



**CHAPTER II**  
**Performance Audit**



## CHAPTER II Performance Audit

### FOREST, ENVIRONMENT AND CLIMATE CHANGE DEPARTMENT

#### 2.1 Performance Audit on Assessment of Plantation Activities undertaken by the Forest Department of Odisha

##### Executive summary

*The State of Odisha follows the National Forest Policy, 1988 and is mandated to manage, conserve and protect forest and wildlife resources in the State through afforestation and regeneration of degraded forest lands. The forest cover in the State is assessed as 51,619 sq. km., which is 33.15 per cent of State's geographical area as per India State of Forest Report 2019.*

*This Performance Audit of "Assessment of Plantation Activities" covering the period from 2013-14 to 2017-18 revealed that;*

- *Achievement of plantation targets during the period ended with unreasonable shortfall, which indicated unrealistic fixation of targets. Due to non-availability of data regarding degraded forest land and vacant revenue land, the planning procedure for plantations was limited to only instant data provided by field staff on a piece-meal manner. The long term planning and fixation of annual target could not be achieved due to lack of coordinated planning among Ranges, Divisions and Forest Headquarters. Required data relating to various plantation schemes, such as scheme wise annual target and achievement, allotment and expenditure, survival percentage were neither maintained at Government nor at PCCF (O&HoFF) level.*
- *It was necessary for the State to formulate their own State Forest Policy (SFP), in line with National Forest Policy, by considering local geo-climatic conditions. Failure to evolve SFP resulted in inadequate planning in enhancement of green cover in the State. Forest Divisions were working without approved Working Plans/ Working Schemes.*
- *Maintenance of plantation journals lacked due care by the field functionaries as the details of plantations like pre and post planting data, complete year-wise expenditure with abstract, Range Officers (ROs) quarterly inspections, authentication by the in-charge of plantation (Forester/ Forest Guard) and ROs were not incorporated due to which Audit could not authenticate the execution of plantations.*
- *Sal species is the principal indigenous species of Odisha but Teak was planted as major species, thereby affecting the originality of the vegetation and biodiversity.*
- *There was no coordination at the level of Divisional Forest Officers (DFOs) and District Rural Development Agencies (DRDAs) in planning the plantation projects executed under MGNREGS in a division. Neither the DFOs nor the Department had the information on total job card holders available in a division which affected the plantation execution.*

- The department incurred unfruitful expenditure worth ₹13.17 crore as 191 out of 485 plantations were not successful. The reasons of failure were improper selection of plantation sites in dense forest and delay in submission of plantation project proposals by Divisional Forest Officers.
- Survival of plantations remained uncertain in plantations executed under MGNREGS due to non-release of funds from second year onwards for maintenance operations.
- Target for Compensatory afforestation programmes under CAMPA was not achieved within the stipulated period of three years and hence, could not compensate the forest cover against the diversion of forest land.
- Audit team and forest officers physically verified 41 plantations and found 20 failed plantations and seven partially successful plantations with unfruitful expenditure of ₹2.67 crore.
- Audit analysis of plantation sites using UAV revealed that many trees were planted in easily accessible areas i.e. along the footpath. Even though few Teak species survived, the quality of growth in respect of height attained was not up to the mark. It was observed that soil moisture conservation activity like digging staggered trenches were either not taken up or have been executed inefficiently i.e. trenches were not dug perpendicular to the terrain slope. Hence, the plantations were failed plantations with unfruitful expenditure of ₹68.36 lakh.
- Irregular release of funds in one instalment during 1st year of bamboo plantation without ensuring the survival percentage in violation of norms of guidelines was noticed.
- Although planting of seedlings was actually not taken up in the Aided Natural Regeneration (ANR) without gap plantation but the cost norm provided for watch and ward during the entire regeneration period of four years. This inappropriate provision led to avoidable expenditure of ₹63.19 crore.
- Though the various components of plantation works of Block plantations and Urban plantations were similar, the provision of man days for urban plantations was fixed unreasonably higher which led to avoidable extra expenditure of ₹39.80 crore.
- Excess expenditure incurred under different components or outside the cost norms led to avoidable/ wasteful expenditure of ₹99 lakh.
- Irregular allotment of funds for fencing and 3rd year maintenance under Urban Tree Plantation led to irregular expenditure of ₹14.82 crore.
- Financial procedures were not followed as ₹69.12 lakh was spent towards watering charges without inviting tenders.
- Avenue plantations were completely damaged due to widening of roads and funds for such damages was not raised against User Agencies (UAs) to compensate the damaged plantations due to lack of coordination and inefficient monitoring.

- *Bamboo plantations were executed inside forests having canopy cover of more than 40 per cent. The growth of clumps was not optimum in such sites because of poor light availability and as a result the sites failed.*
- *The variation in performance of different plantations was attributed to variation in site quality, species taken and level of management. Selection of wrong sites and poor management had resulted in the failure of plantations in 251 sites, as found in audit.*
- *Inspection and monitoring by field level officers, in particular the Range Officers, was deficient compared to prescribed norms.*
- *Required database relating to various plantation schemes, such as scheme wise annual target and achievement, allotment and expenditure, survival percentage were neither maintained at Government nor at PCCF (O & HoFF) level. The data maintained at PCCF (O & HoFF) and Division level lacked integrity. There were no concurrent evaluation of plantation schemes and undue delay in 3rd party evaluation of plantations.*

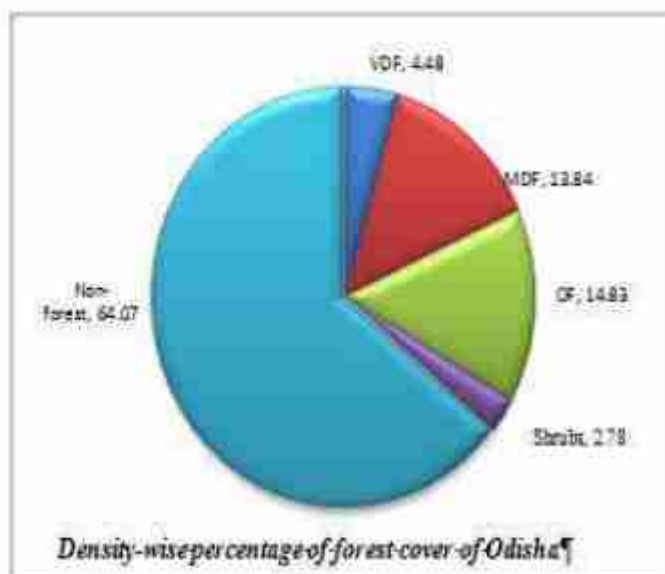
## 2.1.1 Introduction

### 2.1.1.1 Odisha forests and afforestation mandate

The Forest Department is mandated to manage, conserve and protect forest and wildlife resources in the State through afforestation and regeneration of degraded forest lands, forest protection as well as socio-economic upliftment of people in the fringe areas and sustainable management of forests and wildlife. One of the basic objectives of National Forest Policy (NFP), 1988 was to substantially increase forest/ tree cover in the country through massive afforestation and social forestry programmes, especially on denuded, degraded and unproductive lands.

Based on the India State of Forest Report (ISFR) 2019, the forest cover in the State is 51,619 sq. km., which is 33.15 per cent of State's geographical area. In terms of forest canopy density classes, the State has 6,970 sq. km. under very dense forest (VDF), 21,552 sq. km. under moderately dense forest (MDF), 23,097 sq. km. under open forest (OF) and 4,327 sq. km. under shrubs.

Chart No.1



The plantation activities in the State of Odisha is funded through various Central and State Government schemes such as State Plan (SP), Compensatory Afforestation Fund Management and Planning Authority (CAMPA), Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), National Afforestation Programme (NAP), District Mineral Foundation Fund (DMF), National Bamboo Mission (NBM), Odisha Environment Management Fund (OEMF), Odisha Forestry Sector Development Project (OFSDP), Corporate Social Responsibility (CSR), Odisha Mineral Bearing Areas Development Corporation (OMBADC), Odisha Bamboo Development Project (OBDP) and Integrated Coastal Zone Management Project (ICZMP). Odisha Forestry Sector Development Projects (OFSDP) and ICZMP are externally aided projects (EAP), taking care of farm forestry and coastal zone plantations respectively.

#### 2.1.1.2 Classification of Plantations

Plantations<sup>2</sup> carried out by the Forest Department in Odisha can be classified in to three broad types, viz. reforestation, afforestation and enrichment plantation as below.

- **Reforestation:-** This plantation is over an area which had recently supported forest growth. This is usually done to replace a forest crop of low value by valuable species or to re-clothe an area which has recently lost its forest cover, mainly due to biotic reasons such as illicit felling, grazing and forest fire.
- **Afforestation:-** This plantation is undertaken in areas which have not contained any forest growth at any time (*e.g.* Coastal sand dunes) or in the recent past. This operation is usually much more difficult than reforestation as it strives to reverse in a few years the ecological degradation which has taken place over ages. Artificial Regeneration (AR) is one such method of afforestation where artificial means to develop the plantation are involved.
- **Enrichment Plantations:-** These are usually carried out to increase the proportion of valuable species in the existing crop. Such species are introduced either in strips cleared for the purpose or in groups, in gaps, recently created. The latter operation is also carried out while rehabilitating degraded forests. Aided Natural Regeneration (ANR) is one method of enrichment plantation where plantations are aided to grow in the degraded gaps of forest naturally. These are also called as Gap Plantations as this is carried out in degraded gaps of forest area.

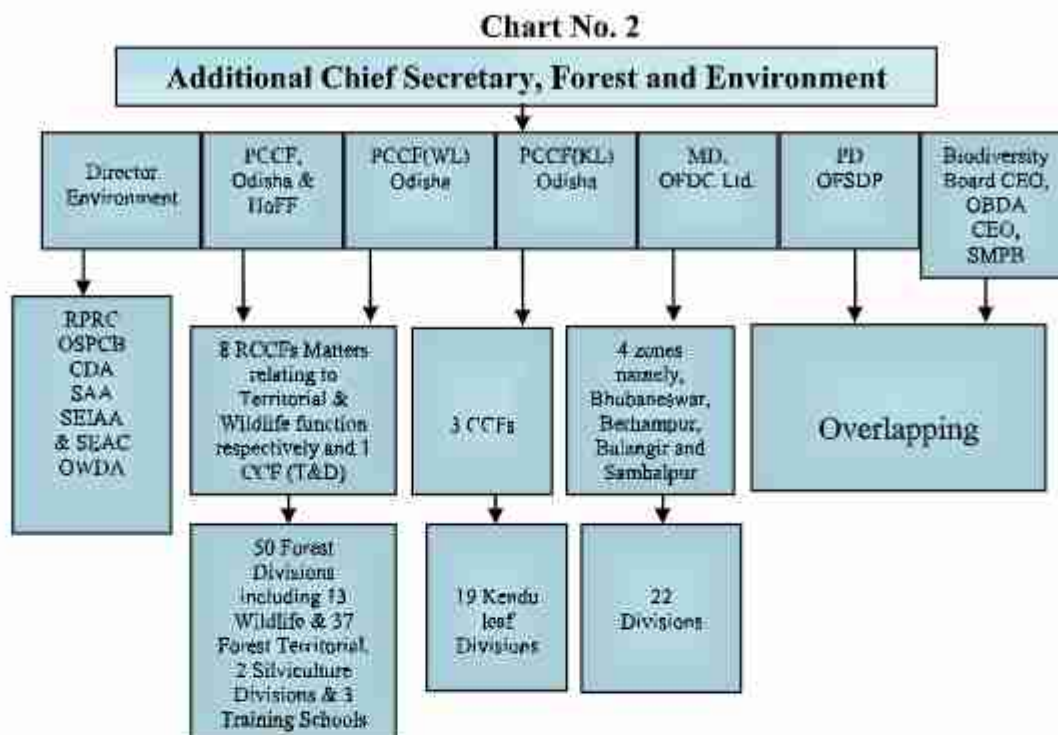
Based on the above classification of plantations, Avenue Plantation, Bald Hill Plantation, Mangrove Plantation, Bamboo Plantation and Urban Plantation are few types of plantations carried out in Odisha.

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<sup>2</sup> Source: Para 3 to 6 of the Odisha Forest Plantation Manual, 1977

### 2.1.1.3 Organisational Set up

The organogram of the Forest Department is as follows:



The field formations under the Forestry set up are organised under three wings, namely Territorial, Wildlife and Kendu Leaf, apart from few projects and Odisha Forest Development Corporation (OFDC). Each wing is headed by one Principal Chief Conservator of Forest (PCCF) namely PCCF, Odisha & Head of Forest Force, PCCF (Wild Life), Odisha and PCCF (Kendu Leaf), Odisha. The Department comprises of 12 circles, 82 forest divisions *i.e.* 37 Territorial divisions, 12 Wildlife divisions (including 03 Mangrove divisions), Similipal Tiger Reserve (STR), Baripada<sup>3</sup>, 19 Kendu leaf divisions, 03 training & development divisions, 02 Silviculture divisions and 08 working plan divisions. There are 3,683 beats under 1,674 Sections in 436 Ranges to execute field level works.

### 2.1.1.4 Audit Objective

Audit was conducted with the objectives to assess whether;

- Plantation activities were planned according to approved Forest Policies and executed efficiently, economically and in an effective manner;
- The provision of funds and manpower were sufficient for timely implementation of the plantation activities; and
- System of monitoring and evaluation of the plantations were sufficient, effective and efficient.

<sup>3</sup> Source: Information furnished by FE & CC Department

### 2.1.1.5 Scope of Audit and Methodology

The Performance Audit (PA) was conducted during May 2019 to February 2021 through test check of plantation records and journals, cash accounts, monitoring and evaluation of plantations, evaluation of plantations through use of Unmanned Aerial Vehicles (UAV) and external experts. Joint Physical Verification (JPV) of plantation sites were conducted by the Audit team including external experts and forest officers of concerned forest divisions for tree counting, tree height measurement, species determination, canopy and tree density and surface moisture conservation measures.

