations being formulated and implemented under CAMPA has specific provisions for forest protection, which includes augmentation of manpower, strengthening of infrastructure, equipment and mobility enhancement. Forest protection squads have been deployed at vulnerable sites, constituting 10 persons per squad, mainly drawn from the neighbourhood rural employed youth. Each squad is provided with a well-fortified camp at a strategic location which includes a barrack for accommodation of personnel, vehicle for mobility, communication equipment, provision of drinking water etc. There are about 143 forest protection squads promoted and supported under CAMPA in the 31 listed vulnerable sites found in different divisions covered under all forest circles. Apart from forest protection squads, other youths are also deployed in interior theft prone and vulnerable bits to assist the frontline staff in forest protection. Under CAMPA, all the 37 territorial forest divisions have been provided with 30 to 60 local youths for forest protection. Apart from forest protection squads and appointment of local people, under CAMPA, control rooms in all forest circle and division offices have been established and maintained for effective communication, both within and outside department. These control rooms have been provided with different facilities, like three attendants, computer and data entry operator to facilitate proper processing of information.



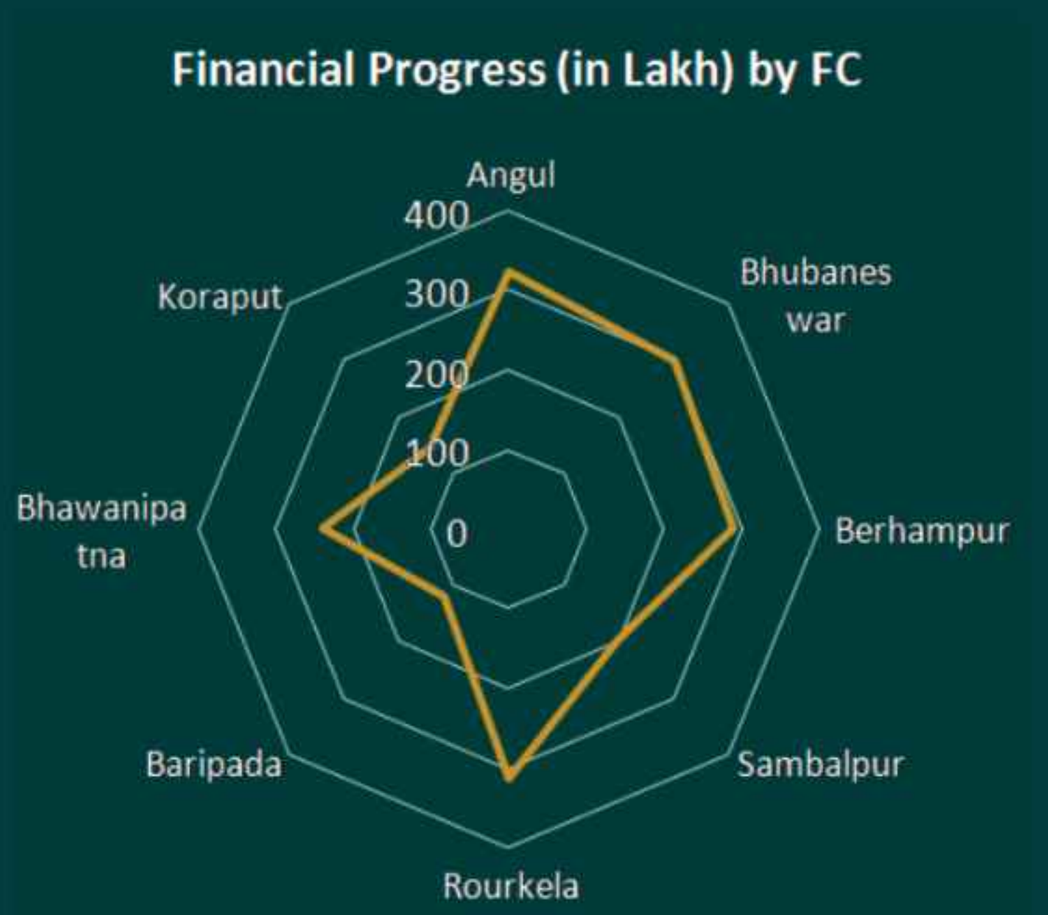


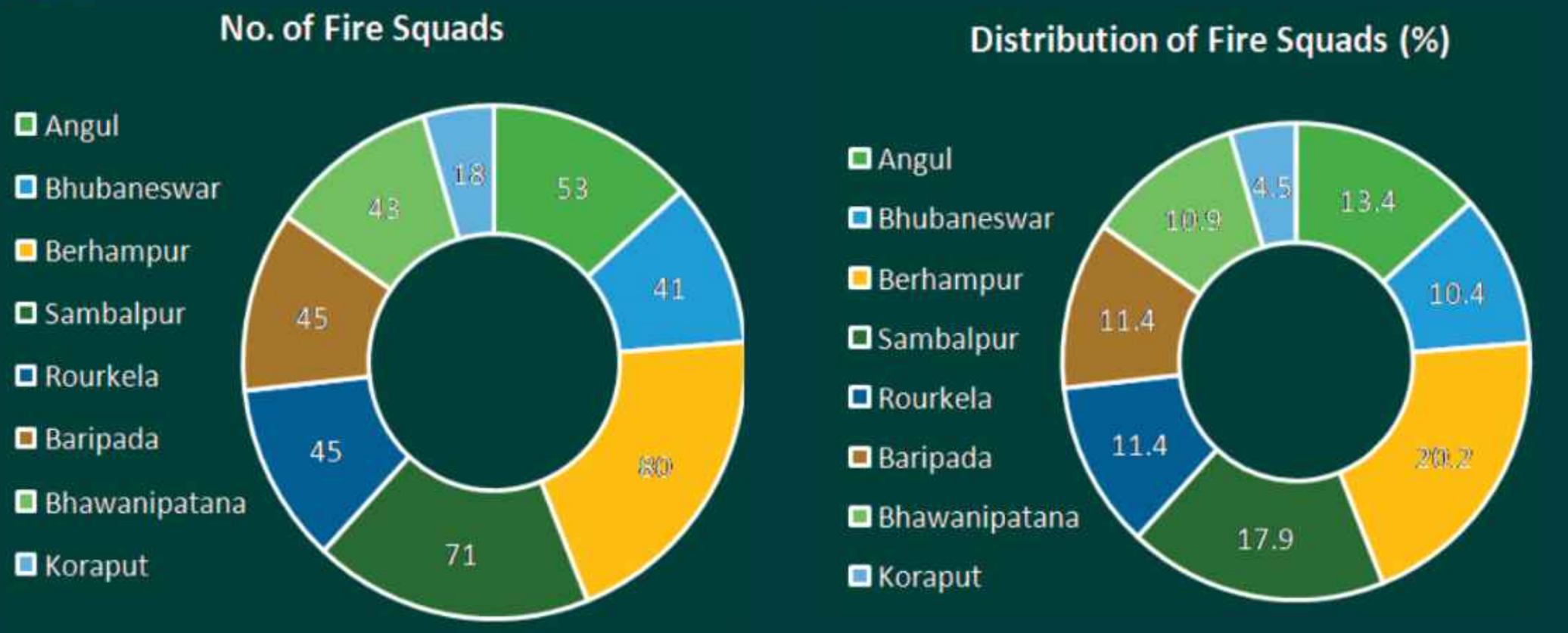
Figure 6: Promoted Forest Squads & Related Expenditure

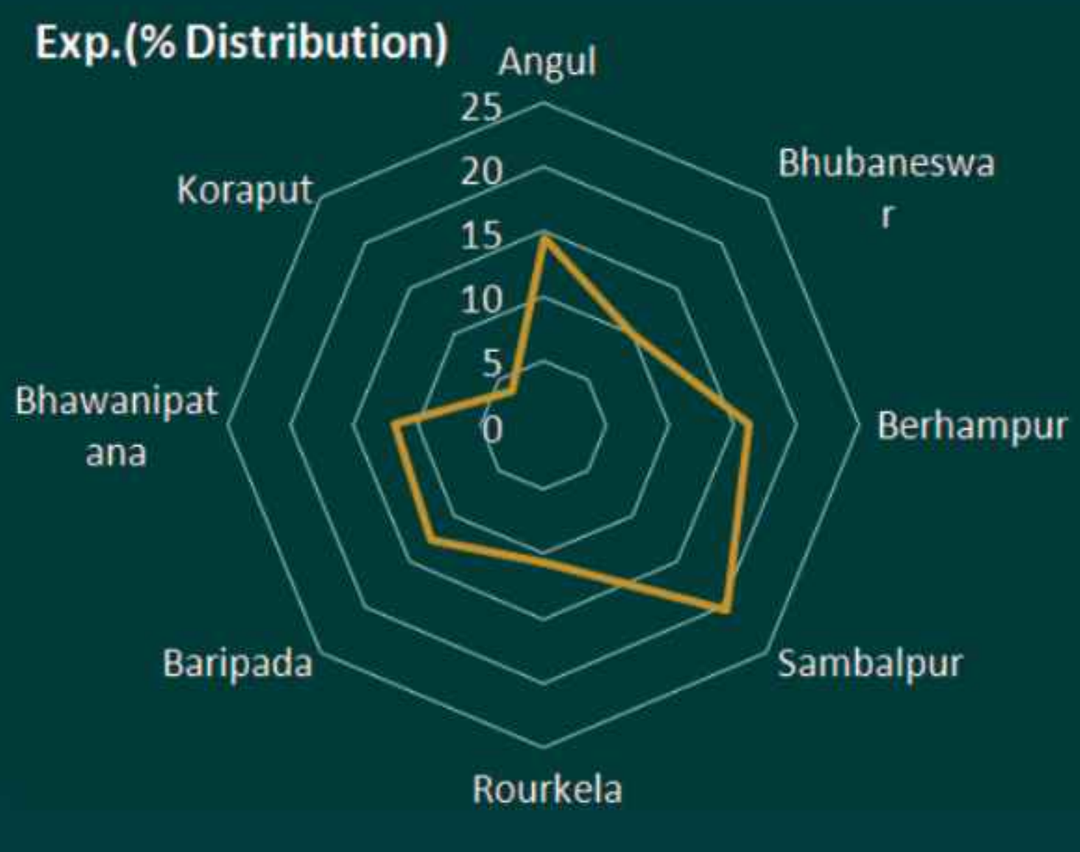
4.5 Fire Fighting

4.5.1 Fire Fighting Squad:

Forest fire is a regular phenomenon in summer season throughout the state of Odisha as major chunk of forests prevailing in the state are dry deciduous type of forests. The forests of interior eastern and Southern parts of Odisha are more vulnerable to forest fires compared to those in the Eastern coastal parts. Fire fighting squads have been promoted under CAMPA where each fire fighting squad comprises 10 persons who are mainly the rural unemployed youths. They have been provided with fire fighting equipment and vehicles for mobility (on hiring basis). The squad is deployed on an average for 150 days during the entire fire season starting from February to July. The members of the team are provided with basic training to fight forest fire. About 396 forest firing squads were engaged in all ranges for effective fire protection. The fire protection teams were provided with blowers and other equipment to combat forest fire. Out of the total fire fighting squads, maximum number of squads were appointed in Berhampur circle followed by Sambalpur and Angul circles.

Fire Line Creation, Ghess Forest Range, Bargarh Division





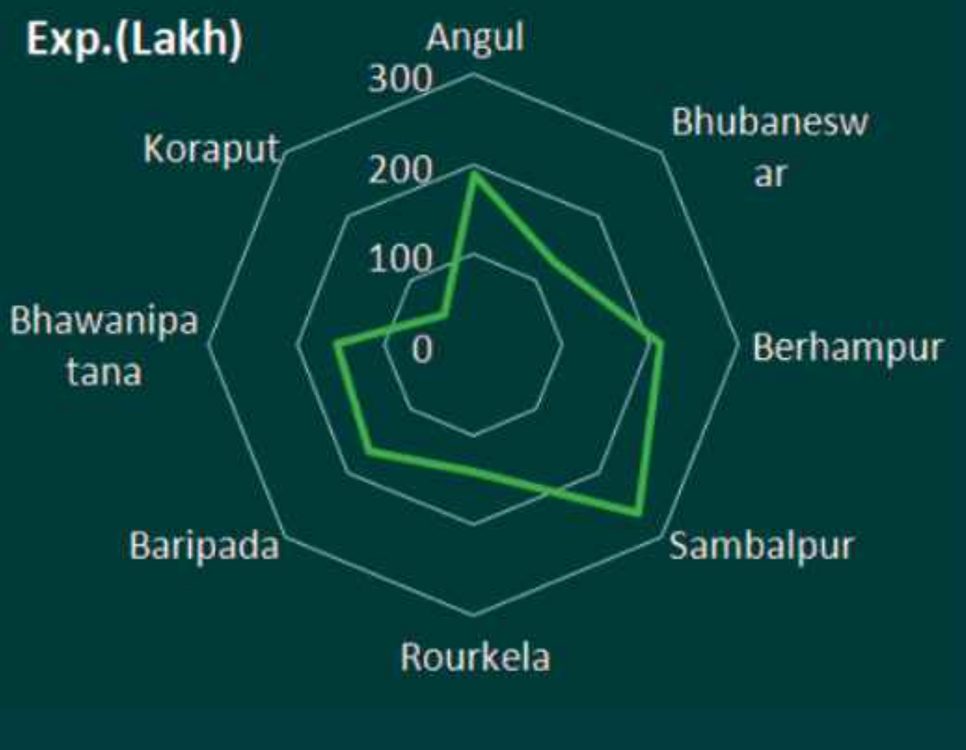
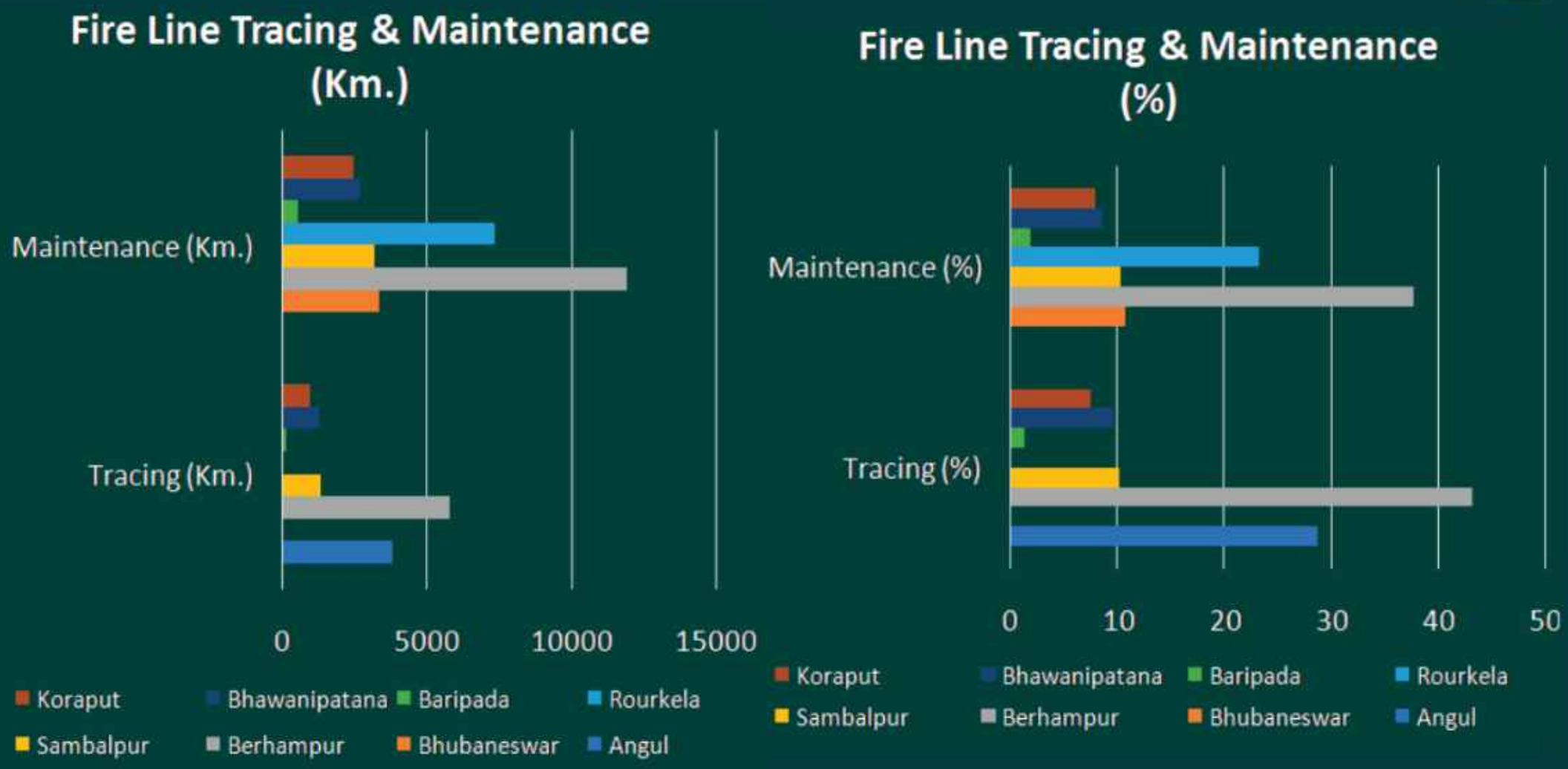


Figure 7: Promoted Fire Fighting Squads and Related Expenditure

4.5.2 Creation and Management of Fire Line:

Further, for protection of forest from fire, fire lines have been created and annually, on an average, a length of 500 kms fire line for each of forest divisions is prepared before the onset of dry season (forest fire season). About 13, 458 Kms of fire line were traced by all the forest divisions during the period 2009-10 to 2016-17.



