CHAPTER-I

Summary of Facts on which proposals are made

1. The tract dealt with

1.1 Name and Situation:-

1.1.1 The Phulbani District was created in 1948 through a series of repeated reorganizations it was reconstituted as Kandhamal District in 1993. The Phulbani forest division contains a part of newly formed Kandhmal District, after being re-organised during the re-organisation of Districts vide Govt. Notification No.DRC-218/93-56408/R dated.22.12.1993. The Phulbani Forest Division came into existence with effect from 01.01.1980 as per re-organisation Notification No.1E (A)-94/79-257782/FFAH dt.11.10.1979 of the Govt. of Orissa. The ex-state forests of Boudh formulated independent Boudh Forest Division. Further G.Udaygiri taluk including Chakapad, Khandamal and Ex-Zamindari forests of Karada, which were separated from Baliguda Forest Division and merged in Phulbani Forest Division. Hence, Kandhamal District covered two Forest Divisions namely Phulbani Forest Division and Baliguda Forest Division.

1.1.2 The Phulbani Forest Division covers the entire area of the revenue sub-division of Kondhamal and G.Udaygiri tehsil of Baliguda revenue sub-division. Hence, Phulbani forest division includes all the area of 2 nos. of revenue tehsils, i.e. Kondhamal Tehsil and G.Udaygiri tehsil of Kandhamal district covering 7 nos. of CD blocks namely, (1) Chakapad, (2) G.Udaygiri, (3) Khajuripada, (4) Phiringia, (5) Phulbani, (6) Raikia, & (7) Tikabali. These 7nos. of CD Blocks consist of 84 nos. of Gram Panchayats having 1408nos. of villages. The Phulbani forest Division covers the following two towns:

i. Phulbani NAC.
ii. G.Udaygiri NAC.

There are small towns like Phiringia, Tikabali, Khajuripada, Kalinga, Raikia and Paburia. This Division comes under the political area of Phulbani parliamentary constituency and two nos. of legislative assembly constituencies i.e. Kandhamal & G.Udayagiri. The District headquarters of "Phulbani" comes under this Forest division and is well connected with Cuttack and the state capital Bhubaneswar as well as other major towns of the state like Baliguda, Boudh, Bolangir, Bhanjanagar, Berhampur, Bhawanipatna, Rayagada and Koraput through state highways. One mini aerodrome is

located at "Gudari", 5 kms away from Phulbani on Phulbani- Khajuripada-Madhapur P.W.D.Road. Phulbani is devoid of direct train links. The Khurda Road- Bolangir proposed S.E railway line will pass through its bordering Boudh division. From Phulbani all-weathermetaled road connection is available to S.E Railway at Khurda Road which is 195 kms away; Bhubaneswar is 215 kms & Berhampur is 165 kms away respectively.

1.1.3 The Phulbani Forest Division. is located between 19^0 49′ 50″ to 20^0 41′20″N latitude and 83^0 46′ 53″ to 84^0 35′ 15″ E longitude. This Division comprises of beautiful landscapes flourished with mountains, plateaus and dense forests. The splendor of green valley is having enchanting scenic places. The forests are undulating with high peaks and steep slopes. The highest peak is "Boradi Parbat" in Bandhagarh PRF at an altitude of 1154.5m from the MSL (Mean Sea Level). A list of highest peaks in different Forest blocks is given in **Table No. 1.8.** This Division is surrounded by Boudh Forest Division on the North, Nayagarh Division on the East, Ghumsur-North Division on the South east, Ghumsur south division on the south and Baliguda Division on the western part of this Division. The southern boundary is co-terminus with the Ganjam District boundary from Karada PRF to Chakapada R.F. The South-Eastern to Eastern part from Chakapada RF right up to Archargi 'A' R.F, the district boundary of Nayagarh is coinciding with the boundary of Phulbani district, which is the common boundary of Phulbani Forest Division up to Archargi 'A' R.F. Thereafter, on the northern portion the boundary line forms a common district boundary of Kandhamal & Boudh district after Burtang RF in Phulbani Forest division and Parhel RF in Boudh Forest division. This runs towards North-Western to Western portion through the common district boundary of the two districts up to the tributary of Khadag River in Parhel R.F of Boudh Division. Thereafter, the boundary runs along the common subdivision boundary of Kandhamal and Baliguda subdivision, up to the intersection point of G.Udaygiri Tehsil boundary. Then this line runs along G.Udaygiri Tehsil boundary up to the common boundary of Karada PRF, which then coincides with the common district boundary of Ganjam district on southern side. Subsequently, it runs along Ganjam and Kandhamal District boundary. Accordingly Phulbani Forest Division has been formed.

1.1.4 The total geographical area of Phulbani Forest division comes to 3312.61 sq.km. or 3,31,261Ha. and the total geographical area of Kandhamal district is 8021sq.km. The total forest area of this division is 2,59,175.796Ha. or 2591.75796 sq.km, which is 78.23% of the total geographical area of the division and 32.31% of the total

geographical area of Kandhamal district. The detailed area of forests is furnished below in a tabular form below in Table 1.1. The Working Plan is formulated for the 59 RF blocks by *Sri Satynarayana Bohidar* I.F.S for the 1st time for the period from 1990-91 to 2000-01. The Revised plan for 2007-08 to 2017-18 covers all the 59 R.F. blocks of the last plan and 2 nos.of P.R.F. blocks newly declared as R.Fs. namely, Baliapata and Dakapalla "A" blocks. The balance 35nos. of P.R.F. blocks were also included in the outgoing Plan out of the 37nos. of P.R.F blocks. Also, it includes 111nos. of village forests for its scientific management, which were created during the functioning of Phulbani social forestry divisions assisted by SIDA. Now the Phulbani Social Forestry Division is defunct.

1.1.5 Hence, this Plan covers 61 R.F. blocks, 35 nos. of PRF blocks and 111nos. of village forests for its management.

Table 1.1

Sl.No.	Category of the forest Blocks	No. of Blocks	Area in Ha.
1.	Reserved Forests	61 Blocks	97697.575
2.	Proposed Reserved Forests	35 Blocks	48336.421
3.	Village Forests	111 nos.	1,064.83
4.	Un classed Forests	- - - - - -	140.00
5.	Other Forests under Revenue Dept.	- - - - - -	1,11,936.97
		G.Total	2,59,175.796

Source:D.F.O, Phulbani Division

The detailed statement showing the D.L.C. report is furnished of Kandhamal district in **Annexure-I**.

1.1.6 Demographic Profile

The human population census **2011** of ***Khandhamal district*** is **733110**, comprising of **3,59,945 males** and **3,73,225 females** with a **growth rate of 13.10%** over **2001 census**.

Out of this, rural population is 660831, comprising of 3,23,523 males and 3,37,368 females registering a growth rate of 11.51% and urban population of the district is 35,857 comprising of 36,422 males and 35,857 females, registering a growth rate of 14.68 % over 2001 census. See table 1.2.

Further, total *categorized* population of ***Phulbani forest division*** including seven CD blocks and two urban areas, namely Phulbani and G. Udaygiri NAC's is depicted in table no. 1.3

TABLE 1.2: 2011 POPULATION CENSUS OF KANDHAMAL DISTRICT & PHULBANI DIVISION.					
S.No	Category	Person	Male	Female	Growth Rate %: 2001-2010
1.	Rural	660831	323523	337368	11.51%
2.	Urban	72279	36422	35857	14.68 %
	Total	**733110**	**359945**	**373225**	**13.10 %**

TABLE 1.3											
Sl. No.	**Name of CD Block**	**No. of house holds**	**Total Population**			**S.C.**			**S.T.**		
	Rural		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
01	Khajuripada	12780	25621	25849	51470	8139	8233	16372	12822	13050	25872
02	Phulbani	9428	19705	20243	29948	4136	4193	8329	10994	11519	22513
03	Phiringia	19379	40713	42715	83428	7194	7501	14695	23437	24788	48225
04	Raikia	12428	25371	26483	51854	3015	3116	6131	14193	15184	29377
05	G.Udaygiri	7661	14575	16043	30621	1620	1752	3378	9503	10598	20101
06	Tikabali	12408	24235	25170	49405	4875	4973	9848	13138	13957	27095
07	Chakapad	11404	21705	22187	43892	5527	5672	11199	9807	10143	19950
Rural Total (R)		85488	171925	178690	340618	34506	35440	69952	93894	99239	193133
08	Phulbani (NAC)	8652	19337	18304	3731	4601	4556	9157	2247	2129	4376
09	G.Udaygiri (NAC)	2697	5357	5945	11302	671	802	1473	1332	1687	3019
UrbanTotal (U)		11349	24694	24249	15033	5272	5358	10630	3579	3816	7395
Grand Total (R+U)		96837	196619	202939	355651	39778	40798	80582	97473	103055	200528
(**Source:** Census 2011 www.kandhamal.nic.in)											

TABLE 1.4				
SL. No.	**Name of CD Block**	**Total workers**		
	Rural	**Male**	**Female**	**Total**
1	Khajuripada	14135	10672	24807
2	Phulbani	10628	8910	19538
3	Phiringia	22303	19788	42091
4	Raikia	14025	11797	25822

5	G.Udaygiri	7710	6757	14467
6	Tikabali	13944	12053	25997
7	Chakapad	12695	10295	22990
Rural Total (R)		**95440**	**95440**	**80272**
8	Phulbani (NAC)	10160	3190	13350
9	G.Udaygiri (NAC)	2703	986	3689
Urban Total (U)		**12863**	**12863**	**4176**
Grand Total (R+U)		**108303**	**108303**	**84448**
(**Source:** Census 2011 www.kandhamal.nic.in)				

The study of the table reflects that tribal constitute 48.48% and S.C constitute 20.11% of the total population of Phulbani forest division and work force constitute 47.18%. Major population segment is rural constituting 87.9% of the total *division's* population.

1.1.7 Administrative details

Phulbani Forest Division comprises of Kandhamal revenue sub-division and G.udaygiri tahasil of Kandhamal district.

The Divisional Forest Officer (Territorial) is responsible for the administration and management of the division. For effective administration, management and implementation of Government works, Assistant Conservator of Forests (ACF), Range Officers, Foresters and Forest Guards assist him, along with office ministerial staff.

The incumbency list of the Divisional Forest Officers who were in-charge of this division is depicted in table No.1.5.

Table 1.5.: Incumbency of Divisional Forest Officers, Phulbani Division

Sl. No.	Name of the Divisional Forest Officer	Date of joining	Date of relief
1.	Sri D.N. Choudhury, A.I.F.C.	10.10.1945	17.10.1947
2.	Sri S.K.A. Sattar	18.10.1947	06.03.1949
3.	Sri S.K.M. Ahmedullah, A.I.F.C.	07.03.1949	10.08.1949

4.	Sri Brundaban Rath	11.08.1949	05.03.1950
5.	Sri S.K. Abdullah	06.03.1950	13.08.1951
6.	Sri R.C. Pattnaik, A.I.F.C.	14.08.1951	01.02.1953
7.	Sri P. C. Mahapatra, A.I.F.C.	02.02.1953	25.03.1953
8.	Sri R.C. Pattnaik, A.I.F.C.	26.03.1953	01.08.1953
9.	Sri G.G. Das, A.I.F.C.	02.08.1953	23.08.1953
10.	Sri S.B. Das, A.I.F.C.	24.08.1953	09.10.1957
11.	Sri S.G. Panda, A.I.F.C.	10.10.1957	28.11.1957
12.	Sri P.K. Pattnaik	29.11.1957	09.06.1962
13.	Sri P. Panigrahi	10.06.1962	12.07.1962
14.	Sri Laxmidhar Pattnaik, O.F.S. (I)	13.07.1962	23.02.1966
15.	Sri Paramananda Mahapatra	24.02.1966	15.03.1966
16.	Sri S. Bose, I.F.S.	16.03.1966	09.05.1968
17.	Sri S.K. Prassad, I.F.S.	10.05.1968	01.08.1969
18.	Sri N.C. Bose, I.F.S.	02.08.1969	12.10.1969
19.	Sri S.K. Prasad, I.F.S.	13.10.1969	18.04.1970
20.	Sri M.F. Ahmed, I.F.S.	19.04.1970	28.08.1970
21.	Sri W.V. Subarao	29.08.1970	13.09.1970
22.	Sri A. Pradhan, I.F.S.	14.09.1970	24.08.1971
23.	Sri P. Pradhan, I.F.S.	25.08.1971	27.06.1974
24.	Sri Trinath Das, I.F.S.	28.06.1974	17.06.1975
25.	Sri L.K. Pattnaik, I.F.S.	18.06.1975	11.05.1977
26.	Sri C.V.S. Murty, I.F.S.	11.05.1977	25.05.1977
27.	Sri N.C Pattnaik, I.F.S.	25.05.1977	28.09.1980
28.	Sri S.C. Sadangi, O.F.S.(I)	28.09.1980	30.06.1983
29.	Sri P.K. Parida, I.F.S.	01.07.1983	30.09.1983
30.	Sri B.B. Routray, I.F.S.	30.09.1983	10.08.1984

31.	Sri A.K. Dash, O.F.S. A.C.F.	11.08.1984	31.08.1984
32.	Sri P.K. Parida, I.F.S.	31.08.1984	3.06.1990
33.	Sri H.K. Bisht, I.F.S.	04.06.1990	19.06.1992
34.	Sri P.C. Padhi, O.F.S.(II)	20.06.1992	01.07.1992
35.	Sri V. Raja Reddy, I.F.S.	01.07.1992	01.05.1995
36.	Sri P.K. Rath, O.F.S.(II)	02.05.1995	14.05.1995
37.	Sri V. Raja Reddy, I.F.S.	15.05.1995	04.07.1995
38.	Sri Sandeep Tripathi, I.F.S.	04.07.1995	24.07.1996
39.	Sri Sankar Swain, I.F.S.	24.07.1996	19.05.1998
40.	Sri Sudipta Dash, O.F.S. A.C.F.	19.05.1998	15.06.1998
41.	Sri Sankar Swain, I.F.S.	15.06.1998	25.08.1998
42.	Mrs. Rebecca Nayar, I.F.S	25.08.1998	07.01.2000
43.	Sri Atish Kuma Behera, O.F.S. (I)	07.01.2000	22.02.2002
44.	Sri Jalaj Kumar Das, O.F.S.(II)	22.02.2002	07.04.2002
45.	Sri P.Krishna Mohan, I.F.S	07.04.2002	07.10.2005
46.	Sri Ramesh Chandra Sethi, O.F.S.(I)	07.10.2005	16.01.2006
47.	Sri Nimai Charana Mohanty, O.F.S (I)	16.01.2006	28.02.2009
48.	Sri Ramesh Chandra Sethi, IFS	28.02.2009	06.03.2009
49.	Sri M. Yogajayanand, IFS	06.03.2009	08.03.2012
50.	Sri Lalit Mohan Patra, OFS-I (SB)	08.03.2012	23.05.2012
51.	Sri M. Yogajayanand, IFS	23.05.2012	15.04.2013
52.	Hanif Mahammed, OFS GRA-(SB)	15.04.2013	03.05.2013
53.	Dr. Prakash Chand Gogineni, IFS	03.05.2013	30. 9.2016
54.	Sri V, Karthik, IFS	01.10.2016	06.11.2016
55.	Dr. Prakash Chand Gogineni, IFS	06.11.2016	02.09.2017

56.	Sri P. Ramasamy, IFS	02. 09.2017	06.09.2017
57.	Sri Lakshmi Narayan Behera, IFS	06.09.2017	Till date

1.1.7.1 Re-organization of the Orissa Forest Department took place vide Govt. Resolution No.1F (A)-100/2003/13228/F&E department dated 08/08/2003 effective from 1st October 2003 and accordingly, the divisional cadre strength has also changed. The latest revised cadre strength along with the vacancy position is tabulated here in table No.1.6

Table: 1.6: Divisional cadre strength and actual staff available including Ranges/Staff position in Phulbani Forest Division

Name of the Division	Category of post	Sanctioned strength	Staff in position	Vacancy position/ Excess	Reason for vacancy	Remark (vacancy in %)
Phulbani Forest Division	1. D.F.O	1	1	0	-	0
	2. A.C.F	3	2	1	-	33.33
	3. Dy.Ranger	8	5	3	-	37.5
	4. Forest Ranger	7	5	2	-	28.60
	5. Forester	40	34	6	-	5
	6. Forest Guard	98	66	32	-	32.65
	7. Head Clerk	1	1	0	-	0
	8. Jr. Accountant	7	4	3	-	28.57
	09. Jr. Clerk	9	5	4	-	44.44
	10. Jr. Steno	1	1	0	-	0
	11. Jeep Driver	2	2	0	-	0
	12. Amin	1	0	1	-	100
	13. Chainman	1	1	0	-	0
	14. Dak Runner	1	1	0	-	0
	15. Office Choukidar	1	1	0	-	0
	16. F.E.O	0	0	0	-	0
Total:-		**181**	**129**	**52**	**-**	

1.1.7.2 From this table it can be inferred, that sizeable vacancy exist from A.C.F downwards to the level of forest guards, and it is pertinent to state that with this vacancy, effective protection and management of forests is seriously compromised and urgently invites policy decision to expeditiously fill-up existing vacancy position highlighting present scenario of biotic interference in forest areas in the best interest of our National property- 'The Forests'.