The PA was conducted in 13<sup>4</sup> out of 49 forest divisions (as plantation programmes are carried out in these divisions) selected through stratified random sampling method basing on the expenditure incurred for the period from 2013-14 to 2017-18. As there are no plantations in STR, Baripada, the division was not included in sample.

Similarly, sampling was adopted to select six<sup>5</sup> out of eleven<sup>6</sup> schemes that implement the plantation activities in the State based on expenditure for audit. Besides, mangrove plantation under ICZMP scheme was selected under Wildlife division. Audit excluded all the plantation sites below 50 ha area for ANR plantations, below 20 ha for AR plantations, below 5 running kilometre (rkm) for Avenue plantations<sup>7</sup> and 10,000 seedlings for Urban Plantation under all the schemes, as these sites had less materiality. Out of the remaining plantation sites in each division under all selected schemes, 50 per cent of the sites were selected by random sampling method. Besides, Audit also test checked records of FE & CC Department, PCCF (O & HoFF), PCCF (WL), Project Director (OFSDP), PD (OBDA) and Forest Resources Survey (FRS) Division, Cuttack.

Before commencement of the PA, an entry conference was held on 22 May 2019 with the Additional Chief Secretary of the department in which the audit objectives, criteria and methodology were discussed. The audit findings were discussed in the Exit conference held on 22 October 2021 and replies of the Government have been suitably incorporated in the report.

Audit acknowledges the co-operation of the Department in providing necessary information and records to Audit for furnishing compliance to the Audit observation.

### 2.1.2 Audit Criteria

The Audit findings are benchmarked against the following Acts, Rules, and Policies:

<sup>4</sup> Bannra (Wild Life), Balangir, Boudh, Kalahandi (South), Keonjhar, Keonjhar (Wild Life), Koraput, Malkangiri, Rairakhol, Mangrove Forest Division (MFD) Rajnagar, Rayagada, Rourkela and Sundargarh

<sup>5</sup> State plan, CAMPA, MGNREGS, NBM, DMF and NAP

<sup>6</sup> SP, CAMPA, MGNREGS, NBM, OEMF, DMF, NAP, OBDA, CSR, OMBADC and ATY

<sup>7</sup> Planting trees along the roadsides, highways and pathway is known as Avenue Plantation, coverage of which is measured in running kilometre (rkm)



- Odisha Forest Department (OFD) Code, 1979. Forest Plantation Manual (FPM), 1977. Code of Management Plan Procedures (CMPP), 1990 and National Forest Policy (NFP), 1988;
- Provisions of Odisha General Financial Rules (OGFR), Odisha Treasury Code (OTC), Procurement Guidelines and Finance Department (FD) Notifications;
- Indian State of Forest Reports (ISFRs) by the Forest Survey of India (FSI), Scheme guidelines and plantation cost norms prescribed by Forest Department;
- Working Plans (WPs)/ Scheme(s) and CAMPA Annual Plan of Operation(s) (APOs); and
- Physical/ financial targets/ norms fixed by the Government/ PCCF/ Sanctioning Authority.

## Audit findings

### 2.1.3 Forest policy and planning

#### 2.1.3.1 Status of plantations in the State during 2013-14 to 2017-18

The physical and financial status of plantation activities in the State, except for plantation activities undertaken under CAMPA, for the period of audit from 2013-14 to 2017-18 are detailed in the **Table 2.1**.

**Table 2.1: Physical and financial status of plantations**

<i>Year</i>	<i>AR Plantation (Ha)</i>	<i>ANR Plantation (Ha)</i>	<i>Avenue Plantation (rkm)</i>	<i>Urban Plantation (Saplings in lakh)</i>	<i>Expenditure on Plantations (₹ in crore)</i>
2013-14	25,086	38,050	4,506	10.57	196.63
2014-15	24,600	60,253	4,755	14.90	226.75
2015-16	16,576	98,540	4,607	15.65	298.87
2016-17	15,322	1,27,973	5,588	13.90	349.75
2017-18	5,776	20,367	3,235	11.15	104.14
<b>Total</b>	<b>87,360</b>	<b>3,45,183</b>	<b>22,691</b>	<b>66.17</b>	<b>1,176.14</b>

*AR: Artificial Regeneration, ANR: Aided Natural Regeneration (refer to para 2.1.1.2 - Classification of plantations, of this report)*

*Sources: Annual Activity Reports of the F&B Department and the PCCF (O)/DFOs*

As above, the AR plantations had shown a steady decrease over the years, but ANR and Avenue plantations increased substantially from 2013-14 to 2016-17. Reduction in expenditure on plantations during 2017-18 in comparison to previous years indicates slowing down of plantation activities.

#### 2.1.3.2 Status of plantations in selected divisions

Out of the plantations during five years in the State, the status of 13 selected forest divisions is detailed in **Table 2.2**.

**Table 2.2: Status of plantations in selected Forest Divisions**

Year	AR Plantation (Ha)	ANR Plantation (Ha)	Avenue Plantation (rkm)	Urban Plantation (Saplings in lakh)	Expenditure on Plantations (₹ in crore)
2013-14	6,752	11,965	1,040	2.03	60.55
2014-15	6,068	18,835	1,292	3.89	81.06
2015-16	7,580	31,082	1,389	4.36	107.39
2016-17	5,738	46,684	1,916	2.78	150.21
2017-18	2,842	8,582	1,262	1.41	41.49
<b>Total</b>	<b>28,980</b>	<b>1,17,148</b>	<b>6,899</b>	<b>14.47</b>	<b>440.70</b>

Source: Data extracted from Divisional information

### 2.1.3.3 Scheme-wise achievement of plantations in selected divisions

All Scheme-wise annual targets fixed and achieved, both physical and financial, were not provided to Audit inspite of repeated requests to Forest, Environment and Climate Change (FE & CC) Department. The physical achievements in respect of the selected schemes during 2013-18 were extracted through data analysis as detailed in Table 2.3.

**Table 2.3: Scheme-wise achievement of plantations in selected Divisions**

Plantation	State Plan	CAMPA	MGNREGS	NBM	DMF	NAP	ICZMP (Mangrove)	Total
AR (ha)	10,158	4,296	8,029	1,596	47	494	240	24,860
ANR (ha)	8,485	63,166	39,888	50	0	645	0	1,12,234
Avenue (rkm)	871	50	5,488	0	0	0	0	6,409
Urban (Sapling in lakh)	12.85	0	0	0	0.48	0	0	13.33

Sources: Data extracted from Divisional information

### 2.1.3.4 Deficiency in planning of annual targets

Para 4.14 of the NFP, 1988, stipulates that periodical collection, collation and publication of reliable data on relevant aspects of forest management needs to be improved with recourse to modern technology and equipment. Rule 21 of the Odisha Forest Department Code, 1979 stipulates that the DFO shall be held responsible for the correctness of all technical operations carried out in his division subject to any instruction that he may receive in the matter from his superior officers.

The physical target set for plantation activities for the entire State during 2013-14 to 2017-18 is given in Table 2.4.

**Table 2.4: Physical targets of plantation activities**

Year	AR Plantation		ANR Plantation		Total Target (Ha)	Total Achievement (Ha)	Shortfall (+)/ Excess (-) (Ha)	Avenue Plantation		Shortfall (+)/Excess (-) (In rkm)
	Target (Ha)	Achievement (Ha)	Target (Ha)	Achievement (Ha)				Target (rkm)	Achievement (rkm)	
2013-14	40,000	25,086	40,000	38,050	80,000	63,136	16,864	4,000	4,506	-506
2014-15	27,252	24,600	49,196	60,253	76,448	84,853	-8,405	5,015	4,755	260
2015-16	24,002	16,576	1,95,584	98,540	2,19,586	1,15,116	1,04,470	5,440	4,607	833
2016-17	25,417	15,322	2,12,529	1,27,973	2,37,946	1,43,295	94,651	5,941	5,588	353
2017-18	19,683	5,776	2,47,042	20,367	2,66,725	26,143	2,40,582	5,383	3,235	2,148
<b>Total</b>	<b>1,36,354</b>	<b>87,360</b>	<b>7,44,351</b>	<b>3,45,183</b>	<b>8,80,705</b>	<b>4,32,543</b>	<b>4,48,162</b>	<b>25,779</b>	<b>22,691</b>	<b>3,088</b>
Percentage of shortfall							50.89			11.98

Sources: Annual Activity Report of Department

The shortfall in achievement of plantation targets during the period 2013-14 to 2017-18 ranged from 11.98 per cent to 50.89 per cent under various types of plantations. The main reasons for huge shortfall in achieving plantations were as below:

- There was no detailed database regarding degraded forest land and vacant revenue land in the State for plantation purpose at all levels *i.e.* Ranges, Divisions and Forest HQs. The planning procedure was limited to only instant data provided by field staff in a *piece-meal* manner.
- Annual targets on plantations were not compiled at Range and Division level. The targets were set by the PCCF and communicated to respective divisions. This indicated lack of coordinated planning by the Ranges, Divisions and Forest HQs.
- Also, the shortfall in achieving the targets is mainly under Centrally Sponsored Schemes (CSP). For example, plantation programs are carried out under MGNREGS where shortfall in achieving target ranged from 23 to 68 percentage, as discussed in *para 2.1.5.1*. The reasons were attributed to various constraints such as delay in approval of projects, non-availability of job card holders, untimely release of funds and lower wage rate.

Hence, the data crucial for any long term planning and fixation of annual targets for plantation activities were not available with the forest department.

Accepting the Audit observation, the Government stated (October 2021) that the proposals of plantation targets were received from the divisions according to availability of degraded land in line with prescriptions in the Working Plan and vacant land and the same were approved and communicated to all the divisions. Though, all the proposals of annual targets were received from the divisions, no such records in this regard were produced to Audit, both by the divisions and PCCF (O & HoFF).

#### **2.1.3.5 Absence of State Forest Policy for management of forest resources**

The National Forest Commission recommended (March 2006) framing of State Forest Policy (SFP) in line with NFP, 1988 for sustainable management of forests and wildlife resources.

Audit observed that the Department was yet to frame an SFP. Failure to evolve SFP resulted in inadequate planning in enhancement of green cover in the State.

In reply, the Government stated (October 2021) that though there was no SFP in place, the State followed NFP instead. The reply was not acceptable as the NFP is a guiding document for all the States. It is necessary by the State to formulate their own SFP, in line with NFP, by considering local geo-climatic conditions.

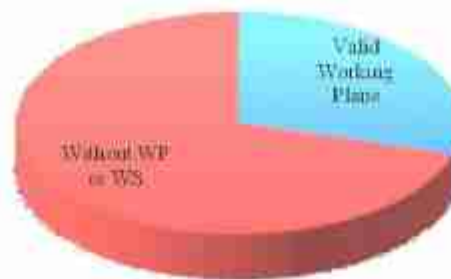
#### **2.1.3.6 Delay in preparation of working plans and working without such plans**

As per Para 3 of Chapter I of the National Working Plan (NWP) Code, 2014 issued by Ministry of Environment & Forests, Govt. of India, all forests are to

be sustainably managed under the prescriptions of a working plan/ scheme. Further, the NFP, 1988 clearly states that no forest should be permitted to be worked without an approved working plan by the competent authority. It is the duty of the manager or owner of the forest area to ensure the preparation of the working plan (WP)/ scheme. Every WP must include the

area specific prescriptions for proper management of forests of a particular forest division and it is revised once in every ten years. The working schemes (WSs) are prepared for smaller areas for a specific purpose or for forest areas under the control/ ownership of such bodies as private, village etc.

Chart No.3  
Working Plans in Odisha Forest Divisions



As per the information furnished to Audit, 44 Divisions i.e. 37 Territorial and 7 Wildlife Divisions were to work as per valid WP. However, it was noticed that out of 44 divisions, only 13 divisions were working under approved WPs. 27 divisions were working under approved WSs and 4 divisions were working without any approved WPs/ WSs. It was also observed that the WSs of 27 divisions had expired as of March 2021. Hence, 31 divisions were working without approved WPs/ WSs (June 2021) as detailed in *Appendix- 1*. Working of forests divisions without valid WPs/ WSs violates the basic principle of NWP Code, 2014 and hindered sustainable management of forests and biodiversity in the region.

Accepting the audit observation, the Government stated (October 2021) that 10 WPs were approved during 2020-21 and 20 WPs had been submitted for approval during 2021-22. Similarly, 10 WSs were submitted for approval during 2021-22.

#### 2.1.3.7 Non-assessment of forest resources by survey division

As per para 76 of Chapter VI of the NWP Code, 2014, an up-to-date and reliable knowledge of plantations is necessary. It envisages survey of plantations for its assessment and the results of the survey are to be recorded in the plantation journals. In accordance with Rule 227 of OFD Code, 1979, the Forest Resources Survey (FRS) division was created (1970) in the State for survey of forest resources, assessing supply and demand of forest raw materials. As per Rule 228 and Rule 233 of the OFD Code, a five-year programme and Annual Survey Plan (ASP) respectively for resources survey should be drawn up by the DFO in charge of resources survey in consultation with his Conservator. An Annual Survey of Forest Resources Report (ASFR) shall be submitted by the division for incorporation in the Annual Administration (AA) report.

Audit scrutinised the records of the survey division and observed the following irregularities:

- ❖ The FRS division was not assigned with the above mandated works. The ASP had not been prepared after 2009-10. Instead of the mandated work, the division was assigned to revise the WP of Keonjhar Wildlife division in 2015-16 by the department, although preparation of WP needs to be done by the Working Plan Officers (WPOs) of the WP division.
- ❖ There was no allotment of funds for work expenditure during 2013-16. The men-in-position of the division ranged from 22 to 31 against staff strength from 38 to 42 and incurred an expenditure of ₹4.89 crore towards establishment cost during 2013-18 and ₹11.56 lakh towards work expenditure during 2016-18. Hence, the expenditure does not justify the functioning of the division as per the above provisions.

The main reason for non-performance of this division was assignment of non-mandated work and non-provision of budget for work expenditure.