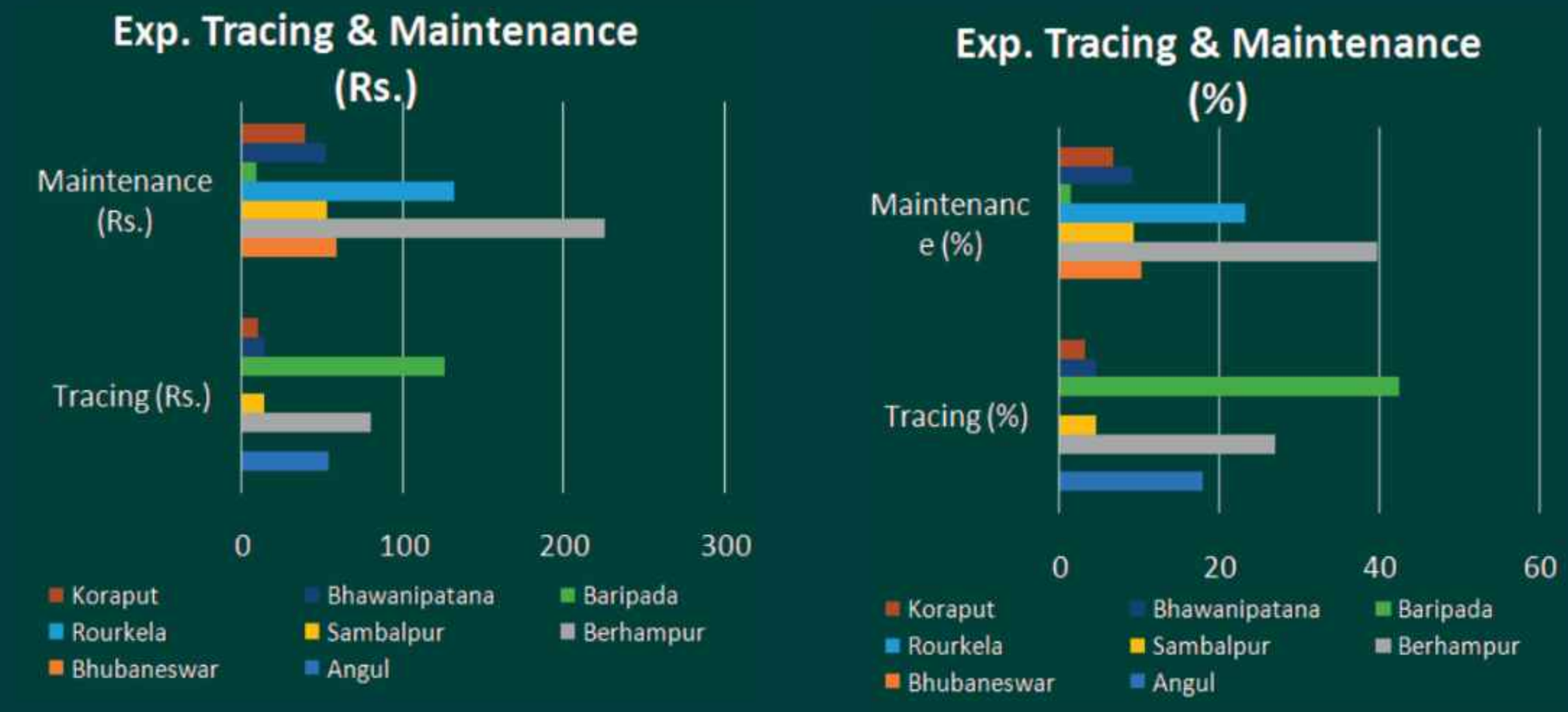


Figure 8: Fire Line Creation & Maintenance

4.5.3 Forest Fire Hotspots:

A particular site recurrently affected by forest fire is defined as forest fire hotspot. For intensive intervention under CAMPA, 21, 084 forest fire hotspots in seven forest circles (except Sambalpur forest circle) have been identified. In these hotspots greater efforts are directed for fire line maintenance.

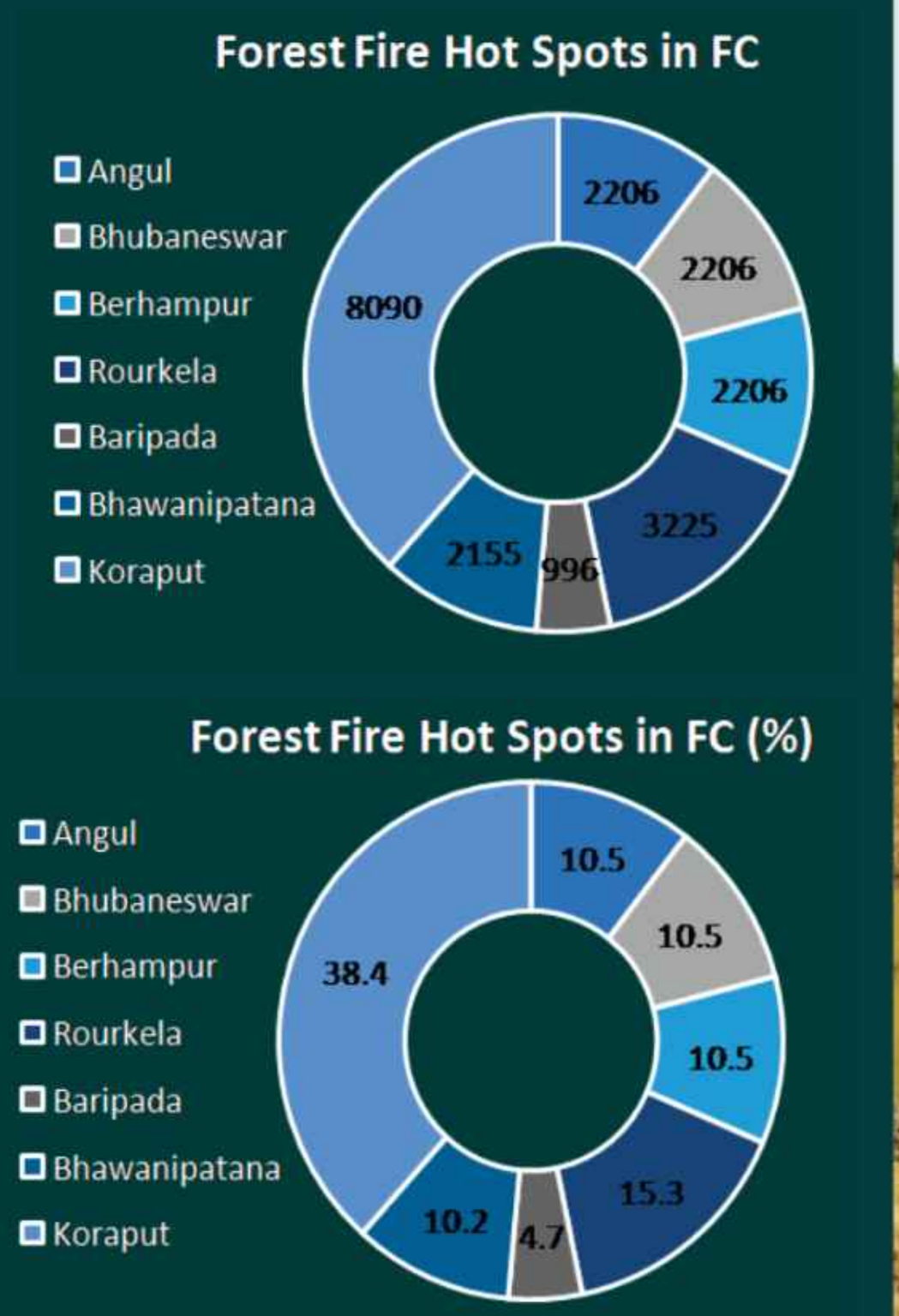


Figure 9: Identified Forest Fire Hot Spots

4.6 Promotion and Maintenance of Sacred Groves:

As per the provisions of Integrated Development of sacred Groves, Govt. of Odisha has identified 2,161 sacred groves in the state. Under CAMPA, 791 sacred groves were developed in the years 2015-16 and 2016-17. The developmental activities for sacred groves included plantation of religiously significant species as decided by the community, creation of permanent water source, creation of contingencies with the public, and maintenance of previous plantations and infrastructure development. Comparatively maximum number of sacred groves in Baripada circle, followed by Rourkela and Koraput circle are developed and maintained (major part of these circles falls under scheduled V area).

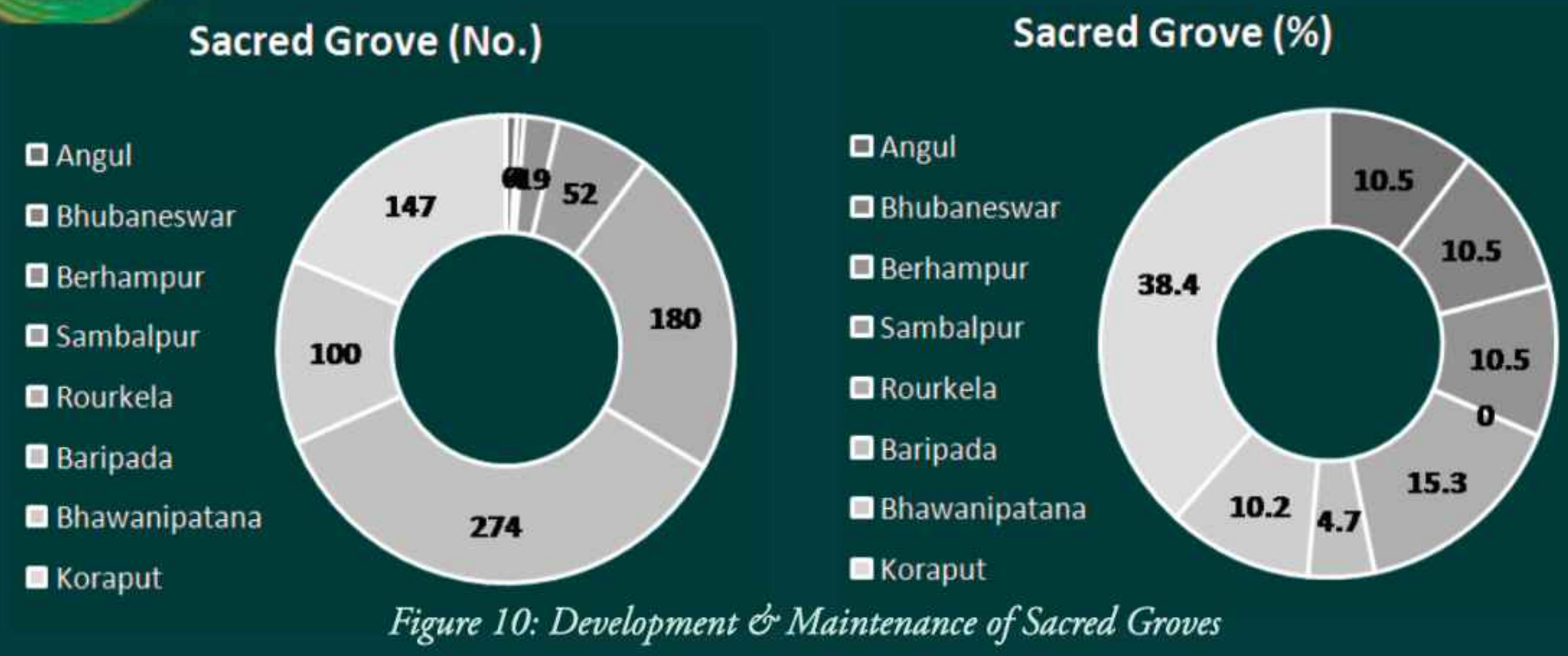
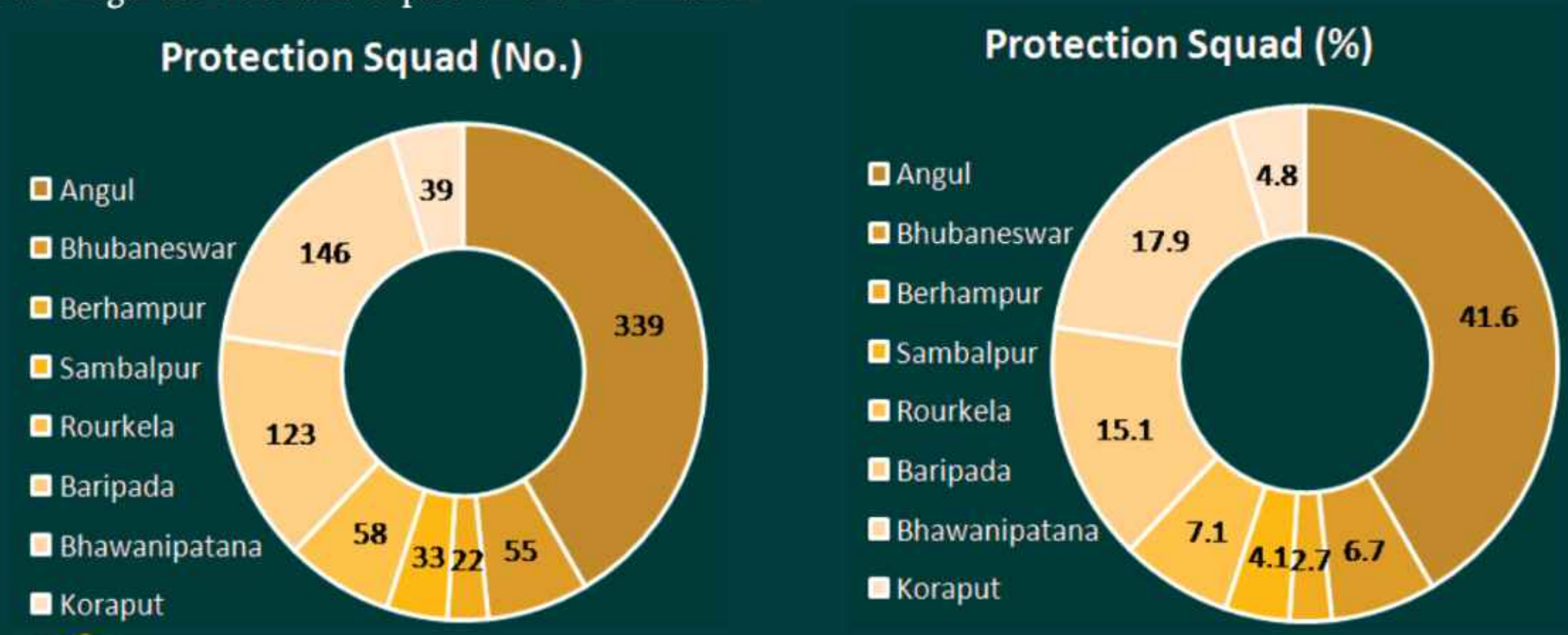


Figure 10: Development & Maintenance of Sacred Groves

4.7 Wild Life Management

4.7.1 Deployment of Protection Squads:

In order to improve protection capability of forest field functionaries with respect to wild life management, protection squads were appointed in all vulnerable areas under all forest circles. These staff are engaged in patrolling within and outside protected and other forest areas, keeping watch over illegal activities and to pass on the information to the field staff in seizure and arrest of offenders etc. During the years 2011-12 and 2012-13, 815 protection squads were appointed, covering all the forest circles. Out of the total number of forest squads appointed under CAMPA, about 40 percent are in Angul circle, followed by Bhawaniptna (17.9%) and Baripada (15.1%). About 83.4 percent of wild life protection squads were appointed in the year 2011-12 and the remaining 16.6 percent in the year 2012-13.



4.7.2 Deployment of River and Sea Patrolling Squads

Aquatic fauna like crocodiles, birds etc. and marine fauna like olive rudely require protection against illegal catch. For this purpose, river and sea patrolling squads (56 No.) have been deployed in coastal forest and wild life divisions. Each squad consists of 10 persons who are mostly local unemployed youths. Altogether 56 vehicles and boats were provided to the squads for patrolling. In subsequent years, the provision of vehicles and boats were not the priority of CAMPA intervention.