Recruitment of Foresters and Forest Guards-2009										
Category of Posts	**Scheduled Tribes (ST)**		**Scheduled Caste (S.C)**		**SEBC**		**Un-Reserved**		**Total**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Forester	**01**	**01**	**01**	**--**	**--**	**--**	**03**	**01**	**05**	**02**
Forest Guard	**03**	**01**	**02**	**01**	**01**	**01**	**04**	**02**	**10**	**05**

Recruitment of Foresters and Forest Guards-2011										
Category of Posts	**Scheduled Tribes (ST)**		**Scheduled Caste (S.C)**		**SEBC**		**Un-Reserved**		**Total**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Forester	**01**	**01**	**--**	**--**	**--**	**01**	**02**	**--**	**03**	**02**
Forest Guard	**03**	**--**	**--**	**--**	**--**	**--**	**04**	**--**	**07**	**--**

"Contractual basis" recruitment of Forest Guards-2015										
Category of Posts	**Scheduled Tribes (ST)**		**Scheduled Caste (S.C)**		**SEBC**		**Un-Reserved**		**Total**	
Forester	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Forest Guard	**04**	**--**	**--**	**--**	**--**	**--**	**11**	**05**	**15**	**05**

1.1.7.3 In accordance with the Principal Chief Conservator of Forests Office Order No. 557/2F(SG) 60/2003, Divisional Forest Officer, Phulbani notified 7 ranges, and in accordance with the Memo No-15095/3F-Misc. 69/2003, dated –23rd August 2003 of the Principal Chief Conservator of Forests, Divisional Forest Officer, Phulbani notified 24 sections and 75 beats, both vide his Office order No.-213/2F-II-19/2003, dated 29th September 2003.The following table No.1.7 reflects re-organized ranges, sections and beats respectively.

TABLE : 1.7 DETAILED LIST OF RANGES, SECTIONS, BEATS OF PHULBANI FOREST DIVISION WITH HEADQUARTERS

Sl No.	Name of Range with headquarter	Name of Sections with headquarters	Name of Beat with headquarters
1	Phulbani	1. Phulbani	1. Phulbani 2. Tudipaju 3. Panaspadar 4. Pirkudi
		2. Khajuripada	5. Khajuripada 6. Dutipada 7. Bhaliapada 8. Dalapada
		3. Dubagarh	9. Dadki 10. Katringia 11. Kalabagh 12. Katramal
		4. Bisipada	13. Bisipada 14. Balaskumpa 15. Gumagarh
2	Sudrukumpa	1. Sudrukumpa	1. Sudrukumpa 2. Tikiripada 3. Bhetkhole 4. Kurmuni
		2. Ranipathar	5. Ranipathar(North) 6. Ranipathar (South) 7. Kirima
		3. Kutibari	8. Kutibari 9. Sikadi
		4. Banardei	10. Banardei 11. Duguda
3	Phiringia	1. Phiringia	1. Phiringia 2. Malikpada 3. Musulipanga
		2. Bandhagarh	4. Bandhagarh 5. Pabingia
		3. Nuapadar	6. Kelapada 7. Rabingia 8. Sadingia
		4. Gochhapada	9. Gochhapada 10. Kerandibali

			11. Pindangi
		5. Balandapada	12. Balandapada 13. Pakari 14. Luising
4	Tikabali (New)	1. Tikabali	1. Tikabali 2. Sankarakhol 3. Burtang
		2. Chakapad	4. Chakapad 5. Pasara 6. Baradakhol 7. Ghatiguda 8. Nediguda
		3. Chahali	9. Chahali 10. Gosama 11. Kupati
5	G.Udayagiri	1. G.Udayagiri	1. G.Udayagiri 2. Lingagada
		2. Kalinga	3. Kalinga 4. Kurmingia 5. Talarimaha
		3. Paburia	6. Paburia 7. Gutingia 8. Tudubali
6	Raikia (New)	1. Raikia	1. Raikia 2. Sugudabadi
		2. Karada	3. Karada 4. Dakarbadi 5. Malaguda 6. Kendukhari
7	Karada (Hqr. At Baraba)	1. Baraba	1. Baraba 2. Pokasunga 3. Kanadi
		2. Ranaba	4. Ranaba 5. Badagada 6. Borada
		3. Indragarh	7. Indragarh 8. Dangesi 9. Dimiripali 10. Gandharibhuin

Abstract					
S. No.	**RANGE**	**SECTION**	**BEAT**	**CHECKGATE**	**TOTAL**
1	Phulbani	04	15	03	23
2	Sudrukumpa	04	11	01	17
3	Phiringia	05	14	--	20
4	Tikabali	03	11	01	16

5	G.Udayagiri	03	08	01	13
6	Raikia	02	06	--	09
7	Karada	03	10	02	16
Grand Total	**07**	**24**	**75**	**08**	**114**

Building & Forest Road:

i. There are 225 Nos. of Govt buildings in Phulbani Division Detailed furnished as **Annexure III**.

ii. In order to facilitate handing over of timber & forest protection & movement of local people. 28 nos. forest roads exist over a length of 242 km. Detailed is furnished as **Annexure-IV**.

iii. There are 02 nos. Forest Rest House in this Division. The detail is furnished below

(a)Phulbani FRH

(b) G.Udayagiri FRH

1.2 Configuration of theground : -

1.2.1. Description of terrain - This division forms a part of the hilly ranges of the "Eastern Ghats". It has mostly undulating high hillocks draining rain water into a number of nallahs and leaving behind a small patch of plain land in between the high lands forming plateaus. It is a triangular mass of highly undulating lands. The nature of undulation is more and clearly prominent in the Northern, Eastern, & Southern parts of this Division. In the Northern part, it leaves behind a tract of plain land along the sides of the nala beds in Donga, Ranipathar, Kalabagh & Sudrukumpa hill ranges. The plain lands are found mainly in pockets in Khajuripada, Lainpada, Phulbani, Tikabali and Phiringia areas with benching pattern (terraced form) of agricultural lands along the sides of the nalas and major rivers. Very few agricultural pockets are seen in Chakapad, Karada, Indragarh& Baraba area with undulating fields. Similar type of crop fields seen in Raikia as well as in G.Udaygiri areas. The Eastern part forms the Chakapad forest block, which continues up to Kalinga, the coldest area of the Division for its higher altitude. Similarly the undulation of high hillocks runs deep into Karada area with pockets of plain lands along the hillocks. This is prominent in between Ranaba, Badegarh and Eastern aspect of Baraba RF.

1.2.1.1. The forests demarcated for the R.Fs or P.R.Fs are mostly at a little higher hill slopes leaving behind the lower portion of the hills & plains for the use of local population, i.e. mainly for the, primitive Kondhas for their bonafide use.

The boundary line runs in most of the RFs and PRFs at a vertical distance of 2-3 contours or more on uphill side.

This division has plain lands mainly in some parts of Khajuripada area with distinct continuous mountain ranges in the Eastern to Northern side separating Phulbani from Nayagarh and Boudh district. In Donga area, continuous mountain range forms the district boundary which runs from northern to western part distinguishing Boudh from Kandhamal. Inside these undulating hillocks, are pockets of agricultural fields with some plain lands in Donga, Ranipathar and Sudurukumpa areas.The cultivated land mostly i.e. adjacent to certain nala bed, form terraced land or bench pattern fields from higher slopes to lower slopes as seen in Phulbani, Tikabali, Gumagarh, and Phiringia areas.

1.2.1.2 Certain pockets of lands of high terrain bearing cultivated fields along the nala bed are seen in Raikia, Karada, and G.Udaygiri areas, vast plain land available in Chakapad area, are surrounded by high hills from all sides.

1.2.1.3 A great number of high hill peaks found in most of the forest blocks ranging from 600mtr. to 1150mtr. which are illustrated in table-1.9. From these undulating hills, nala beds form waterfalls as seen in Pokadajhar in Sudurukumpa Range, which is developed by this division with the assistance of DRDA funds for tourism and picnic spot and is connected by all weather black topped road. After the cessation of the practice of podu cultivation, such areas are regenerating gradually due to regular protection measures. The enrichment process enhances the beauty of the water falls by a green coverage with the conservation of water. (Some of the highest peak in this division are Boradi Parbat having 1154.5mtrs.(3788'), Tilagiri peak 960mts, all in Bandhagada block, Satandom 813mtrs in Gochhapada block and Bandharison 885.7mts in Sudrukumpa block)

TABLE : 1.8 Highest Peaks of different hillocks in Phulbani Forest Division

Name of the Range	Forest Block	Name of the Peak	Height
Phiringia	Bandhagarh P.R.F.	Boradi parbat	1154.5
	Bandhagarh P.R.F.	Tilagiri	960.0

	Gochhapada R.F.	Satarison	813.0
Sudrukumpa	Sudrukumpa R.F.	Bandharison	885.7
	Ranipathar R.F.	Perisaru	890
	Ranipathar R.F.	Panisolghat	849.5
Tikabali	Burtang(s) R.F.	Turuparhisaru	925.0
	Burtang(s) R.F.	Badesaru	870.0
	Burtang(s) R.F.	Rangedisaru	892.0
Phulbani	Khajuripada R.F.	Debata parbat	837.0
	Khajuripada R.F.	Budha parbat	841.0
Tikabali	Lainpada R.F.	Pisijiri saru	1137.6
Raikia	Karada P.R.F	Tongarasaru	1062.0
Tikabali	Chakapad R.F.	Pisuli parbat	689.0
	Chakapad R.F.	Pajipania parbat	573.0
Phulbani	Kalabagh R.F.	Arensaru	737
Phiringia	Gerupada (w) R.F.	Pria saru	940
Phiringia	Kerandibali(E) R.F.	Daisara saru	878.0
Raikia	Ganjuguda'A' P.R.F.	Pajibiska saru	1009.0
Tikabali	Chakapad R.F.	Mardabadisaru	874.0
Karada	Ranaba R.F.	Besarbata parbat	538.0
Karada	Machhaghat R.F.	Tangari parbat	655.0
Raikia	Sikabadi P.R.F.	Kondabari saru	1063.0

1.2.2 Drainage:

On account of undulating terrain, thistract is well drained due to the presence of number of small nalahs and streams. These small nalahs and streams subsequently drain into river Salki & Baghnadi, which in turn drain into the river Mahanadi.

1.2.2.1 Baghnadi emerges from the Bandhagarh hills near Telamaha village and carries all the water from the Southern portion of Bandhgarh RF, Nuapadar RF, Damingia Ext. PRF & Baghanadi RF and runs in the South-North direction upto river Mahanadiin Boudh District. The river Salki emerges from Kanabagedi RF in G.Udaygiri range and runs in South-North direction carrying all the rain water from G.Udaygiri, Raikia, Tikabali areas up to Garmaha, where it meets Pilasalki river, which emerges from Khajuripada area collecting all water from Khajuripada, Balaskumpa, Pilasalki & Phulbani area. These two rivers run in northerly direction forming the river Salki. Thereafter, Salki river carry all the water from Kalabagh RF to drain into the river Mahanadi passing through the territory of Boudh district.

1.2.2.2 On the Eastern side, the nalas emerging from Burtang North & South RF's, Archangi RF, Chakapada RF drain all the water into Burtang nadi and its tributaries,

which finally drain into river Mahanadi after running towards east in Nayagarh District. The southern parts of Chakapada RF drains water into Barha Nadi and ultimately it passes through Ganjam district to drain into Rusikulya River. Similarly, number of small nallahs carrying the water from Karada PRF, Sikabadi PRF, Nandabali RF, Baraba RF & Ranaba RF drains into Karada nala in southern part, which subsequently passes through Ganjam District draining all the water into Rusikulya river. All the above rivers and nalas flow only during rainy season, for a few days in winter season and remains dry during the rest part of the year. Hence, this Division has two main rivers, i.e. Salki & Baghnadi.

1.3 Geology Rock and Soil

The topography of Phulbani Forest Division comprises of all types of geomorphologic units such as hill slopes, valleys, plains and plateaus. Hence, the topography of this division is highly undulating and rugged, intersected by small patches of plain lands. Geologically, this division forms part of the Indian peninsular shield of "Eastern Ghats Belt".

1.3.1 The rocks belong to "Eastern Ghats super group of Archean age" which are much ancient in formation. The age of the rocks as per geological time scale may be put under the Pre-Cambrian age group of Archean era. Since million years back, as per the geological history, sedimentary and igneous rocks which formed major part of the underlying geological structure found in few pockets were subjected to repeated changes of temperature and pressure.

1.3.2 Due to seismic movements, various stages of folding, faulting and uplifting in rock layers occurred. All these resulted in the formation of metamorphic rocks, such as Charnockite, Khondalite, and Granite gneisses, which are types of Orthoschists and Paraschists, now found in different parts of this division.

1.3.3 Rocks comparatively in younger age groups like Diorites are also found (a type of volcanic rock), Quartzites, calcareous granites, laterites, claystones, sandstones, shales and micaschists. The Sandstones generally form the hills, while limestone and shale constitute the valleys. In between the oldest Charnockites-Khondalites and younger sandstone-limestone, occur granite and mica-schist of various types. The Khondalite constitutes flat topped hills and plateaus, while the Charnockites form

sharp ridges and hills. However, many hills and valleys have resulted from continuous weathering and erosion of these rocks.

1.3.4 The major rocks found in the Division belong to Charnockite and Khondalite groups though Granite & Gneiss are also found in North-Western portion, mainly in Kalabagh, Palchi, Chakapad, Burtang, Sudrukumpa, Ranipathar & Donga blocks as shown in detail below in the map in Fig.1: 1

Map-1.1

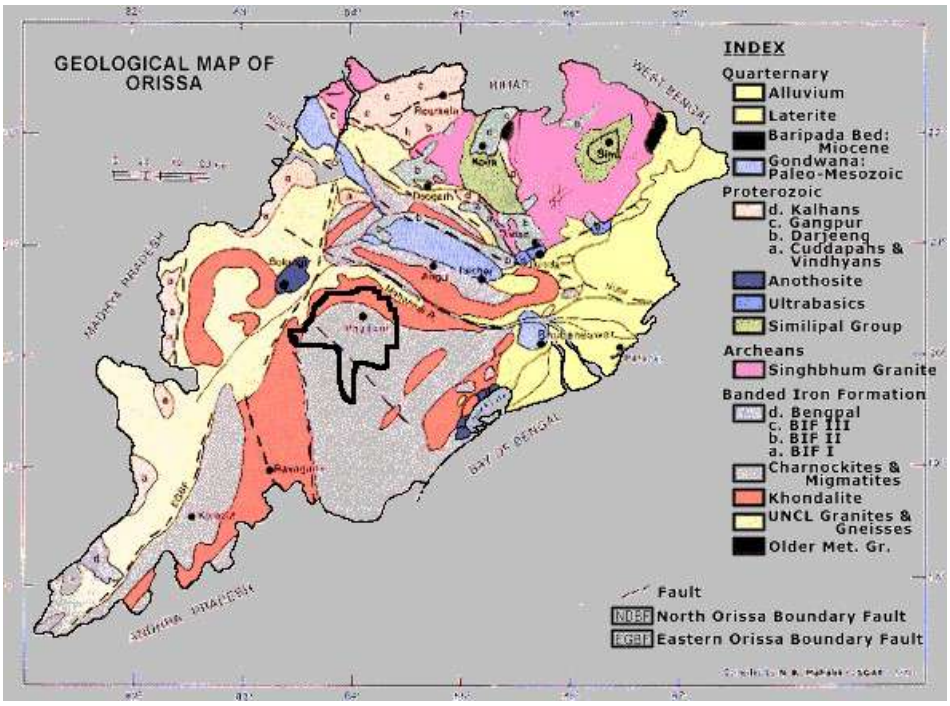


Table No.- 1.9 Major rock types in Phulbani Forest Division	
Major group	**Main rock type**
Recent to sub-recent	Alluvium soil and laterite
Gondwana Formation	Shale and sandstone unconformity.
Intrusive	Quartz and pegmatite veins: Leptynites and garnetiferous granite gneiss.
Archean(Eastern Ghat group)	Khondalite, Charnockite, Calcareous granulites, Quartzite.

1.3.4.1 Charnockites:

The highly metamorphosed rocks belong to the Eastern ghat group are Charnockites, Khondalites etc. The Charnockites are basically granitic in composition with hypersthenes as an additional mineral in varying amounts. When the rock is rich in hypersthenes, which is a dark green mineral, appears dark and is termed as 'Basic charnockites'. On the other hand, if the rock is rich in quartz with some amount of hypersthenes, the rock is called "Acid Charnockites". Rocks of intermediate composition are called "Intermediate Charnockites".

All the above varieties of rocks are found in different parts of this division. The rock is very hard and generally forms rounded hills and outcrop in the valleys. In a few cases high hills are also formed of charnockites in this area, forming steep to gentle slopes. The major mineral constituents of this rock are quartz, Calcareous Feldspar and hypersthenes (Ferromagnesium mineral) with a little amount of hornblende and garnet. This rock gives good soil on weathering, as it contains feldspar. Also Charnockite hills with fresh exposed rock generally do not support much vegetation, however trees grow on the joints and foliation plains of such rocks. Charnockite outcrops are found sporadically at the south east part of this Division, i.e. Chakapad, Burtang South & Burtang North Blocks. In Phiringia Range, the availability of charnockites are restricted to valleys only.

1.3.4.2 Khondalites:

The word Khondalite is given after the tribals "Kondha", being the major tribe of Phulbani Division and other southern tribal areas. Kondalite is brownish rock with spotted appearance due to the presence of the mineral garnet (Ferro Aluminous Silicate) in it. Some specks of granite may also be present in these rocks. Also, the Khondalitie rocks contain normal constituents like sillimanite (Aluminous silicate), Quartz (Silica), Feldspar (potassium alluminium sillicate). Very often the exposed rocks are being weathered (oxidized) and highly friable with the available garnet in it, which is converted to limonite (brownish yellow iron oxide). This resulted into thick piles of reddish soil due to iron content and large proportion of Silica. Hence this type of soil has poor water retaining capacity and hence unsuitable for agricultural purpose. These types of rocks are available in the high hill ranges and in the plains. This rock invariably supports excellent growth of Bamboo and other forests. In blocks like

Kalabagh, Palchi, Sudurukumpa, gneiss contain large proportion of minerals like orthoclase feldspar and plagioclase feldspar.

1.3.4.3 Quartzite:

It is a massive rock containing silica. These rocks are composed of quartz and garnet with little amount of biotite (Ferroaluminous silicate), Magnetite (Iron oxide), Silimanite and feldspar. Out of these constituents quartz (Silica) constitutes the highest percentage i.e. more than 70% of the total mass of the rock. For the above, the soil formed from this rock is obviously very poor due to higher percentage of silica and less quantity of Clay. Water retaining capacity is very poor. It is available in some parts of Donga, Ranipathar & Karada areas.