In reply, the Government stated (October 2021) that the division was assigned for preparation of WP of Keonjhar Wildlife Division. The reply was not acceptable as the core function of the division was not accomplished. The preparation and revision of WP, as assigned by Government, are additional functions over and above their core function of forest resource survey and assessment.

### Recommendations (Forest policy and planning)

- *Government may formulate State Forest Policy for sustainable management of forest and wildlife resources to enhance green cover in the State.*
- *Government may consider to create detailed data base on degraded forest land and vacant revenue land in the State for plantation purpose at all levels i.e. Ranges, Divisions and Forest Headquarters.*
- *Coordinated planning at all levels may be ensured before fixing annual targets for plantation activities in the forest department.*
- *Forest department may prepare valid working plans and working schemes for working of divisions for sustainable management of forests and biodiversity in the State.*

## 2.1.4 Execution of plantation activities

### 2.1.4.1 Irregular selection of species

Forest plantation programmes are primarily meant to cover the area with trees, without significantly affecting the originality of the vegetation in the landscape. The Working Plans/ Schemes prescribe that priority shall be given to indigenous species as they are better adapted to local environment. Further,

scrutiny of the WPs/ WSs of the audited divisions revealed that *Sal* tree is the principal species of Odisha. This fact was substantiated by the PCCF circular (October 2018) wherein Teak, Acacia and Eucalyptus shall not be planted in forest areas as such species significantly reduce biodiversity.

- Audit scrutinised the plantation records like Plantation Journals, WPs/WSs and information furnished by the selected Divisions. It was observed that Teak was planted as major species over *Sal* species in 926 plantations covering 73,692.46 ha of Aided Natural Regeneration (ANR) undertaken during 2013-18 in 12 out of 13 selected divisions. Out of total 173.81 lakh seedlings, 67.53 lakh Teaks (36 per cent) were planted while only 3,000 *Sal* (0.02 per cent) were planted in Rairakhol Division. Balance 106.25 lakh seedlings belonged to *Amla*, *Simaruba*, *Gambhari*, *Karanja*, *Sisoo*, *Kaju*, Bamboo. However, ANR plantation was not executed under Rajnagar (MFDWL) Division. This was in violation of the WPs/ WSs of the divisions as it prioritised to plant only indigenous species.
- One plantation of 10 ha at Kambunathpur was executed under NAP in Boudh Forest Division during 2013-14 under Purunakatak Range. Audit observed that the physical features of the site, i.e. rainfall/temperature data, soil analysis were not recorded in the plantation journal. The RO's quarterly inspection regarding status of the plantation, growth and survival percentage as required under Rule 207 of the FPM was also not available. Seedlings of 4,000 Teak, 4,000 *Sisoo* and 3,000 Bamboo in total 11,000 plants were planted as per the journal. During Joint Physical Verification (JPV) of the site, it was observed that teak plants survived well in two patches at average of 80 per cent survival with average height of 12 to 15 feet after six years of plantation. As only Teak was planted during casualty replacement, both *Sisoo* and Bamboo plants could not be noticed during the JPV. Hence, the average survival of plantation was 37 per cent. From the above, it was evident that the choice of species as per site with pre-planting analysis of required parameters of soil, rainfall, temperature, drainage system was improper.

The Government stated (October 2021) that the basic aim of plantations was to increase the green cover in the State and species for plantation were selected taking into the local climatic conditions and the rate of survival of the species. The replies were not acceptable as the WPs/ WSs of their respective divisions were prepared basing on the geo climatic conditions and priority was given to plant indigenous species to protect the biodiversity of the forest.

#### **2.1.4.2 Improper maintenance of plantation records**

As prescribed under Rule 197 and 201 of the FPM, 1977, plantation register and plantation journal shall be maintained in Appendix - XI & XII respectively of FPM at division as well as Range level. All the copies of these journals shall be kept updated at all times and invariably be produced before the higher authorities during inspection. Condition of the plantations on maximum/ average height, survival percentage, cause of mortality for

three consecutive years, beginning with year of formation, shall be invariably incorporated in all plantation journals at division as well as Range level.

Audit scrutinised records in 13 selected Forest Divisions and observed that total of 4,586 plantations were executed under different schemes. Out of which, 312 numbers (07 per cent) of journals pertaining to the period from 2013-14 to 2017-18 were not even opened for each corresponding plantation site as the same could not be produced to audit for verification. Out of 4,586 plantation journals, 2,373 journals were selected for audit as per sampling method. Based on sampling, 50 per cent of selected journals i.e. 1,187 were scrutinised in detail and it was revealed that 148 plantation journals (12.47 per cent) were not maintained properly as detailed in the *Appendix- 2*. The details of plantations like pre and post-planting data, complete year wise expenditure with abstract, RO's quarterly inspections, authentication by the in-charge of plantation (Forester/ Forest Guard) and ROs were not incorporated in the plantation journals. As the plantation journals were not maintained properly by recording the details of works executed in a plantation site, Audit could not authenticate the actual execution of plantations.

Accepting the audit observation, the Government stated (October 2021) that since plantation work was time bound and the field staff were short in number, preparation of plantation records was compromised in the field units. Therefore, the journals were not maintained properly.

## **Plantation activities under various Schemes and programmes**

### **2.1.5 Plantations under MGNREGS**

The MGNREGS aims at enhancing the livelihood security of people in rural areas by guaranteeing hundred days of wage-employment in a financial year, to a rural household whose adult members volunteer to do unskilled manual work. In Odisha, the scheme is being implemented from the year 2006 onwards. The works are carried out to address problems like deforestation, soil erosion among others.

The roadmap on convergence of MGNREGS with other schemes had been developed in 2014-15 following series of discussions with Panchayati Raj (PR) Department and among the line Departments. FE & CC Department is a line Department and implements plantations and trench digging, among other projects under MGNREGS. The Collector releases MGNREGS funds directly to the implementing agencies through District Rural Development Authority (DRDA).

#### **2.1.5.1 Under performance in achieving targets and fund utilisation**

As per the information furnished by the PCCF (O & HoFF) and Annual Activity Reports of the department published for 2013-14 to 2016-17, the utilisation of sanctioned funds and plantation activities undertaken under MGNREGS are detailed in **Table 2.5**. However, information on plantations under the scheme taken up during 2017-18 were neither published nor furnished to Audit by the Department.

Table 2.5: Utilisation of sanctioned funds and achievement of plantation targets

Plantation Year	Funds (₹ in lakh)		AR Plantation (Ha)		ANR Plantation (Ha)		Avenue Plantation (ekm)	
	Sanctioned	Utilised	Sanctioned	Utilised	Sanctioned	Utilised	Sanctioned	Utilised
2013-14	13,557.09	6,661.12	25,782	8,313	30,757	24,774	3,000	3,506
2014-15	18,181.25	6,749.54	4,195	3,596	31,745	36,308	4,015	3,755
2015-16	14,134.99	8,056.32	10,117	2,109	29,330	26,245	4,138	3,340
2016-17	14,646.88	8,838.92	3,000	913	25,000	16,893	4,000	3,714
<b>Total</b>	<b>60,520.21</b>	<b>30,305.90</b>	<b>46,094</b>	<b>14,931</b>	<b>1,41,832</b>	<b>1,09,220</b>	<b>19,153</b>	<b>14,315</b>
<b>Percentage of shortfall</b>	<b>50</b>		<b>68</b>		<b>23</b>		<b>25</b>	

Sources: Information furnished by the PCCF (O) and Annual Activity Report of Department.

As can be seen from the above table, 50 per cent funds were not utilised and also the shortfall in plantation activities ranged from 23 to 68 per cent. Further, as per Rule 130 (b) of FPM, 1977, planting shall be completed by July from the start of the regular monsoon rains. Accordingly, the proposals for plantation programmes under the scheme should be submitted and approved well in advance of the plantation season. Audit could analyse the target and achievements of plantations in selected Divisions. Audit analysis revealed the following:

- ❖ It was observed that 527 project proposals for plantations were submitted by five DFOs<sup>8</sup> belatedly i.e. between May to July for approval and the projects were also approved by District Rural Development Authorities (DRDAs) during July/ August of the same year. However, three DFOs<sup>9</sup> submitted 95 projects in time i.e. before plantation seasons during 2013-14, 2015-16 and 2017-18 which were also approved in time by the DRDAs. The reasons for shortfall were lack of coordination between DFOs and DRDAs as well as at the level of Departments and non-assessment of availability of job card holders by the DFOs at each Division to execute plantation programmes during the above period, for which the targets of the plantation programmes could not be achieved.
- ❖ Although funds were timely sanctioned and available through PFMS to the Divisions on the approved projects by the DRDAs, the DFOs could not utilise the funds fully to achieve the plantation targets.
- ❖ It was also noticed that the Division-wise information on availability of job card holders was not available with the PCCF (O & HoFF) to monitor the plantations under the scheme.
- ❖ The DFOs did not utilise the total man-days sanctioned by DRDAs to execute various forest works under MGNREGS although job card holders and funds were available. This adversely affected the planning and implementation of plantation works under this scheme. The observation on utilisation of man-days is briefed in *para 2.1.5.2*.

<sup>8</sup> DFO, Bamra (WL) (92), Boudh (61), Keonjhar (100), Rayagada (215) and Sundargarh (159)

<sup>9</sup> Boudh (2015-16 = 12 and 2017-18 = 10), Keonjhar (2013-14 = 20) and Rayagada 2017-18 = 53)



The Government stated (October 2021) that the under-performance in achieving targets under the scheme was due to delay in approval of proposals by the DRDAs, non-availability of job card holders inside forest areas and low wage rate for which the labourers were unwilling to work. The reply was not acceptable, as it could be seen from above, the divisions did not utilise the sanctioned mandays fully although job card holders were available. Also, as the DFOs submitted project proposals belatedly, approval of DRDAs were also delayed. As funds were available according to the sanctioned projects and the payments were made on actual expenditure basis through PFMS, the delay in allocation of funds does not seem to be correct. Further, the wage rate under the scheme was approved by Central Government and it is applicable to all other line departments of the State.

### 2.1.5.2 Shortfall in utilisation of mandays

Audit analysed the status<sup>10</sup> of sanction and utilisation of mandays with respect to implementation of plantation activities under MGNREGS in selected Divisions. Audit obtained the relevant mandays sanction and utilisation data from concerned DRDAs. Audit observed that a total of 98.93 lakh mandays were sanctioned to 13 selected Divisions to execute various works, including plantations, during 2013-18, out of which only 51.04 lakh mandays (51.58 per cent) were utilised for 5,100 forest projects which included 2,013 plantations activities. The Division-wise percentage of utilisation of mandays ranged from 15 to 96.

The allocation and utilisation of funds were also analysed as per the information available in seven out of 13 Forest Divisions as detailed in Table 2.6.

Table 2.6: Division-wise utilisation of funds and man-days

Sl. No.	Name of Divisions	Physical achievement		Amount (₹ in lakh)		Percentage of shortfall in utilisation of fund $\{(5-6)/5 \times 100\}$	Mandays (in numbers)		
		Ha	rkni	Allocated	Utilised		Generated	Shortfall $\{(8/10) \times 7\}$	Percentage of mandays utilised $\{100 - (7)\}$
1	2	3	4	5	6	7	8	9	10
1	Bamra WL	1,100	271	483.76	305.82	36.78	1,13,345	65,949	63.22
2	Koraput	3,290	263	1,210.13	673.07	44.38	2,29,453	1,83,086	55.62
3	Keonjhar	4,883	472	1,936.96	950.30	50.94	2,90,053	3,01,151	49.06
4	Boudh	1,941	302	994.79	443.34	55.43	1,54,385	1,92,032	45.47
5	Sundargarh	5,838	455	2,186.24	1,120.47	48.75	2,69,254	2,56,109	51.25
6	Malkangiri	2,020	195	799.76	435.15	45.59	2,05,249	1,71,977	54.41
7	Rourkela	7,030	613	2,446.43	1,905.56	22.11	8,05,183	2,28,541	77.89
	Total	26,105	2,575	10,063.07	5,839.71		20,66,930	13,98,854	

Source: Information submitted by the concerned DFOs

It can be seen from the above that the shortfall in financial utilisation ranged between 22.11 to 55.43 per cent during 2013-18. Despite sanction of 48,47,471 mandays in the divisions for all activities including plantation programmes, the DFOs failed to utilise the mandays as per their requirement and could utilise mandays ranging between 45.47 to 77.89 per cent of the total sanctioned mandays. This indicated lack of planning in execution of the plantation activities under the scheme by the DFOs. DFOs also did not coordinate with DRDAs to

<sup>10</sup> Information furnished to audit by the PCCF, (O&HoFF)

ascertain the availability of job card holders and mandays for efficient execution of plantation programmes.

In reply, the Government stated (October 2021) that the shortfall of mandays was due to non-availability of job card holders, low wage rate and delay in approval of projects. The replies were not acceptable as the information furnished by the DRDAs that the job card holders were available under the divisions, but the divisions could not utilise the mandays as per their requirement. The DFOs had not also coordinated with the respective DRDAs for timely approval of projects. Lack of coordination among DFOs and DRDAs was the main reasons for not achieving the targets.

### **2.1.5.3 Unsuccessful plantations due to non-maintenance**

Rule-35 of the Forest Plantation Manual, 1977 under "Plantation Timetable" stated that all operations in connection with plantations are time bound. If any one of the operations concerned is delayed, the success of the whole plantation is jeopardised. A late start is almost certain to have serious consequences. It is therefore, necessary to work out a detailed time-table for all items of work in connection with plantation and to adhere to it strictly. As per Rule 30, the soil profile of the plantation site must be examined and the treatments to be applied at different patches should be carefully planned. Further, as per Rule 130 (b), planting shall be completed by July from start of the regular monsoon rains. Plantations were undertaken either solely under MGNREGS or brought under convergence from State Plan to MGNREGS<sup>11</sup>. As per the condition of convergence, the subsequent maintenance of plantations was to be borne by funds other than MGNREGS.