4.7.3 Deployment of Anti-Depredation Squads

Disturbances in the wild life habitats and pressure on their food and fodder resources have led to movement of wildlife specifically elephants and bears into human habitations resulting in human animal conflict. In order to prevent and control human animal conflict and to augment anti-depredation capability of forest field functionaries, anti- depredation squads have been deployed under CAMPA. Like all other squads, anti-depredation squads also consist of 10 persons mostly locally unemployed youths. Each squad is provided with vehicle for mobility and communication equipment.

4.7.4 Engagement of Elephant Trackers:

Elephant trackers are appointed in elephant movement areas to pass on information about the movement of elephants and to make aware the public and staff about elephant movement.

4.7.5 Fencing:

In order to check the entry of wild animals into human habitations and to avoid subsequent depredations, provision of fencing with trenches, stone walls, solar power and wire mesh are created under CAMPA.

4.7.6 Strengthening of communication:

For improving the performances of wild life protection and anti-depredation squads, communication instruments were provided like VHFs/GPS sets, new mobile sets and recharging and maintenance of mobile sets.

4.7.7 Establishment of Control Rooms in wild Life Divisions:

For effective communication both within and outside department, control rooms were established in all the wild life divisions. These control rooms are provided with two attendants, computers and one data entry operator to facilitate processing of information.

4.7.8 Maintenance of Forest Roads:

Forest roads were developed / maintained to make the roads motorable which would support in movement of the ground force and monitoring.

4.8 Ama Jungle Yojana

Ama Jungle Yojana is one of the premier people-oriented forestry schemes of Govt. of Odisha It is being implemented through Odisha Forestry Sector Development Society to promote sustainable forest management in the state with emphasis on livelihood support for the communities living in forest fringe villages. The objectives of the scheme are to conserve and restore degraded forests with active engagement of communities living in the forest fringe by developing their skills through capacity building and creation of alternative opportunities to reduce pressure on forest. Different activities were taken up under this programme like Preparatory works (Survey and Documentation; Boundary Clearance, Construction of RCC Pillars, Carriage, Loading and Unloading, digging of pit and posting of plants); Publication and Communication; Micro Plan Preparation; support activities like capacity building of forest personnel and support personnel; forest restoration and plantations. Upto 2017-18, about 500 VSSs were covered in 30 forest divisions.

4.9 Research Development and Capacity Building

National CAMPA Advisory Council in their recommendation has earmarked a budget of maximum 5% of NPV to address needs-based research. Accordingly, CAMPA in Odisha conducted research activities relating to maintenance of tree genome bank, preservation of biodiversity, introduction of new species in afforestation, study of different techniques in afforestation works etc.

Training and capacity building activities constitutes to be an integral part of the human resource development of the department. CAMPA adequately emphasized upon training and capacity development at range level in all the forest divisions. There are three types of training and capacity development programmes undertaken under CAMPA which include theme-based training, strengthening communication and capacity building. During the period 2009-10 to 2016-17, 187 training programmes were conducted at division level and about 651 training programmes were conducted at range level.

4.10 Infrastructure Development

Infrastructure development has been given due attention in all the forest circles under CAMPA, since 2009-10. Considering manifold increase in the role and responsibility of forest range offices and inadequacy of infrastructure available at range level, priority is accorded in strengthening infrastructure and augmenting manpower at range level under CAMPA. Various infrastructures created under CAMPA in forest circles / divisions are like (a) office building with required facilities, (b) barrack facilities for strike forces, (c) malkhana for safe storage of seized produces, (d) compound wall and gate for safety and security, (e) toilet facility and water supply system, (f) vehicles for mobility etc.

4.11 IT and Working Plan Exercise

With the objective of digitisation of delivery, smoothening of operations and strengthening the MIS, CAMPA have a consistent focus on promoting IT enabled services in forest department. In this direction different activities have been taken up under CAMPA like (a) operationalisation of web-based GIS solutions, (b) training to departmental staff for IT and e-governance activities, (c) digitisation of forestry boundary etc.

4.12 Monitoring, Evaluation and Accounting:

Under this component, the work involves monitoring and evaluation of CAMPA activities regularly by an independent/ 3rd party organisation to assess the quality as well as effective utilisation of funds.

4.13 Financial Performance:

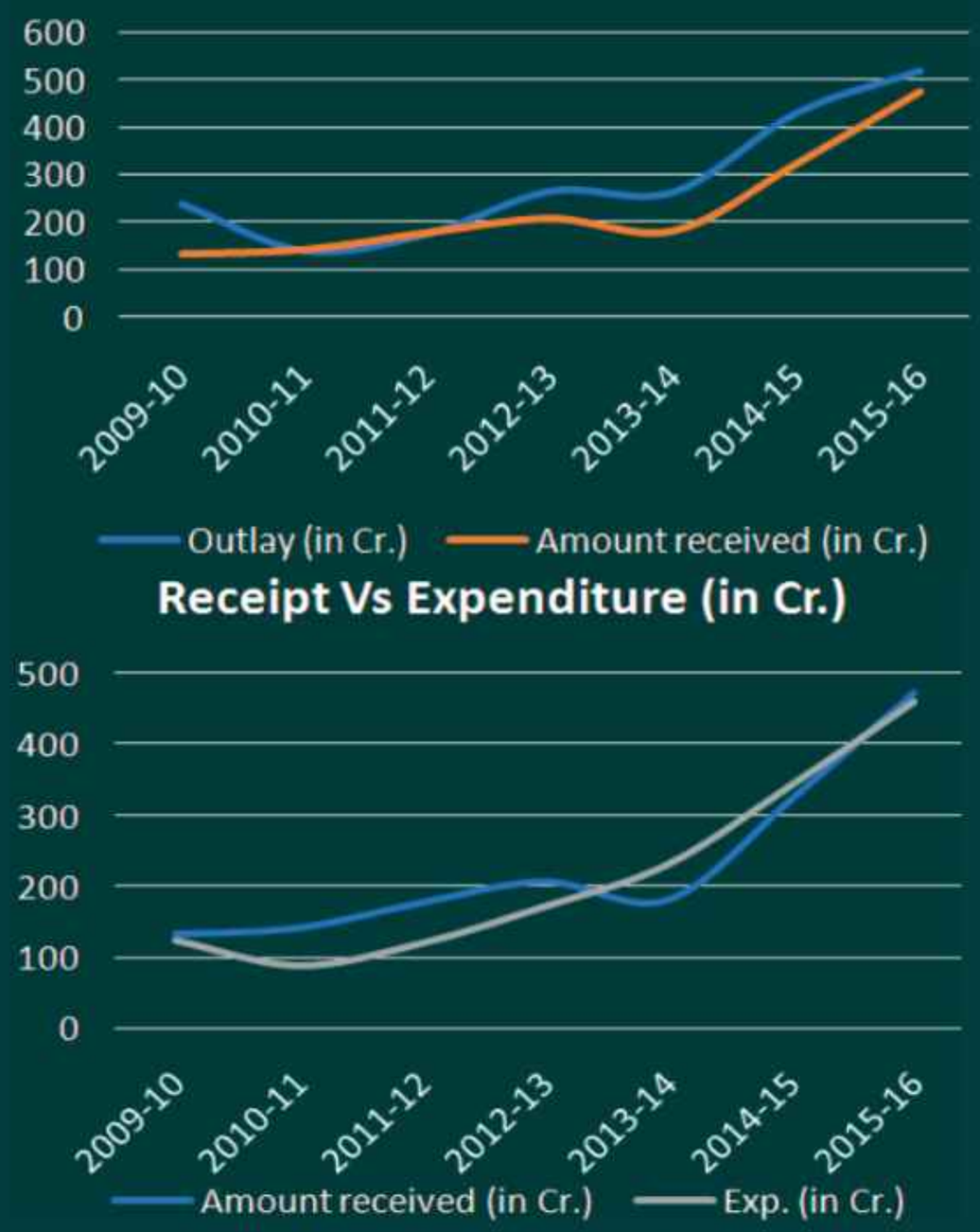
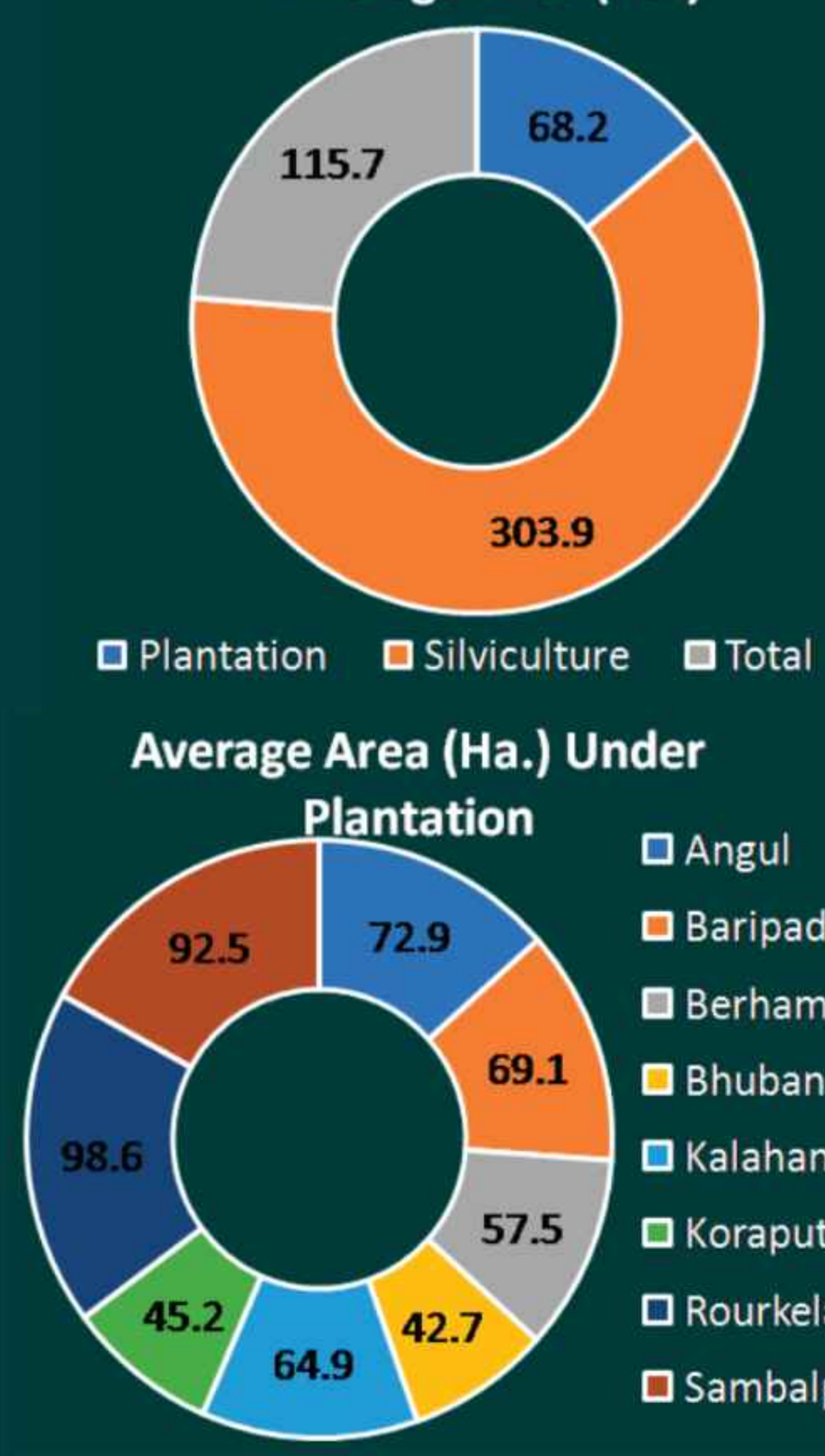


Figure 11: Funds Receipt and Expenditure; Source: Forest Department, Odisha State CAMPA APO, 2017-18

5.0 Area of the Studied Sites:

The average plantation area of the studied sites observed to be 68.2 ha. with total plantation area of 17,054.8 ha. Of the total plantation area, 65.1 percent are ANR with gap plantation, followed by block plantation (20.3 percent). Bamboo plantation and bald hill plantation has been less, i.e., 5.3 percent and 2.7 percent respectively.