1.3.4.4. Calcareous Granulites:

These rocks are lime rich and occur as narrow bands interlocked with khondalites**.**

The components of this rock are Calcite, Calcareous Feldspar, Hornblende (Calcareous aluminous silicate) and little amount of quartz. On weathering this rock gives rise to grooves and rills. Soil formed out of this rock is calcareous in nature. Hence soil is not rich in plant nutrients and not suitable for agriculture. This type of rocks patches are found in Ganjuguda, Chakapada and Ranipathar forest areas.

1.3.4.5 Granites &Gneisses :

This group of rock occurs closely associated with the above two groups as disconnected outcrops and narrow cliffs. The rock is leucocratic comprising mainly of quartz, feldspar, garnet and biotite. The presence of garnet and biotite imparts spotted look to the rock. The garnetiferrous granite gneiss of different compositions and textures occur in close association. As a whole, these rocks are massive to weakly foliated and show over all gneissic fabric. The rock is leucocratic, grayish white to pinkish white in colour comprising of quartz, feldspar and garnet. The hills consisting of granites generally give rise to dome shaped relief with gentle slopes. The general trends of the hills normally follow the major structural trend. Most of the smaller blocks of G.Udaygiri range like Kanabagedi, Dibari, Kilundi, Tikabali, Padangi etc. contain granites. At some places isolated rounded hills and mounds are found containing granites. These granitic rocks are highly jointed with wide joints. These

joints are good acquifers for ground water. Soil yielded from granites is not good enough as it contains much amount of Silica.

1.3.4.6 Laterites:

Laterites are the secondary rocks, which are derived mainly from granites and in less number of cases from charnockites. It appears reddish to yellowish brown in colour and in nature it is hard to spongy and cavernous, ferruginous or limonitic with patches of yellowish white clay (kaoline). Colitic texture in laterite is less commonly seen. Laterite is mostly found capping the higher hill portions. It is also found occasionally covering the primitive rocks at plains.

1.3.4.7 The probable soil formations on weathering from different rock types are given in table 1.10 as follows:

Table No.- 1.10 Relationships between Rock types and resulting soil formations

Sl. No	Rock type	Nature of Resulting Soil
1.	Limestone	Soils are generally calcific in nature with low to very low silica content.
2.	Shale	Basic soils, rich in Iron (Fe), Alluminum (Al), Magnesium (Mg), and Calcium (Ca).
3.	Quartite	Hard rock, generally does not form any soil, but when formed, soils have higher Silica content.
4.	Granitic-intrusive	Acidic soils with high Silica content, rich in Alluminum (Al) and Iron (Fe).
5.	Garnetiferrous-granite	Acidic soils with high Silica content, rich in Alluminum (Al) and Iron (Fe).
6.	Acidic/ Intermediate Charnoekites	Acidic soils with high Iron (Fe), Alluminum (Al) and Silica (Si) content.
7.	Khondalite	Acidic to Basic soils, very suitable for prolific luxuriant growth of Plants.

(Source: Geology in India by Wadia D.N.)

1.3.5 Minerals& soil:

The main minerals available in this Division are Iron, Manganese, Alluminium, Graphite, Quartz, Limestone, Granites, etc. But the quantity of these minerals is very low, which cannot be exploited commercially in this Division. So mineral exploitation is not done in Phulbani Forest Division.

1.3.5.1 Soil:

The soil in the forests is immature. They are very well suited to the growth of forest vegetation except on very steep slopes with shallow soils. In the valleys, where a good depth of soil accumulates and where subsoil water is readily available, good crop of sal is found. Highly calcareous rocks, its resultant soil and dry pockets are not favourable for sal, but they are favourable to Bamboo and Teak. The soil of Phulbani Forest Division is mostly acidic, for which sal bears luxuriant growth in lower parts in many of the forest blocks. In some areas, it is observed that Bamboo is scarce or absent. Careful observation reveals that due to the absence of calcareous rocks such as basic charnockites, and more prevalence of Khondalite and other siliceous rocks, this phenomenon exists.

1.3.5.2 Clayey-loams or loamy soil on the riverain tracts are derived from granite-gneisses rich in soda-lime, feldspar. This soil is lightened due to surface run off from the hills. At places it carries loams with sand. Hence deep alluvium provides fertility to the agricultural crop, which is supplemented by provision of proper irrigation and scientific method of cultivation. Where the percentage of quartz in gneiss rises, the soil become lighter and sometimes sandy. But the lightest soils are those which are produced from khondalites; and these are rare. The hornblende schist and charnockites (hyperthene-gneisses) generally yield heavy clay, which is very much suitable to raise paddy crop. Exposure of plateaus & hill slopes to weathering yield typical red clay. Laterite soil occurs on some of the higher hill topes along the Northern & Eastern boundary.

1.3.5.3 Grey soil is generally composed of clay with a little of quartz and some lime. This is associated with charnockites. Its colour is due to its magnesium content, and because of high water retention capacity, this type of soil supports good cultivation. The Khondalite gives rise to soil composed of quartz, a little clay and iron oxide, called red soil. Those are generally red in colour and have poor water retaining capacity and are not suitable for agriculture. Sandy soils consisting mainly of quartz and clay, predominate in granite terrains and due to their high water retaining ability and fertility this type of soil is good for agriculture.

1.3.6 Soil types:

The following main types of soil occur in this Division.

I. Clayey-loam soil or Black soil.

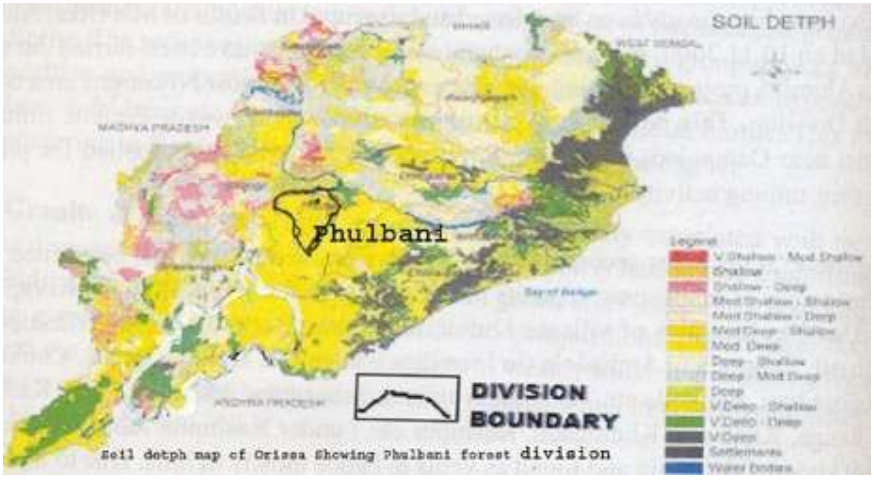
II. Sandy loam soil or Alluvium soil.

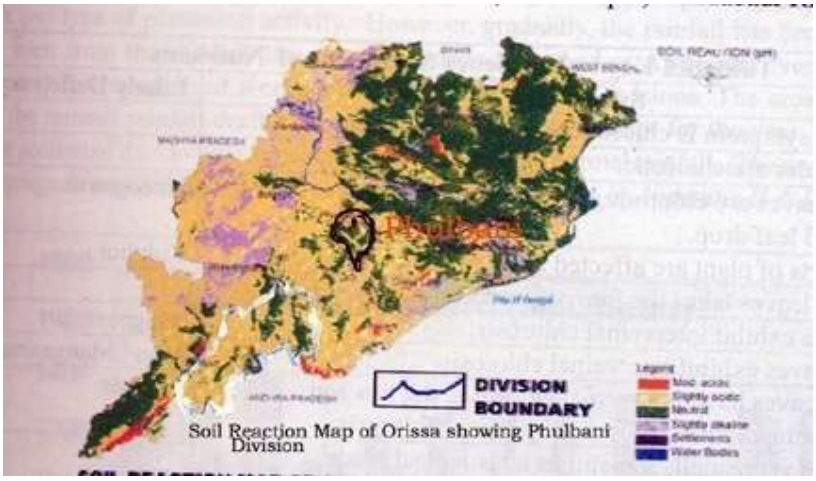
III. Red soil or grey soil.

1.3.6.1 Clayey loam or Black soils are found in most of the valleys of the forest blocks. Plateaus bearing calcareous clay or clayey loam are deep. But at hill slopes it is clayey-loam or interbeded with boulders and large rocks as in Burtang (N), (S), Archangi, Darki, and Kalabagh areas. Sandy loam is predominant in Chakapad, Kalabagh and Palchi areas along the nala banks and moderate slopes. This type of soil is also available in the Salki nadi, Bagh nadi, Karada nala, and Samapaju nala in Donga areas. Due to its high water retaining capacity, this soil is very suitable for agriculture. At hill tops the soil is found eroded at few places resulting in exposed rocks. On the river beds, after disintegration of rocks and wash downwards, some pebbles and broken rocks are found with some alluvial deposition. Kanker formation is seen in Khajuripada, Ranipathar, & Palchi forest blocks. In plains there is dense vegetation due to the humus deposit in the soil. Red soil is found in almost all forest blocks in the contours and laterite soil is found almost in all forest blocks in top hill portion as the rain water washes away the soil. This is found in plateaus.

1.3.6.2 Due to rampant Podu cultivation in the past and present trend of organic turmeric cultivation, the vegetation is removed leaving behind rocks exposed to weathering effects and the top soil gets eroded. Hence there is no structural development in the texture of the soil. Those become massive and porous, causing poor water holding capacity. Hence, the soil depth varies from shallow (25-50cm) to moderately deep (>100cm) as shown in the soil map of Orissa.

1.3.6.3 The soil depth varies from area to area in different forest blocks. The soil depth varies from shallow (25-50)cm, to moderately deep (75-100)cm and vary deep (>100)cm as found in few low land areas of Chakapad, Kalabagh, Ranipathar, Burtanga (N) & (S) areas, where luxuriant growth of the forest crop is seen. The map showing the soil particles are collected from clayey to raid soil. The soil temperature is hyperthermic (22-28^{0}C). It is observed that the soils are moderate to well drained and support good vegetation. In rampant Podu affected areas in the past the water retaining capacity has become low due to the surface run-off and no structural development in the soil, as they are massive & Porous.





1.3.6.4 Nutrient Status:

In most forest blocks the soil is generally rich in potash, but has low contents of Carbon, Nitrogen and Phosphorus as per available data of different areas of Phulbani division. The following table shows the PH content with the soil fertility status. In such areas plantations can be raised with application of moderate doses of nitrogenous fertiliser. The soil parameters, nutrient values, soil fertility, the basis of soil reaction are shown in table No.-1.11,1.12& 1.13 below respectively.

Table 1.11: PARAMETERS FOR NUTRIENT VALUE ASSESSMENT

CONTENT	LOW	MEDIUM	HIGH
Organic carbon	up to 0.50%	0.5 to 0.75%	0.76% & above
Phosphorous(P_2O_5)	0 to 14kg/hac	14 to 40kg/hac	More than 40 Kg/hac
Potassium(K_2O)	up to 118 kg/hac	118 to 280 kg/hac	More than 280 kg/hac

(**Source**: OUAT Laboratory, Semiliguda)

Table 1.12: SOIL FERTILITY STATUS REPORT OF PHULBANI DISTRICT													
Rocks	**PH**			**Nitrogen (N)**			**Phosphorous (P)**			**Potash(K)**			**Remarks**
	Acidic	**Alkaline**	**Neutral**	**Low**	**Med.**	**High**	**Low**	**Med.**	**High**	**Low**	**Med.**	**High**	
Phulbani	Acidic	-	-	Low	-	-	Low	-	-	-	-	High	
Khajuripada	Acidic	-	-	Low	-	-	Low	-	-	-	-	High	
Phiringia	Acidic	-	-	Low	-	-	Low	-	-	-	-	High	
G.Udaygiri	Acidic	-	-	Low	-	-	Low	-	-	-	-	High	
Tikabali	Acidic	-	-	Low	-	-	Low	-	-	-	-	High	
Chakapad	Acidic	-	-	Low	-	-	Low	-	-	-	-	High	
Raikia	Acidic	-	-	Low	-	-	Low	-	-	-	-	High	

(**Source**: Soil chemist Phubani.)

Table 1.13: Soil Reaction Criteria	
CLASS	**P^H VALUE**
Strongly Acidic	**<**4.5
Moderately Acidic	4.5 to 5.5
Slightly Acidic	5.5 to 6.5
Neutral	6.5 to 7.5
Slightly Alkaline	7.5 to 8.5
Moderately Alkaline	8.5 to 9.5
Strongly Alkaline	>9.5

(**Source**: Soils of Orissa by National Bureau of Soil Survey & Land Use Planning)

1.3.6.5 Relation between Geology, Soil & Minerals:

The relationship between geology, soil & minerals on the distribution of forest types is complex and depends on several factors. The physical condition of the soil, moisture retaining capacity, soil aeration and the quantity of mineral as well as organic plant nutrients available in the soil also influences the distribution of various types of forest vegetation. It depends on the depth & soil moisture, which is more important than the available rocks. The availability of lateritic soil imbibes a marked effect on the vegetation, as observed in Teak that it cannot give better result in lateritic soils, where as Sal is tolerant to it as found in Ranipathar, Donga & Chakapad areas. The associated species of sal are Xylia and Cleistanthus species. Most of the forests are found to occur in hill slopes. Many of them are steep having shallow soil and sometimes extremely rocky. This condition is seen in forests of Phulbani Range, Karada range, G.Udaygiri range as well as Ranipathar and Donga RF's of Sudurukumpa range. Consequently, the hill slopes carry poor quality of Sal forest and

at places dry miscellaneous forest. The khondalite rocks give rise to loamy soil. These soils have high water retaining capacity and support good crop of sal and miscellaneous vegetation rich in Bamboo forests, as seen in Chakapad, Burtang, Sudurukumpa, Kalabagh, Baghnadi, Katingia, Ranipathar & Donga forest blocks. This type of forests is seen in the forests of karada range.

Table: 1.14 Essentiality of Nutrients in the Soil	
(A) MACRONUTRIENTS	
Nitrogen	Essential part of Chlorophyll and proteins: fosters vegetative growth
Phosphorus	Promotes root growth and stem strength: essential in all energy transfer in plants
Potassium	Promotes starch & sugar formation: root growth & plant vigour
Calcium	Enhances N uptake, cell elongation & development of meristematic tissues
Magnesium	Major constituent of chlorophyll in plants; important in Phosphorous metabolism and enzyme activation
Sulphur	Essential for synthesis of S-containing amino acids & nitrogen fixation by legumes.
(B) MICRONUTRIENTS	
Iron	Important in Chlorophyll production and enzyme activation
Manganese	Activates enzymes regulating carbohydrate metabolism and essential for photochemical reaction.
Copper	Metal activator for several enzymes and possible light reaction in Plants.
Zinc	Metal activator for enzymes.
Boron	Responsible for several regularity mechanisms in many plants, including sugar translocation across cell membranes and oxidation process.
Molybdenum	Required for N-fixation in legumes & nitrate reduction in non-legumes.

1.3.6.6. The relationship between different nutrients in the soil vis-a-vis their role in bringing about specific characters of vegetation is very complex. However, essentiality of these nutrients and their symptoms of deficiency are furnished below in the table. This is an indicative for the foresters to maintain the forests in the field for taking necessary remedial measures, more so with regard to the plantations.

Table: 1.15 Key to Deficiency Symptoms of Nutrients	
Symptoms	**Likely Deficiency**
(a) The dominant symptom is chlorotic foliage (discolouration)	

(i) Entire leaf blades are chlorotic.	
Only the lower leaves are chlorotic, followed by necrosis (tissue death) and leaf drop.	Nitrogen
Leaves on all parts of plant are affected & often have a beige cast.	Sulphur
(ii) Yellowing of leaves takes the form of interveinal chlorosis.	
Only older leaves exhibit interveinal chlorosis.	Magnesium
Only younger leaves exhibit interveinal chlorosis.	Iron/ Manganese
While younger leaves have interveinal chlorosis, the tips and lobes of leaves remain green, followed by veinal chlorosis.	Copper
Young leaves are very small, sometimes missing leaf blades altogether, and internodes are short, giving a rosette appearance.	Zinc
(b) Leaf Chlorosis is not dominant symptom.	
(i) Symptoms appear at base of plant. First, leaves are dark-green smaller than normal. Later purple pigment develops in older leaves.	Phosphorus
(ii) Margins of older leaves burn or necrotic spots appear on older leaf blades.	Potassium
(iii) Symptoms appear at top of plant; terminal buds die, giving rise to a witch's-broom.	Boron
(iv) Margins of young leave fail to form, sometimes yielding trap-leaves. Growing point ceases to develop, leaving a blunt end.	Calcium

1.4 Climatic parameters

The term 'Climate' connotes "average" behaviour of the atmospheric state including its variability in

space and time. It is a descriptive entity estimated from the observed statistics of weather conditions (surface/ atmospheric temperature and rainfall) over a period of some decades.

1.4.1 This Division is characterized by subtropical type of climate. The weather is very much of extreme type, experiencing very hot and very cold climate. Also, it experiences normal rains from the middle of June to the last week of October. In most of the areas of this division, severe cold is experienced in winter from November to March of the next year except in certain areas, where extreme cold is experienced during December & January, in places like Kalinga, Phiringia, and Kalabagh etc. Mainly

three seasons are experienced in this division, i.e. summer, rain & winter. Places having higher altitudes like G.Udaygiri, Kalinga, winter spell prevails for a longer period, whereas in the southern part of this division, i.e. Karada Range the duration of winter is very short. In summer it is very hot during the month April to the middle of June. Intense summer is experienced in Ranipathar, Khajuripada, & Chakapad. But in places like Phiringia, Gochhapada, & G.Udaygiri, atmospheric temperature in summer is comparatively very less as compared with the other parts of the division.