Similarly, as per Rule 2.98 of the Code of Management Plan Procedure (CMPP), 1990, plantations with survival of 60 *per cent* and above may be termed as successful in good quality sites for long rotation crops. Survival between 40 to 60 *per cent* as partially successful and less than 40 *per cent* survival may be termed as failed plantation.

As per Annual Activity Reports of the Department, 2,013 plantations were carried out in 1,24,151 ha during 2013-17 apart from 14,315 rkm of avenue plantations under MGNREGS. It was revealed that ₹18.43 crore was spent during 1st year for 485 out of 2,013 plantations covering 11,296 ha and 1,035 rkm during the period. Information on plantations under the scheme taken up during 2017-18 were neither published nor furnished to Audit by the Department. However, no expenditure was incurred from second year onwards for these plantations on maintenance works like casualty replacement, complete weeding and pruning, soil working and manuring, soil conservation measures, fertilizer and insecticides, fire line tracing and inspection path, watering and watch and ward due to lack of release of funds under the scheme as well as from other schemes as per the condition of the convergence. Thus, maintenance operations were not taken up in these plantations and their survival remained uncertain as detailed in *Appendix- 3*.

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<sup>11</sup> Source: PCCF (O) letter No. 8781 dated 03.5.2016

Similarly, as per the information furnished by the selected Divisions, 35 plantations in 925 ha and 160 rkm with an expenditure of ₹2.78 crore in five Divisions<sup>12</sup> were failed plantations as the survival percentage of plants was below 40. Also, 146 plantations in 4,585 ha and 207 rkm with an expenditure of ₹9.13 crore in 10 Divisions<sup>13</sup> were partially failed plantations as the survival percentage of plants was between 40 and 60. In total, the expenditure of ₹11.91 crore was unfruitful due to low survival percentage as the physical activities of plantation sites could not be taken up due to non-availability of funds on time. Hence, the desired objectives of the scheme could not be achieved in these Divisions.

To ascertain the status of such plantations, JPVs of the following MGNREGS plantation sites were undertaken during field audit as detailed in Table 2.7.

**Table 2.7: Results of Joint Physical Verifications of two plantation sites**

Sl. N	Division	Range	Year of plantation	Type	Area	Survival percentage as per journals	Survival per cent as per JPV
1.	Bamra WL	Bamra (Randhabar RF)	2013-14	ANR	50 ha	Not recorded in journal	50
2.	Malkangiri	Malkangiri (Dadaguda)	2013-14	ANR	50 ha	Nor recorded in journal	32

As observed in Bamra WL division, only Teak plants survived and other species like *Gambhari*, *Jamun*, *Acacia* perished. The height of the plants was ranging from 3 to 18 feet after six years of plantation. As observed in Malkangiri division, few Teak, Cashew and *Chakunda* species survived and height of plants was 3 to 8 feet only even after six years of plantation. The Divisions did not conduct soil test before execution of plantation to assess the soil health. Also, no soil moisture conservation (SMC) measures were undertaken in site.

The reasons of non-maintenance from second year onwards were non-allocation of funds either from MGNREGS or from any other scheme. Hence, necessary maintenance operations like weeding out, silviculture, SMC were not carried out after 1st year of plantation. This resulted in scattered growth and average survival for which the plantations were unsuccessful.

Accepting the Audit observation, the Government stated (October 2021) that the maintenance of plantations from second year onwards could not be carried out due to non-allocation of funds under the scheme which resulted in low survival percentage.

#### 2.1.5.4 Unsuccessful plantations due to irregular selection of site

Artificial Regeneration (AR) is taken up on barren, open areas, waste lands, blanks and laterite patches<sup>14</sup> and forest areas where canopy density or root stock is less than 10 per cent.

<sup>12</sup> Balangir (18), Keonjhar (WL) (01), Keonjhar (02), Bamra (WL) (03), Boudh (11)

<sup>13</sup> Balangir (18), Rourkela (48), Rayagada (37), Malkangiri (7), Keonjhar (WL) (03), Keonjhar (7), Kalahandi (South) (02), Bamra (WL) (8), Boudh (10) and Koraput (6)

<sup>14</sup> Soil layer that is rich in iron oxide and derived from a wide variety of rocks

- Scrutiny of records in Bisra Range under Rourkela Forest Division revealed that nine plantation programmes<sup>15</sup> were undertaken under the scheme during 2013-16 covering 710 ha and 10 rkm. Plantation expenditure details on the work done were not recorded in the plantation journals in prescribed manner till the date of audit (August 2019). Expenditure towards the plantations amounting to ₹1.11 crore was incurred as per the information furnished to Audit, but the required muster rolls of labourers engaged in execution of the work were not maintained.

Photograph No.1

Out of the above nine plantations, one ANR plantation site at North Chirobeda was selected for JPV. As per journal, the species like Teak, *Karanja*, Neem, Acacia, *Simaruba* were planted. But survival percentage along with heights of the plants were not recorded. Regular works like pillar posting, sign board, SMC were not noticed. After six years



of plantation, the survival percentage of Teak, Neam and Acacia plants was only 15 per cent with average heights of two to six feet only which indicated that it was a failed plantation effort. Further, as per the information furnished to Audit, the survival percentage of other eight plantations was below 60. Thus, one plantation failed and other eight plantations were partially successful as detailed in the *Appendix – 4*. Hence, total expenditure incurred in these nine plantation sites amounting to ₹1.11 crore was unfruitful.

- Similarly, test check of plantation journals in Keonjhar Division revealed that one 50 ha block (AR) plantation (1600 saplings/ ha) was undertaken during 2015-16 inside Talapada Khesari forest in Telkoi Range at a cost of ₹14.98 lakh. During JPV of the plantation site, it was noticed that the site was situated inside dense forest having 50 per cent of canopy density and *Sal* as the predominant species. This plantation was in its fourth year. Most of the minor species like *jamun*, bamboo, mango as mentioned in journal were not noticed. The average survival percentage of species was 35 with average height of 10 to 20 feet. Thus, it was a failed plantation in terms of Rule 2.98 of CMPP, 1990.

(Photograph No.2)



<sup>15</sup> AR-1, ANR- 7 and Avenue -1

From the above, it was evident that the selection of site was improper against the above cited AR principle as the area was dense forest instead of a barren area having canopy density less than 10 per cent.

Accepting the Audit observation, the Government stated (October 2021) that the discrepancies noticed in the plantation sites had been noted and action as deemed proper would be taken against the staff responsible.

### 2.1.6 Plantations under Compensatory Afforestation Fund Management and Planning Authority

As per Para 9 (i) of MoEF Guidelines on State CAMPA 2009, the functions of State Compensatory Afforestation Fund Management and Planning Authority (CAMPA) shall include funding, overseeing and promoting compensatory afforestation (CA) done in lieu of diversion of forest land for non-forestry use under the Forest Conservation (FC) Act, 1980. It would administer the amount received from the *ad-hoc* CAMPA and utilise the monies collected for undertaking compensatory afforestation, assisted natural regeneration, conservation and protection of forests, infrastructure development, wildlife conservation and protection and other related activities.

Further, one of the conditions in Stage-II (Final) approval of Central Government stipulates that CA over identified non-forest land or degraded forest land shall be raised by the State Forest Department within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved plan from the funds deposited in State CAMPA account by the User Agency (UA).

#### 2.1.6.1 Target vis-à-vis achievement under implementation of Compensatory Afforestation

Audit scrutinised the records of diversion of forest land and implementation of CA. It was revealed that the targets of CA under normal and backlog plantations fixed during 2013-18 were not achieved fully as detailed in Table 2.8.

**Table 2.8: Target and achievement under Compensatory Afforestation**

Category of CA	Target (In ha)	Achievement (In ha)	Shortfall (In ha)
Normal	10,403.116	7,106.220	3,296.896
Backlog	11,525.316	10,825.678	699.638 <sup>16</sup>
<b>Total</b>	<b>21,928.432</b>	<b>17,931.898</b>	<b>3,996.534</b>

It can be seen from the above table that the normal (31.69 per cent) and backlog (6.07 per cent) CA were not completed within the stipulated period of three and five years respectively. Due to lack of co-ordination with District administration, information on degraded forest land and non-forest land were not available with the Department. Non-clearance of target of CA could not

<sup>16</sup> Keonjhar (WL) - 259.178 ha for 2015-16, Keonjhar - 3 ha for 2015-16, Cuttack (T) - 377.244 ha for 2017-18, Ghumusur (South) - 11.966 ha for 2017-18, Kalahandi (South) - 48.25 for 2017-18

ensure the afforestation on degraded land against the diversion land. It was also a violation of the FC Act and CAMPA Guidelines.

Accepting the Audit observation, the Government stated (October 2021) that most of the targets for CA had been achieved within the stipulated period of three years except few cases and steps were being taken to complete the balance CAs in the coming years.

#### 2.1.6.2 Joint physical verification of plantations under CAMPA

As per Rule 2.98 of the CMPP, 1990, plantations with survival of 60 per cent and above may be termed as successful in good quality sites for long rotation crops. Similarly, survival between 40 to 60 per cent as partially successful and less than 40 per cent survival may be termed as failed plantation. Further, as per Rule 2.97 of the above Code, for plantation survey, the plantations of more than three years need to be covered.

Out of total 1,187 plantation journals selected for audit, 491 journals were scrutinised under CAMPA. It was revealed that three plantations in 820 ha with expenditure of ₹1.78 crore partially failed as the survival of plants was within 40 to 60 per cent. The survival percentage of remaining 488 plantations were shown as more than 60. However, to verify the above claims of the Divisions, JPV was conducted in three CAMPA plantation sites as detailed in Table 2.9.

**Table 2.9: Results of Joint Physical Verifications of three plantation sites**

Sl. No.	Name of the plantation site	Percentage of survival as per journal (In percentage)	Percentage of survival as per JPV (In percentage)
1	Rajpur 1 (Regular)	85	38
2	Rajpur 2(Additional)	85	21
3	Sagarpali	55	29

It could be seen from the above table that as per the JPV, the percentage of survival of the above plantations were from 21 to 38, whereas the DFOs had over projected the survival percentage from 55 to 85.

The Government stated (October 2021) that wherever high mortality had been reported in plantations, the department would evaluate and appropriate action would be taken against the concerned staff.

There were many constraints in JPV and the results were not always accurate. Hence, in order to accurately assess the plantations, Audit used remote sensing technology i.e. Satellite images and UAVs, the details of which are mentioned in the subsequent paragraphs.

#### 2.1.6.3 Assessment of plantations by using UAVs/ Drones

Audit conducted JPVs by randomly selecting 5-6 quadrats of 20 m<sup>2</sup> each. Audit observed that calculation of survival percentage by this JPV was not 100 per cent accurate. Also in many cases, JPV team could not completely access the entire site due to heavy vegetation, threat of wild life. Considering size of each site, justice could not be done by JPV team in covering the entire site.

Hence, in order to overcome above issues, Audit used remote sensing technologies *i.e.* satellite imageries and UAV/ Drone to assess the plantations accurately.

In order to assess plantations through Satellite images, Google Earth (GE) software was used. The GPS coordinates of the site was plotted on GE and the site was analysed with Historical Imagery tool available in GE to check for changes in the site. If forest/ green cover change was not visible, then the particular plantation site was selected for further detailed study through UAVs. The detailed analysis using Satellite images was not possible due to lack of good spatial resolution and cloud cover in the images. Due to these reasons, micro level analysis was not possible. Hence, UAV was chosen for detailed accurate assessment of plantations.



In this study, the UAVs were deployed (February 2021) in three ANR sites and one Mangrove plantation site covering 265 ha to evaluate the plantation growth in various aspects *i.e.* tree count, tree species identification, tree height, spacing, assessment of soil moisture conservation measures. The UAV images of the plantation areas were processed, analysed and compared with details registered in the respective plantation journals. The deviations are reported to improve the evaluation and monitoring of plantation activity in a better way.

Four plantation sites were selected for Drone study as detailed in **Table 2.10**.

**Table 2.10: Results of Unmanned Aerial Vehicle evaluation of plantations**

Sl. No.	Name of plantation	Total plantation Area (In ha)	Plantation area covered under Drone study (In ha)	Scheme	Year of execution	Expenditure incurred (In ₹)
1	Rajpur - 1 (Regular)	50	50	CAMPA	2015-16	10,49,825
2	Rajpur - 2 (Additional)	50	50	CAMPA	2015-16	10,49,825
3	Sagarpali	100	100	CAMPA	2015-16	23,37,800
4	Santubi	65	65	ICZMP	2014-15	23,98,500
<b>Total</b>		<b>265</b>	<b>265</b>			<b>68,35,950</b>

The site-wise analyses of plantations are detailed below:

- The plantation sites of Rajpur 1 and 2 (regular and additional) under Sundargarh Forest Division were selected and its map, as plotted in Google Earth software, is shown below:

Photograph No.5



**Rajpur - 1 (Regular)** plantation site: Number/ type of species counted are detailed in Table 2.11.

Table 2.11: Results of Unmanned Aerial Vehicle evaluation of plantations at Rajpur-1

Forest Division	Range/ Plantation site	Scheme / year of plantation/ area in ha	Type of trees	Trees planted during 2015-16 as per plantation journal	Trees as per UAV study conducted in February 2021	Survival percentage	Total expenditure (in ₹)
Sundargarh	Ujalpur/Rajpur (regular)	CAMP/ 2015-16/ 50	Teak	4,000	1,835		10,49,825
			Karanj	2,000	0		
			Shisoo	1,000	0		
			Simarouba	1,000	2		
			Neam	2,000	0		
<b>Total</b>				<b>10,000</b>	<b>1,837</b>	<b>18.37</b>	<b>10,49,825</b>

It was observed that as per plantation journal, 10,000 plants of five species were planted but as per the UAV evaluation, only 1,837 plants survived. Hence, the survival was 18.37 per cent which can be treated as a failed plantation. Also, as can be seen from the height chart of Teak plants, out of the survived 1,835 Teak plants, 1,329 Teak plants (73 per cent) were within 5 feet height even after five years of plantation.