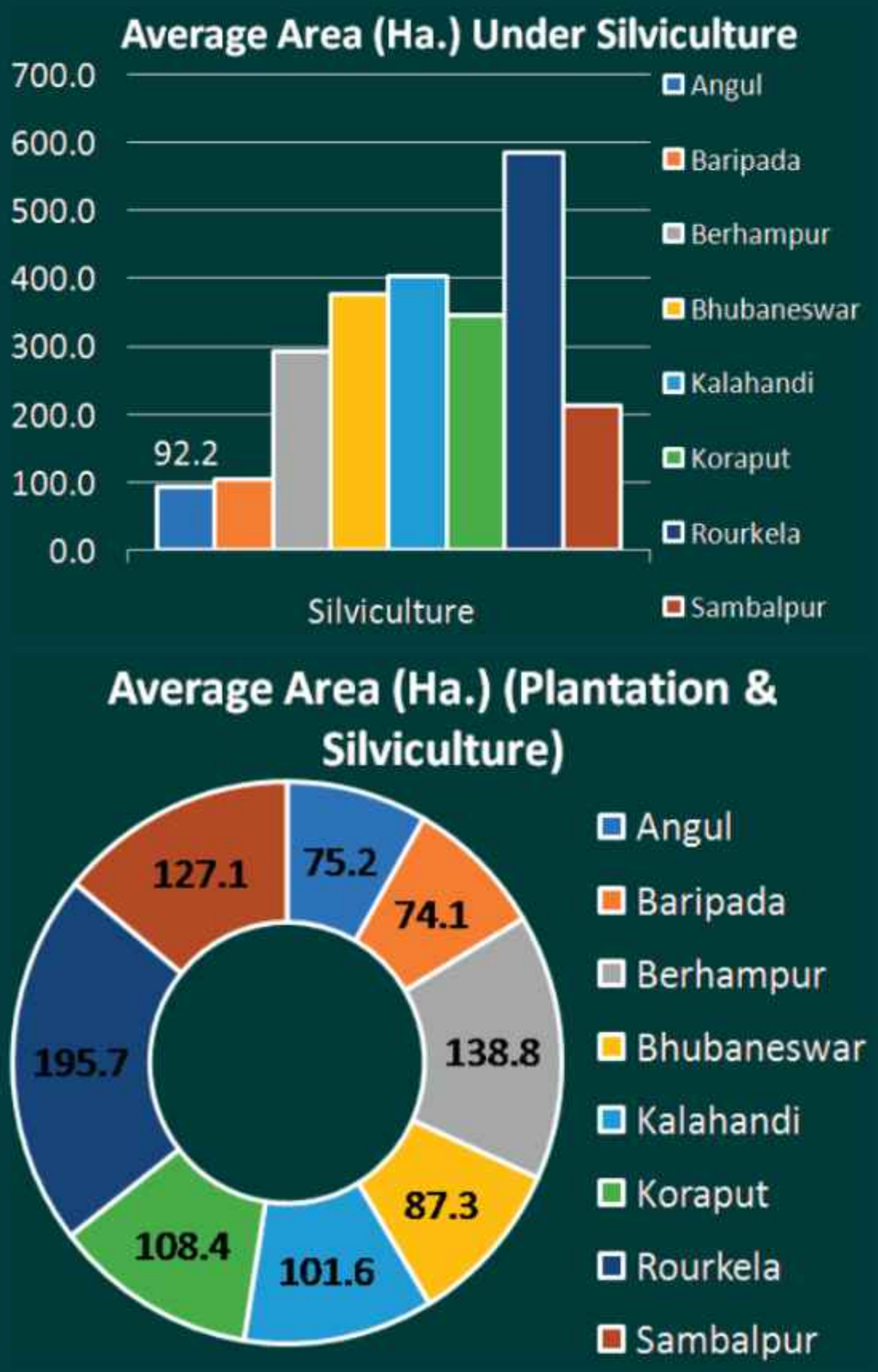
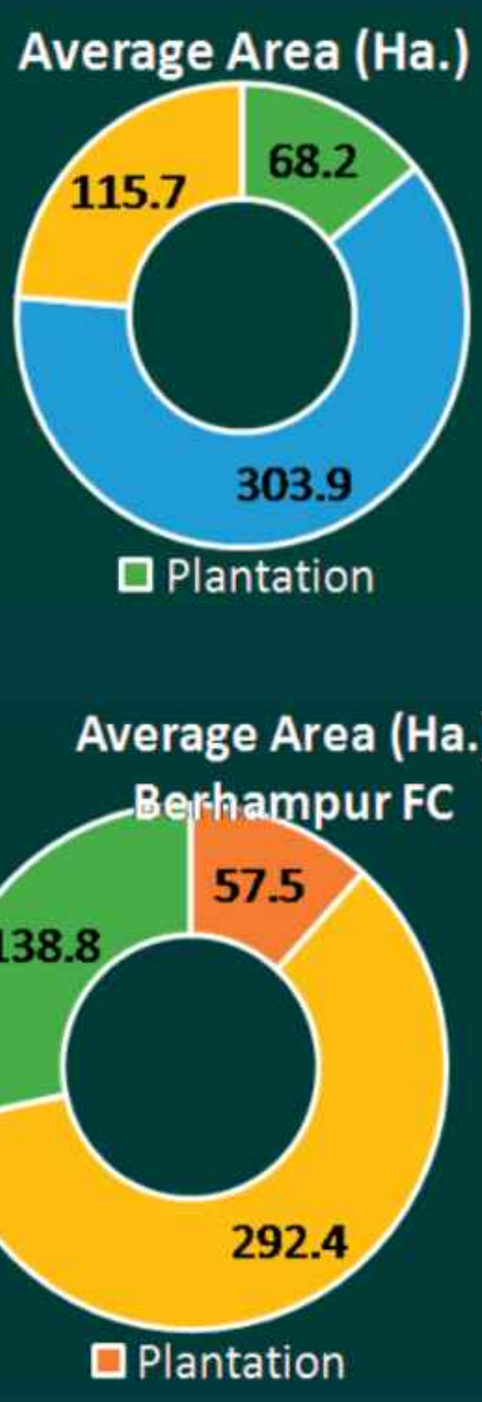
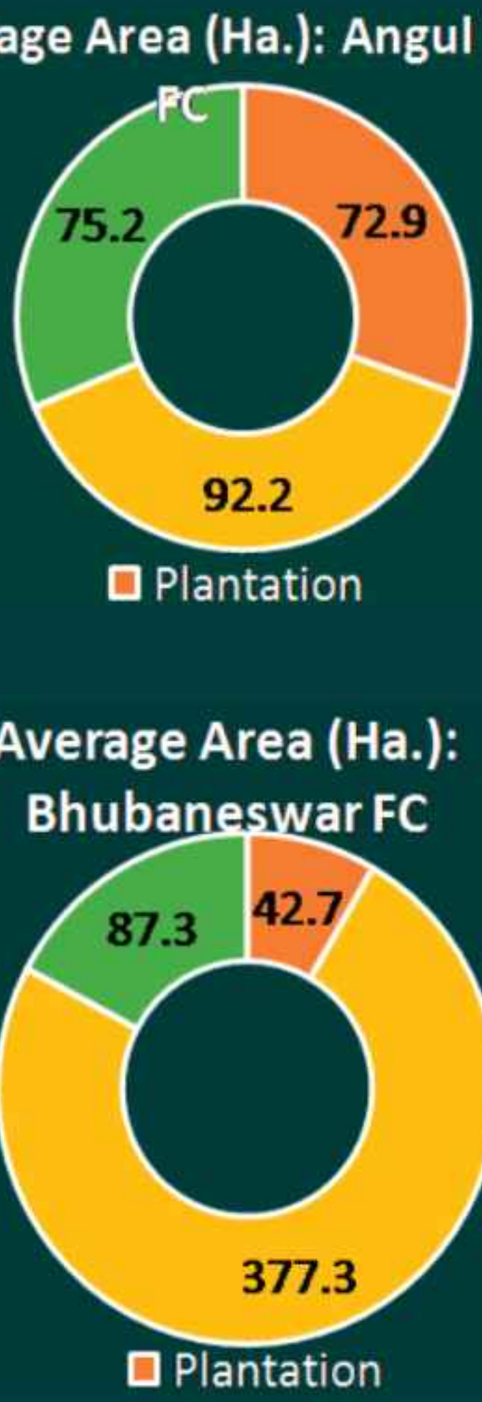
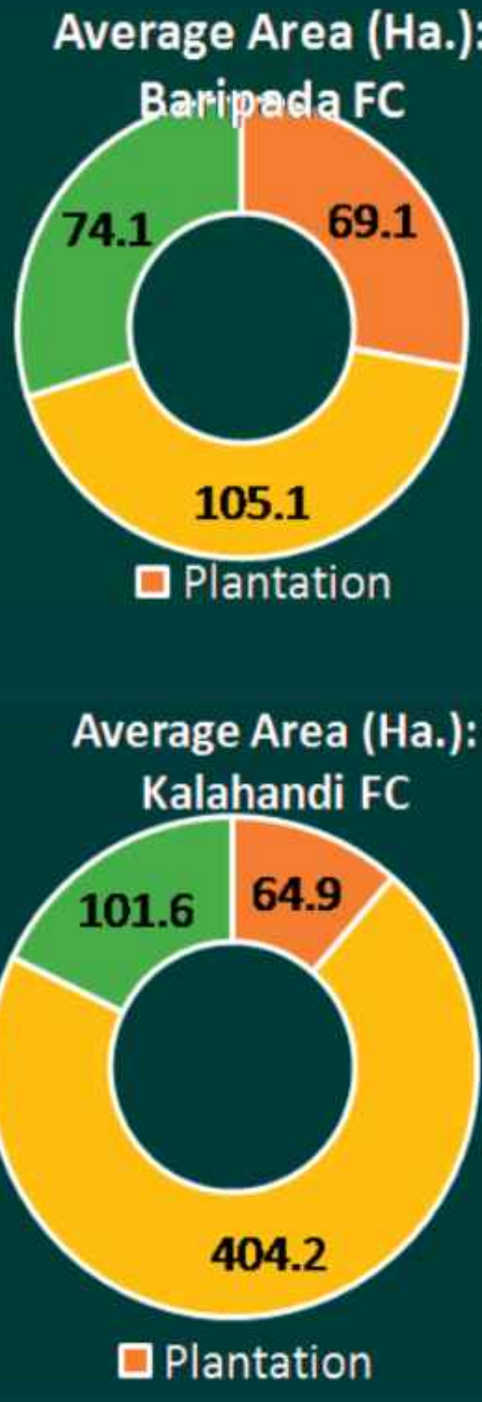


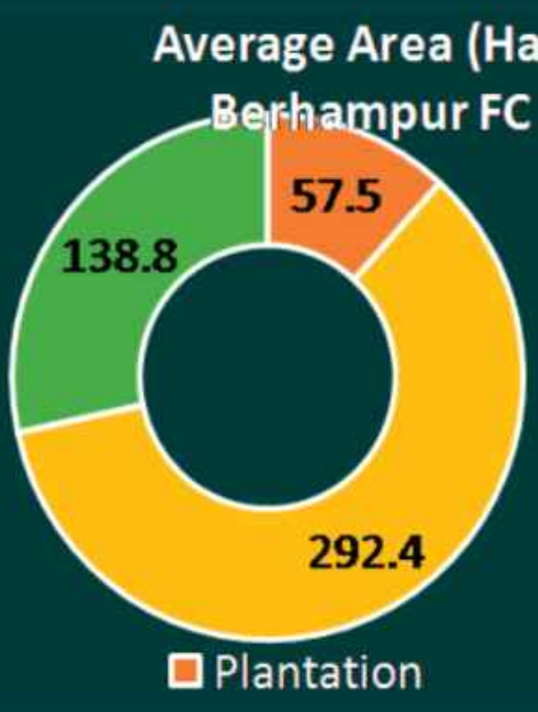
Figure 12: Area under Plantation & Silviculture (Study Area)

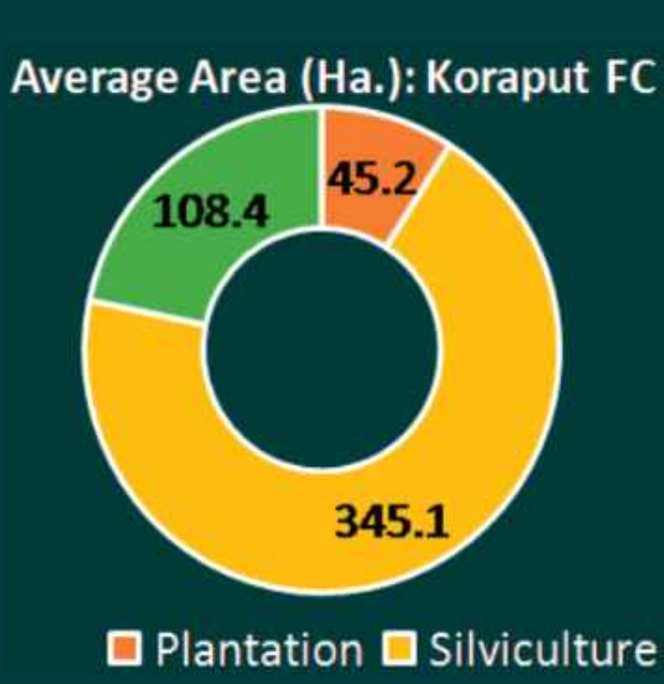
Average area under silvicultural operation, irrespective of its type, is 303.9 ha. with total area of 19,144.6 ha. In the silvicultural operation, emphasis has been given to SSO Bamboo (77.3 percent of the total area) followed by SSO timber (14.2 percent of the total area).

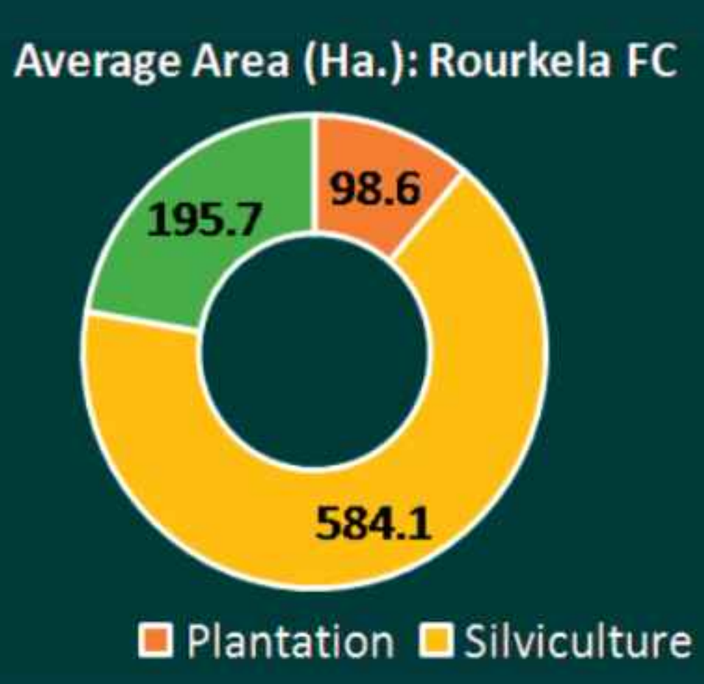












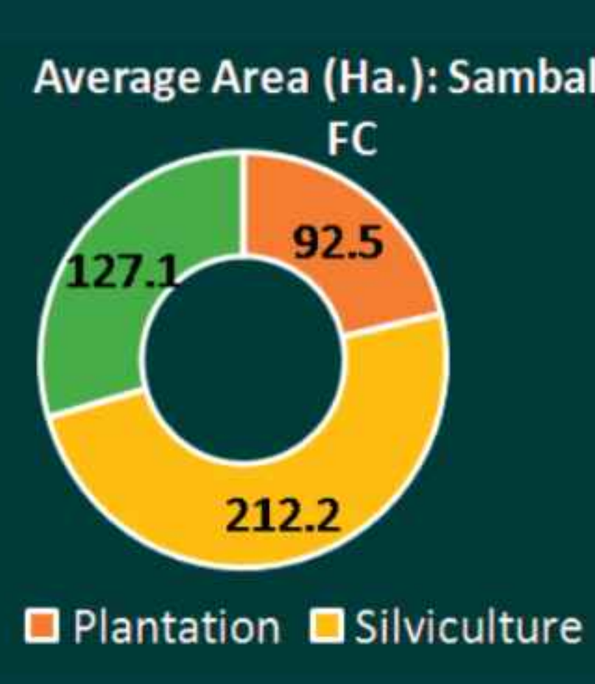


Figure 13: Average Area of the Sites by Forest Circle

6.0 PLANT SURVIVAL RATE:

Plant survival rate varies by plantation categories and also by forest divisions. Overall, survival rate is calculated to be 89.1 percent (all circle combines). Highest plant survival is reported in Sambalpur (93.1 percent) forest circle followed by Rourkela (91.3 percent) and Baripada (91.0 percent). Plant Survival Rate in Bhubaneswar and Berhampur circle is relatively less due to damage of plantation sites in the cyclonic storm.

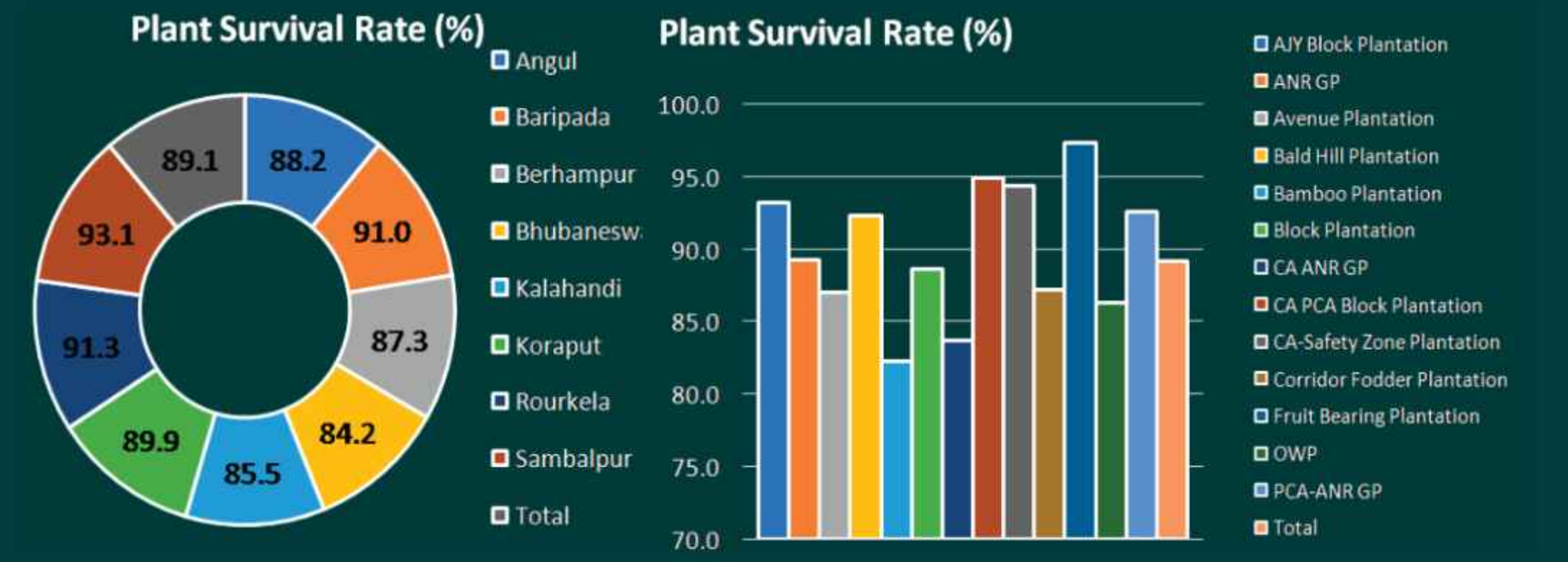


Figure 14: Plant Survival Rate

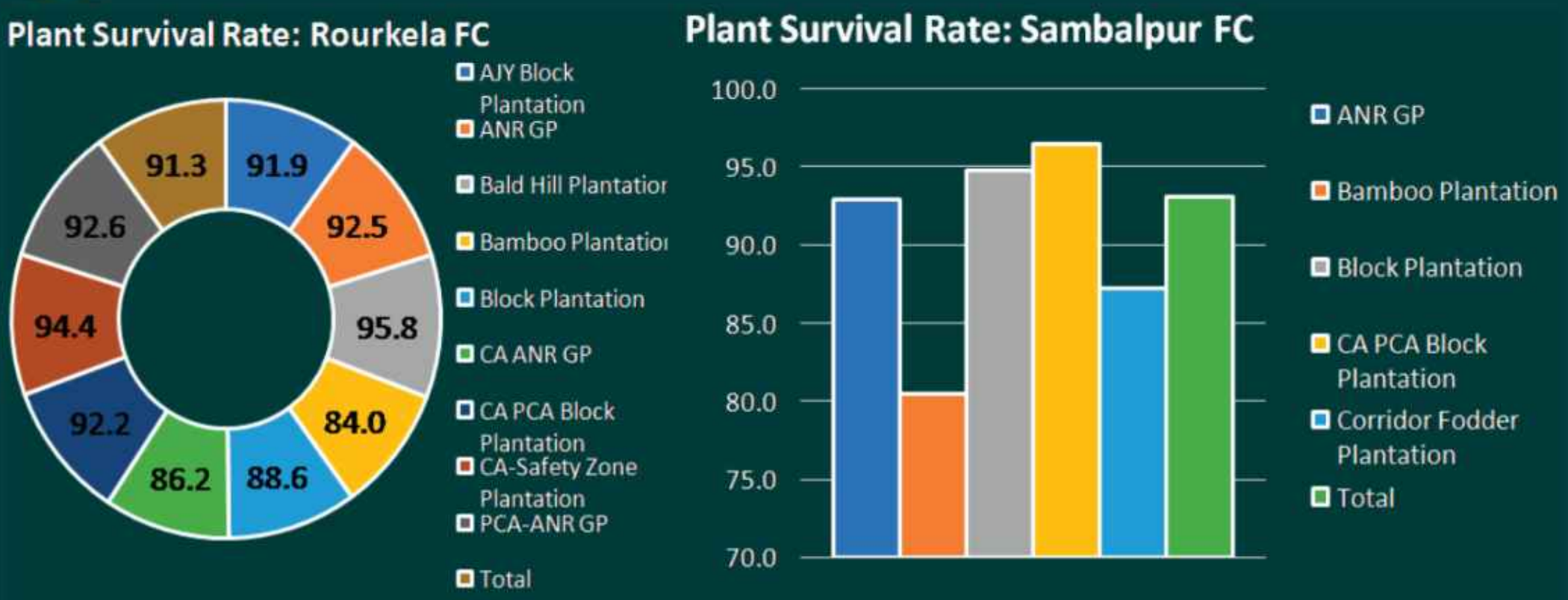


Figure 15: Plant Survival Rate by Forest Circle

Ranking of sites by plant survival rate reveals that about 23.4 percent are in >95% survival category, 15.5 percent are in the >93% &<=95 % category followed by 17.3 % in >90 % to <=93 % category.