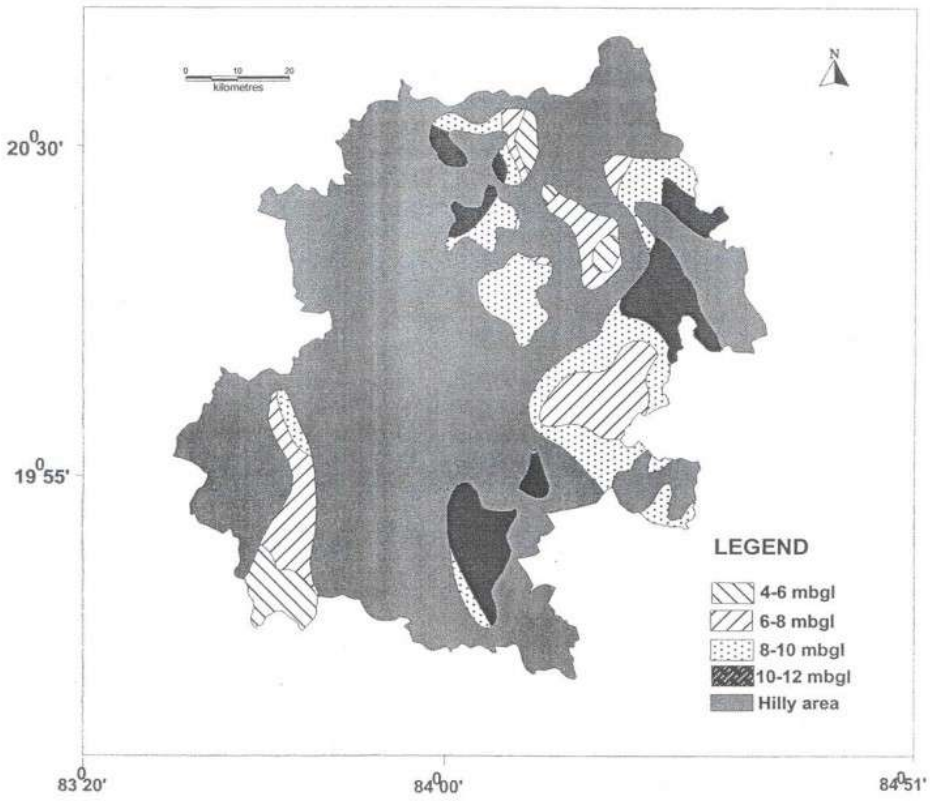
1.4.2 The overall climate in this division is healthy now-a-days than in the past. Malaria is very much common in this tract. At times in interior areas like Chahali, Ghatiguda, Archangi, Indragarh, Karada, it becomes very much fatal. But due to the extensive National Malaria Eradication Program (NMEP) and health Programs, the Malaria is under control. Health centers has been opened at remote areas like Chakapad, Indragarh, Karada etc. and medical facilities have been provided for prophylaxis checkup and treatment of malaria.

1.4.3Rainfall:

Rainfall is largely influenced due to highly undulating hilly terrains. High hills of Karada, Burtang, Chakapad, Ranipathar, Donga, Kalabagh etc. form a continuous stretch the part of eastern ghats. The rainfall varies from place to place in this division. Wind ward side gets ample rain fall. The lee ward side experiences scanty rain fall.

PRE MONSOON DEPTH TO WATER LEVEL MAP OF KANDHAMAL DISTRICT, ORISSA (APRIL-2011

PLATE-II



Year-2008

Month	Chakapad	G.Udayagiri	Khajuripada	Phiringia	Phulbani	Raikia	Tikabali	Total
January	0.00	0.00	3.00	40.00	0.00	35.00	497.60	575.60
February	0.00	0.00	0.00	8.00	0.00	0.00	0.00	8.00
March	0.00	0.00	0.00	5.00	0.00	0.00	95.00	100.00
April	0.00	0.00	0.00	15.00	0.00	0.00	0.00	15.00
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
June	171.00	60.40	341.00	245.00	270.00	170.00	285.40	1542.80
July	316.00	78.00	71.50	296.00	262.20	181.00	444.00	1648.70
August	287.00	305.00	163.00	332.00	489.40	292.00	545.00	2413.40
September	540.00	358.00	153.00	760.00	449.00	464.00	753.00	3477.00
October	117.00	121.00	0.00	79.00	31.00	10.00	25.00	383.00
November	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
December	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1431**	**922.4**	**731.5**	**1780**	**1501.6**	**1152**	**2645**	**10163.50**

Year-2009

Month	Chakapad	G.Udayagiri	Khajuripada	Phiringia	Phulbani	Raikia	Tikabali	Total
January	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
February	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
March	0.00	0.00	0.00	14.00	0.00	0.00	0.00	14.00
April	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May	78.00	0.00	0.00	12.00	0.00	0.00	0.00	90.00
June	846.20	0.00	0.00	1080.00	0.00	0.00	0.00	1926.20
July	846.00	0.00	0.00	1080.00	0.00	0.00	0.00	1926.00
August	303.00	0.00	0.00	285.00	0.00	0.00	0.00	588.00
September	195.00	0.00	0.00	174.00	0.00	0.00	0.00	369.00
October	136.00	0.00	0.00	0.00	0.00	0.00	0.00	136.00
November	49.00	0.00	0.00	17.00	0.00	0.00	0.00	66.00
December	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2453.2	0	0	2662	0	0	0	5115.2

Year-2010

Month	Chakapad	G.Udayagiri	Khajuripada	Phiringia	Phulbani	Raikia	Tikabali	Total
January	61.00	33.00	22.00	0.00	1.00	4.00	84.00	205.00
February	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
March	0.00	85.00	0.00	0.00	0.00	5.00	0.00	90.00
April	18.00	0.00	20.00	0.00	0.00	56.00	10.00	104.00
May	161.00	184.00	138.00	27.00	78.00	129.00	187.00	904.00
June	173.00	136.00	144.00	144.00	127.00	53.50	163.00	940.50
July	341.00	324.00	299.00	255.00	279.00	263.00	2097.00	3858.00
August	274.00	292.00	246.00	330.60	234.00	151.00	386.00	1913.60
September	349.00	273.60	293.90	270.30	258.00	162.00	1030.00	2636.80
October	276.00	248.00	79.00	80.00	35.60	75.50	289.00	1083.10
November	57.00	81.00	24.00	0.00	15.00	0.00	74.00	251.00
December	50.00	38.00	38.00	42.90	12.00	429.00	46.00	655.90
Total	1760	1694.6	1303.9	1149.8	1039.6	1328	4366	12641.9

Year-2011

Month	Chakapad	G.Udayagiri	Khajuripada	Phiringia	Phulbani	Raikia	Tikabali	Total
January	0.00	15.00	0.00	0.00	16.00	0.00	84.00	115
February	33.00	26.50	9.00	0.00	3.00	6.00	38.00	115.5
March	10.00	18.00	4.00	4.00	0.00	9.00	9.00	54
April	94.00	117.30	101.30	88.50	0.00	4.50	158.00	563.6
May	79.00	143.81	92.00	62.00	32.05	52.00	131.60	592.46
June	132.00	99.00	206.00	148.00	5.50	809.00	185.00	1584.5
July	160.00	108.00	109.00	125.50	1397.00	184.30	230.00	2313.8
August	254.00	277.00	460.00	324.00	239.16	519.16	452.00	2525.32
September	317.60	106.00	339.60	340.50	203.30	514.00	303.20	2124.2
October	52.00	9.00	35.00	81.00	54.20	5.00	75.00	311.2

November	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
December	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1131.6	919.61	1355.9	1173.5	1950.21	2103.96	1665.8	10300.58

Year-2012

Month	Chakapad	G.Udayagiri	Khajuripada	Phiringia	Phulbani	Raikia	Tikabali	Total
January	63.00	3.00	110.00	139.00	880.00	39.00	67.20	1301.2
February	0.00	0.00	0.00	8.00	0.00	0.00	0.00	8
March	0.00	0.00	0.00	5.00	0.00	0.00	95.00	100
April	0.00	0.00	0.00	15.00	0.00	0.00	0.00	15
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
June	170.00	63.00	342.00	200.00	150.00	120.00	179.00	1224
July	347.00	77.00	71.50	296.00	262.20	181.00	444.00	1678.7
August	290.00	300.00	163.00	332.00	489.40	292.00	545.00	2411.4
September	530.00	357.00	153.00	760.00	449.00	464.00	753.00	3466
October	112.00	112.00	0.00	79.00	31.00	10.00	25.00	369
November	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
December	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1512	912	839.5	1834	2261.6	1106	2108.2	10573.3

Year-2013

Month	Chakapad	G.Udayagiri	Khajuripada	Phiringia	Phulbani	Raikia	Tikabali	Total
January	0.00	13.00	0.00	13.20	43.00	609.00	44.00	722.20
February	24.00	2.00	7.00	0.00	0.00	3.00	0.00	36.00
March	0.00	0.00	0.00	5.00	0.00	0.00	95.00	100
April	0.00	0.00	0.00	15.00	0.00	0.00	0.00	15
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
June	179.00	65.00	345.00	200.00	155.00	125.00	174.00	1243
July	350.00	75.00	72.00	295.00	264.00	187.00	455.00	1698
August	295.00	350.00	165.00	339.00	495.00	293.00	555.00	2492
September	550.00	339.00	155.00	769.00	444.00	465.00	755.00	3477
October	112.00	113.00	0.00	75.00	35.00	15.00	26.00	376
November	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
December	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1510**	**957**	**744**	**1711.2**	**1436**	**1697**	**2104**	**10159.2**

Year-2014

Month	Chakapad	G.Udayagiri	Khajuripada	Phiringia	Phulbani	Raikia	Tikabali	Total
January	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
February	0.00	0.00	0.00	8.00	0.00	0.00	0.00	8.00
March	0.00	0.00	0.00	5.00	0.00	0.00	95.00	100.00
April	0.00	0.00	0.00	15.00	0.00	0.00	0.00	15.00
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
June	170.00	60.20	341.00	255.00	275.00	176.0	275.00	1552.20
July	320.00	79.31	71.50	295.00	263.00	159.0	445.00	1632.81

August	290.00	305.20	163.00	330.00	245.00	200.0	555.00	2088.20
September	550.00	359.00	153.00	750.00	445.00	465.0	780.00	3502.00
October	115.00	122.00	0.00	80.00	31.00	15.00	37.00	400.00
November	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
December	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1445**	**925.71**	**728.5**	**1738**	**1259**	**1015**	**2187**	**9298.21**

Year-2015

Month	Chakapad	G.Udayagiri	Khajuripada	Phiringia	Phulbani	Raikia	Tikabali	Total
January	56.00	16.80	25.00	15.00	25.00	24.00	23.00	184.80
February	52.00	20.00	19.00	20.00	23.00	12.00	12.00	158.00
March	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
April	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
June	170.00	145.00	60.52	342.00	175.00	312.00	244.00	1448.52
July	139.00	160.00	158.00	125.00	181.00	272.00	256.00	1291.00
August	188.00	201.20	334.00	255.00	166.00	123.00	157.00	1424.20
September	157.00	250.00	129.00	130.00	172.00	124.00	553.00	1515.00
October	245.00	126.00	125.00	125.00	100.00	200.40	251.00	1172.40
November	0.00	0.00	12.00	0.00	0.00	0.00	17.31	29.31
December	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1007**	**919**	**862.52**	**1012**	**842**	**1067.4**	**1513.312**	**7223.23**

1.4.3.1 It experiences rainfall due to south-west monsoon during mid-June to mid-September and again due to north-east monsoon during Oct. to Nov. From the total yearly rainfall table at different station of this division for the period from 1990 to 2005, it is observed that the annual rainfall varies from 90.55cm. in the year 2000 to highest rainfall of 179.41cm during 1990. The trend of rainfall reduces from 1990 to 1996 with a little rise and fall in 2000. But subsequently, the rainfall rises from 2001 to 2005. This clearly shows that the reduction of forest vegetation causes reduction in rainfall. But due to awareness of the local people, the vegetation in the forest have increased causing more rainfall in this division. The table showing the rainfall data from 1990 to 2005 with the month wise & area wise, relation of the rainfall-data shown in the following table with its graphical representation will help in drawing up the inference.

From the above month wise average data it is observed that rainfall increases from June to September and highest rainfall takes place during Aug.-Sept. Tikabali is receiving maximum rain fall. Minimum rainfall is experienced at Phulbani.

1.4.4Wind:

The prevalence of wind is experienced during April-May for the southwest monsoon. Velocity of wind is generally light to moderate with some increase in force during the spell of southwest monsoon. The direction of wind is oriented between southwest and north east during monsoon periods. In summer months wind direction becomes variable. During such wind effect, it causes damage to the tree growth by uprooting & breaking up of their branches in different forest blocks every year. Table gives mean wind speed (km/hr) in the undivided Phulbani district during the year 1976. This area falls within the effective zone of cyclonic storms. Karada is situated in a valley. The intensity of wind effect is experienced to be very less there.

1.4.5Temperature:

This division experiences two physiographic unit i.e. southern-eastern parts and northern to north-western position, which have distinct variation in temperatures. Karada, Chakapada, Ranipathar etc. are very hot in summers. It is less hot at Phulbani, Phiringia, Raikia, G.Udaygiri, Tikabali, and Kalinga with certain higher attitude areas in Donga forest block.

1.4.5.1 The maximum temperature varies from 25^0C to 35^0C during day time in the month of May. The minimum temperature falls below up to 7.7^0C during winter nights. This temperature reduction occurs after the onset of monsoon. The temperature data collected from the Metrological centre, Phulbani is given below with its graphical representation for the last 13years from 1990 to 2002 and monthly average maximum & minimum temperature data is furnished for comparison for the years from 2003 to 2005. This shows a variation of rise in maximum temperature from 25^0C to 40^0C & minimum temperature from 8.5^0C to 25.3^0C. When monsoon withdraws during the month of October, the diurnal temperatures remain nearly same as in previous month, but night get cooler. December and January are the coolest months having temperature varying from 8^0 C to 10^0C. Sometime it falls to 6^0 C. Kalinga, Phiringia, & Raikia are the coolest places during winter.

Humidity and Temperature
STATION: PHULBANI
(ANNUAL AVERAGE VALUE)

Table: 1.16				
YR\DATA	**MAX.T.**	**MIN.T.**	**RH(0830)**	**RH(1730)**
2008	30.6	13.5	078	073
2009	30.0	12.9	075	079
2010	31.5	15.3	076	072
2011	31.0	10.1	077	066
2012	25.3	07.7	079	071
2013	32.6	18.8	081	066
2014	35.9	21.1	075	062
2015	29.2	21.7	077	065
2016	33.8	17.4	078	067
2017	32.1	13.1	076	068
2018	33.3	14.3	074	070
2019	33.5	13.8	076	064

R/H= Relative humidity

Max.T=Maximum Temperature

Min T=Minimum Temperature

1.4.6.1 Humidity:

High relative humidity and other forms of precipitation e.g. frost and dew are helpful in prolonging humid condition in the locality. These conditions are favourable for development of natural vegetation and growth of orchids & epiphytes, Relative humidity is high generally during monsoon and post monsoon periods as observed from the table above for the last three year i.e. 2011, 2012, 2013 the relative humidity is highest during monsoonic period i.e. July-Aug. & less in April-May, Relative humidity in the morning is comparatively more than the evening hours. The trend of month wise Relative Humidity percentage has been given in the above table and it gradually reduces from 2014 to 2015.

1.4.6.2Special Weather Phenomenon:.

Pre-monsoon months experiences a few thunderstorms with turbulent wind effects. During rains, the rivers like Salki & Baghnadi and their tributaries cause floods with damage, to the roads disrupting the communication system in certain inaccessible areas like Kalabagh, Donga, etc. But flood, have less effect in this division in

comparison to adjoining the adjacent Boudh division. However, catchment areas need protection with water harvesting structures for conservation of water.

1.4.6.3<u>Water Supply</u>:

This division has three major rivers namely, Salki, Bagh, Khadag. Baghanadi, forming the western boundary of the division separating it from Bliguda division to some extent in the Phiringia range. These three rivers are flowing from the southern part of the division towards the north; and they formulate the major perennial source of water supply. A number of tributaries are supplying water to these rivers. Salki & Baghnadi are the two main tributaries of river Mahanadi. But Khadag nadi is a tributary of Salki nadi. Salki nadi carries water from different parts of Raikia and G.Udaygiri range through a number of small nalas in one branch. Similarly, the other branch of Salki nadi, carries water from Khajuripada and Phulbani areas, in the name of Pilasalunki river, which remains perennial throughout the year. So the course of river Salki and its tributaries play a major role in supplying water to the local tribal people. Similarly, Khadag river, Baghnadi and its tributaries mostly remain perennial, along their course to supply water to the people of Phiringia range. In Karada range, Karada nala is the main tributary of the river Rusikulya supplying water to the Karada area and remains perennial throughout the year. Other tributary-nalas flowing in this area remain dry throughout the year except the rainy season.

1.4.6.4 The water supply in the eastern part of this division i.e. in Chakapad plateau depends on the tributary nalas of Burtang river, originating from Burtang north & South and Chakapad hills. Burtang nala emerges as a stream from the Chakapad hills which subsequently meet Kalaranala to form Burtang nadi and runs downward through Nayagarh division to meet river Mahanadi. It is perennial throughout the year, but its tributaries remain dry except during rains. These are the major sources of water supply in this area besides the ground water. However water supply becomes scanty in summer when majority of the streams dry out.

1.4.6.5 The ground water level goes down considerably resulting in drying up of most of the dug-wells, ponds & tube wells at least for some time during peak summer, in the month of May. The hydrological information of hydrograph networking stations in Phulbani forest division showing the block wise survey of village data or topology, total depth of observed wells furnishing the data of water level during different seasons for

the years 2002 to 2006 with rock type is tabulated below which is collected from the geologist, GWS & I (monitoring) sub-division, Phulbani.