Photograph No.6



Plantation site at Rajpur - 1 (regular)

Chart No.4



**Rajpur - 2** (Additional) plantation site: The number/ type of species counted through UAV are detailed in Table 2.12.

**Table 2.12: Results of Unmanned Aerial Vehicle evaluation of plantations at Rajpur -2**

Name of Forest Division	Range/ Plantation site	Schema/ year of plantation / area in ha	Type of Trees	Trees #s per Plantation	Trees as per UAV	Overall Survival percentage	Total Expenditure (in ₹)
Sundargarh	Ujalpur/ Rajpur (additional)	CAMPA/2015-16/ 50	Teak	4,000	341		10,49,825
			Karanj	500	0		
			Sisoo	1,000	3		
			Bamboos	1,500	0		
			Simaruba	1,000	36		
			Gambhari	1,000	0		
			Sirs	500	8		
			Neam	500	2		
			10,000	390	3.9	10,49,825	

As can be seen above, the survival percentage was only 3.9 per cent. Also, heights of 311 out of 341 surviving Teak plants were between the ranges of one to three feet only. Similarly, heights of 36 surviving *Simaruba* plants were up to three feet only.

Photograph No.7



Plantation site at Rajpur - 2 (additional)

Chart No.5

Teak Tree Height - Rajpur 2

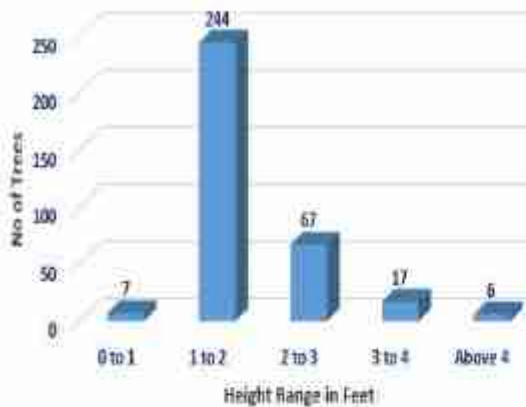
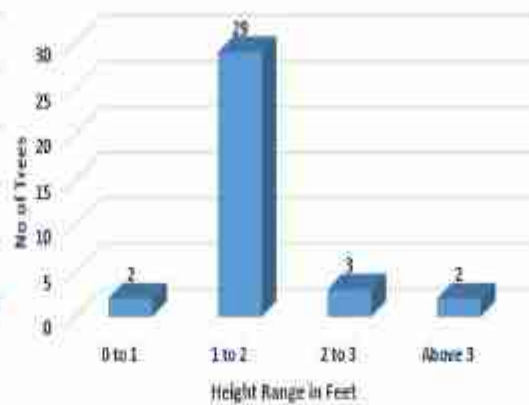


Chart No.6

Simaruba Tree Height - Rajpur 2



It was found from the above bar diagrams of plantation sites at Rajpur – 1 and 2 that the heights of the different species were ranging from 0.5 and more than 20 feet.

- **Tree canopy coverage calculation**

The canopy coverage varies for every tree and it depends on the tree species, as they have different crown sizes, shapes, and heights.

Canopy coverage measurement is more important for various reasons. If a tree is affected by nutrition, water access, disease, pest infestations and stress, the same would reflect on the canopy cover. It can also be used



Tree diameter proximity buffer of Rajpur pinatation sites

to evaluate the impact of forest use in terms of deforestation, degradation, thinning, or afforestation. In this project, a semi-automated proximity process was adopted to find the canopy coverage of a tree to find the tree diameter. The tree diameter proximity buffer of the Rajpur area is shown in the image above.

Chart No 7

Tree Canopy - Rajpur 1

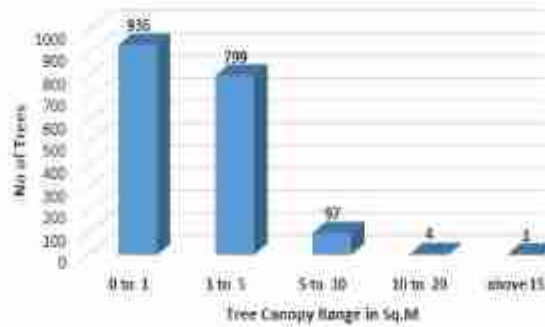
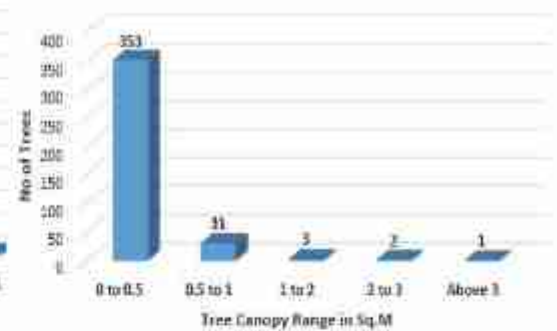


Chart No 8

Tree Canopy - Rajpur 2



As can be seen from the above bar charts, in Rajpur – 1 (Regular) site, 1,735 plants were having a canopy cover in the range between one to five sqm and 102 plants were having a canopy cover ranging between five to 15 sqm. Similarly, in Rajpur – 2 (Additional), 384 plants were having canopy cover in the range of 0.5 to 1 sqm only and six plants had canopy cover in the range from one to three sqm. This indicated that, though the trees survived, the quality of the survival was not satisfactory.

- **Soil Moisture Conservation measures - Water Trenches**

As per Rule 123 (b) of FPM, 1977, when the slope is steep, plantation shall be carried out along contour trenches that are 45 inches wide at the base and 45 inches deep on the downhill side. The trenches shall be seven metre long each interrupted by unworked lengths of three metre. Contour and drainage networks were used for identifying and validating the created water embankment/ staggered trenches to check whether it was created perpendicular to the drainage network or along the slope area. As per assessment of plantation site using UAV, it was found that 215 and 703 Staggered Trenches were created in the Rajpur – 1 and Rajpur – 2 plantation areas respectively. Out of these, 70 and 211 Trenches were not perpendicular to the slope. This defeated the very purpose of creating trenches *i.e.* to conserve and capture rainwater from running off so as to improve the survivability of the planted trees. The sample of a staggered trench inside the plantation area is shown below.

Photograph No.9 – Staggered trench inside the plantation area



**Table 2.13: Trenches non perpendicular to drainage at two plantation sites**

Sl. No.	Area	Total no. of trenches	Not perpendicular to drainage	Out of plantation area
1	Rajpur (Regular)	215	70	55
2	Rajpur (Additional)	703	211	55

Also, Audit found out that some of the water trenches in the Rajpur (Additional) plantation area was created after December 2018. Hence, it could be concluded that proper maintenance in the form of soil moisture conservation measures through digging of trenches were not done during the plantation period (April 2015 to March 2019). The same was found out using historical imagery tool of Google Earth as below:

**Photograph No.10**

No Water Trenches in Rajpur 2 (December, 2018)



**Photograph No.11**

Water Trenches in Rajpur 2 (May, 2020)



- The plantation area map of Sagarpali plantation site under Balangir Forest Division is shown below.

**Photograph No.12**



Sagarpali plantation site- the number/ type of species counted through UAV are detailed in Table 2.14.

Table 2.14: Results of Unmanned Aerial Vehicle evaluation of plantation at Sagarpali

Name of the Division	Range/ plantation site	Scheme/ year / area in ha	Type of trees	Trees as per plantation Journal	Trees as per UAV	Survival percentage	Total expenditure (in ₹)
Balangir	Degaon/ Sagarpali	CAMPA/ 2015-16/ 100	Siriv	2,000	0	6.09	23,37,800
			Teak	9,300	1,196		
			Chakunda	1,500	0		
			Bada Chakunda	1,200	0		
			Khair	2,000	3		
			Bamboo	2,000	19		
			Sisoo	1,000	0		
			Khir	1,000	0		
<b>Total</b>				<b>20,000</b>	<b>1,218</b>		<b>23,37,800</b>

The following were noted:

It could be observed from the above table that as per plantation journal, 20,000 trees of eight species were planted but as per the UAV evaluation, only 1,218 plants survived. Hence, the site is a failed plantation site with a survival rate of 6.09 per cent.



Plantation site at Sagarpali



Image of Sagarapali plantation site captured by Drone

Audit plotted the vacant degraded patch within the plantation site area (Turquoise polygon) and compared it with the actual planted area (Green dots). It was noticed that maximum number of trees were planted in areas with easy access *i.e.* along pathways (Blue line), whereas the degraded patches inside the forest area (red polygon) which was inaccessible, were not taken for plantation activity. Hence, proper assessment of degraded forest land within the identified plantation site area was not done due to which the objectives and aims of ANR plantations could not be achieved.

Chart No.9

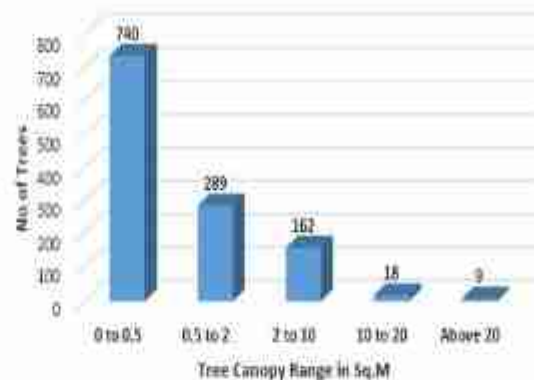
Teak Tree Height - Sagarpulli

Also, as could be seen from the bar chart, 976 out of 1,218 trees (80 per cent) were below 10 feet height even after five years. This indicates that due to non-maintenance of the site, improper SMC measures and silviculture operations, the quality of the surviving trees could not be ensured.



**Chart No.10**

Tree Canopy - Sagarpalli



As could be seen from the bar chart, in Sagarpalli site, 1,029 plants were having a canopy cover in the range between zero to two sqm and 162 plants were having a canopy cover ranging between two to 10 sqm. Similarly, 27 plants were having canopy cover in the range of 10 to above 20 sqm only. This indicated that, though the trees survived, the quality of the survival was not satisfactory.

- **Soil Moisture Conservation measures - Water Trenches**

As per assessment of plantation site using UAV, it was found that only 121 Staggered Trenches were created. Out of these, 34 and 2 trenches were not perpendicular to the slope and outside the plantation site area, respectively. This defeated the very purpose of creating trenches *i.e.* to conserve and capture rain water from running off so as to improve the survivability of the planted trees. Hence, the three plantations involving 200 ha were failed plantations and the expenditure of ₹44.37 lakh was unfruitful.

In reply, the Government stated (October 2021) that the ANR plantations of Sundergarh and Balangir divisions were taken up during 2015-16 and these districts receive less rainfall comparison to average rainfall of the State. However, after verification of the plantation sites by the flying squad, appropriate action would be taken against the concerned staff.

### 2.1.7 National Bamboo Mission

The Government of India (GoI) have introduced several policies to support the bamboo sector in India. These policies include promoting bamboo plantation, strengthening bamboo based handicrafts and developing bamboo based technology applications. Bamboo sector development is considered as livelihood project for poor weaker sections, artisans, growers and farmers especially Scheduled Castes (SCs) and Scheduled Tribes (STs). With these objectives, GoI has launched the National Bamboo Mission (NBM) with central assistance from the year 2006-07 onwards. Funds were sanctioned by GoI as 100 *per cent* Grant-in-aid (GIA) up to 2014-15 and from 2015-16, the funding pattern was changed to 60:40 share basis from GoI and State respectively.

#### 2.1.7.1 Plantations executed under National Bamboo Mission

As per Rule 2.98 of the CMPP, 1990, plantations with survival of 60 *per cent* and above may be termed as successful in good quality sites for long rotation crops. Similarly, survival between 40 to 60 *per cent* as partially successful and less than 40 *per cent* survival may be termed as failed plantation. Further, as per Rule 2.97 of the above Code, for plantation survey, the plantations of more than three years' age need to be covered.

Out of total 1,187 plantation journals selected for audit, 41 journals were scrutinised under NBM. It was revealed that three plantations in 40 ha with expenditure of ₹8.38 lakh failed as the survival percentage of plants was recorded as below 40 *per cent*. Similarly, 10 plantations in 116 ha with expenditure of ₹26.37 lakh partially failed as the survival of plants was recorded within 40 to 60 *per cent*. However, the survival of plants in balance 28 plantation sites were shown as successful with more than 60 *per cent*. To verify the above claims of the Divisions, JPV was conducted in five out of 38 bamboo plantation sites as detailed in **Table 2.15**.

**Table 2.15: Results of Joint Physical Verifications of bamboo plantations**

Sl. No.	Name of the plantation site	Percentage of survival as per journal (In percentage)	Percentage of survival as per JPV (In percentage)
1	Beredabari	55	52
2	Banamahuladiha	82	35
3	Kalapat RF	90	94
4	Jogidanger	Not mentioned in journal	65
5	Saparangiguda	Not mentioned in journal	12

It can be seen from the above table (as per the JPV), the actual percentage of survival in the above plantations were 12 to 94 whereas in three plantations, the DFOs had projected the survival percentage from 55 to 90. Hence, expenditure made in this regard was unfruitful in three plantations. However, in three plantations, the DFOs had not mentioned the survival percentage in journals.

### 2.1.7.2 Scientific Assessment of Bamboo Plantations

A joint assessment of six plantation sites located in Boudh, Keonjhar and Koraput Forest Divisions was made by the team comprising Bamboo expert from Odisha University of Agriculture & Technology (OUAT), Audit team and field level officers of concerned forest division through field visit as sample assessment during March 2020 to February 2021.

**Map No.1**



• **Methodology and equipment used for site selection**

Out of 13 forest divisions, three were chosen such as Boudh, Keonjhar and Koraput as samples. These three divisions were chosen as the agro-climatic conditions that were nearly representative among the agro-climatic conditions of the State. The observations were recorded on survival *per cent* of clumps, number of culms developed per clump, height and diameter of dominating culm in the clump. The site condition was recorded in terms of soil physico-chemical characteristics, upper canopy vegetation and rainfall received in the locality during the establishment period. For soil characteristics, the soil samples were collected from 0 - 30 cm depth from each site and tested in the Soil Science laboratory of OUAT.