Aggregating different survival rate categories, it can be concluded that 93.2 percent sites have plant survival rate within 80.0 percent and 87.1 percent sites have plant survival rate within 85.0 percent.

7.0 CANOPY COVER:

Canopy cover, as observed in the assessment, varies by plantation types, year of plantation and by forest division and circle. The average canopy cover in plantation sites found to be 44.68 percent whereas in silviculture sites, canopy cover observed to be 58.37 percent.

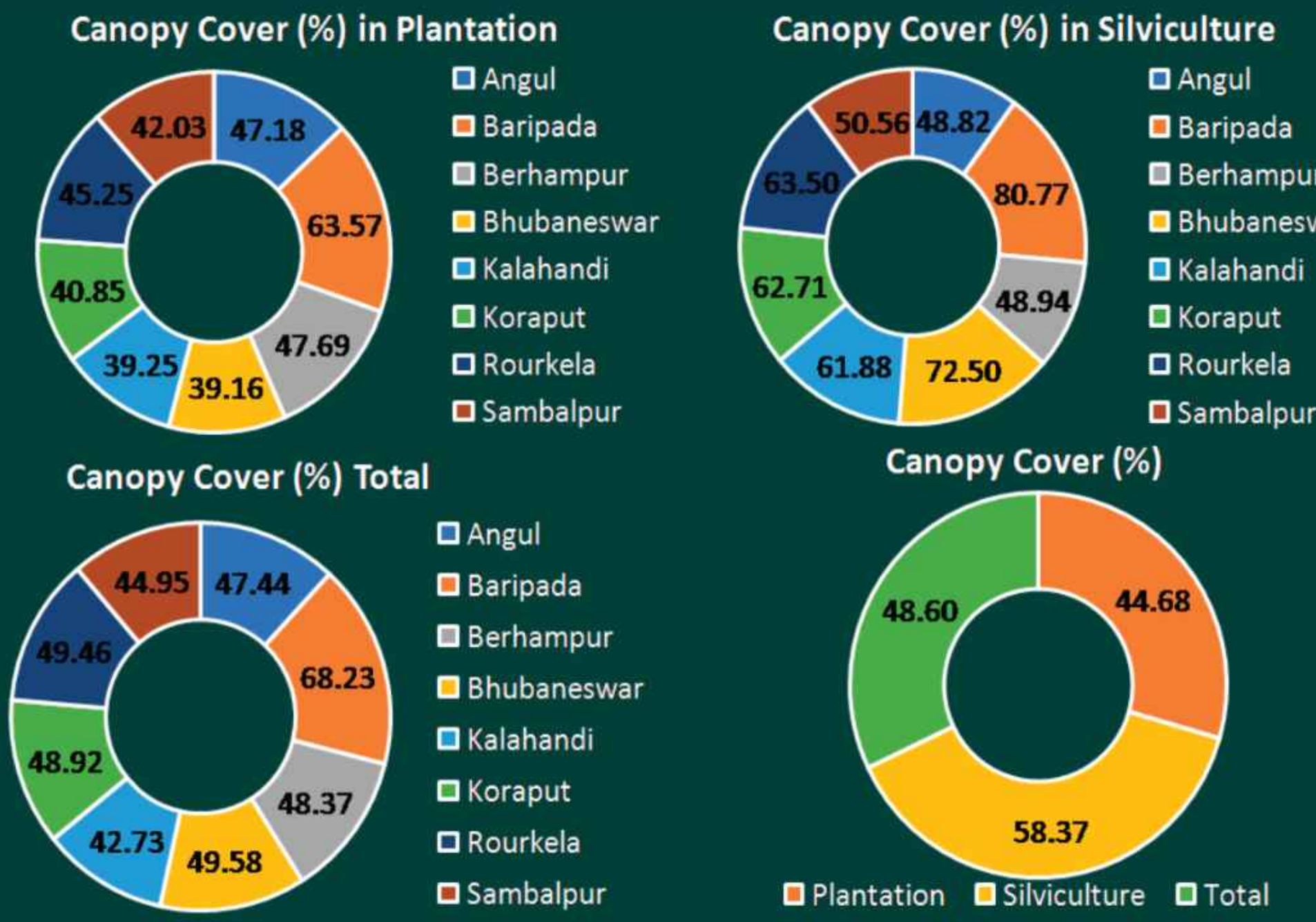


Figure 16: Canopy Cover in Forest Circle

Canopy cover in mangroves observed high among all the planation categories (100.0 percent), followed by safety zone plantation (70.0 percent) and Bamboo plantation (61.67 percent). Sites covered under silvicultural operations have better canopy cover in comparison to plantation sites. Average canopy cover observed to be highest in case of SSO timber (74.7 percent) followed by old teak management sites (70.0 percent).

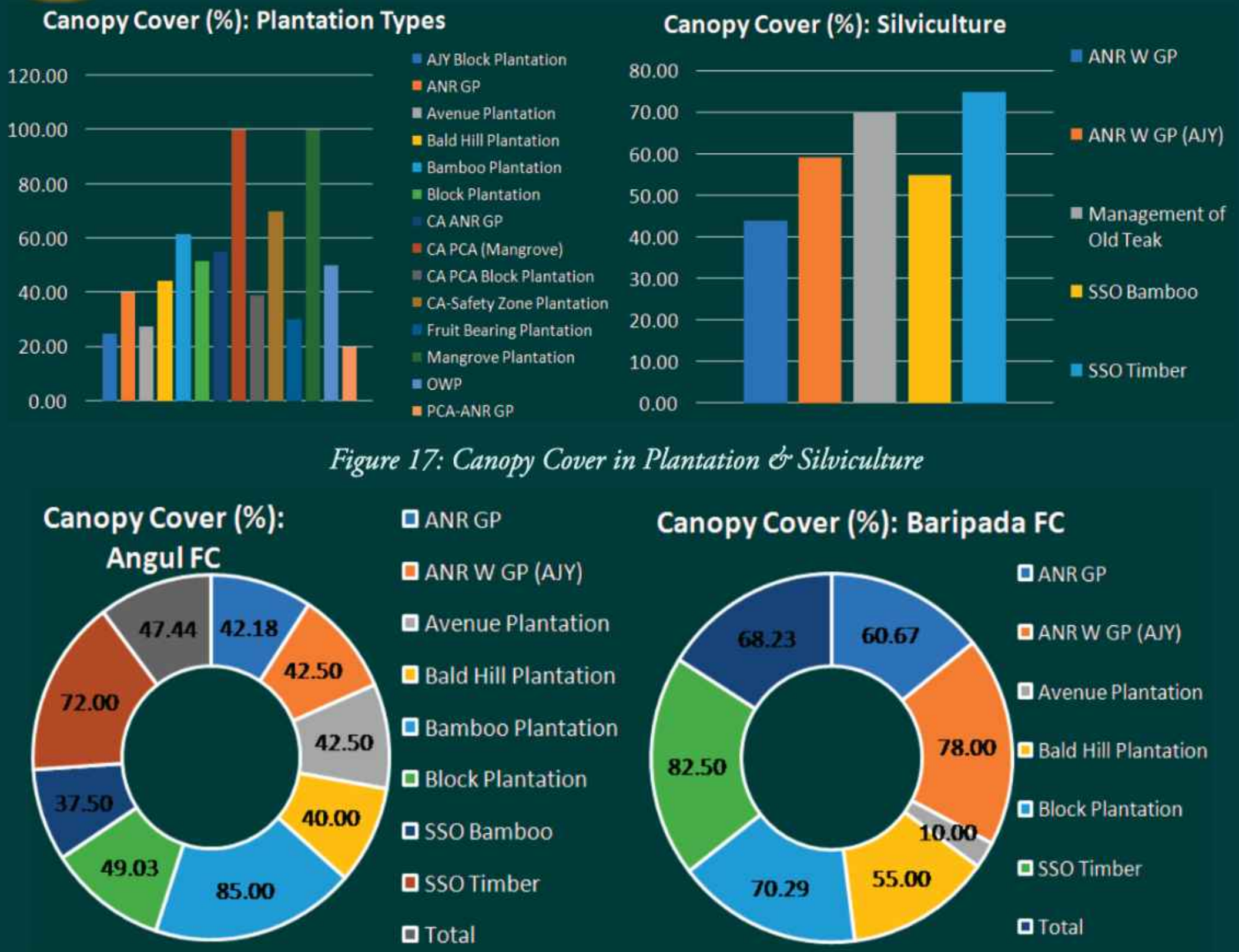
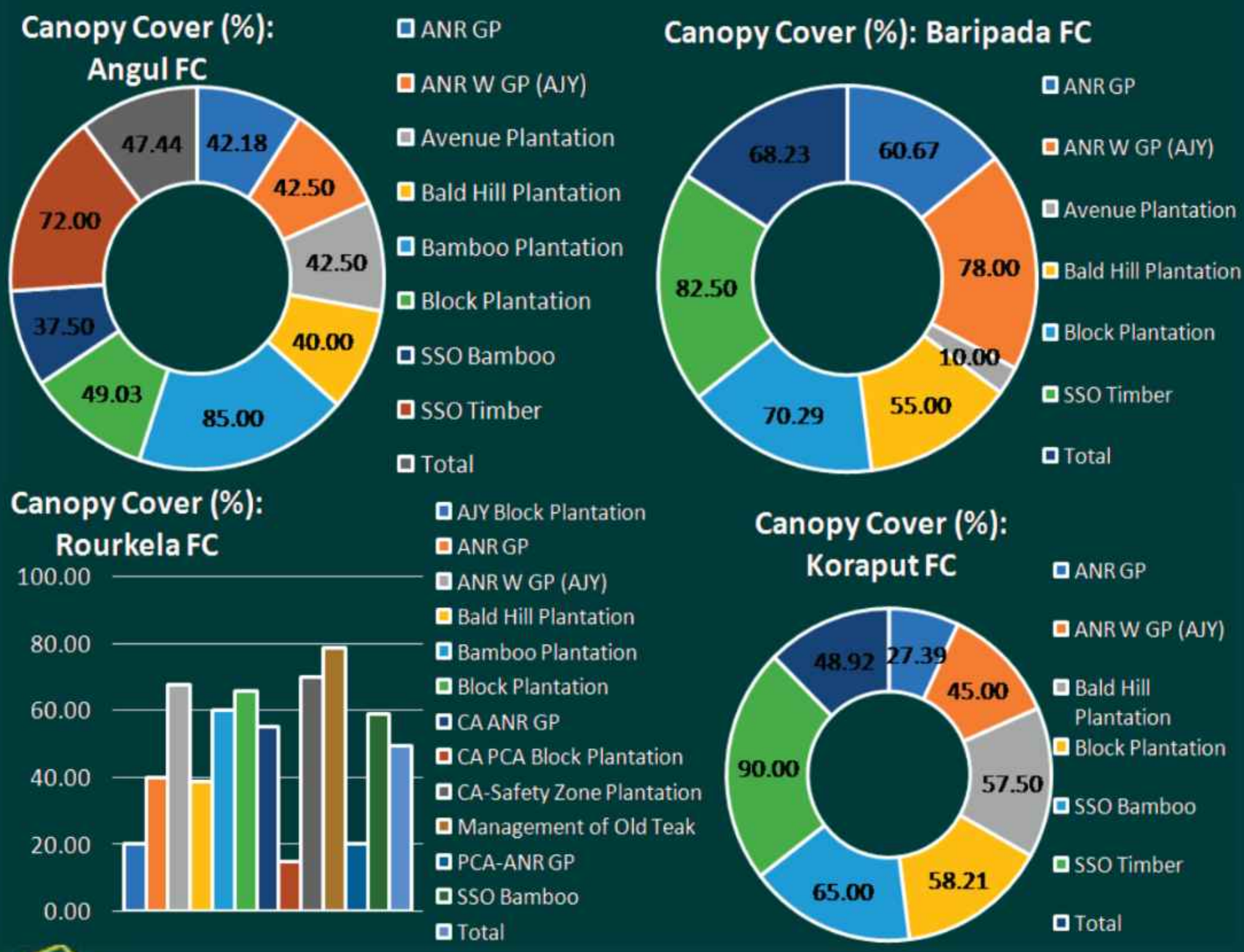


Figure 17: Canopy Cover in Plantation & Silviculture



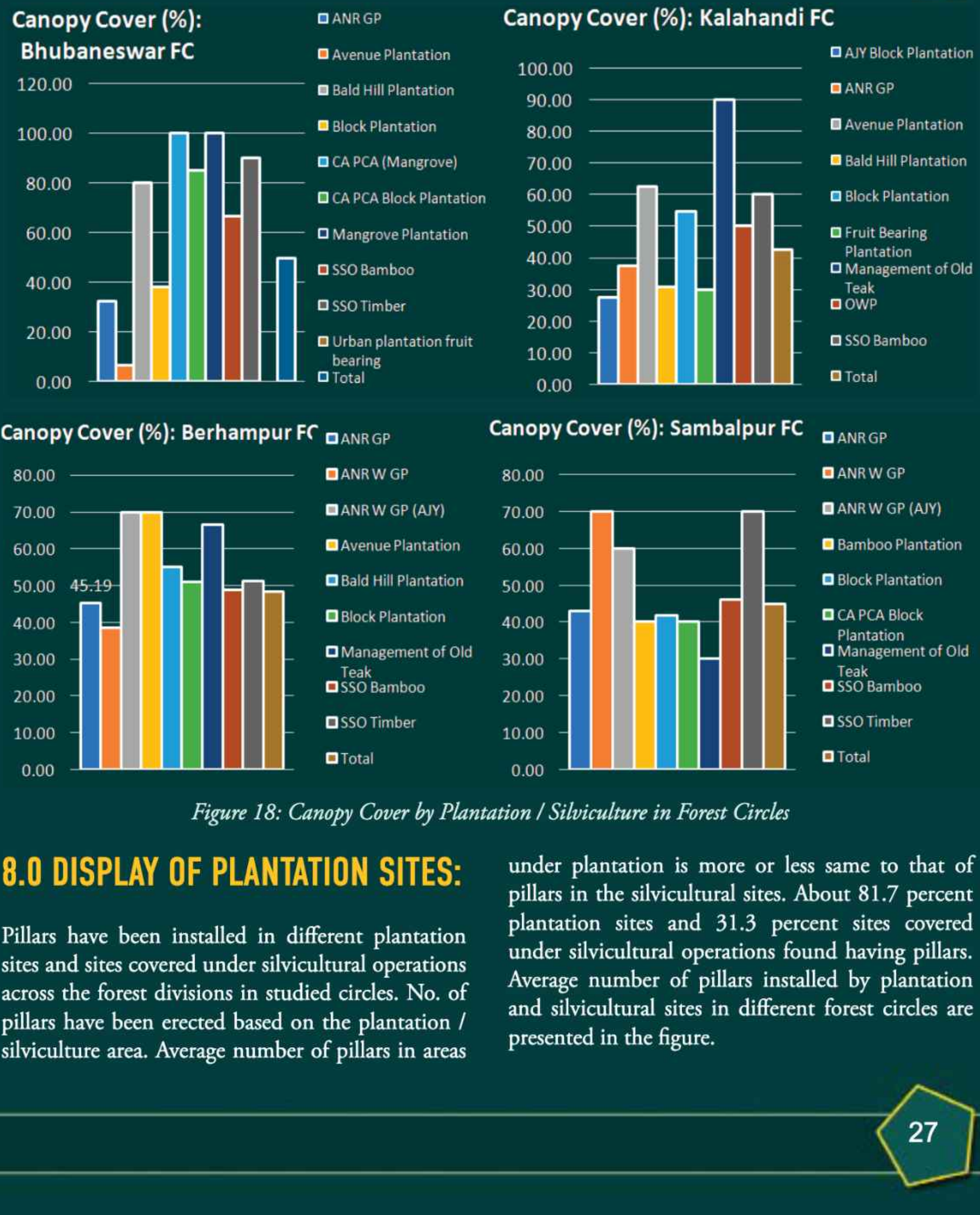
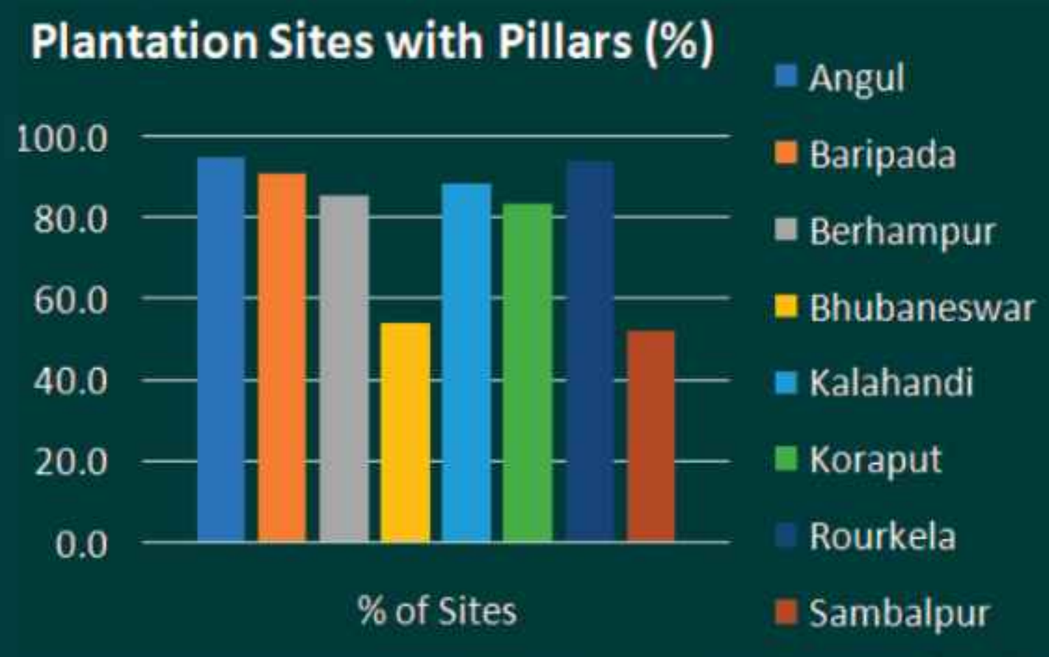