1.4.6.6 There are also tanks and ponds in this division for supply of water. Also, number of soil conservation check dams and minor irrigation projects have been formed, which are supplying water for the requirement of the local people. Also, in some areas of undulating topography, water hole(water harvesting structures)are constructed in masonry to supply water as seen in water scarcity areas like Raikia & Gumagarh etc. for local consumption. Also, a number of tube wells have been dug up to supply water to the local people. Pipe line water supply have been installed in urbanised areas of Phulbani, Khajuripada, Tikabali, Gumagarh, Phiringia, G.Udaygiri, Raikia etc. Also, in certain remote areas like Chakapad pipe line water supply is effected to feed water for the local consumption.

1.4.6.7<u>Suitability of ground water for drinking purposes</u>

As per the norms of Indian standard institution for water for drinking, mostly the ground water of Phulbani district is suitable for drinking purpose except for a few places. Out of the 28 nos of samples 2 nos of samples contain total Arsenic in the range of 0.0002 -.0004 mg/l, rest 26 nos of samples do not c ontain any arsenic. The NHNs in the district having arsenic are Ranipathar (Ar-0.0002 mg/l) and Lingagada(Ar-0.0004 mg/l). G Udaigiri has high nitrate (>100mg/l), while Sudrukumpa has high iron (2.3 mg/l).

<u>1.4.6.8 Chemical Quality of ground water in deeper aquifer</u>:

The ground water from deeper aquifers are suitable for drinking purposes as almost all the constituents are well within the permissible limit. The quality of ground water for irrigation use is also good. A study of the chemical analysis data shows that in general ground water in the area is marginally alkaline in nature. Ground water is fresh with the average EC value within the permissible limits. NO_3 and F values are well within the permissible limit except only at a few places.

1.4.6.9 The Zilla Parishad approved to provide fresh drinking water to the local inhabitants by installation tube wells, sanitary wells and pipe line water facility. A table showing the detailed CD block wise availability of drinking water facilities is furnished below. Tube wells are the safest and most preferred source of rural water supply in this division. The tube well water is readily accepted by the villagers and hence these

wells are the major sources of drinking water supply. Both shallow & deep wells have been dug up to provide drinking water by the RWSS department & PHD. The well water is free from pollutants and minimise the incidence of water borne diseases. Forest department has also installed some tube wells to provide fresh drinking water to the remote villagers inside the forest areas.

Sl. No	Name of the Block	Minor Irri.Proj		LIP		W.H.S		Borewell		Dug well		Other source	% of irrigation
		Nos	Pote	Nos	Pote.	Nos	Pote.	Nos	Pote.	Nos	Pote	Pote	
1	Khajuripada	7	448	20	400	60	374	87	174	652	261	812	42.01
2	Phiringia	7	466	73	1498	42	377	92	184	630	252	2212	31.63
3	Phulbani	7	714	35	704	65	485	100	200	446	178	873	45.28
4	Chakapad	6	840	27	544	76	447	77	154	406	162	127	23.53
5	G.Udayagiri	5	648	3	60	42	471	0	0	312	125	128	17.52
6	Raikia	5	404	11	228	82	457	15	30	298	119	334	11.66
7	Tikabali	3	290	25	518	31	207	17	34	456	182	352	13.84
		40	3810	194	3952	398	2818	388	776	3200	1279	4838	185.47

Source:-**Executive Engineer., RWSS, Kandhamal (As on 2017)**

N.B. – Pote. – Potential

1.4.6.10 Most of the remote villages in this division suffer from water- crisis during summer days. The water harvesting structures may be constructed inside the forest areas to overcome water scarcity to the wild animals and the local population. Due to dryness, most the areas become unsuitable for wild life habitat.

1.4.7 Health:

The climate of the tract is generally dry & healthy except the areas, surrounded by the forests where the region is particularly affected with Malaria, Cholera, Dysentery, Smallpox and Enteric fever. Bronchitis and Pneumonia are also prevalent in the division in the villages remaining inside the forests and adjacent areas. This happens due to the pollution of water during rainy seasons.

1.4.7.1 Gradually, medical facilities have been improved to some extent with provision of heath and sanitation facilities, but medical assistance is not adequate for the local people. However, medical infrastructure and other facilities given to the local dwellers of this division are furnished below. The available facility provided to the local people is not sufficient. It needs to be strengthened further.

CHAPTER-II

2. Maintenance / Increase in the extent of forest and tree cover

2.1 Area of forests under different legal classes(RF,PRF,UF& others).

The Forests are classified in to different legal classes under various acts / Rules / judgments of Apex court. The forests under Odisha Forest act, 1972 are classified in to Reserved Forests (those are finally notified u/s 21 of the OFA'1972 or that of Indian Forest Act'1927), Proposed Reserved Forests (those are notified u/s 4 of the OFA, 1972 and in the process for declaration of Reserved forests), Village Forests (Declared U/s 30 of the OFA'1972), Protected Forest (Declared u/s 33 of the OFA'1972).

Under the provisions of The Odisha Settlement Act' 1962 & Rules thereof, certain lands in a village has been recorded as Forest like "Gramya Jungle, Bada Jungle, Chhota jungle or any other type of Jungle" are considered as Revenue Forest. These forests are not under direct control of Forest Department. Hence this type of forest land has not been taken in to account for management purpose under provisions of "Working Plan".

There are lands under control of Forest department and used for Buildings, Nursery, forest Rest Houses etc. These Forests are classified as "Un classed Forests". These areas are mentioned in the Working Plan for regulating purpose.

There are areas not classified as forest as per any Act's / Rules but as per the District Level Committee (DLC) constituted during the year 1997 in each district under the Chairmanship of the District Collector as per the Orders passed by the Hon'ble Supreme Court of India in W.P. (C) 202/1995 to identify all forest areas under the administrative control of F&E Department /Revenue Department and Forest land / Plantations belonging to private persons. After necessary scrutiny of the DLC Reports by the State Level Expert Committee, the details of such Forest land were submitted before the Hon'ble Apex Court in shape of an affidavit. All such Forest Land which found place in the final DLC reports is recorded as DLC Forest. The extent of area under different class of Forest is described as follows**.**

2.1.1Distribution and area:

In the outgoing plan 61 Reserved Forests (RF) having total area of 98423.02 ha. and 35 no Proposed Reserved Forests (PRF) having area of 56793.85 ha. was considered for management.

2.1.2 So, the total number of RFs covered in this plan is 61nos. In this plan, all the areas covered under PRF and village forest will also be included as decided in the working plan committee. Therefore, this plan covers 61nos. RFs having a total area of 97697.575 ha., 35nos. PRFs with area of 48336.421 ha.and the total declared 111 nos. of village forests having area of 1064.83Ha. The detailed range wise distribution of areas for RFs, PRFs and village forests are given below in the followings tables. The area figures of the RF's and PRF's blocks are given below as per Topomapand as per the notifications. The areas which are notified during the year 1955, the correctness of the computed areas have been verified. There are discrepancies in the areas in the Toposheet and the notified area, such as Balaskumpa RF in Phulbani range, Donga RF in Sudurukumpa range and Krandibali(w) RF in Phiringia range. However, the areas as per Toposheet has been taken into consideration. In this plan, the area will be computed by digital planimeter for calculating the management areas of different forest blocks. However, areas for RF's & PRF's are given below in the table 2.1 &2.2 respectively.

Table:2.1List of Rangewise distribution of Reserve Forest (RF's)

Sl. No.	Name of Range	Name of the R.F. Block as per DFO's Report	Name of the same RF Blocks as per RF Notification	No. and date of Gazette Notification	Area in Ha.	
					As per Topomap	As per Notifi-cation
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	G.Udaygiri	Baliapata	Baliapeta	S.R.O.No.217/99 Dt. 19.2.99	202.17	164.26
		Dakapalla	Dakapalla	No.2876 LRS.XV-4/54Dt. 12.10.55	265.89	170.78
		Godingia'A'	Godingia'A'	No.2664 LRS.XV-23/54Dt.29.11.55	719.79	683.93
		Godingia`B'	Godingia`B'	No.2666/LRS.XV26/ 54Dt.29.11.55	742.57	870.09
		Gidipabali	Gidipabali	No.2074/LRS.XV.2/ 54Dt.12.10.55	326.29	314.44
		G.udaygiri'A' (Pukulingia)	G.udaygiri'A' (Pukulingia)	No.2672/LRS.XV.16 /54Dt.30.11.55	169.47	176.44
		G.udaygiri'B' (Sujeli)	G.udaygiri'B' (Sujeli)	No.2674/LRS.XV.25 /54Dt.30.11.55	53.75	71.22
		G.udaygiri`C' (Rotingia)	G.udaygiri`C' (Rotingia)	No.2660/LRS.XV.28 /54Dt.29.11.55	116.31	113.31
		Kalinga (Sandal wood)	Kalinga (Sandal wood)	No.2670 LRS.XV.17/54Dt.30. 11.55	31.39	9.71

		Kalinga (i) (Jobedi)	Kalinga (i) (Jobedi)	No.2072/LRS.XV.18 /54Dt.12.10.55	198.53	194.25
		Kalinga (ii) (Gotingia)	Kalinga (ii) (Gotingia)	No.2088 LRS Dt.12.10.55	81.88	103.60
		Kalinga (iii) (Kurmungia)	Kalinga (iii) (Kurmungia)	No.2086-LRS.XV.43/54Dt.12. 10.55	119.99	161.47
		Kanabagedi	Kanabagedi	S.R.O.No.180/77 Dt.14.3.77	192.53	186.96
		Padangi	Padangi	S.R.O.No.943/75 Dt.4.12.75	1842.44	2092.27
		Tudubali	Tudubali	No.2662/LRS.XV.19 -54Dt.29.11.55	1431.69	1668.15
				Total	**6494.69**	**6980.88**
2.	Karada	Baraba	Baraba	S.R.O.No-277/79 Dt.16.12.78	1746.025	1325.37
		Machhaghat	Machhaghat	S.R.O.No-850/77 Dt.09.12.77	1909.21	1935.65
		Ranaba	Ranaba	S.R.O.No-851/77 Dt.09.12.77	2864.316	2624.44
				Total	**6519.551**	**5885.46**
3.	Phiringia	Baghanadi	Baghanadi	No.28550 FS 312/68Dt.5.06.68 & FF & AH SRONo.458/80 Dt.15.4.80	9776.03	7224.60
		Bandhagarh' B'	Bandhagarh' B'	S.R.O.No-1042/75 Dt.27.12.75	265.5	275.35
		Daisara	Daisara	S.R.O.No-709/75 Dt.08.9.75	214.78	185.02
		Gerupada (E)	Gerupada (E)	No-54888-FS.101/ 68RDt.28.10.68	236.19	200.32
		Gerupada (W)	Gerupada (W)	S.R.O.No-5/70 Dt.31.12.69	199.47	303.52
		Gochhapada	Gochhapada	No.48274-FS.119/68RDt.20.09 .68	5038.33	5220.55
		Krandibali (E)	Krandibali (E)	No.34806 FS.282/69RDt.30.05 .69	3349.75	5872.11
		Krandibali (W)	Krandibali (W)	S.R.O.No-265/70 Dt.6.1.70	4957.53	2645.89
		Ladapadar	Ladapadar	No.66708-FS.103/68RDt.24.12 .68	1530.58	2347.22
		Nuapadar	Nuapadar	S.R.O.No-7/70 Dt.31.12.69	705.72	546.33

		Sadingia	Sadingia	No.56121.F.S-115/68RDt.1.11.68	767.19	910.56
				Total	**27041.07**	**25731.47**
4.	Phulbani	Balaskumpa	Balaskumpa	S.R.O.No-1/70 R Dt.23.12.69	342.87	101.17
		Bhaliapada	Bhaliapada	S.R.O.No-11/71 Dt.17.11.70	250.61	217.32
		Burtang (N)	Burtang (N)	2676-LRS.XV.34/54 Dt.28.09.55	1805.3	1538.64
		Dakapalla (A)	Dakapalla (A)	No.Fs.6/98.10332/R Dt.18.2.99	275.14	183.89
		Dakapalla (B)	Dakapalla (B)	S.R.O.No-307/71 Dt.1.06.71	318.15	351.27
		Darki	Darki	S.R.O.No-4/70 Dt.23.12.69	370.57	760.82
		Dutimendi	Dutimendi	No-32561-FS-292/69RDt.21.5.69	154.84	222.58
		Gugulasahi	Gugulasahi	No-32120-FS-305/69RDt.19.05.69	116.76	242.81
		Gumagarh	Gumagarh	No-54886-F.S-100/68RDt.28.10.68	2613.35	3628.08
		Kalabagh	Kalabagh	No.FS.118/68-28546/R Dt.5.6.68	5055.01	4056.65
		Kalamuri	Kalamuri	No-48278-F.S-117/68RDt.20.9.68	60.33	113.31
		Khajuripada	Khajuripada	S.R.O-201/75 Dt.31.3.75	2637.71	2525.29
		Khaumunda	Khaumunda	FS-249/78, 84129/R Dt.16.12.78	213.84	169.97
		Muskuli	Muskuli	No.F.S.52/67-1892-RDt.11.1.68	161.38	267.09
		Palchi	Palchi	No.40247-108/68R Dt.3.8.68	1888.9	1845.40
		Pandrisuga	Pandrisuka	No.31763-F.S.316/68RDt.25.6.68	95.82	133.54
				Total	**16360.58**	**16357.83**
5.	Raikia	Dibari	Dibari	No.S.R.O-317/74 Dt.25.04.74	203.78	163.41
		Kilundi	Kilundi	S.R.O.No.251/75 Dt.16.04.75	270.407	278.42
		Lendrikia	Lendrikia	S.R.O.No-782/75 Dt.10.10.75	741.192	866.24
		Raikia	Raikia	S.R.O.No.330/75 Dt.22.5.75	657.345	637.39
				Total	**1872.724**	**1945.46**

6.	Sudrukumpa	Donga	Donga	S.R.O.No-320/75 Dt.24.05.75	6888.2	6798.86
		Raniphathar	Raniphathar	17583.S-7/63R Dt.16.3.64	5160.04	6481.58
		Sudreju	Sudreju	No.F.S-62/67.1906/RDt.11.01.68	445.55	531.36
		Sudrukumpa	Sudrukumpa	No.10F(D).23/79.8694FFAHDt.8.04.80	4740.11	4584.37
				Total	**17233.9**	**18396.17**
7.	Tikabali	Archangi'A'	Archangi'A'	S.R.O.No.279/79 Dt.20.01.79	225.84	319.70
		Archangi'B'	Archangi'B'	S.R.O.No.731/79 Dt.2.01.79	210.39	412.78
		Burtang (S)	Burtang (S)	No.2658/LRS/XV-42/54 Dt.1.10.55	5167.59	4767.30
		Chakapad	Chakapad	No.79/LRS.XV Dt.24.07.1917	12775.52	16754.35
		Ghudukapadar	Ghudukapadar	S.R.O.No.141/79 Dt.18.01.79	199.81	263.05
		Lainpada	Lainpada	S.R.O.No.579/70 Dt.3.07.70	3044.94	3308.16
		Sankarakhol	Sankarakhol	No.2668/LRS-XV-33/54 Dt.1.10.55	466.72	663.69
		Tikabali	Tikabali	S.R.O.No.671/77 Dt.24.09.77	84.25	78.91
				Total	**22175.06**	**26567.94**

Abstract (RF's)				
Sl. No.	**Name of Range**	**Total no. of R.F**	**Total R.F area as Topomap in Ha.**	**Total R.F area as per notification in Ha.**
1	G. Udaygiri	15	**6494.69**	6980.88
2	Karada	3	**6519.551**	5885.46
3	Phiringia	11	**27041.07**	25731.47
4	Phulbani	16	**16360.58**	16357.83
5	Raikia	4	**1872.724**	1945.46
6	Sudrukumpa	4	**17233.9**	18396.17
7	Tikabali	8	**22175.06**	26567.94
G.Total		**61**	**97697.575**	**101865.21**

Table:2.2 List of Range wise distributions P.R.F Blocks (PRF's)						
Sl. No	**Name of Range**	**Name of Blocks as per D.F.O's report**	**Name of Forest Blocks as per notific-ation**	**Under section which pending for notific-ation**	**Area in Ha.**	
					As per Topomap	**Area as per notificati on**
1.	**G.**Udaygiri	Bakingia	Bakingia	U/S 21	1857.91	2812.62
		Banjapadar	Banjapadar	U/S 21	731.77	979.75
		Katingia	Katingia	U/S 4(i)	3139.57	4300.00
		Paburia	Paburia	U/S 21	1456.2	2185.35
		Talarimaha	Talarimaha	U/S 4(i)	1016.32	1052.32
				Total	**8201.77**	**11330.04**
2.	Karada	Badegarh	Badegarh	U/S 21	1352.63	1417.00
		Nandabali	Nandabali	U/S 21	3207.00	3808.50
				Total	**4559.63**	**5225.50**
3.	**Phiringia**	Bandhagad 'A'	Bandhagad 'A'	U/S 21	3592.91	4386.88
		Balandapa da 'N'	Balandapada 'N'	U/S 4(i)	1321.55	408.74
		Balandapada 'S'	Balandapada 'S'	U/S 4(i)	5873.93	291.38
		Damingia	Damingia	U/S 4(i)	1133.65	752.60
		Damingia (extn.)	Damingia (extn.)	U/S 6	605.22	478.32
		Kelapada 'A'	Kelapada 'A'	U/S 21	125.81	396.236
		Kelapada 'B'	Kelapada 'B'	U/S 4(i)	224.66	161.87
		Kelapad 'C'	Kelapad 'C'	U/S 4(i)	68.66	68.0
		Kiamunda	Kiamunda	U/S 6	4766.78	6070.41
		Mallikpada	Mallikpada	U/S 4(i)	660.16	616.34
				Total	**18373.33**	**15890.78**
4.	**Phulbani**	Ganjuguda 'B'	Ganjuguda 'B'	U/S 21	1055.72	523.40
		Kalabagha (extn.)	Kalabagha (extn.)	U/S 21	215.68	142.56
		Phulbani	Phulbani	U/S 4(i)	749.2	722.98
		Pilasalunki (E)	Pilasalunki (E)	U/S 4(i)	170.82	180.54
		Pilasalunki (W)	Pilasalunki (W)	U/S 4(i)	184.27	192.38
		Katringia	Katringia	U/S 4(i)	2421.86	2260.0
				Total	**4797.55**	**1761.86**