• **Findings of the assessment**

Bamboo is highly subjected to browsing and grazing, particularly in the first three years of plantation. In the first three years, every clump needs protection for whole period. The performance of bamboo plantations of the three forest divisions assessed as detailed in the **Table 2.16**.

**Table 2.16: Results of Joint Physical Verification of bamboo plantations**

Sl. No.	Name of the Forest Division	Name of the plantation site	Year of Plantation	Scheme/ area in ha	Name of species	Expenditure incurred (in ₹)	Survival percent as per JPV
1	2	3	4	5	6	7	8
1	Boudh	Beredasari (Boudh Range)	2014-15	NBM/ 25	<i>Bambusa bambos</i> and <i>Dendrocalamus strictus</i>	5,60,234	52 (partially successful)
2		Mundeswar (Medhapur Range)	2015-16	NBM/10	-do-	1,33,180	58 (partially successful)
3	Keonjhar	Banamahuldaha (Patna Range)	2013-14	NBM/ 20	-do-	4,60,754	35 (failure)
4		Kalapat R.F (Telkoi Range)	2016-17	NBM/ 60	<i>Bambusa bambos</i> and <i>bambusa vulgaris</i>	13,10,100	94 (good)
5	Koraput	Jogidanger (Semiluguda Range)	2013-14	NBM/ 20	<i>Bambusa bambos</i>	4,07,260	65 (good)
6		Saparmgiguda (Lampatput Range)	2014-15	ORBP/ 25	<i>Dendrocalamus strictus</i>	5,13,926	12 (failure)

Soil condition	Average Rainfall	Canopy area in percent	Total no. of culms/ clump	Height of dominating culm (m)	Collar diameter of dominating culm (cm)	Remark of the Expert
9	10	11	12	13	14	15
Soil is little degraded	Good	40 to 50	6.6	6.6	2.1	Growth of plants is poor
Good	Good	50 to 60	5.9	5.5	1.9	Growth is below optimum
Moderately degraded	Good	45 to 55	3.9	4.0	1.8	Performance of the plantation is bad
Good	Good	0 to 40	6.6	7.8	3.1	Good
Degraded, murrum, rocky	Good	0 to 10	8.4	8.6	3.9	Good
Degrade and rocky	Good	0 to 5	2	0.3	0.5	No visibility of bamboo plants



Photograph No.15



Photograph No.16



Bamboo plantation at Banamahuldiha under Patna Range

- It was observed that out of six plantation sites, two plantation sites were partially successful, two sites were completely failure and two sites were fairly successful. The survival *per cent* varied from 12 *per cent* at Saparangiguda (Lamataput range, Koraput Division) to 94 *per cent* at Panga- Batakhaman (Telkoi Range, Keonjhar Division).
- The variation in performance of different plantations was attributed to variation in site quality, species taken and level of management. Selection of wrong site and poor level of management had resulted in the failure of plantation at Saprarangiguda. The plantation at Banamahuldiha, Patna Range had also failed nearly having 35 *per cent* survival rate which was due to poor level of management.
- Out of six plantations, four were undertaken inside existing forests having canopy cover of more than 40 *per cent*. The growth of clumps was not optimum in such sites because of poor light availability.
- Plantation Journals were not maintained for the desired periods. This indicated that the concerned forest officials were not involved with the plantation sites during the recommended period and abandoned the maintenance activities quite before time.
- Adequate protection in the form of watch and ward was not given to clumps in most of sites, atleast for initial three years, although provision was there for all the years, till 5th year of the plantation.

Hence, the four sites were failed plantations. Selection of bamboo species for particular sites should have been done correctly. In areas with heavy biotic interference, the resistant/ thorny species like *Bambusa bambos* should have been preferred. The expenditure incurred amounting of ₹16.68 lakh was unfruitful. Responsibility should be fixed on the persons responsible for not monitoring the plantations to ensure their survival.

The Government did not furnish any specific compliance to the above observation of audit.

### **2.1.8 Plantations under Increasing Green Cover/ State Plan schemes**

The Forest department received funds for various schemes under State Plan (SP) for different types of plantations such as AR, ANR, Avenue Plantation, Block Plantation, Urban Plantation, Bamboo Plantation, Bald Hill Plantation. The Increasing Green Cover (IGC) scheme was introduced in 2013-14 by subsuming 11 continuing plan schemes<sup>17</sup> for afforestation activities.

#### **2.1.8.1 Non-existence of bamboo plantations**

Rule 28(i) of the OFD Code, 1979, stipulates the duties of Range Officers (RO) that he must know the nature, value and extent of forest property committed to his charge and must know the plan prescribed for protection and management of that property, which not only consists of natural forests and wildlife but also plantations, roads, buildings, wells. Further, as per Rule 26 of FPM, 1977, a species which can be subjected to grazing and browsing shall not be planted unless browsing can be eliminated and measures to ensure that are contemplated.

- Check of plantation records (journals) in Koraput division revealed that one 40 ha bamboo plantation was executed in 2013-14 at Baghdangar Protected Reserve Forest (PRF) measuring 566.65 ha without recording the actual site coordinates in Lamtaput Range with an expenditure of ₹5.51 lakh. In this regard, the following were observed during audit:
  - Except for some entries on the expenditure incurred, no other information like survey details, site location details, climate data, details on pre planting operations were recorded. The expenditure was also not completely recorded as out of total expenditure of ₹5.51 lakh, expenditure of ₹4.18 lakh only was recorded in the journal.
  - A JPV including representative team from forest division was conducted to confirm its existence and to assess survival of the bamboo plantation. As the plantation site Global Positioning System (GPS) coordinates were not recorded in plantation journal, it could not trace the whereabouts of the site inside PRF area. The officials of the division also could not identify even a single planted bamboo to Audit. Hence, the entire expenditure of ₹5.51 lakh was doubtful and the site was a failed plantation. Also, the chances of misappropriation of expenditure shown in this regard cannot be ruled out.

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<sup>17</sup> Urban Plantation, Plantation of Medicinal Plant, Economic Plantation, Odisha Bamboo Development Programme, Bald Hill Plantation, Avenue Plantation, Popularisation of Fuel Efficient Chullahs, Agro-Forestry, Permanent Nursery, Ama Jungle Yojana and Conservation of Sacred Groves

The Government stated (October 2021) that appropriate action would be taken against the staff for low survival percentage of plantation.

- Audit test checked the plantation records of Keonjhar (Wildlife) division and observed that one Bamboo plantation of 10 ha was executed inside the Hadagarh Sanctuary in 2013-14 with an expenditure of ₹2.02 lakh. Out of total expenditure, ₹0.68 lakh was



spent towards watch and ward function. The JPV team visited the site and found that the plantation site was in a very dense forest and there was no sign board and pillar posting. Though the plantation site matched with the GPS co-ordinates as recorded in the journal, JPV could not identify a single bamboo plant in the plantation site. The selection of site for bamboo plantation was incorrect as the same was executed inside a very dense forest. This resulted in doubtful expenditure of ₹2.02 lakh.

The Government stated (October 2021) that appropriate action would be taken against the staff for low survival percentage of plantation.

### 2.1.9 Mangrove Plantations

Mangrove forests<sup>18</sup> are extremely productive ecosystems that provide numerous goods and services both to the marine environment and people.

Photograph No.18 – Mangrove plantation in Bhitarkanika



<sup>18</sup> Source: [www.mangroveplantations](http://www.mangroveplantations)

Mangrove forests are home to a large variety of fish, crab, shrimp and mollusc species. These fisheries form an essential source of food for thousands of coastal communities around the world. These forests also serve as nurseries for many fish species, including coral reef fish. This helps stabilize the coastline and prevents erosion from waves and storms. The mangrove plantations were carried out under Integrated Coastal Zone Management Project (ICZMP), CA and the central assistance received towards implementation of Management Action Plan (MAP) for conservation and Management of Mangroves in Bhitarkanika.

### 2.1.9.1 Evaluation of mangrove plantation

During JPV of mangrove plantation site under Rajnagar Mangrove Forest Division, the JPV team could not enter into the mangrove plantation site due to deep muddy terrain and heavy inundation. The only way to analyse mangrove plantations was through remote sensing method. Satellite images and UAVs were used to analyse the Mangrove plantations at Santubi and results are detailed below:

The plantation area map of Santubi plantation site under Rajnagar Mangrove Forest Division is as shown below.

Photograph No.19



Mangrove plantation at Santubi under Mahakalapada Forest Range

The evaluation of the site was done using UAV as detailed in Table 2.17.

Table 2.17: Results of evaluation of mangrove plantation by UAV

Forest Division	Range/ plantation site	Schema/ year of plantation/ area in ha	Type of trees	Trees as per Plantation Journal	Trees as per UAV	Plantation expenditure (in ₹)	Survival percentage
Rajnagar	Mahakalapada/ Santubi	ICZMP/ 2014-15/ 65	Sindhuca and Rai	2,88,925	1,05,333	23,98,500	36.46
<b>Total</b>				<b>2,88,925</b>	<b>1,05,333</b>	<b>23,98,500</b>	<b>36.46</b>

The survival percentage of the plantation was 36.46 at Santubi, which should be treated as a failed plantation.

### 2.1.9.2 Non-renovation of creeks and channels

Creeks are the lifeline of mangrove forests. They carry fresh and tidal water to the adjoining area and supply the vital nutrients. It also recharges the soil with fresh dose of sediments. But due to several factors like change of course of rivers, biotic interference and diversion of water channel, creeks are silted up in the upper reaches. It is necessary to renovate the creeks from time to time. The renovation of creeks includes maintenance of adequate depth of the creeks. The renovation was to be taken up in a five-year cycle. Further, the planting technique is different for mangrove plantations. There are two types of methods of mangrove plantations *i.e.* seedling and hypocotyle. In the areas that do not get inundated, fish bone channels are to be dug out. In areas, where mangrove vegetations came up afresh, new fish bone channels were recommended. This was to be decided by the DFO. Thus, the management interventions aim at creek renovations and maintenance of adequate salinity.

In this regard, the information pertaining to number of important creeks and channels existing in the division and length thereof, year of last assessment, five year planning document for renovations of these creeks and channels during the period from 2013-18 were not furnished to audit. Further, the extent of renovations in creeks, tidal channels and fishbone channels during the period was also not available with the Division.

Hence, it was evident that the creeks and channels were not renovated from time to time as required although the central assistance was received towards implementation of Management Action Plan (MAP) for conservation and management of mangroves in Bhitarkanika.

In reply, the Government stated (October 2021) that during 2013-18, 70.94 ha of channels were dug with expenditure of ₹72.56 lakh under MAPs and 21 km of creeks and channels were renovated with expenditure of ₹16.40 lakh under APOs. However, no documents in support of renovation of creeks and channels could be furnished to Audit.

### 2.1.10 Evaluation of plantations sites through joint physical visits

During field audit, JPV consisting of Audit team and forest officers was conducted to assess the survival of plantation in 35 plantation sites covering all the selected schemes in selected divisions. It was found that mainly teak plants survived and the survival of other species like *amla*, *bamboo*, *neem*, *chakhunda* and *cashew* were poor. Out of 35 plantations, 18 plantations of 985 ha were completely failed, six plantations of 305 ha were partially successful and 11 plantations were successful as per the provision of the Code. Out of the 24 sites (including the failed and partially successful ones), five sites under SP, eight sites under CAMPA, nine sites under MGNREGS, one site each under NBM and NAP had been executed. However, the JPV evaluation result of survival percentage of these plantations ranged from zero to 53 *per cent* compared with the survival data furnished by the DFOs, which was ranging from 10 to 95 *per cent*. Hence, the expenditure of ₹2.51 crore incurred on these 24 plantations was unfruitful as detailed in the *Appendix - 5*.

The Government accepted (October 2021) the above observation of Audit.

## Recommendations (Implementation of various plantation programmes)

- *The department may give priority to plantation of indigenous native species. The selection of species for plantations should be as per the site with pre-planting analysis of required parameters of soil, rainfall, temperature and drainage system.*
- *There may be Department level coordination and local level coordination of DFOs and their respective DRDAs for timely approval of plantation projects through MGNREGS and release of funds along with utilisation of available job card holders for successful plantations.*
- *The department may ensure proper planning before taking up a plantation project under any scheme i.e., selection of suitable sites having canopy density less than 10 per cent.*
- *The department may utilise the services of remote sensing technologies like satellite imageries and UAVs/ DRONES for effective and efficient monitoring and evaluation of plantations.*

## Financial management

### 2.1.11 Financial irregularities in implementation of plantations

#### 2.1.11.1 Avoidable expenditure due to inappropriate provision of watch and ward

Aided natural regeneration (ANR) without gap module<sup>19</sup> was introduced in the cost norm of 2016. In this module, only regeneration works are undertaken without any actual planting of saplings. As per the cost norm, regeneration works include works like survey, demarcation, site preparation, silvicultural operation, soil conservation measures, fire line tracing, watch and ward during 0<sup>th</sup> to 4<sup>th</sup> year. As per Rule 29 and 30 of OFD code, 1979, a forester is required for proper protection of forest in his charge and Government properties entrusted to him. Similarly, the forest guard is responsible for maintenance of fence in good conditions and tending of area under regeneration and weeding young plants whenever necessary. Further, as per Rule 179 of FPM, 1977, provision of watch and ward may be provided for each 25 ha of new plantations.

Scrutiny of different components of this cost norm module revealed that though planting of seedlings was actually not executed, the cost norm provides for watch and ward for 21 mandays<sup>20</sup> (₹4,200 at the rate of ₹200 per day) per ha during the entire regeneration period of four years. In the absence of new plants, the provision of watch and ward was unnecessary and avoidable although the foresters and forest guards are responsible for protection and

<sup>19</sup> ANR without gap modules means that there is wider variety of local native species in forest and the area is to be maintained/ protected only. No further new plantations are executed in the module and the existing trees would be maintained

<sup>20</sup> Five man days in 1<sup>st</sup> year, 7 mandays in 2<sup>nd</sup> year, 7 man days in 3<sup>rd</sup> year and 2 man days in 4<sup>th</sup> year

fencing of regeneration of forest. During 2016-18, total 4,06,640 ha<sup>21</sup> of ANR without gap plantations was executed in the State with expenditure of ₹63.19 crore which was avoidable.