Figure 18: Canopy Cover by Plantation / Silviculture in Forest Circles

8.0 DISPLAY OF PLANTATION SITES:

Pillars have been installed in different plantation sites and sites covered under silvicultural operations across the forest divisions in studied circles. No. of pillars have been erected based on the plantation / silviculture area. Average number of pillars in areas under plantation is more or less same to that of pillars in the silvicultural sites. About 81.7 percent plantation sites and 31.3 percent sites covered under silvicultural operations found having pillars. Average number of pillars installed by plantation and silvicultural sites in different forest circles are presented in the figure.



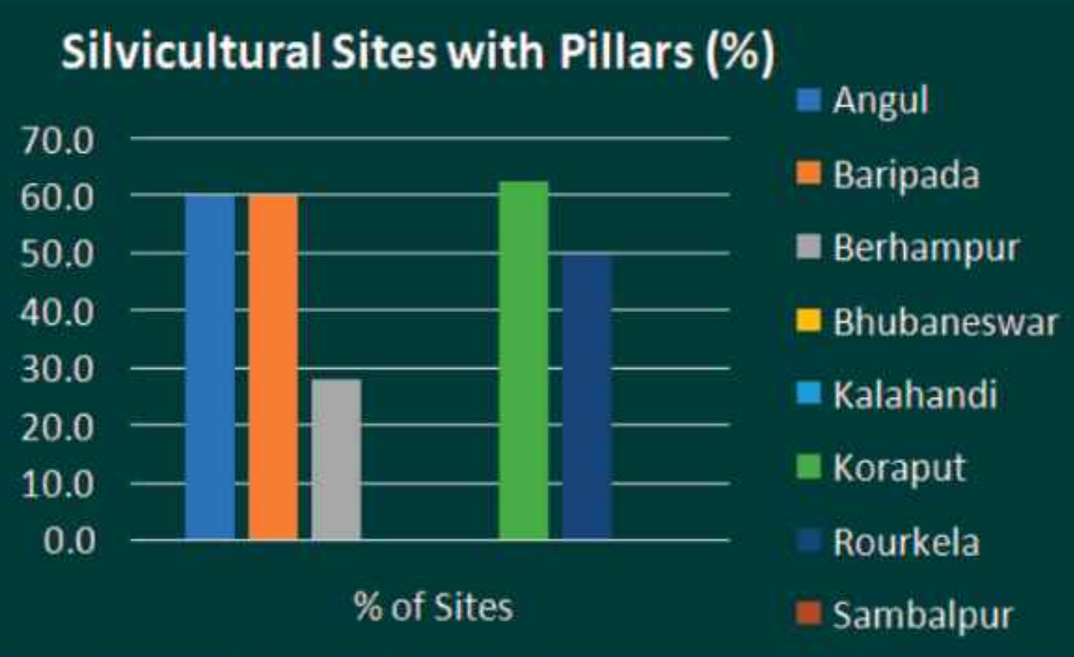


Figure 19: Installation of Pillars by Plantation / Silviculture Sites

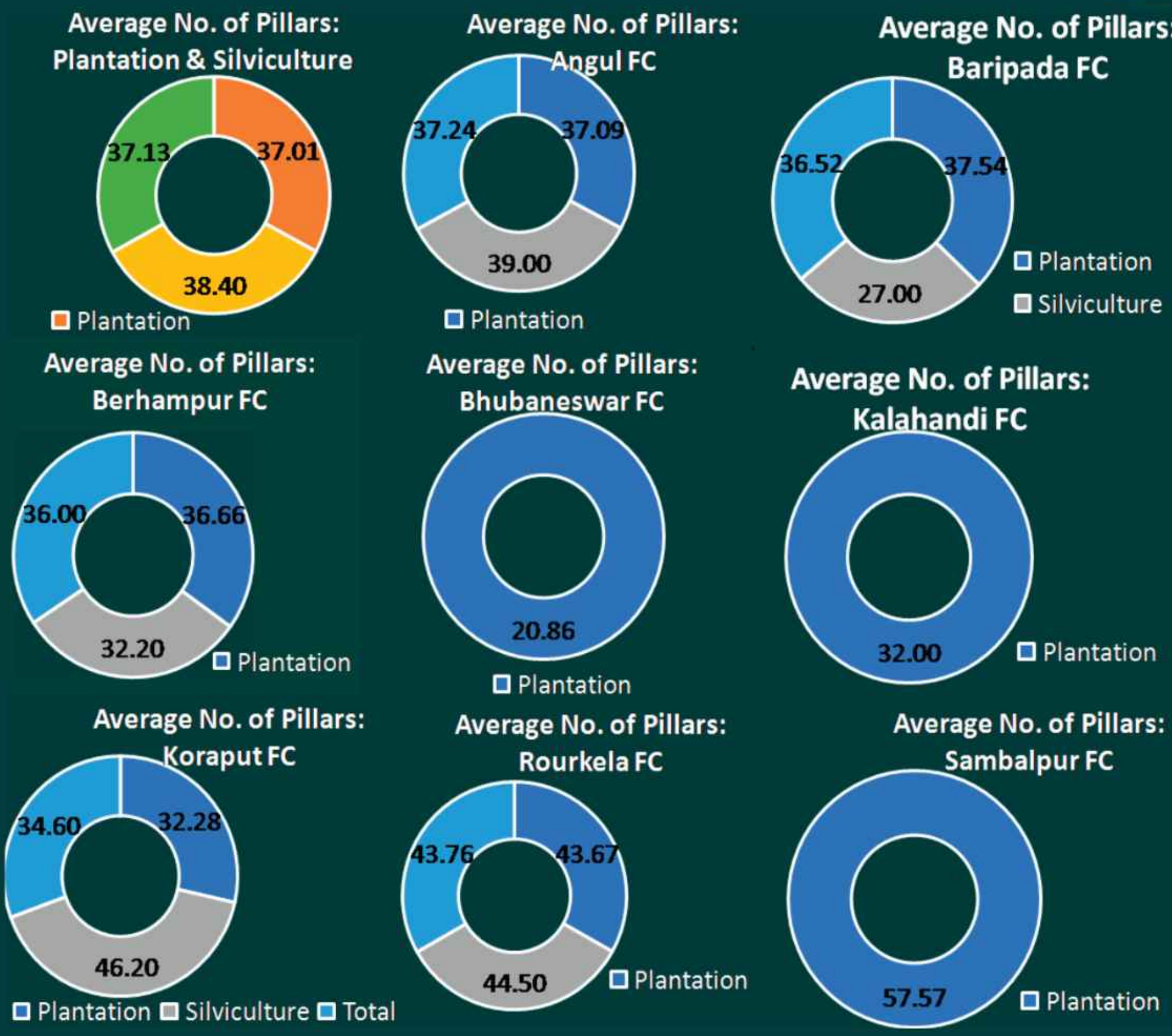
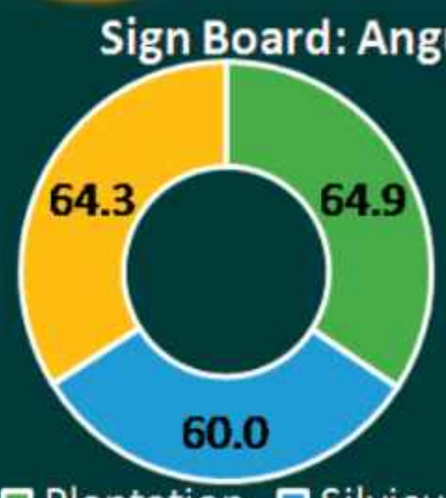
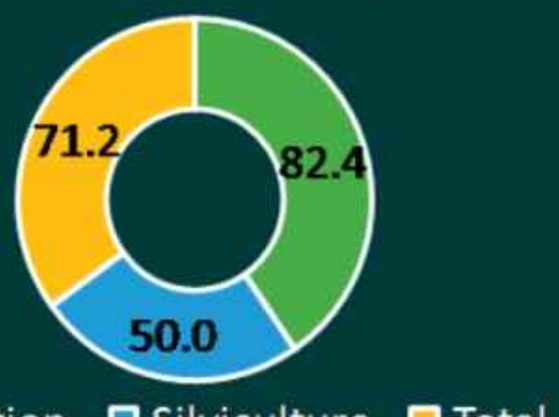
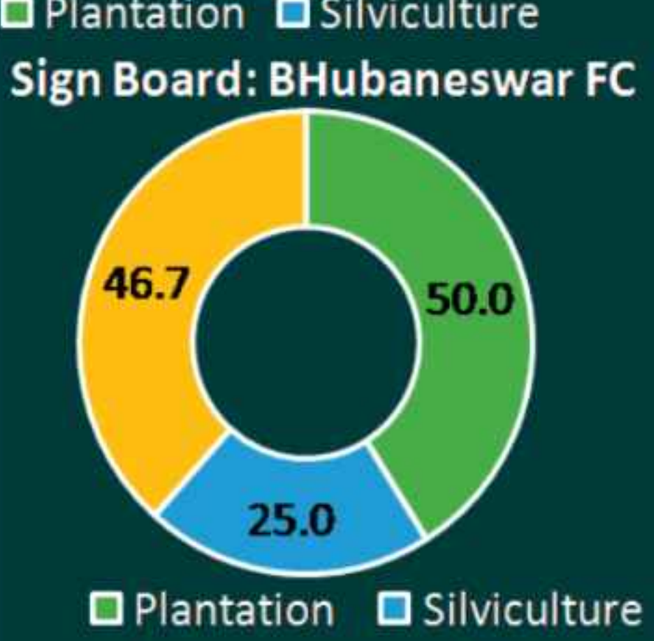


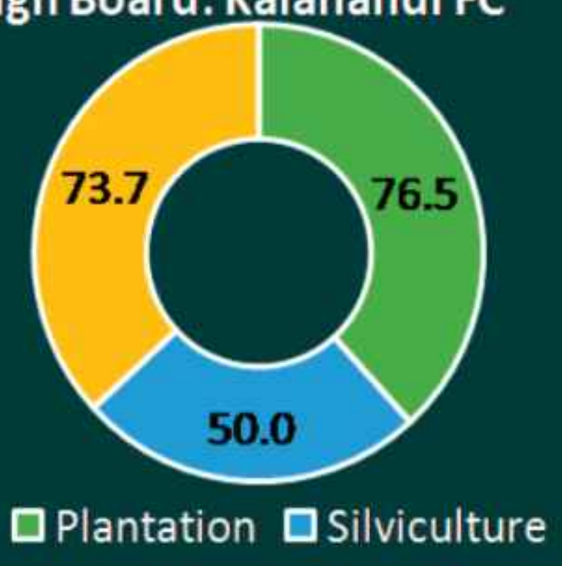
Figure 20: Pillars in Forest Circles

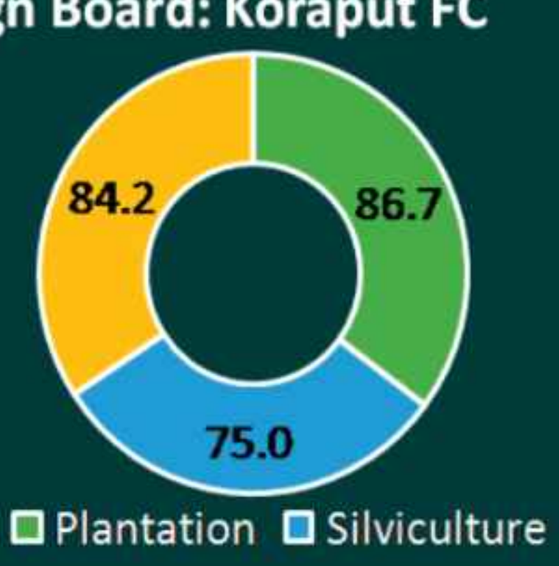
During assessment, sign boards are observed installed near the plantation / silviculture sites. About 73.3 percent plantation sites and 49.2 percent silvicultural sites found having sign board which highlights the plantation / silvicultural details.

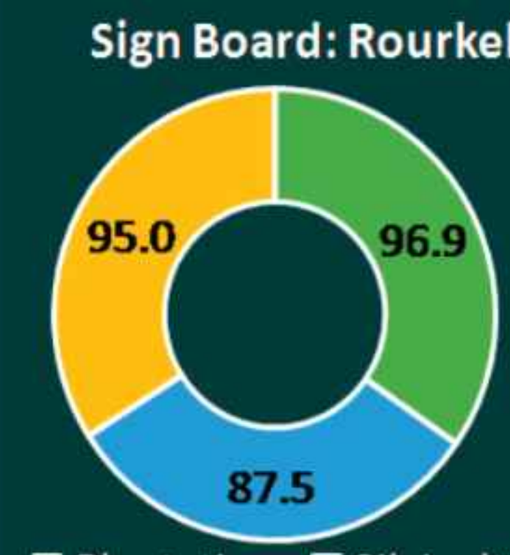












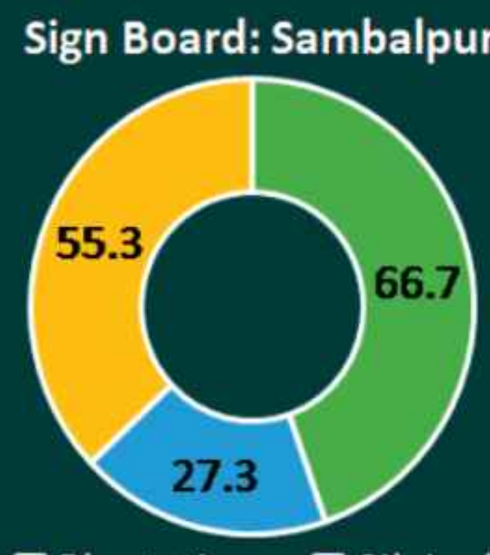


Figure 21: Sign Boards in Forest Circles

9.0 SOIL AND MOISTURE CONSERVATION (SMC) MEASURES:

Different soil moisture conservation measures have been taken under CAMPA in both plantation sites and area under silvicultural operations. Different SMC works have been taken up based on its locational suitability and assessed requirements. Soil moisture conservation measures taken up are like staggered trench, half-moon trench, LBCD, check dam structure etc.