5.	**Raikia**	Ganjuguda 'A'	Ganjuguda 'A'	U/S 21	840.48	2104.41
		Karada	Karada	U/S 4(i)	7130.68	11849.81
		Manikeswar	Manikeswar	U/S 4(i)	557.52	492.99
		Sikabadi	Sikabadi	U/S 21	2260.211	910.12
				Total	**10788.891**	**15357.33**
6.	**Tikabali**	Baradikia	Baradikia	U/S 6 S.No-124/86 Dt.-21.1.86	56.09	60.987
		Beheragan	Beheragan	U/S 4(i)	305.35	604.93
		Budukakhol	Budukakhol	U/S 4(i)	59.73	68.87
		Mundula	Mundula	U/S 21	275.36	119.81
		Nandini 'A'	Nandini 'A'	U/S 21	151.71	165.11
		Nandini 'B'	Nandini 'B'	U/S 21	46.94	42.08
		Raghaguda	Raghaguda	U/S 21	230.87	210.44
		Tadipaju	Tadipaju	U/S 21	489.2	447.59
				Total	**1615.25**	**1719.817**

Abstract (PRF's)				
Sl. No.	**Name of Range**	**Total no. of P.R.FBlocks**	**Total area as per Topomap**	**Total areas per notification in Ha.**
1	G.Udaygiri	5	8201.77	11330.04
2	Karada	3	4559.63	6135.62
3	Phiringia	10	18373.33	15890.78
4	Phulbani	6	4797.55	1761.86
5	Raikia	3	10788.891	14447.21
6	Tikabali	8	1615.25	1719.817
	G.Total	**35**	**48336.421**	**51285.33**

Table: 2.3 LIST OF RANGE-WISE VILLAGE FORESTS PROPOSED FOR INCLUSION IN THE REVISION OF WORKING PLAN OF PHULBANI FOREST DIVISION

SL. No.	Name of the Village Forest	Area in Ha.	Notification No. and Date
1.	Kaminaju	05	AFFN(SIDA)35/90/2230/3/FFAH dt.12.09.1990
2.	Jarginaju	20	-do-
3.	Kochilagada'A'	05	-do-
4.	Kandabada	05	-do-

5.	Kochilagada'B'	07	-do-
6.	Kapanaju	05	-do-
7.	Loharnaju	05	-do-
8.	Jarginaju'B'	05	-do-
9.	Katalnaju	05	-do-
10.	Puduguda	05	-do-
11.	Jadangbali	05	-do-
12.	Bakikamba	05	-do-
13.	Dubenaju	05	-do-
14.	Telingia	05	-do-
15.	Tiparigam	05	-do-
16.	Tiparigam (Adibasisahi)	05	-do-
17.	Kandabada	08	-do-
18.	Muningia	15	AFFN(SIDA)81/91.22852 F&E dt.24.12.1991
19.	Kantalnaju	06	-do-
20.	Katimendi	10	-do-
21.	Chumpali	05	-do-
22.	Kamirikia	05	-do-
23.	Bordikia	05	-do-
24.	Chhatijhar	05	-do-
25.	Patulisahi	13	-do-
26.	Chumpuli	05	-do-
27.	Berdakia&Raikia (Dalbali)	12	-do-
28.	Basantinagar	08	-do-
29.	Masedikia	05	-do-
30.	Musumaha	12	-do-
31.	Pajimaha	05	-do-
32.	Mohupanga	13	-do-
33.	Kiramaha	05	-do-
34.	Chhatijhar	10	-do-
35.	Lujaramunda (Mundasahi)	05	No. AFFN (SIDA)36/92-715 F&E dt.08.01.93
36.	Malikapada	05	-do-
37.	Godaguda	25	-do-
38.	Gatamaha	05	No. AFFN (SIDA)36/92-715 F&E dt.08.01.93
39.	Katalnaju	24.50	-do-
40.	Kiramaha	10	-do-
41.	Malikapada	04	No.27417/F&E dt.16.12.93
42.	Lujuramunda	10	-do-
43.	LujuramundaGumagada	06	-do-
44.	Padhanpada	10	-do-
45.	Sujali (Kurmingia)	08	-do-
46.	Raikhol	15	-do-
47.	Tiparigam	15	-do-
48.	Dutukagam	10	-do-
49.	Padhanpada	10	-do-

50.	MundaSahiGumagada	15	-do-
51.	Mallikpada	30	-do-
52.	Lingagada	15	-do-
53.	Godabisa	05	-do-
54.	Kumbhiguda	05	No. AFFN (SIDA)-35/90-29234/FFAH dt.08.01.93
55.	Dumuriguda	05	-do-
56.	Sudhasahi	03	-do-
57.	Sunakhadu	10	No. AFFN (SIDA)-85/91/8990/F&E dt.28.10.1991
58.	Rabingia	10	-do-
59.	Dangerikia (Penagiri)	10	-do-
60.	Jayalamba	10	-do-
61.	Gurupada	05	-do-
62.	Sakhipada	3.5	-do-
63.	Kiliakuti	05	No. AFFN (SIDA)81/91/22852 F&E dt.24.12.1991
64.	Tandrigam	05	-do-
65.	Masripada	05	-do-
66.	Nuapadar	05	-do-
67.	Nahanagam	05	-do-
68.	Budhakamba	05	-do-
69.	Gopipadar	05	-do-
70.	Dumuriguda	25	-do-
71.	Babadangia	20	No.27421/F&E dt.16.12.1993
72.	Saitingia	10	-do-
73.	Rabingia	15	No.27945/F&E dt.21.12.1993
74.	Babadangia	08	-do-
75.	Rabingia	10	No.27421/F&E dt.16.12.1993
76.	Saitingia	10	No. AFFN.(SIDA) 36/92(pt)29464/F&E dt.8.12.1992
77.	Tarkapakhal	07	No.27421/F&E dt.16.12.1993
78.	Ranjakumpa	10	No.AFFN(SIDA)-85/91/18990/F&E dt.28.10.1991
79.	Bunduli	07	-do-
80.	Palpasahi	10	-do-
81.	Baida	10	AFFN(SIDA)65/91/22852/F&E dt.24.12.1991
82.	Gudari	10	-do-

83.	Baida	15	-do-
84.	Karadakumpa	20	-do-
85.	Khaumunda	16	-do-
86.	Karadakumpa	20	-do-
87.	Marisapada	08	No.2112/F&E dt.31.01.1992
88.	Sudhasahi	10	-do-
89.	Kudapada	8.4	-do-
90.	Mulagudari	10	-do-
91.	Gudribaju	05	-do-
92.	Jarginaju	05	-do-
93.	Bradinaju	05	-do-
94.	Gudribaju	20	-do-
95.	R.Nuagam (Khajuripada)	12.5	-do-
96.	Dumuriguda	4.930	-do-
97.	R.Nuagam	05	-do-
98.	Dangulu (Kirabira)	05	-do-
99.	Rasimendi	07	No.27421/F&E dt.16.12.1993
100.	Manipadar	05	-do-
101.	Gerakumpa	06	No. AFFN(SIDA)36/92-715/F&E dt.08.01.1993
102.	Dakapal (Jargipada)	10	-do-
103.	Tibirikuti	10	No.27421/F&E dt.16.12.1993
104.	Terkapakhal	05	-do-
105.	Pakanagam	20	-do-
106.	Terakapakhal	20	No.1035/F&E dt.14.01.1994
107.	Dadpaju	10	-do-
108.	Dangulu	15	-do-
109.	Suduli	25	-do-
110.	Bedanpaju	25	-do-
111.	Jalangpadar	20	No. AFFN(SIDA)36/92(PT)-29464/F&E dt.08.12.1992
	G.TOTAL	**1064.83**	

2.1.3 State of Boundary:

The total boundary length of 61 RFs is 1913.838 RKM. It has been observed that the boundaries of the RFs in this division are at the middle of the hillock (nearing the ridge) or at higher slopes. The lower portion of the hills or forest blocks has been left unreserved for the bonafide use of the local tribal people, mainly 'Kondhas'.

2.1.3.1 In some RF's and PRF's it has been noticed that the stone walls run for some KMs in remote areas, such as Padangi RF, Donga RF, Ranipather RF, Burtang(N) RF, etc. Due to readily availability of stones, it is cheaper to construct stone cairns than masonary pillars, However masonary pillars should be constructed in areas succeptible to encroachment. It is suggested that annual boundary verification as well as maintenance should be undertaken to safe guard the boundaries where the problem of encroachment is acute. The construction of boundary pillar should be made as per the specification of the PCCF, Odisha vide his memo no. 15931 dated 03.08.2007. A detailed forest block wise list of pillars, with boundary length is given below.

Table No. 2.4 RF and PRF Boundary pillars and length

Name of the Range	Sl. No.	Name of the RF Blocks as per RF Notification	Boundary pillar No	Boundary length in KM
1	**2**	**3**	**5**	**6**
G.udayagiri	1	Baliapeta	123	7
	2	Dakapalla	64	7
	3	Godingia 'A'	105	22.8
	4	Godingia 'B'	122	22.3
	5	Gidipabali	23	5.4
	6	G.udayagiri 'A' (pukulingia)	85	8.1
	7	G.udayagiri 'B' (sujeli)	47	4.9
	8	G.udayagiri 'C' (Rotingia)	35	4.9
	9	Kalinga(sandal wood)	7	1.3
	10	Kalinga (i) (jabedi)	69	5.7
	11	Kalinga(ii) (Gotingia)	14	5.9
	12	Kalinga(iii) (Kurumingia)	60	6.0
	13	Kanabagedi	69	5.8
	14	Pandagi	324	46.3
	15	Tudubali	212	31.0
Karada	16	Baraba	180	35.8
	17	Machhaghat	286	24.4
	18	Ranaba	321	21.6
Phiringia	19	Baghanadi	188	52.3
	20	Bandhagarh'B'	211	20.8
	21	Daisara	119	7.1

	22	Gerupada (E)	147	27.6
	23	Gerupada (W)	113	15.8
	24	Gochhapada	1315	112.6
	25	Krandibali(E)	736	105.1
	26	Krandibali (W)	84	64.8
	27	Ladapadar	156	32.8
	28	Nuapadar	319	34.4
	29	Sadingia	295	39.4
Phulbani	30	Balaskumpa	135	14.0
	31	Bhaliapada	169	15.7
	32	Burtang (N)	85	9.4
	33	Dakapalla (A)	64	7.2
	34	Dakapalla (B)	157	16.9
	35	Darki	151	18.9
	36	Dutimendi	100	9.8
	37	Gugulasahi	116	8.3
	38	Gumagarh	520	64.7
	39	Kalabagh	495	64.0
	40	Kalamuri	32	3.9
	41	Khajuripada	248	46.0
	42	Khaumunda	85	9.9
	43	Muskuli	92	6.3
	44	Palchi	114	22.9
	45	Pandrisuga	66	4.7
Raikia	46	Dibari	82	8.1
	47	Kilundi	84	9.4
	48	Lendrikia	174	16.1
	49	Raikia	152	17.0
Sudrukumpa	50	Donga	787	106.9
	51	Raniphathar	421	54.4
	52	Sudreju	246	25.7
	53	Sudrukumpa	394	92.0
Tikabali	54	Archangi'A'	107	11.6
	55	Archangi'B'	179	12.0
	56	Burtang (S)	755	73.6
	57	Chakapad	420	152.0
	58	Ghudukapadar	94	8.4
	59	Lainpada	641	71.1
	60	Sankarakhol	162	21.8
	61	Tikabali	64	5.2
Total Reserved Forest			**13220**	**1792.8**

Name of the Range	Sl No.	Name of the PRF	Total Boundary Pillar No.	Length of Boundary Line KM
G.Udayagiri	1	Bakingia	525	36
	2	Bhanjapadar 'A'	235	24
	3	Paburia	254	24
Karada	4	Badagada	474	35
	5	Nandabali	299	25
	6	Sikabadi	351	30
Phringia	7	Bandhagada 'A'	1428	141
	8	Damingia (Extn)	140	18
	9	Kelapada 'A'	222	21
	10	Kiamunda	412	37
Phulbani	11	Ganjuguda'B'	260	15
	12	Kalabagh Extn	73	8
Raikia	13	Ganjuguda 'A'	290	21
Tikabali	14	Bardikia	54	4
	15	Mundula	81	6.4
	16	Nandini 'A'	88	6
	17	Nandini 'B'	42	2
	18	Ragaguda	72	6
	19	Tadipaju	93	7
TOTAL PRF PILLARS			**5393**	**466.4**
PRF without Section-4 Gazette Notification				
G.Udayagiri	20	Katingia	638	53
	21	Talarimaha	319	23
Phringia	22	Balandapada 'N'	202	14
	23	Balandapada 'S'	369	17.15
	24	Damingia	181	34
	25	Katringia	416	50
	26	Kelapada 'B'	203	8
	27	Kelapada 'C'	40	3
	28	Mallickpada	303	30
Phulbani	29	Phulbani	219	25
	30	Pilasalunki (E)	89	9
	31	Pilasalunki (W)	110	17
Raikia	32	Karada	364	32
	33	Manikeswar	120	14
Tikabali	34	Beheragaon	90	10
	35	Budukakhol	58	4
TOTAL DPF PILLARS			**3721**	**343.15**
G.TOTAL			**9114**	**809.55**

Abstract of Range wise RF and PRF boundary length

Sl. No.	Name of Range	R.Fs			PRF		
		No. of Blocks	No. of Pillars	Total length in RKM	No. of Block	No. of Pillars	Total length in RKM
1.	G.Udaygiri	15	1359	184.454	5	1971	160
2.	Karada	3	787	81.877	2	773	60
3.	Phiringia	11	3683	513.0201	11	3916	373.15
4.	Phulbani	16	2629	322.763	5	751	74
5.	Raikia	4	492	50.5775	4	1125	97
6.	Sudurkumpa	4	1848	279.019	--		
7.	Tikabali	8	2422	355.7412	8	578	49.578
TOTAL		**61nos.**	**13220**	**1792.8**	**35nos**	**9114**	**809.55**

2.1.3.2 Boundary Maintenance cycle suggested

The boundary of the forest pillars will be maintained in a cycle of 5 years to improve the boundary condition. Maintenance cycle is furnished below.

Table No. 2.5: Boundary Maintenance cycle suggested.

Year of Boundary maintenance	Name of the Range	Sl no	Name of the forest block
2021-22 &2026-27	G.Udayagiri	1	Baliapata RF
	G.Udayagiri	2	Dakpalla RF
	G.Udayagiri	3	Godingia'A RF
	G.Udayagiri	4	Bakingia PRF
	Karada	5	Baraba RF
	Phiringia	6	Baghanadi RF
	Phiringia	7	Bandhagada B RF
	Phiringia	8	Bandhagada A PRF
	Phiringia	9	Balandapada N PRF
	Phulbani	10	Balaskumpa RF
	Phulbani	11	Bhaliapada RF
	Phulbani	12	Burtanga N RF
	Phulbani	13	Dakpalla A RF
	Phulbani	14	Ganjuguda B PRF
	Raikia	15	Dibari RF
	Raikia	16	Ganjuguda A PRF
	Sudrukumpa	17	Donga RF

	Tikabali	18	Baradakia PRF
	Tikabali	19	Archangi A RF
2022-23 & 2027--28	G.Udayagiri	1	Godingia B RF
	G.Udayagiri	2	Gidipabali RF
	G.Udayagiri	3	Pukulingia RF
	G.Udayagiri	4	Bhanjapadar PRF
	Karada	5	Badegarh PRF
	Phiringia	6	Daisara RF
	Phiringia	7	Gerupada East RF
	Phiringia	8	Balandapada South PRF
	Phiringia	9	Damingia PRF
	Phulbani	10	Dakpalla B RF
	Phulbani	11	Dadaki RF
	Phulbani	12	Dutimedi RF
	Phulbani	13	Gugulasahi RF
	Phulbani	14	Kalabagh (Extn) PRF
	Raikia	15	Kilundi RF
	Raikia	16	Karada PRF
	Sudrukumpa	17	Ranipathar RF
	Tikabali	18	Archangi B RF
	Tikabali	19	Burtanga South RF
	Tikabali	20	Beheragaon PRF
2023-24 & 2028-29	G.Udayagiri	1	Sujeli RF
	G.Udayagiri	2	G.Udayagiri C(Rotingia)
	G.Udayagiri	3	Kalinga Sandal Wood RF
	G.Udayagiri	4	Katingia PRF
	Karada	5	Machhaghat RF
	Phiringia	6	Gerupada West RF
	Phiringia	7	Gochhapada RF
	Phiringia	8	Krandibali East RF
	Phiringia	9	DamingiaExtn PRF
	Phiringia	10	Kelapada A PRF
	Phiringia	11	Kelapada B RF
	Phulbani	12	Gumagada RF
	Phulbani	13	Kalabagh RF
	Phulbani	14	Kalamuri RF
	Phulbani	15	Katringia PRF
	Phulbani	16	Phulbani PRF
	Raikia	17	Lendrikia RF
	Sudrukumpa	18	Sudreju RF
	Tikabali	19	Burtanga South RF

	Tikabali	20	Budukakhol RF
2024-25 & 2029-30	G.Udayagiri	1	Kalinga-I(Jobedi) RF
	G.Udayagiri	2	Kalinga-II(Gotingia) RF
	G.Udayagiri	3	Kalinga-III (Kurmingia) RF
	Karada	4	Nandabali PRF
	Phiringia	5	Krandibali West RF
	Phiringia	6	Ladapadar RF
	Phiringia	7	Kelapada C PRF
	Phiringia	8	Mallickpada PRF
	Phulbani	9	Khajuripada RF
	Phulbani	10	Palchi RF
	Phulbani	11	Khaumunda RF
	Phulbani	12	Pilasalunki East PRF
	Raikia	13	Raikia RF
	Raikia	14	Maikeswar PRF
	Sudrukumpa	15	Sudrukumpa RF
	Tikabali	16	Chakapad RF
	Tikabali	17	Linepada RF
	Tikabali	18	Mundula PRF
	Tikabali	19	Nandini A PRF
	Tikabali	20	Nandini B PRF
2025-26 & 2030-31	G.Udayagiri	1	Kanbagedi RF
	G.Udayagiri	2	Padangi RF
	G.Udayagiri	3	Tudubali RF
	G.Udayagiri	4	Paburia PRF
	G.Udayagiri	5	Talarimaha PRF
	Phiringia	6	Nuapadar RF
	Phiringia	7	Sadingia RF
	Phiringia	8	Kiamunda PRF
	Phulbani	9	Pandrisuga RF
	Phulbani	10	Muskuli RF
	Phulbani	11	Pilasalunki West PRF
	Raikia	12	Sikabadi PRF
	Tikabali	13	Sankarakhol RF
	Tikabali	14	Tikabali RF
	Tikabali	15	Ragaguda PRF
	Tikabali	16	Tadipaju PRF

2.2. Forest Area under different working circles

The current working plan covered the forest area of Phulbani Forest Division in 8 working circles. They are as follows:

1. The Selection Working Circle.
2. The Rehabilitation Working Circle.
3. The Plantation Working Circle.
4. The J.F.M. (Overlapping) Working Circle.
5. The Forest Protection Working Circle.
6. The Bamboo (Overlapping) Working Circle.
7. The NTFP (Overlapping) Working Circle.
8. The Wildlife (Overlapping) Working Circle.