In reply, the Government stated (October 2021) that it was necessary to engage watchers to protect the natural regeneration from biotic interference and incidence of fire in the forest area which were cause of degradation. However, the reply was not acceptable as actual plantations were not executed and no forest asset was created to engage separate provision for watch and ward. Only silvicultural operations as well as soil moisture conservation works were taken up as per the cost norm module. Besides, separate provisions for inspection path and fire line tracing were included in the cost norm.

#### **2.1.11.2 Avoidable extra expenditure due to inconsistency in plantation cost norm**

In case of areas which have sparse vegetation or bare soil and the natural regeneration was out of question there and the only method of covering the area with vegetation was through Artificial Regeneration (AR). This method was adopted by the department as Block Plantation. Urban forestry is the care and management of single trees and tree populations in urban environment. The Department implemented this method as Urban Plantation with an aim to create green pool in the crowded urban areas. Plantation activities were undertaken as per cost norms of 2016 during the period 2016-18. The cost norm 2016 was modified as per the prevailing wage rate *i.e.* ₹150 to ₹200 besides all other components remaining the same.

Scrutiny of components of the cost norms for both block and urban plantations revealed that in block plantation, 1,600 plants of six months old seedling were planted in one ha with a gap of 2.5 m x 2.5 m. But in urban plantation, 1,000 plants of six months old seedling were planted in an area of 0.625 ha with a gap of 2.5 m x 2.5 m. Audit noticed wide inconsistencies between the costs of similar components like 1st and 2nd weeding, soil working and watch and ward. The comparison of four similar components under both the plantation cost norms of 2016 are as detailed in **Table 2.18**.

<sup>21</sup> Source: Annual Activity Report 2016-17-160,880 ha, 2017-18-245,760 ha

**Table 2.18: Comparison of cost norm of Block and Urban plantations**

Item of work	Provision of mandays (In number)		Excess provision in Urban Plantation for 1600 plants	Excess cost involved for 1600 plants (col.4 x ₹200)	Cost per plant (col.5/1600) (in ₹)	Excess cost for 1000 plants under Urban Plantation (in ₹)
	Block Plantation (1600 Plants)	Urban Plantation (for 1600 Plants*)				
1	2	3	4	5	6	7
1 <sup>st</sup> year-1 <sup>st</sup> & 2 <sup>nd</sup> weeding, soil working and watch & ward	26	347	321	64,200	40.13	40,130
Second year -do-	28	394	366	73,200	45.75	45,750
3 <sup>rd</sup> year -weeding with fertilizer application and watch & ward	29	330	301	60,200	37.63	37,630
4 <sup>th</sup> year-watch & ward	15	298	283	56,600	35.38	35,380
<b>Total</b>	<b>98</b>	<b>1,369</b>	<b>1,271</b>	<b>2,54,200</b>	<b>158.89</b>	<b>1,58,890</b>

Source: Plantation cost norm 2016. \* 1600 plants are taken against 1000 plants in urban plantation for comparison.

It can be seen in the above table that the labour component provided in the cost norms of urban plantation was very high (14 times) in comparison to block plantation involving avoidable extra cost of ₹1.59 lakh for 1,000 saplings under urban plantation. Specifically, provision of labour component on watch and ward was inappropriate in spite of gabion/ fencing in the cost norm. During the period 2016-18, 25.05 lakh saplings were planted in urban areas in the State and incurred an avoidable extra expenditure of ₹39.80 crore at the rate of ₹158.89 per plant.

The Government stated (September 2021) that the cost norm for different plantation modules were prepared by the cost norm committee. Realising the importance of Urban plantations in city areas and intense management, the cost norm for the same was prepared to provide more care and protection against biotic pressure. Despite furnishing all the above mentioned reasons, the Department could not explain how 14 times of labour requirement as in urban plantation was arrived at. Neither it was recorded nor was any scientific analysis done to assess the same.

### 2.1.11.3 Avoidable/ wasteful expenditure in plantation components exceeding cost norm

Rule 187 of the FPM, 1977 stipulates that the DFOs shall prepare a detailed item-wise estimate of cost for the plantation of his division and submit it to his Conservator of Forests (CoF), who in turn shall examine these estimates in detail and approve the details and the total cost per unit for each of his divisions, provided that the total estimate for his circle shall not exceed the amount arrived at as per the cost approved by the Government.

- Audit test checked the records of plantations and cash accounts and noticed in 12 selected divisions that irregular excess expenditure of ₹93.60 lakh was incurred in 112 plantations in 47 Ranges under different components or outside the cost norms as detailed in **Appendix- 6**. These expenditures were made to utilise savings after altering the fixed components' costs which were completely avoidable.



The Government stated (October 2021) that the expenditures were incurred as per the field requirements and within the overall cost norm of the plantation. The replies are not acceptable as each item of work with labour and material cost and its period of activity were clearly stipulated in the approved cost norm to be duly followed by the field functionaries.

- Scrutiny of plantation journals and cash accounts in one division<sup>22</sup> revealed that ANR with Gap Plantation was to be executed at Chirobeda RF in Panposh Range over 800 ha (200 plants/ ha) during 2014-15. An amount of ₹10.80 lakh was spent in pre-planting operation such as survey, demarcation, site preparation except pitting during January to March 2014. Subsequently, the ANR plantation was converted to 400 ha resulting in wasteful expenditure of ₹5.40 lakh.

The Government stated (October 2021) that 16,000 seedlings were planted over 400 ha instead of 800 ha. The reply was not acceptable as the expenditure incurred on pre-planting operation over 400 ha was wasteful.

#### **2.1.11.4 Irregular excess expenditure on silvicultural operations under CAMPA plantation**

As per plantation cost norm 2016, the pre-planting (0th Year) silvicultural operation (SO) in ANR plantation (200 plants/ ha) shall be carried out after site preparation in the month of January – February at the rate of ₹1,000 per ha *i.e.* five mandays at the rate of ₹200. The 1st year SO shall be carried out in September – October at the rate ₹3,000 per ha (15 mandays) after the plantation during July/ August. These SOs include clearance of weeds, climber cutting, high stump cutting and singling of shoots.

Audit scrutinised plantation journals and cash books, report returns in Balangir division. It was revealed in audit that 6,000 ha ANR plantations (200 plants/ ha) were executed under CAMPA APO 2015-16 in 11 Ranges. The pre-planting SO in January -February before plantation were not done as no such expenditures were incurred and shown in respective journals. Planting in all sites were completed during July-August. Expenditure for post planting SO (1<sup>st</sup> Year) amounting to ₹2.40 crore was booked at the rate of ₹4,000 per ha in place of ₹3,000 between December 2016 and March 2017. The pre planting expenditure has been included along with post planting expenditure which resulted in irregular excess expenditure of ₹60 lakh in violation of the cost norm.

In reply, the Government stated (October 2021) that pre-plantation works were carried out in due time for plantation. After release of funds, the expenditure had been booked for both pre and post planting expenditure. The reply was not acceptable as these SO works were to be executed separately before and after the planting as per periodicity prescribed in cost norm.

<sup>22</sup> DFO, Rourkela

### 2.1.11.5 Non-raising of compensatory fund against damage of Avenue Plantation

As per the circular issued (June 2018) by the Government of Odisha (GoO), plantation of two times the number of trees likely to be felled will have to be carried out by way of CA in widening of roads irrespective of forest or non-forest land. This stipulation is aimed at conserving and protecting the environment from the harmful impacts of deforestation.

Scrutiny of the plantation records in four Forest divisions<sup>23</sup> revealed that 13 avenue plantations with 32,750 seedlings at the expenditure of ₹1.29 crore were planted in 131 rkm during 2013-18 as detailed in *Appendix - 7*. These were completely damaged due to widening of roads during 2017-18 by the Public Works department (PWD)/ National Highways Authority of India (NHAI). No communication between the DFOs and user departments was made to compensate the damaged plantations. The DFOs neither took any action for assessing and raising demand to compensate the cost of damage plantations nor did the user agencies (UAs) (PWD/NHAI) propose any plantation scheme for approval of the concerned DFOs. This resulted in non-raising of compensatory fund of ₹3.92 crore as per the prescribed cost norm in violation of the above provision.

In reply, the Government noted (October 2021) the above observation of Audit.

### 2.1.11.6 Irregular diversion of CAMPA funds to State Plan scheme

As per Sub-rule-5 and Explanation 2 of CA Fund Rules, 2018, the monies received towards net present value (NPV) deposited in the State fund shall be used in the manner provided in sub-rule (2) and sub-rule (3) and the mixing of the monies received towards NPV shall not be allowed with any other State Schemes under implementation from any other budget. Further, Ama Jangala Yojana (AJY) is a flagship programme of Government of Odisha, implemented through Odisha Forestry Sector Development Society (OFSDS) in 30 Territorial and Wildlife Divisions of the State through 7,000 Vana Surakshya Samitis (VSSs) and Eco Development Committees.

Scrutiny of records of AJY and information of PCCF (O) revealed that an amount of ₹225.84<sup>24</sup> crore was diverted from CAMPA APO 2014-18 in violation of CAMPA rules and utilised in the above State scheme. The reasons for this diversion were not on record.

In reply, the Government stated (October 2021) that the Empowered Finance Committee had approved the components of AJY to be funded under CAMPA. The same had also been approved by the State Level Steering Committee. However, it was a violation of CAMPA Rules by utilising the funds towards AJY which is a flagship programme of the Government of Odisha instead of CAMPA plantations.

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<sup>23</sup> Balangir, Keonjhar WL, Rairakhol and Rourkela

<sup>24</sup> APOs - 2014-15 (₹18.62 crore), 2015-16 (₹22.41 crore), 2016-17 (₹117.10 crore) and 2017-18 (₹67.71 crore)

### 2.1.11.7 Irregular payment of committed liability for plantation maintenance

As per Rule 35 of the Forest Plantation Manual, 1977, all operations in connection with plantations are time bound. If any one of the operations concerned is delayed, the success of the whole plantation is jeopardised. A late start is almost certain to have serious consequences. In this regard, the plantation cost norm, 2016 notified by PCCF (O&HoFF) prescribes the preferable period of activity for 3rd year maintenance for various plantations is August to November, covering soil working, manuring, weeding including SMC/ watch and ward for whole year.

Audit scrutinised the records of budget for the year 2017-18, allotment and disbursement of funds for "Increasing Green Cover (IGC)" under Programme Expenditure (State Plan). It was revealed that no fund was released during the year 2017-18 for 3rd year maintenance of 2015-16 plantations of 4,300 ha under economic plantation, bald hill plantation and OBDP and 1,000 rkm under avenue plantation. The same was included in 2018-19 demand for ₹6.15 crore and disbursed as "committed liabilities of 2017-18" as funds were not released under CAMPA interest fund during 2017-18.

As there was no such provision to incur expenditure on credit basis for any plantation/ maintenance work, the release of the said funds as committed liabilities to DFOs was irregular. Further, to execute the maintenance of plantation works on credit basis, approval of appropriate authorities was also not obtained by the DFOs.

In reply, the Government stated (October 2021) that funds were released towards 3rd year maintenance work during 2018-19 to DFOs as committed liabilities of 2017-18. The reply of the Government was not acceptable as there is no such provision to execute works on credit basis.

### 2.1.11.8 Irregular expenditure in urban tree plantation without provision in cost norm

The cost norm, 2014 does not provide any expenditure for fencing and 3rd year maintenance for Urban Tree Plantation (block module) of 1,000 saplings with eight months old seedlings.

Scrutiny of records revealed that funds for fencing [barbed wire with Reinforced Concrete and Cement (RCC) pillar] and 3rd year maintenance were irregularly allotted by the PCCF (O&HoFF) for implementation of above Urban Tree plantations during 2014-15 to 2017-18. A total of ₹14.82 crore was allotted and spent for fencing and 3rd year maintenance (₹6.32 crore and ₹8.50 crore respectively during above period) in 29 sites under 13 divisions in violation of applicable cost norm as detailed in *Appendix - 8*.

In reply, the Government stated (October 2021) that the cost norm for 3rd year maintenance work of urban plantation was prepared for cost norm 2014, but it was omitted by mistake in the final set of cost norm for printing. Further, it was stated that the fencing work was taken up during the 1<sup>st</sup> year plantation as

per the gabion cost norm prescribed. The reply was not acceptable as both the cost norms for fencing as well as 3<sup>rd</sup> year maintenance were not prescribed in the approved plantation cost norm, 2014.

#### **2.1.11.9 Irregular submission of utilisation certificate without incurring expenditure**

As per para 2 (b) of the sanction order issued (October 2013) by the GoI, the implementing agency shall submit the utilisation certificates (UCs) to the Department as soon as possible after close of the financial year. Further, sub-para (h) stipulates that any unspent balance of grant which is not spent for the purpose for which it is sanctioned during the financial year shall be refunded to the GoI after the end of the financial year. The payment shall be made to the concerned implementing agency.

Audit scrutinised the records pertaining to allotment and expenditure in Odisha Bamboo Development Agency (OBDA). Audit observed that all the UCs were submitted to GoI after disbursing the funds to the divisions, though the money was not actually utilised in the same year as per the approved Annual Action Plan (AAP).

It was revealed that out of total allotment/ release of ₹25.84 crore during 2013-18, ₹18.14 crore were spent towards plantation programmes leaving unspent balance of ₹7.70 crore. Utilisation certificates for total allotted amount were furnished to GoI. Thus, submission of UCs for the total amount including unspent balance was improper. This amount should have been refunded to the GoI as per conditions of sanctions. Further, as discussed in the 1st State Level Executive Committee (SLEC) meeting held during October 2018, there was an unspent balance of ₹12.12 crore (since inception) including the above unspent balance also available with OBDA although UC has been submitted to GoI for the entire amount. The saving was largely due to non-utilisation of funds against failed plantations for 3<sup>rd</sup> and 4<sup>th</sup> year maintenance respectively.