Different SMC works have been taken up in plantation / silviculture sites with emphasis on staggered trench (58.9 percent sites), followed by LBCD structures (24.8 percent sites) and half-moon trench (15.0 percent sites). Contour bunding and percolation pits have also been taken up in some sites. In Angul, 78.6 percent sites having SMC structures, 83.3 percent sites in Baripada and 43.3 percent sites in Bhubaneswar are having SMC structures of different kinds. In the remaining forest circles, i.e., Berhampur, Kalahandi, Koraput, Rourkela and Sambalpur have SMC works in almost all the sites or multiple SMC works in different sites.

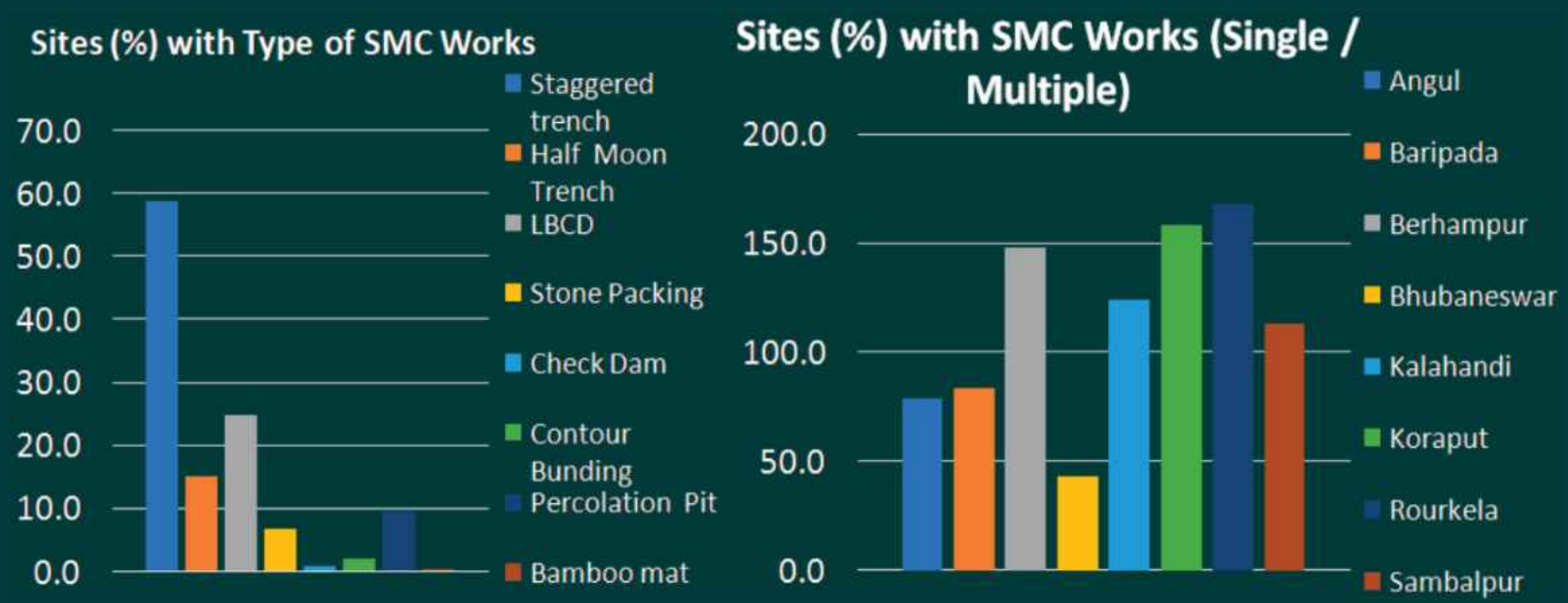


Figure 22: SMC Works by Forest Circle

There are about 38.2 sites (both plantation and silviculture) where single SMC work taken up whereas 37.3 percent sites have more than one SMC works (32.2 percent sites having two and 5.1 percent site having more than 2 SMC works). In plantation sites, 41.4 percent sites have single SMC work whereas 31.5 percent sites have more than one SMC works. In silvicultural sites, 25.4 percent sites have single and 60.3 percent sites have more than one SMC works.

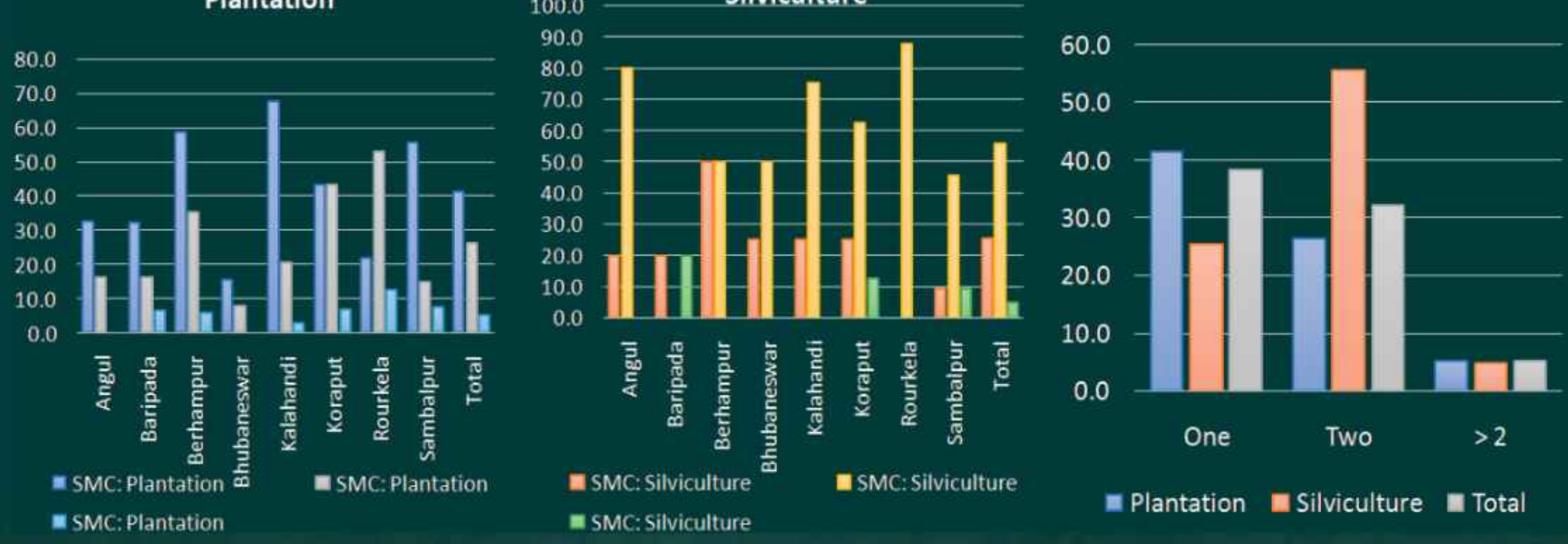
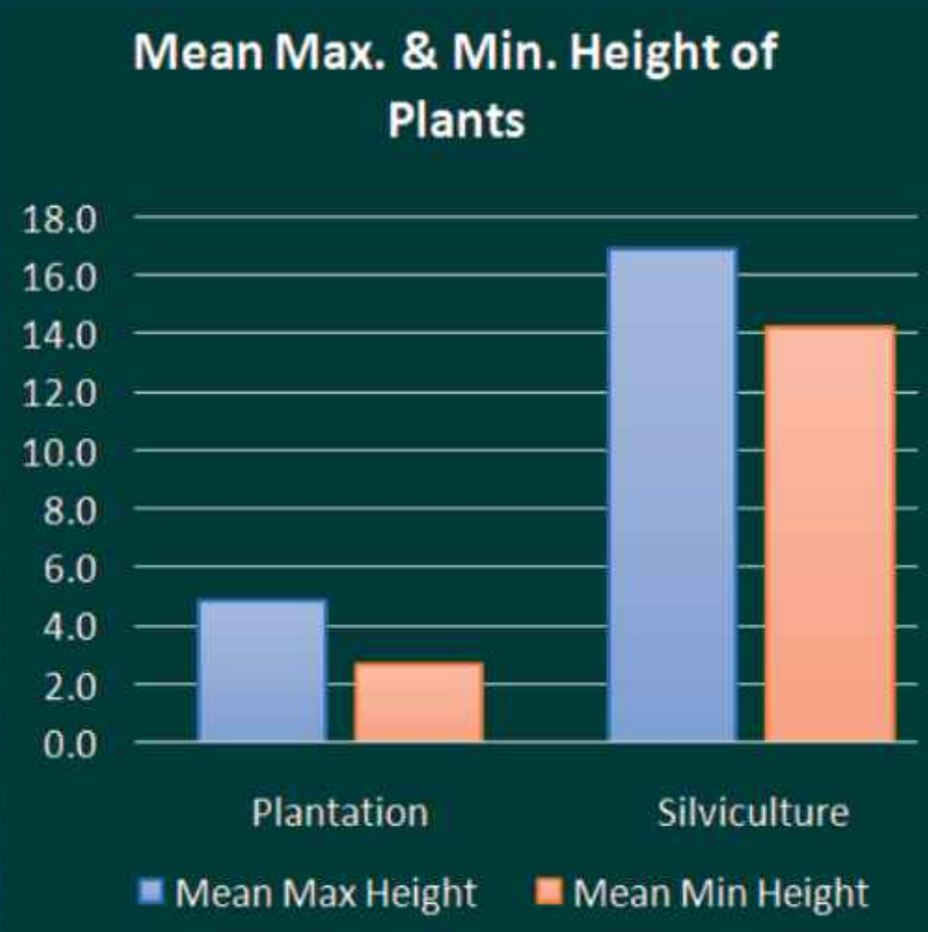


Figure 23: Single / Multiple SMC Works by Forest Circle

10.0 PLANT HEIGHT AND GBH/GCH:

The mean maximum height of the plants, irrespective of the year of plantation, location, type of plantation and plant species, calculated to be 4.9 mt. The mean minimum height of the plants at the circle level found to be 2.7 mt. for the plantation sites. Similarly, mean maximum GBH/GCH has been 21.2 cm and mean minimum GBH/GCH has been 11.0 cm (excluding bamboo plantation).In silviculture, mean maximum height of the plants measured to be 16.9 mt. and mean minimum height found to be 14.2 mt. The mean maximum GBH/GCH of the plans observed to be 114.4 cm. and mean minimum GBH/GCH observed to be 86.4 cm.



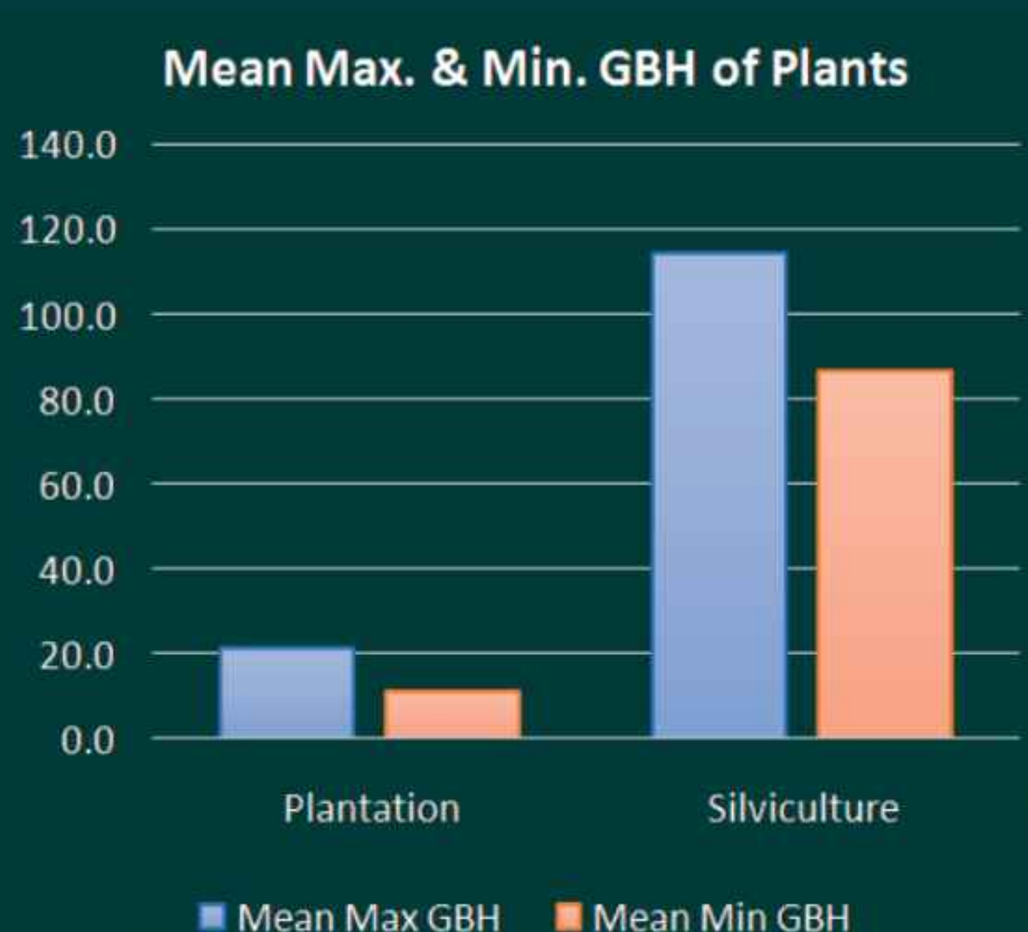


Figure 24: Mean Height and GBH/GCH of Plants

Height and girth of the plants by forest circle reflects that, irrespective of age of plantation and plant species, mean maximum height of the plants in plantation category is highest in Koraput circle (7.1 mt.) followed by Angul (6.0 mt.) and lowest in Kalahandi (2.9 mt.). Similar trend is observed in case of mean minimum height, where Koraput is highest with 3.9 mt. and Kalahandi is lowest with 1.7 mt. Similarly, in case of mean maximum and mean minimum GBH/GCH, Angul is the highest among all the forest circles (32.2 cm.).Irrespective of the site and plant species, the plants that were planted in the year 2009-10, is having mean maximum height of 8.3 mt. and mean minimum height of 4.9 mt.

The mean maximum and mean minimum GBH/GCH of the plants measured to be 39.1 cm. and 19.4 cm. respectively. The mean maximum and minimum height of the plants, planted in the year 2009-10 is highest among all the plantations taken up in successive years, excluding some plantation types, specifically in bald hill plantation where height of the plant is relatively higher than 2009-10 plantation. It is observed during assessment that there is difference in height and girth of the plans by species, apart from year of plantation and type of plantation.

11.0 PLANT PROTECTION MEASURES:

Different plant protection measures have been taken in all the forest divisions to improve plant survival rate. Plant protection measures taken are like fencing, fire protection measures, watch and ward etc. In certain cases, villages and VSS have been found taking care of the local forest area and plantation sites. At the circle level, covering all the forest divisions, it is found that high emphasis is given to watch and ward among all the protection measures. For old plantations (like plantation of 2009-10), watch and ward provision was made for three years, excluding the plantation year. In the later stage, the site was covered under general monitoring and supervision. But for the plantations taken up in 2016-17 and 2017-18, watch and ward observed at the site level. In specific cases, fire protection measures have also been taken.

12.0 RECORD KEEPING AND DOCUMENTATION:

Different records / documents are maintained at the range office level with respect to plantation / silvicultural activities, such as plantation journal, plantation site map, treatment map and other registers. Plantation journal is observed for 96.0 percent plantation sites, covering all the forest circles. Journal for planation activities found for all the sites in case of Berhampur forest circle, Bhubaneswar and Sambalpur forest circles. Of the available plantation journals, 97.6 percent were found to be fully prepared. About 90.8 percent sites, across different forest circles, have map of plantation sites where Sambalpur is having map for all the plantation sites.