The above 8 working circles only selection rehabilitation plantation &protection working circles were exclusive, and the rest 4 working circles are overlapping working circles. The current working plan computed the area of different forest blocks by taking the area obtained from digitized boundaries of forest blocks. Further, this area was used in dividing the compartments and allotted to different working circles. The GIS areaof the forest blocks has been taken and divided into different circles in this working plan and area under different management circles do not match. The following table shows the area considered by the current working plan under different working circles.

Table 2.6 Area allotment to different Working Circles in the current Working Plan

Sl. No.	Working circle	Area in ha.	Percentage of total working plan area of 145746.8
1.	Selection working circle	45943.04	31.5 %
2.	Rehabilitation working circle	91946.806	63.08%
3.	Plantation overlapping working circle	3176.8	2.1%
4.	Forest protection overlapping working circle	4680.131	3.2%
5.	Bamboo overlapping working circle	99937.682	68.5%
6.	NTFP overlapping working circle	145746.8	100%
7.	Wildlife overlapping working circle	145746.8	100%
8.	JFM overlapping working circle	56369.853	38.67%

Settlement of Forest Land under Management in FRA :

During the implementation of current working plan, land under different working circles was settled in favour of rights holders under FRA,2006. The detailed forest block wise settlement is presented in **Annexure-VIII**. From the list it is cleared that 1309.278 ha of forest land which was previously under working plan management has been settled in favour of Forest Right holders. Therefore the WPO shall exclude all such areas from the respective management circles. The WPO shall also demarcate such lands through GPS survey and map it on the relevant forest block.

2.3 Percentage of forest with secured boundaries

Almost all the Forest Block Boundaries have been maintained at least once in past 8 years. The total RF boundary length is 1787.5 kms and PRF boundary length is 810.3 kms. In total the Division has 2597.8kms of Forest Boundary. In addition boundary along enclosures is also there in several forest blocks which also need maintenance. In general most of the Forest Blocks require repair & maintenance of Boundary Pillars.

The boundary maintenance was done under several heads of funding which as follows (a) Non-Plan Head of State Government, (b) Central Sponsored Scheme, (c) 12th Finance Commission Grant, (d) CAMPA Fire line maintenance and Boundary Maintenance. (e) IFM. The present documentation available in the Division does not show the kind of pillar i.e Concrete or Store Crain on the location. The Working Plan Officer shall document the kind of pillar and its location.

2.3.1 Specification of Reserve Forest pillars. (as per memo No. 15931 dated 03.08.2007 of the PCCF, Odisha)

(a) ***Stone Pillar***

1. The ground shall be leveled before construction of pillar.
2. The diameter at the base of the pillar shall be kept 120 cm and that at the top 80cm so that the diameter at the centre will be 100 cm. Height of pillar shall be 130 cm. Locally available stones and boulders shall be fixed using mud mortar.
3. The pole of 160 cm length (duly painted with coal tar) to be fixed in the centre shall be 130 cm inside pillar and 30 cm above i.e. one end of pole shall be embedded in ground.
4. The visible portion of pole shall be flattened with face towards outside and the pillar number written on it. The pillar number shall also be written at the base of the pillar.
5. The voids on the outer surface of the pillar should invariably be cemented.

(b) *Masonry Pillars*

Masonry pillars may also be constructed on the RF boundary line where adequate curing is possible. The foundation of such pillar shall be 60cm X 60cm X 60cm. The size of the pillar above foundation (ground) shall be 60cm X 60cm X 90 cm (ht) on back side and 60cm X 60cm(ht) on front side with face slanting outside. This will have a volume of 18cft.

(II) PRF Boundary pillars

A)***Stone cairns :***

1. The ground shall be leveled before construction of the pillar.
2. The diameter at the base of the pillar shall be 90 cm while that at top 60cm. Thus diameter at centre will be 75cm. Height of pillar shall be 100cm. Locally available stones and boulders shall be used and made stable before filling up voids with mud mortar.

3. The pole of 130cm length (duly painted with coal tar) to be fixed in the centre shall be 100cm inside pillar and 30cm above. i.e. one end of pole shall be embedded in ground.
4. The visible portion of pole shall be flattened with face towards outside and pillar number written on it. The pillar number shall also be written at the base of pillar.

B) Masonry Pillars :

Masonry pillars may also be constructed on the PRF/DPF boundary at place where adequate curing is possible. The foundation of such pillar shall be 60cm X 60cm X 60cm. The size of the pillar above foundation (ground) shall be 60cm X 60cm X 60cm(ht) on back side and 60cm X 30cm (ht) on front side with the slanting surface facing outside. The pillar shall be plastered and duly numbered with name of PRF/DPF written on the slanting portion. This will have a volume of 14cft.

2.4 Land use, land use change and forestry (LULUCF)

The Forest Survey of India in its Report 2017 indicates change in Forest Cover in the state both within the Recorded Forest area and Outside the Recorded Forest area. The information furnished in the FSI, Report for Phulbani Forest Division is furnished in.

Table No.-2.7

Type of Forest cover	**FC Data – 2015 Data area in ha.**	**FC Data – 2017 Data area in ha.**	**Forest Cover change between 2015 & 2017**
VDF	32653.05	33128.15	475.10
MDF	120021.92	119386.47	-635.45
OF	65720.60	69593.95	3873.35
TOTAL	**218395.57**	**222108.57**	**3713.00**
% of GA	60.17	61.20	1.02
Scrub	22919.67	22962.28	42.61
Non-Forest	120053.30	116582.59	-3470.71

2.5 Threats to Forest

2.5.1 Injuries to Which Crop is Liable:-

The forests lying over the tracts of Phulbani Forest Division are prone (susceptible) to following types of injuries:

(a) Shifting cultivation, (b) Forest fire, (c) Unregulated grazing, (d) Illicit felling, (e) Unauthorized encroachment, (f) Diseases caused by Fungi & parasites, (g) Damage of forest crop by wild animals (h) Climbers, (i) Insects, (j) Epiphytes, (k) Frost, (l) Lopping, (m) Damage by wind, (n) Sweeping of the forest floors in plain forest, (o) Weeds (*Lantana camara, Eupatorium odoratum* & others)

2.5.1.1 Shifting Cultivation: From time immemorial, it has become a practice by the tribes of cutting the trees after rains. During dry spell of winter they burn felled materials. During summers, they cultivate the field and raise crops during rains. They practice agriculture over the said patch for two to three years. When they observe that the yield is falling short of the previous years, they abandon the present patch and move on to another patch. They harvest the seasonal crops like Maize, Beans, Kandula, Rasi, Til and Mustard etc.. Destruction of forest and associated loss of bio-diversity, severe erosion and land degradation and primitive subsistence living is associated with the spread and intensification of shifting cultivation. It is a predominant farming practice on hill slopes. Shifting cultivation is quite prevalent in Orissa. Koraput, Phulbani, Kalahandi, Ganjam and adjoining Keonjhar and Sundargarh districts have already been severely and adversely affected by shifting cultivation.

2.5.2 Forest fire

2.5.2.1 Introduction

Forest fires globally are considered as one of the major factors of climate change, biodiversity loss and increase in global temperature due to production of biological carbon and greenhouse gases. In the tropical deciduous forests of Orissa, fire is a recurrent phenomenon due to higher levels of water stress during summer. Traditional and use practices and changes in weather pattern have resulted in higher fire incidences in the tropical India. Forest Fires in India is mostly anthropogenic in nature. Following are the major causes of fire, which may be intentional as well as unintentional:

- Burning of forest floor for good growth of grass or mushrooms in the next season
- Hunting
- Un-extinguished campfires, charcoal panniers
- Sparks from railway engines
- Un-extinguished cigarettes or bidi buts being thrown in the under bush etc

Based on forest fire occurrence over last 5 years using satellite based observations, the forest fire vulnerability of blocks was assessed for the Phulbani division.

2.5.2.2 Methodology: Coarse resolution satellite data of sensors like MODIS, ASTER, NOAA detect active fire based on brightness temperature levels recorded in short wave and thermal IR wavelength bands. Detection of active fires as a function of pixel brightness temperature above that of the background depends on fire temperature and size relative to the background resolution of the sensor, fire and smoldering intensity levels, vegetation type, background land cover and atmospheric interference.

MODIS aqua and terra satellite daily active fire location information products over 5 years (2001 to 2005) have been used for assessing the vulnerability The number of channels or bands in MODIS is 36 and of these bands 20-36 falls under the thermal bands having a resolution of 1 km and daily coverage. The fires which have an extent of 1-2 ha or more are only picked up by the satellite. The daily data has been integrated over one year and the annual integrated output has been prepared. The annual fire occurrence over the last six years has been overlaid in GIS domain with the management layers to give block wise annual fire occurrence data and generating fire vulnerability map based intensity of fire occurrence.

Results: The block wise annual fire occurrence has been tabulated (table No. 4.2 of Chapter- IV of Part-I) according to the year of occurrence. It may be noted that the data provided refers to fire occurrence over 1 km area but not the spread of burnt area. It has been observed that Phulbani forest division has relatively high forest fire occurrence in 2018-19 year as a whole with 3415 Nos. fire occurrence in the last 5 years 2016-2020.

2.5.3 Population Explosion:

Exploding human population coupled with rapid urbanization in this Division is the main cause of degradation of forest resources. Human beings are directly as well

as indirectly responsible to a great extent for depletion and degradation of valuable forest of this Division to illicit felling and removal, uncontrolled grazing, girdling and lopping, setting fire in forests with vested interest, encroachment of forestland and the like. Poverty and unemployment is very common in the villages around forests. The demand for agricultural implements, small timbers for house hold requirements and firewood are increasing day-by-day. This is the major cause and danger to Forest & Forest land.

2.5.4 Illegal collection of timber and firewood.

Forests are subjected to illegal removal of Forest Produce for Timber, Fuel Wood, bamboo, Young bamboo (Karadi) for food purpose. Though the magnitude is not alarming but hampers the growth & density of Forests. Bamboo forests have been depleted to a great extent. The supply of timber & firewood from legal sources is very low in comparison to demand of present population. Illicit felling are noticed in the forest blocks because of the demand of the townships of Phulbani, Tikabali, G.Udayagiri & Raikia. In some of the Forest blocks, the very character of the vegetation has been changed from Sal forests to miscellaneous mixed forests due to illicit removal of trees. Forests in the vicinity of the villages are also affected owing to collection for firewood and timber from forests.

2.6 Distribution of different forest Types

General Description of Growing Stock

2.6.1 The detailed observation of the growing stock are classified below as per the classification of "Champion & Seth"

Sub group 3C – North Indian Tropical

Moist Deciduous Forest.

3C/C2: Moist Peninsular Sal:

(i) Moist Peninsular High Level Sal.
(ii) Moist Peninsular Low Level Sal.
(iii) Moist Peninsular Valley Sal.

3C/C3: Moist mixed deciduous Forest.

5B: Northern tropical dry Forest.

5B/$C_{IC.}$ Dry Peninsular Sal Forest

5B/$C_{2C:}$ Dry Mixed Deciduous Forest.

5B/$E_{9:}$ Dry Bamboo Brakes.

Sub-group 3C: North Indian Tropical

Moist Deciduous Forest.

The tract of Phulbani Forest Division is formed of a network of hills, valleys and nalas. Composition of the forest crop is heterogeneous in nature. Thus, the sub-group mentioned above is sub-divided into following types, such as (a) **3C/C_2 moist peninsular Sal** (b) **3C/C_3 Moist mixed Deciduous Forest**.

2.6.2:3C/C_2 Moist Peninsular Sal:

Lower fringes of the hills and the valleys over the tract of Forestlands in Phulbani, Phiringia and G.Udaygiri Forest Ranges come under this type of forests. In these areas, the site is enriched with humus, adequate soil depth and adequate moisture. Growth of "Sal", the principal species is better and luxuriant. Sal is gregarious in nature along such sites. Top storey (Upper storey) associates of Sal are Asan, Kasi, Kurum, Mahul, and Piasal and the Second storey associates are Amla, Bandhan, Jamu, Karada, Sidha and Sunari etc.

Under growth observed in common are *Clerodendron viscosum, Cycas ciricinalis, Helicteres isora, Indigofera pulchella, Eupatorium odoratum and Andrographis paniculata* etc.

The climbers observed in common are *Milletia auriculata, Combretum decandrum, Bauhinia vahlii, Smilax macrophylla and Mimosa himalayana* etc.

This type is further Sub-divided into the following Sub-types, namely,

2.6.3: 3C/C2 Moist Peninsular High Level Sal:

This category of forests is observed in Ranipathar, Sudurukumpa, Donga, Palchi, Ladapadar, Gochhapadar, Burtang South and Tudubali Forest Blocks. Here, Sal is observed on crystalline rocks over the hill slopes covered with lateritic soil. Sal, in these forests can be put under site quality IV.

The associates of Sal are *Anogeissus latifolia, Bridelia retusa, Emblica officinalis, Lagerstroemia parviflora, Madhuca indica, Ougeinia oojeinensis, Petrocarpus marsupium and Terminalia alata* etc.

Undergrowth observed is *Indigofera pulchella, Phoenix acaulis and Woodfordia fruticosa.*

Salia Bamboo is observed in Donga, Ranipathar, Palchi & Burtang South Blocks as Lower Storey associate.

The common climbers are *Milletia auriculata, Combretum decandrum, Bauhinia vahli, Mimosa himalayana and Butea superba*.

2.6.4: 3C/C_2 Moist Peninsular Low Level Sal:

The crystalline rocks bearing the underlying deep layers of loamy soil are found on the lower hill slopes and the foothills. This condition maintains a good soil moisture regime and thereby, bears moist Sal forests. Adequate depth and richness of soil promote the growth of better quality Sal having site quality III / IV.

Some more species variety are associated with Sal along the lower slopes Viz. *Adina cordifolia, Anogeissus latifolia, Buchanania lanzan, Cleistenthus collinus, Dalbergia latifolia, Dillenia pentagyna, Diospyros melanoxylon, Gmelina arborea, Lannea grandis, Pterocarpus marsupium, Schleichera oleosa, Terminalia alata, and Terminalia chebula*. The undergrowth observed is *Diospyros montana* (along the nalas), *Holarrhena antidysenterica, Nyctanthes arbortristis, Phoenix acaulis & Woodfordia fruticosa*. Baghnadi, Burtang North, Chakapada, Kalabagh & Khajuripada Forest Blocks bears these types of forests. In these forests, *Dendrocalamus strictus* is found as under storey. Climbers commonly found in these forests are Bauhinia vahlii, *Butea superba, Combretum decandrum and Milletia auriculata*.

2.6.5: 3C/C2 Moist Peninsular Valley Sal:

These types of forest occur in the valley portions of Chakapada forest block. The soil is rich in humus with adequate moisture and good depth of loamy soil. Thus, this forest boasts of good quality Sal, bearing site quality III.

Adequate moisture and favorable conditions promote the growth of numerous associates of Sal viz. *Bridelia retusa, Careya arborea, Gmelina arborea, Lannea grandis, Mitragyna parviflora, Pongamia pinnata, Syzygium cuminii, Terminali aalata*

and Terminali aarjuna. The undergrowth constitutes *Cleistenthus collinus, Eupatorium odoratum, Flemingia chhapper, Holarrhena antidysenterica, Indigofera pulchella and Lantana camara*. The Climbers observed in common are *Bauhinia vahlii, Combretum decandrum, Milletia auriculata and Smilax macrophylla.*

2.6.6:3C/C2 Moist Peninsular Valley Sal

These types of forests are confined to the Valley portions of Chakapada forest block of Tikabali Range. Soil is loamy, enriched with profuse deposits of humus and adequate soil moisture. Thus, the condition becomes congenial for the growth of Sal. The quality of sal is considered to be of Site quality III. The favorable locality factors indicate a wide range of associates of Sal, as *Bridelia retusa, Careya arborea, Gmelinaarborea, Lannea grandis, Mitragyna parviflora, Pongamia pinnata, Syzygium cumini, Terminalia alata, Terminalia arjuna and Trewia nudiflora.* The undergrowth observed is *Cleistenthus collinus, Eupatorium odoratum, Flemingia chhapper, Holarrhena antidysenterica, Indigofera pulchella and Lantana camara*. The Climbers observed in common are *Bauhinia vahlii, Combretum decandrum, Milletia auriculata and Smilax macrophylla.*

2.6.7: 3C/C3 Moist Mixed Deciduous Forest

Major chunk of this type of forests comprises the upper slopes and tops of the hills especially in Donga, Ranipathar and Sudurkumpa forest blocks of Phulbani Division. Due to excessive drainage, the status of plant-nutrients and soil-moisture regime is low (poor). Thus the site quality of Sal is poor.