In reply, The Government stated (October 2021) that the funds were released after approval of Annual Action Plan (AAP) of OBDA. After releasing funds to different implementing agencies, the UCs were submitted to GoI. The reply was not acceptable as the funds were not utilised fully for the plantations for which it was sanctioned and not also shown as unspent balance to be included in the next AAP.

#### **2.1.11.10 Irregular release of funds without ensuring survival percentage**

As per Para 6.4.5 of NBM operational guidelines 2006, the estimated cost for area expansion of *bamboo* in forest area was ₹25,000 per ha up to 2013-14 which was to be released in two equal instalments. From 2014-15, the cost norm per ha was revised to ₹42,000, which would be released in three annual instalments in the ratio of 50:25:25. Further, as stipulated in the guidelines, the assistance for second year would be released subject to 90 *per cent* of survival of plants.

Audit scrutinised plantation records and information furnished for audit and observed that total 1,580 ha plantations were executed in 73 sites under ten<sup>25</sup> forest divisions out of 13 selected divisions and plantations were started during 2013-17. The allotted funds of ₹5.25 crore was released to the concerned DFOs in one instalment in the 1st year of plantation which resulted in irregular release of funds without ensuring the first year survival percentage in violation of the above provision.

Accepting the Audit observation, the Government stated (October 2021) that the funds had been released to the DFOs for 2013-17 phase wise soon after receipt from the GoI and also as per operational guideline of NBM. But the survival percentage of the 1<sup>st</sup> year plantation could not be monitored due to acute scarcity of field officials at Division level. The reply was not tenable as the DFOs are implementing agencies and OBDA was to ensure the fulfilment of mandatory condition before release of second instalment.

#### **2.1.11.11 Engagement of vehicles for watering of plantations without tender**

As per Para 5(b) of Circular issued by GoO (September 2011), for estimated value of the work or service above rupees two lakh, the competent authority should issue a brief tender enquiry in one local daily asking for the offers by a specified date and time and the details be made available in the website of competent authority. In case the estimated value of work/ service exceeds rupees ten lakh the under enquiry should be advertised in at least one largely circulated National Newspaper. The cost norm for Urban Plantation includes provision of watering, which includes cost of water, labour and transportation through tractor/ tanker.

Scrutiny of cash accounts in Rourkela forest division revealed that ₹69.12 lakh was paid irregularly to individuals/ firms towards watering charges without invitation of tender in Urban Tree Plantation during November 2015 to March 2016 in three Ranges viz. Panposh, Kuarmunda, Rajgangpur as detailed in the *Appendix-9*.

In reply, the Government stated (October 2021) that the watering cost had been included in the cost norm. The watering in urban tree plantation by engaging vehicles was being done in *piecemeal* contract basis. The vehicle was engaged through contract in the Range level. However, the compliance was silent about non invitation of the tender for watering of plantations although the vehicles were engaged in contract basis.

<sup>25</sup> Balangir, Boudh, Kalahandi(S), Koraput, Keonjhar, Malkangiri, Rairakhol, Rayagada, Rourkela and Sundargarh

## Recommendations (Financial management in implementation of plantations)

- *The department may consider not to include provision of watch and ward under ANR without gap in cost norms as regeneration works are undertaken without any plantation.*
- *The department may consider reviewing the cost norms for similar components like labour etc. in two kinds of plantations.*
- *The department may not divert CAMPA funds for utilisation in other State plan schemes in contravention to CA Fund Rules, 2018.*
- *The department may ensure compliance to the provisions regarding release and utilization of funds as per the cost norms, and rules/ guidelines governing other Schemes like MGNREGS, CAMPA, AJY, NBM etc.*
- *The department may consider not to release funds to the DFOs in one instalment in the 1st year of plantation without ensuring the first year survival percentage in violation of the provisions under NBM.*

## Monitoring and evaluation

### 2.1.12 Monitoring of Plantation sites

#### 2.1.12.1 Insufficient inspection and monitoring of plantations

Rule 207 of FPM, 1977 stipulates that each plantation shall be visited by the Range Officer (RO) once in October, then in January and again in June for three consecutive years beginning with the year of formation. After each inspection, the RO shall submit a report on the 5th November, 5th February and 5th July every year on the condition of the plantation on the points (a) maximum height, (b) average height, (c) total number of plants surviving (d) survival percentage, (e) cause of mortality and (f) condition of weed growth. A separate report shall be submitted in respect of each individual plantation to the DFO.

Scrutiny of plantation Journals in all selected divisions revealed that, in 148 out of 1,187 plantations, neither quarterly inspections were done by the ROs nor was insisted upon by DFOs for submission of required reports. Thereby the year-wise growth and survival percentages could not be confirmed, which was the sole factor for assessing the success of the plantations. Further, inspection reports of higher officials were not incorporated in most of the journals. This indicated deficiency in monitoring and evaluation of plantations.

In reply, the Government stated (October 2021) that the observation of the Audit had been noted for future guidance.

#### 2.1.12.2 Deficiency in management information system

As per Para 4.14 of the NFP, 1988, inadequacy of data regarding forest resources is a matter of concern because this creates a false sense of complacency. Priority needs to be accorded to completing the survey of forest resources in the country on scientific lines and updating information. For this

purpose, periodical collection, collation and publication of reliable data on relevant aspects of forest management needs to be improved with recourse to modern technology and equipment.

Scrutiny of records, as furnished to Audit, revealed the following discrepancies:

- ***Non-maintenance of records/ data for plantation programmes***

The basic information relating to plantation activities, plantation index number, extent of available degraded forest and vacant revenue land were not maintained properly as no such information could be made available to Audit by the PCCF (O&HoFF) as well as all selected DFOs. However, some information on physical/ financial targets and achievements were furnished by the PCCF (O&HoFF) after obtaining from divisions. Hence, no centralised data/ information was maintained by the department.

Maintenance of information on plantation programmes was crucial for planning long term plantation activities and its concurrent monitoring. Absence of such valid information hampers the process of planning, decision-making, control and coordination by the higher management in achieving the objectives of NFP.

- ***Lack of data integrity in plantation information***

Scrutiny of divisional plantation information for the period 2013-18 containing achievement of physical/ financial targets and generation of mandays revealed that uniformity in maintenance of above information or data was absent. Records like plantation registers containing year-wise, scheme-wise and plantation-wise expenditure with survival percentage were not maintained uniformly at both division and Department level.

Thus, the available data lacked integrity and extraction of year-wise, Range-wise and scheme-wise data was difficult for audit analysis.

- ***Inaccuracy in Odisha web based monitoring portal e-Green Watch***

With an objective to collect and present information to monitor and track how well CAMPA funds are being utilised, e-Green Watch was developed as an integrated online system to present the data in real time for monitoring and accessible to all stakeholders and public at large.

Audit observed that the data were not in real time on forest activity in the FSI link as out of 503 CA plantations, data of only 288 CA sites (57 per cent) were uploaded with polygons<sup>26</sup> and data of balance 215 sites were still pending for uploading since 2010.

In this regard, the *Ad-hoc* CAMPA while releasing funds (January 2017) observed that the reports of the State against most of the monitoring

<sup>26</sup> A polygon is a plane figure that is described by a finite number of straight line segments connected to form a closed polygonal chain. The co-ordinates of plantation site boundaries are plotted in Google Earth software to form a polygon

parameters were far from satisfactory. The levels of inaccuracy in e-Green Watch was 11.09 per cent with 12.79 per cent polygons being incorrect and 76.12 per cent being unascertainable. There was no report on central screening of polygons before loading on the e-Green Watch portal.

In reply, the Government accepted (October 2021) the above observation of Audit.

#### **2.1.12.3 Non-evaluation of plantations executed under IGC**

As per para 12 of the scheme guidelines of IGC, internal and third party evaluation were to be taken up. Evaluation were to be made based on survivability of saplings planted, growth of saplings, preparation of maps and maintenance of records, involvement of local people and other line departments and district administration. Sixty per cent survivability of sapling planted after a period of four years should be considered as successful plantation. Performance of the field staff was to be adjudged based on the evaluation report.

Scrutiny of the third party evaluation records revealed that the department initiated tender process for evaluation of IGC Programme in 2018 after nearly one year of closure of the programme. Indian Institute of Forest Management (IIFM), Bhopal, an autonomous institute of MoEF&CC was duly selected through tender process and work order was issued (Mar 2018) to undertake the assignment at a cost of ₹76.12 lakh. But the proposal was cancelled (April 2018) due to disagreement on time and payment schedule. However, the request of IIFM seeking six months' time in place of earlier two months at no extra cost and 50 per cent advance payment was accepted by the Department. Finally, the agreement to this effect was signed during March 2019. Though advance payment of ₹38 lakh was made (March 2019), field work of evaluation by IIFM was yet to commence. Thus, concurrent evaluation of plantations had been delayed by nearly 48 months.

The Government stated (October 2021) that IIFM had submitted the final report to the PCCF (O&HoFF) office. However, no such copy of evaluation report of the IIFM furnished with the compliance.

#### **2.1.12.4 Shortage of field staff**

Review of sanction strength and men in position in PCCF office as well as in 13 selected divisions along with FRS division revealed that the overall vacancy in sanctioned strength was ranged from 16 to 38 per cent as on 31 March 2018 as detailed in the *Appendix - 10*.

Most importantly, vacancy in non-gazetted field staff responsible for implementation of base level plantation activities varied in similar range between 15 to 38 per cent. This vacancy position prevailed in similar pattern during 2013-18.

In reply, the Government stated (October 2021) that plantations raised under IGC could not be inspected as well as evaluated as per the prescribed provision due to want of man power in the field.



### Recommendation (Monitoring and evaluation of plantations)

- *The department may ensure that quarterly inspections of plantations are done by the ROs and supervised by DFOs for proper maintenance of plantations.*
- *The department may maintain database on plantation programmes which is crucial for planning long term plantation activities and its concurrent monitoring.*
- *The department may consider to maintain a database of GPS tagged images of each plantation sites for better management of forest resources.*

#### 2.1.13 Conclusion

- Audit noticed that the achievement of plantation targets during the period ended with unreasonable shortfall, which indicated unrealistic fixation of targets. Due to non-availability of data regarding degraded forest land and vacant revenue land, the planning procedure for plantations was limited to only instant data provided by field staff on a *piecemeal* manner. The long term planning and fixation of annual target could not be achieved due to lack of coordinated planning among Ranges, Divisions and Forest Headquarters. Required data relating to various plantation schemes, such as scheme wise annual target and achievement, allotment and expenditure, survival percentage were neither maintained at Government nor at PCCF (O&HoFF) level.

It was necessary for the State to formulate their own SFP, in line with NFP, by considering local geo-climatic conditions. Failure to evolve SFP resulted in inadequate planning in enhancement of green cover in the State. Forest Divisions were working without approved WPs/ WSS. The plantation works executed by the Department lacked proper planning. The sites were not properly selected and prepared before plantation activities.

- As the database of degraded forest and non-forest land was not available with the Department, target for Compensatory afforestation programmes under CAMPA was not achieved within the stipulated period of three years and hence, could not compensate the forest cover against the diversion of forest land.
- The execution of the plantation work was also poor as the Department failed to plant the indigenous species and instead planted Teak as the major species. The heights and canopy cover attained by the individual species were not commensurate to the age of plantation. No effective and efficient soil moisture conservation activities were taken up by the department as the staggered trenches were either dug outside the plantation area or were not executed at all. The executed trenches were

also not perpendicular to the terrain slope which further reduced the water retention capacity of the trench. The degraded patches inside the plantation sites were not assessed properly and the trees were planted in easily accessible areas. Hence, an expenditure of ₹3.36 crore became unfruitful.

- The plantation programmes carried out under MGNREGS remained unfruitful and failed due to improper selection of plantation sites in dense forest. There was no coordination at the level of DFOs and DRDAs in planning the plantation projects in a division. The DFOs and the Department did not have information on total skilled labourers available in a division and the project proposals were sent to DRDAs in a delayed manner which affected the plantation execution. Also, funds were not released from second year onwards for maintenance operations. All these reasons led to failed plantations executed under MGNREGS with unfruitful expenditure of ₹13.17 crore.
- The Department could achieve only 51.74 per cent of total target of bamboo plantations under NBM. The survival percentage of executed bamboo plantations was poor due to poor selection and poor management of the sites. The sites were selected inside dense forests having a canopy density of more than 40 per cent which resulted in very less growth of clumps due to poor light availability.

Irregular release of entire sanctioned funds worth ₹5.25 crore by OBDA in one single instalment during first year of bamboo plantation without ensuring the survival percentage violated the scheme guidelines.

- As there was no actual forest asset created *i.e.*, no actual trees were planted in the Aided Natural Regeneration (ANR) without gap plantations, provision for watch and ward during the entire regeneration period of four years in the cost norm led to avoidable expenditure of ₹63.19 crore. Also, the provision of mandays for urban plantations was fixed unreasonably higher without any scientific analysis led to avoidable extra expenditure of ₹39.80 crore. Hence, the Department failed to frame the cost norm scientifically and reasonably.

Excess expenditure was incurred under different components or outside the cost norms led to avoidable/ wasteful expenditure of ₹99 lakh. Funds of ₹14.82 crore for fencing and 3rd year maintenance were irregularly allotted and spent under Urban Tree Plantation which led to violation of the applicable cost norm. Avenue plantations were completely damaged due to widening of roads and funds for such damages was not raised against UAs to compensate the damaged plantations due to lack of coordination and inefficient monitoring. Hence, the Department failed to adhere to the relevant cost norms and financial rules.

- The plantation journals were not maintained properly and inspection/ monitoring by field level officers, Range Officers in particular, was

deficient. The year-wise growth and survival percentages could not be confirmed which led to failure in assessing the prime objectives of department in creation and maintenance of forestry assets.

- Thus, the plantation activities undertaken by the State of Odisha did not result in improvement of degraded forest area and increase in forest cover to its full potential.