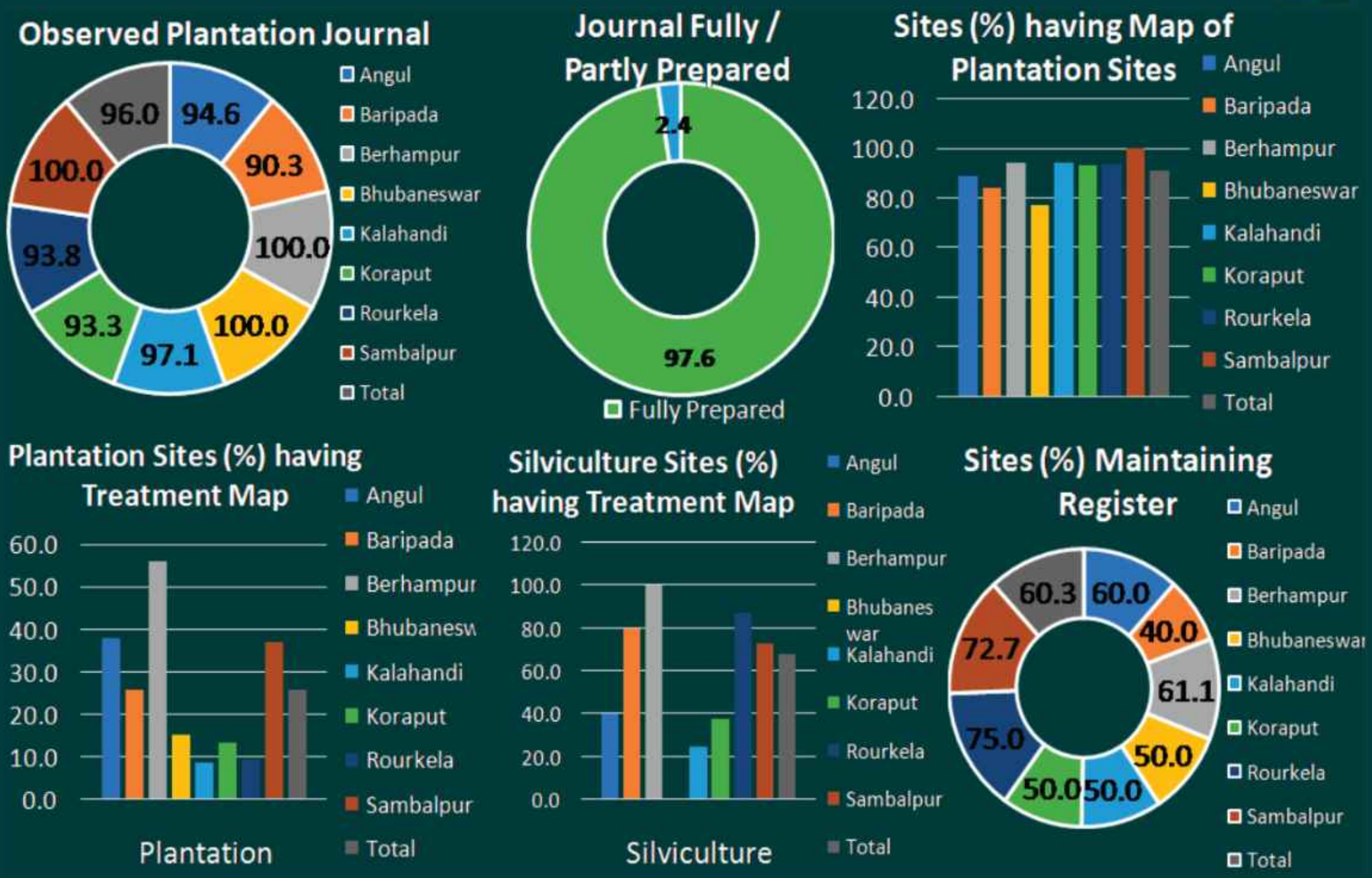


Figure 25: Different Records Maintained

13.0 MAJOR FINDINGS FOR OTHER THAN PLANTATION ACTIVITIES

1. CAMPA has been supportive in developing essential infrastructures that has helped in management of forest resources, enhanced community participation, improved monitoring mechanism, strengthened wild life management. The created infrastructures found to be in use productively.
2. CAMPA fund has enabled to engage contractual watch and ward staff in forest operation, management and wildlife protection actions. Plantation casualty largely depended upon the watch and ward which benefited with continuity of the contractual employees who were mostly drawn from local community.
3. CAMPA fund helped in intensification of protection measures and wildlife management across forest divisions;
4. Water bodies created under CAMPA benefited wild life and local communities;
5. Involvement of VSS at various stages of plantation and forest management has improved. VSSs were found to be supportive to the department and activities taken up for forest protection;
6. Mega nursery Infrastructure like seedling yard, compost pit, mixing yard, store house, seedling beds, etc. have raised the departmental capacity to produce quality planting material.
7. At few wildlife sites, causeway and culvert constructed under CAMPA has served the desired purpose in easing connectivity.

14.0 SUMMARY NOTE:

For need based interventions and effective execution, plan of operation has been prepared on annual basis under CAMPA. The annual plans of operation (8 nos.) having both core and non-core activities, looking at the specific identified requirements. Core activities comprise of plantation, creation of SMC measures, forest protection, wildlife management, implementation of Ama Jungle Yojana, sacred groves promotion and management. The non-core activities cover research and development, Capacity Building; infrastructure development; IT and working plan exercise; monitoring, evaluation and accounting;

Out of the total block plantation during the period 2009-10 to 2017-18, about 98 percent of block plantation has been done during the initial years. Since 2013-14, a rising trend of bald hill plantation is observed which has been quite successful. Implementation of avenue plantation was focussed in the initial years along with compensatory afforestation. ANR, owing to its inherent merits of natural regeneration of trees, have been accorded due priority in CAMPA. Silvicultural operations were undertaken by all the forest circles and regeneration of bamboo is found to be one of the focussed interventions. Uprooting of invasive weeds were done in the year 2009-10 in all the forest circles and management of economic species was implemented in the year 2010-11 and 2011-12.

Different SMC structures were created under CAMPA like loose boulder check dams, contour trenches, gully plugging etc. SMC structures created under CAMPA are site specific and undertaken as per the need assessment by frontline forest officers. Apart from this, different infrastructures were also created like office buildings, bit houses, residential quarters for forest department officials etc.

Augmentation of manpower by employing forest protection squads, local youths and strengthening of infrastructural activity like Forest protection barracks, and investing in fire safety equipment like blowers etc. has constituted added focus for forest protection under CAMPA. By the end of 2016-17 about 500 sacred groves were developed. Due to such activities, the local community found supportive to fore development and management measures.

In order to protect the wild life and wild life habitat, CAMPA have dedicated provisions for wild life management. A range of activities comprising of deployment of wild life squads, river/sea squads, anti-depredation squads, elephant trackers etc are undertaken under CAMPA.

In areas covered under AJY, association of local VSS has been promoted and supported for forest development and management. In the opinion of local VSSs, due to CAMPA, there has been better conservation and protection of forest resources and increased livelihood opportunities for VSS members.

Human resource development has been another focus area under CAMPA, Capacity enhancement measures have been taken which include theme-based training, strengthening communication and capacity building.

15.0 WAY FORWARD

15.1 Plantation

1. Plantation of indigenous species may be encouraged more. Species selected for planting should be done in accordance with local forest types and species composition in the forests of respective agro-climatic zone and physiography. Polyculture mode of plantation may be practised in all sites so that the plantation develops different canopy layers. Species should be selected on the basis of soil condition of the plantation site. Climate resilient drought hardy species, good coppice need to be identified for planting in degraded open forests.

2. Advance planning for plantation programme would help in developing quality planting materials, site treatment, pitting, manuring, etc. to ensure growth and higher survival rate. In those lands where soil quality is not conducive for growth of plant, FYM can be applied during initial years of plantation.

3. Ideally 2-year seedling could be used to prevent casualty due to browsing and wind damage. Towards quality planting materials, efforts may be directed for germinating it by best quality seeds from indigenous mother trees.

4. Maintenance and watch and ward activity could continue for 6 to 8 years for sustainability of plantations. Allotment of plantations to VSS for upkeep and maintenance in exchange of a consolidated amount per year as an incentive can be thought of. Number of watchers could be in proportion to the size of the plantation site. It is ideal to place one watcher for each 10 hectares of plantation. Brush wood fencing is required for the plantation in site which is nearer to the habitation, unless successful community participation is ensured.

5. As far as feasible, contiguous areas should be taken up for consecutive planting in successive year to close canopy in open forests and for ease of maintenance and protection. Post planting operations should be taken up in a time bound manner, as it is observed that delayed release of fund seriously affects post planting work and has a tell-tale effect on the condition and growth of planted seedlings.

6. After damage of installed sign boards and pillars, there should be reinstallation of the same for proper demarcation and identity of the plantation site.

7. A combination of planting models with specific objectives should guide species selection and planting design. Only mixture of species should not be the criteria of planting design. Criteria like fuel wood production, NTFP production, Fruit plants corridor, Bamboo breaks, Medicinal trees grove etc. could be various models adopted in selected sites every year.

8. Encroached forest land and land earlier affected by shifting cultivation should be given priority in afforestation works so that the area is salvaged permanently. Fruit bearing tree species may be planted along with other species as it will promote interest of the locals for protection and will also provide some livelihood to them.

9. Root trainer seedling technology is viewed to have mixed result. It's efficacy however needs proper evaluation.

10. In cyclone prone areas, species identified to withstand strong wind and cyclone need to be planted. Horticultural species can be promoted in rural areas outside forests under entry point programme to provide livelihood along with green cover.

15.2 Silvicultural Operation and SMC:

More focus may be given to silvicultural operations, apart from plantation, owing to better growth of trees. But the person days allotted for SSO Bamboo work seems inadequate to carry out all the planned activities. Hence, person days may be increased for silvicultural operations. Planting of 2-3-year-old bamboo seedlings has a better chance of survival and growth. Seedlings developed through layering and cutting technique has been adopted in many states to raise successful bamboo plantations.

Subsidiary silvicultural work like climber cutting and thinning in high forest, forests with high canopy and density can be taken up as a regular activity. Limited pruning and thinning seem to have been done in old plantations including Teak. Under CAMPA, emphasis was given to teak plantation pruning and mixed plantations were less focused upon. Congested mixed plantations beyond 10 years need thinning which can be taken up. It will also be helpful to produce fuel wood and timber for local people.

Bamboo SSO works should be taken up in a continued manner so as to cover a particular forest block in 2-3-year time, instead of operating in a scattered way in different forest blocks. Rotational closure of forests to grazing would be helpful in regeneration of severely degraded bamboo areas. The adjoining villages need to be roped in for bamboo SSO works in a way that forest closure to grazing can be enforced.

There should be periodic termite treatment measures against termite attack to teak trees in various plantation sites. Along with this, regular maintenance on SMC structures would improve the efficiency and durability of the water and soil conservation system

There is constant need to augment the water harvesting structures and various SMC work particularly in degraded sites, and hilly terrains in many districts. Inlet and outlet provision may be made in water bodies for proper management of water inflow and out flow, especially in monsoon.

Fire protection measures such as fire line creation, training of fire squad & upgradation of equipment may be a regular activity, especially before the onset of summer season. For effectiveness of fire lines, its maintenance may be done on routine basis.

15.3 Training - Capacity Building:

Need of training of Forest Staff on proper documentation of Plantation journal, record keeping and reporting is felt. There should be well structured training modules and annual training schedule for different categories of regular and contractual staff. The CCF training and Research could be in charge of monitoring implementation and guidance of the overall trainings conducted at field level.

Resource persons may be drafted from different line department, academic institutions and NGOs. Organising refresher trainings on annual basis would also be helpful.

A professional agency can be engaged to assess training need, develop short term training modules and content design in consultation with the department. Exposure visit within the state and to outside state for lower rung staff like guard, forester would expose them to best practices.

15.4 Infrastructure Development:

Different infrastructures have been created under CAMPA over the years which would require repair and maintenance in coming years. Hence, funds provision may be made accordingly to meet the requirements.

Permanent electricity and water connection required to be provided to certain categories of buildings which is currently using alternative power or not having such facility. Along with this, plan and design of each category of building may be re-examined like making provision of staircase in residential quarter to access the roof, sewerage tanks, boundary wall and tube well in residence of Ranger, Forester and Forest guard. Provision of iron window and door panel could be substituted with wooden or PVC door/window panels in view of extreme heat in western Odisha.

15.5 Wildlife Management:

Meadow development may be part of CAMPA intervention which would also encourage eco-tourism in specific destinations.

Fodder plantation has been one of the activities which may be further augmented and prioritized in identified elephant corridors. Such type of plantation would restrict elephants to forest area and in the process, minimize human elephant conflict.

Permanent tracking stations in the elephant corridor and adjoining habitations, regularly visited by elephants, would be helpful for round the year monitoring of animal movements.

Some incentive system may be thought of, apart from current emoluments, for para workers, anti-poaching staff, elephant trackers and persons in different forest squads. Such provisions would act as a motivational input for the frontline workers.

Maintenance of solar fencing system should be taken up periodically. In many instances it is observed that once the battery is damaged, there is no further provision of maintenance of solar fencing system. Provision of AMC or empanelled vendors for maintenance at circle/division level would help to keep all units functional and serve the objective.

Along with this, solar lighting of vulnerable villages in the forest fringes can be helpful to prevent village raiding by elephant.

There has been less focus in maintaining VHF system in the wake of mobile use. However, in many interior areas it serves useful purpose. So, all the dysfunctional units may be repaired/replaced and updated.

Before taking up water bodies, site selection may be done based on techno-feasibility assessment, giving due importance to approachability of wild animals.

Dovetailing wild life management schemes with CAMPA would help to avoid overlapping of similar works in specified sites and having additional resources.

Use of mobile APP for tracking animals and communication may be thought as a part of wildlife management approach. An information network (APP based) and WhatsApp group involving all vulnerable villages of a range can provide advance intimation and warning on wildlife movement. Use of drone in monitoring wild animal can be thought of on experimental basis.

Required additional provision may be made for more effective sea patrolling like providing additional fuel contingency for trawlers engaged in sea patrolling (Ex. Rajnagar WL division). The wildlife protection squad patrolling at sea (Rajnagar WL division) may also be given additional training and sea worthy equipment and protective gears.

Provision of a greater number of rescue units and increased mobility to attend injured animal may be given importance in future. Among others, Department may also plan for online payment to affected households for the crop damage caused by wildlife. Regular awareness campaign to protect wildlife and do's and don'ts for public in vulnerable areas through electronic and print media can be taken up as a round the year activity by wildlife wing.

15.6 Ama Jangal Yojana:

It is a flagship programme of GoO which is at the initial stage of implementation. The budgetary allocation to the scheme and its adequacy may be re-examined. Required budget provisions will support in taking up different livelihood centric entry point activities, apart from plantation and other conservation measures.

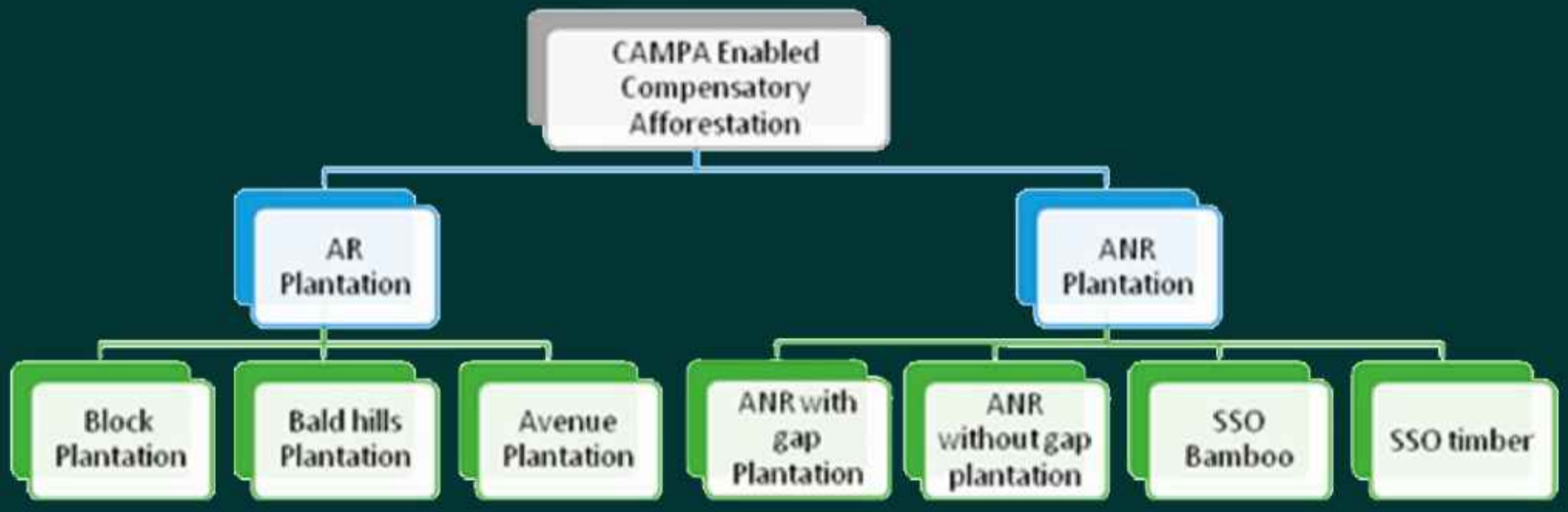
Community response and involvement widely varies across ranges. To make it a full-scale community programme the scheme needs long term continuity along with higher infusion of funds. The local community may also be oriented on the scheme benefits and objective of participatory forest management.

Block Plantation - Angul Circle

SSO, Bamboo - Bhubaneswar Circle

Sacred Grove - Sambalpur Circle

Entry Point Activities with AJY - Berhampur Circle


CAMPA Enabled Compensatory Afforestation
AR Plantation
ANR Plantation
Block Plantation
Bald hills Plantation
Avenue Plantation
ANR with gap Plantation
ANR without gap plantation
SSO Bamboo
SSO timber