At places, Sal is scanty or totally absent. This condition leads to the predominance of miscellaneous species like Asan, Dhaura, Kurum, Mahula, Sidha and Sirish etc. The undergrowth observed in common is *Eupatorium, Holarrhena, Lantana, Mimosa and Phoenix* etc. At places, *Dendrocalamus strictus* have come up gregariously. Common climbers are *Butea superba, Combretum decandrum, Milletia auriculata and Ichnocarpus frutescens* etc.

2.6.8: 5B North Tropical Dry Deciduos Forests:

Such forests are confined to shallow soil containing poor plant-nutrient and low soil-moisture status.

These forests occur only in Karada forest range of Phulbani Division. This type is further subdivided into**5B/C_1C- Dry Peninsular Sal Forests &5B/C_2C- Dry Mixed Deciduous Forests.**

2.6.9: 5B/CIC- Dry Peninsular Sal Forests:

This type of forests is found in Baraba, Machhghat and Ranaba Forest Blocks of Karada Range. Parent rocks are metamorphic. On weathering, these rocks have disintegrated into crystalline granules and porous soil bearing low-water-retaining Capacity. Thus, the Soil moisture regime is low and bears unfavorable condition for growth and development of Sal. Site quality of Sal is variable between Quality III/IV. But, the regeneration of Sal is reasonably fair. This is feasible because occurrence of such forests is confined to plain areas and lower fringes of the hills.

The rate of growth of Sal is impeded due to unfavorable conditions. The top storeys as well as middle storey associates of Sal are Asan, Bandhan, Bija, Kasi, Kurum, Mahul, Mundi, and Salia Bamboos respectively.

The undergrowth observed is *Diospyros embryopteris* (along the nalas), *Helictere sisora*, *Holarrhena antidysenterica* and *Indigofera pulchella*.

The climbers observed in common are *Bauhinia vahlii*, *Combretum decandrum*and *Smilax macrophylla*.

2.6.10: 5B/C_2C. Dry Mixed Deciduous Forests:

The upper hills of Baraba, Machhghat and Ranaba forest blocks of Karada Range bear such forests. Poor and shallow soils are not congenial for the growth of Sal. Hence, Sal is almost absent. Dry nature of species like *Anogeissus latifolia*, *Cleistenthus collinus*, *Emblica officinalis*, *Lagerstroemia parviflora* and *Mitragyna parviflora* are present. *Terminalia alata* occurs in the lower fringe of such forests. Undergrowth observed is *Holarrhena, Ixora* and *Mimosa* species.

Climbers found along such forests are *Combretum decandrum* & *Milletia auriculata*.

2.6.11: 5B/E_9. Dry Bamboo Brakes:

In some pockets bamboos occur gregariously and at places they occur sporadically. In Donga RF, sporadic flowering has taken place especially in compartment No6.

2.7.Tree cover outside forest area

The TOF are integrated contribution of

a) Plantations Raised outside the conventional Forest area by Forest Department, Horticultural plantation and other department.
b) Plantations raised by private individuals in their fellow land and back yard.
c) Agro Forestry practices.
d) Avenue Plantations.
e) Institutional Plantations.

The TOF plantations raised during last plan period are furnished in Chapter-15 of Part-II.

2.8Shifting Cultivation:

2.8.1 From time immemorial, it has become a practice by the tribes of cutting the trees after rains. During dry spell of winter they burn felled materials. During summers, they cultivate the field and raise crops during rains. They practice agriculture over the said patch for two to three years. When they observe that the yield is falling short of the previous years, they abandon the present patch and move on to another patch. They harvest the seasonal crops like Maize, Beans, Kandula, Rasi, Til and Mustard etc.. Destruction of forest and associated loss of bio-diversity, severe erosion and land degradation and primitive subsistence living is associated with the spread and intensification of shifting cultivation. It is a predominant farming practice on hill slopes. Shifting cultivation is quite prevalent in Orissa. Koraput, Phulbani, Kalahandi, Ganjam and adjoining Keonjhar and Sundargarh districts have already been severely and adversely affected by shifting cultivation.

2.8.2 Shifting cultivation of the Division has already resulted in serious forest and land degradation. Intensification of shifting cultivation and its spread to new forest areas, marginal lands, steep slopes and rock out crops, has aggravated the degradation problems and affected regeneration of vegetation. Cultivation on steep slopes in the absence of any conservation measures had led to land degradation at a faster pace. These causes and processes consist of the major degradation problems of the region. To bridge the gap between output and needs and due to abject poverty,

the tribal are compelled to cut trees for fuel for their bonafide use and income. It is observed that shifting cultivation has been wiped out some forest areas in different forest blocks of the Division.

(a.3) The following strategies are essential ingredients in tackling the pernicious age old prevailing practice of shifting cultivation:

1. A good data base of the Division is required in shifting cultivation regions and people. The effort may include: practice and management on shifting cultivation, resource, peoples, socio-economics, skills and enterprises; and felt needs.
2. Alternative land uses for fruits, timber, commercial plantation crops, fibres, medicinal plants etc. should be inducted in phased manner. Peoples' preference, resources, land classification and market will be the main deciding factor. Value addition is also needed to the rural products to fetch good market value.
3. Treatment of the area should be based on resource conservation on watershed basis including improved nutrient cycling water management and bio-diversity.
4. Socio-economic, skill, credit infrastructural issues and land tenure problems should be attended on priority.
5. Shifting cultivation offers diversity of products to meet tribal needs. These need improved management. Many areas may not be suitable for settled cultivation.
6. Agro-forestry practices can be viable alternative to shifting cultivation. Productivity should be greatly increased by optimum land use and management.
7. There should be suitable organizational structure entrusted with the development activities of shifting cultivation areas of the Division.

   A comprehensive policy on shifting cultivation is needed.

CHAPTER-III

3. MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY.

3.1 Forest Composition and distribution

The tract of Phulbani Forest Division is situated within the Sub-tropical zone. The weather is very much of extreme type experiencing very hot and very cold climate. Also it experiences normal rains from the middle of the June to the last week of October. In most of the areas of this Division severe cold is experienced in winter from November to February of the next year except in certain areas, where extreme cold is experienced during December and January. Basing on the climatic factors, the vegetation is categorized as Tropical Moist Deciduous with a little variation in the crop depending on the specific site condition. Sal is the principal tree species in this tract of forests.

Sal regeneration is good in lower and gentler hill slopes and the site quality of Sal is class III & class IV as observed in Ranipathar, Donga, Sudurukumpa, Burtang South, Chakapada, Gochhapada Ladapadar, Palchi, Kalabagh, Baghnadi Khajuripada and Burtang North etc. Bamboo is observed in the up hills of Machhaghat, Karada and Baraba Forest Blocks. Basing on the moisture regime of the soil the crop composition varies. In most areas, the main species are Sal, associated with Asan, Kurum, Piasal, Mahul, Semal, Mango& Kasi in the top storey along with Amla, Sunari, Jamun, Karada and Kendu in the second storey. Here, all age classes are represented. Due to requisite soil depth and favourable moisture conditions, general condition of the crop is healthy with luxuriant growth. Site quality of Sal is III. The undergrowth constitutes *Indigofera pulchella, Woodfordia fruticosa, Helicteres isora* and *Clerodendron viscosum*. The climbers found in common are *Millettia auriculata*, *Bauhinia vahlii, Smilax macrophylla* and *Combretum decandrum*.

The under growth are *Holarrhena antidysenterica*, *Eupatorium odoratum*, *Lantena camera, Ocimum tenuiflorum*

3.1.1 Classification of Forest

According to the classification made by Champion and Seth in their "Revised Survey of Forest Type in India"1962, the types of forests present in the Division are in the following categories.

(i)Sub group 3C – North Indian Tropical
Moist Deciduous Forest.

(ii)3C/C2: Moist Peninsular Sal:

(i) Moist Peninsular High Level Sal.
(ii) Moist Peninsular Low Level Sal.
(iii) Moist Peninsular Valley Sal.

(iii)3C/C3: Moist mixed deciduous Forest.

5B: Northern tropical dry Forest.

$5B/C_{IC:}$ Dry Peninsular Sal Forest

$5B/C_{2C:}$ Dry Mixed Deciduous Forest.

$5B/E_{9:}$ Dry Bamboo Brakes.

3.1.2 Orissa Tropical Semi Evergreen Forests

Sub Group 3C	North Indian Tropical & Moist Deciduous forest
Type	Moist Peninsular Sal & Moist mixed deciduous forest

3.1.2 Sub-group 3C: North Indian Tropical Moist Deciduous Forest

The tract of Phulbani Forest Division is formed of a network of hills, valleys and nalas. Composition of the forest crop is heterogeneous in nature. Thus, the sub-group mentioned above is sub-divided into following types, such as (a) **$3C/C_2$ moist peninsular Sal** (b) **$3C/C_3$ Moist mixed Deciduous Forest**.

3.1.33C/C2: Moist Peninsular Sal:

3.1.3.1 Floristic composition

Top storey (Upper storey) associates of Sal are Asan, Kasi, Kurum, Mahul, and Piasal and the Second storey associates are Amla, Bandhan, Jamu, Karada, Sidha and Sunari etc. Under growth observed in common are *Clerodendron viscosum, Cycas ciricinalis, Helicteres isora, Indigofera pulchella, Eupatorium odoratum and Andrographis paniculata* etc. The climbers observed in common are *Milletia auriculata, Combretum decandrum, Bauhinia vahlii, Smilax macrophylla and Mimosa himalayana* etc.

Lower fringes of the hills and the valleys over the tract of Forest lands in Phulbani, Phiringia and G.Udaygiri Forest Ranges come under this type of forests. In these areas, the site is enriched with humus, adequate soil depth and adequate moisture. Growth of "Sal", the principal species is better and luxuriant. Sal is gregarious in nature along such sites.

This type is further Sub-divided into the following Sub-types, namely

3.1.4 3C/C2 Moist Peninsular High Level Sal:

3.1.4.1 Floristic Composition:-

This category of forests is observed in Ranipathar, Sudurukumpa, Donga, Palchi, Ladapadar, Gochhapadar, Burtang South and Tudubali Forest Blocks. Here, Sal is observed on crystalline rocks over the hill slopes covered with lateritic soil. Sal, in these forests can be put under site quality IV. The associates of Sal are *Anogeissus latifolia, Bridelia retusa, Emblica officinalis, Lagerstroemia parviflora, Madhuca indica, Ougeinia oojeinensis, Petrocarpus marsupium and Terminalia alata* etc. Undergrowth observed is *Indigofera pulchella, Phoenix acaulis and Woodfordia fruticosa*.

Salia Bamboo is observed in Donga, Ranipathar Palchi & Burtang South Blocks as Lower Storey associate. The common climbers are *Milletia auriculata, Combretum decandrum, Bauhinia vahli, Mimosa himalayana and Butea superba*.

3.1.5: 3C/C_2 Moist Peninsular Low Level Sal:

3.1.5.1 Floristic Composition:-

The crystalline rocks bearing the underlying deep layers of loamy soil are found on the lower hill slopes and the foothills. This condition maintains a good soil moisture regime and thereby, bears moist Sal forests. Adequate depth and richness of soil promote the growth of better quality Sal having site quality III / IV. Some more species variety are associated with Sal along the lower slopes Viz. *Adina cordifolia, Anogeissus latifolia, Buchanania latifolia, Cleistenthus collinus, Dalbergia latifolia, Dillenia pentagyna, Diospyros melanoxylon, Gmelina arborea, Lannea grandis, Pterocarpus marsupium, Schleichera oleosa, Terminalia alata, and Terminalia chebula*. The undergrowth observed is *Diospyros montana (along the nalas), Holarrhena antidysenterica, Nyctanthes arbortristis, Phoenix acaulis & Woodfordia fruticosa*. Baghnadi, Burtang North, Chakapada, Kalabagh & Khajuripada Forest Blocks bears these types of forests.

In these forests, *Dendrocalamus strictus* is found as under storey. Climbers commonly found in these forests are *Bauhinia vahlii, Butea superba, Combretum decandrum and Milletia auriculata.*

3.1.6: 3C/C2 Moist Peninsular Valley Sal:

3.1.6.1 Floristic Composition:-

These types of forest occur in the valley portions of Chakapada forest block. The soil is rich in humus with adequate moisture and good depth of loamy soil. Thus,

this forest boasts of good quality Sal, bearing site quality III. Adequate moisture and favourable conditions promote the growth of numerous associates of Sal viz. *Bridelia retusa, Careya arborea, Gmelina arborea, Lannea grandis, Mitragyna parviflora, Pongamia pinnata, Syzygium cuminii, Terminalia alata and Terminalia arjuna*. The undergrowth constitutes *Cleistenthus collinus, Eupatorium odoratum, Flemingia chhapper, Holarrhena antidysenterica, Indigofera pulchella and Lantana camara*. The Climbers observed in common are *Bauhinia vahlii, Combretum decandrum, Milletia auriculata and Smilax macrophylla.*

3.1.7:3C/C2 Moist Peninsular Valley Sal

3.1.7.1 Floristic Composition:-

These types of forests are confined to the Valley portions of Chakapada forest block of Tikabali Range. Soil is loamy, enriched with profuse deposits of humus and adequate soil moisture. Thus, the condition becomes congenial for the growth of Sal. The quality of sal is considered to be of Site quality III. The favorable locality factors indicate a wide range of associates of Sal, as *Bridelia retusa, Careya arborea, Gmelina arborea, Lannea grandis, Mitragyna parviflora, Pongamia pinnata, Syzygium cumini, Terminalia alata, Terminalia arjuna and Trewia nudiflora.* The undergrowth observed is *Cleistenthus collinus, Eupatorium odoratum, Flemingia chhapper, Holarrhena antidysenterica, Indigofera pulchella and Lantana camara*. The Climbers observed in common are *Bauhinia vahlii, Combretum decandrum, Milletia auriculata and Smilax macrophylla.*

3.1.8: 3C/C3 Moist Mixed Deciduous Forest

3.1.8.1 Floristic Composition

Major chunk of this type of forests comprises the upper slopes and tops of the hills especially in Ranipathar, Donga and Sudurkumpa forest blocks of Phulbani Division. Due to excessive drainage, the status of plant-nutrients and soil-moisture regime is low (poor). Thus the site quality of Sal is poor. At places, Sal is scanty or totally absent. This condition leads to the predominance of miscellaneous species like Asan, Dhaura, Kurum, Mahula, Sidha and Sirish etc. The undergrowth observed in common is *Eupatorium, Holarrhena, Lantana, Mimosa and Phoenix* etc. At places,

Dendrocalamus strictus have come up gregariously. Common climbers are *Butea superba, Combretum decandrum, Milletia auriculata and Ichnocarpus frutescens* etc.

3.1.9: 5B North Tropical Dry Deciduos Forests:

Such forests are confined to shallow soil containing poor plant-nutrient and low soil-moisture status.

These forests occur only in Karada forest range of Phulbani Division. This type is furthersubdivided into:

5B/CIC- Dry Peninsular Sal Forests & 5B/C2C- Dry Mixed Deciduous Forests

3.1.10 5B/CIC- Dry Peninsular Sal Forests:

3.1.10.1 Floristic Composition

This type of forests is found in Baraba, Machhghat and Ranaba Forest Blocks of Karada Range. Parent rocks are metamorphic. On weathering, these rocks have disintegrated into crystalline granules and porous soil bearing low-water-retaining Capacity. Thus, the Soil moisture regime is low and bears unfavorable condition for growth and development of Sal. Site quality of Sal is variable between Quality III/IV. But, the regeneration of Sal is reasonably fair. This is feasible because occurrence of such forests is confined to plain areas and lower fringes of the hills. The rate of growth of Sal is impeded due to unfavorable conditions. The top storeys as well as middle storey associates of Sal are Asan, Bandhan, Bija, Kasi, Kurum, Mahul, Mundi, and Salia Bamboos respectively. The undergrowth observed *is Diospyros embryopteris* (along the nalas), *Helicteres isora, Holarrhena antidysenterica and Indigofera pulchella*. The climbers observed in common are *Bauhinia vahlii, Combretum decandrum and Smilax macrophylla.*

3.1.11: 5B/C2C. Dry Mixed Deciduous Forests:

3.1.11 Floristic Composition

The upper hills of Baraba, Machhghat and Ranaba forest blocks of Karada Range bear such forests. Poor and shallow soils are not congenial for the growth of Sal.Hence, Sal is almost absent.Dry nature of species like *Anogeissus latifolia, Cleistenthus collinus, Emblica officinalis, Lagerstroemia parviflora and Mitragyna parviflora* are present. *Terminalia alata* occurs in the lower fringe of such forests. Undergrowth observed is *Holarrhena, Ixora* and *Mimosa* species. Climbers found along such forests are *Combretum decandrum & Milletia auriculata.*

3.1.12: 5B/E9. Dry Bamboo Brakes:

In some pockets bamboos occur gregariously and at places they occur sporadically. In Donga RF, sporadic flowering has taken place especially in compartment No6.

3.2. Plants Species diversity

The data collected during sample point enumeration (UID) such as number of individuals of each species and the DBH of each tree are utilized to derive secondary attributes like basal area (BA, 32/ha), density (D, tree per ha) and frequency (F, no of quadrates where trees are present in relation to total plots observed). Relative values of BA, D and F has been calculated. Importance Value Index (IVI) has been calculated by adding up Relative Basal Area (RBAF), Relative Density (RD) and Relative Frequency (RF). However, in case of shrubs & herbs, the IVI is calculated on the basis of Relative Values, i.e. Relative Frequency and Relative Density. It is assumed that the dominance of a species increases with an increasing importance value and that the species with lowest importance value is the lowest dominant one. The maximum value IVI value is 300 (100 each for RBA, RD and RF). The following formula is used for calculation of IVI value.

Density of species = $\frac{\text{Total No. of individuals of a species}}{\text{Total area of quadrates studied}}$

Frequency of a species (%) $= \frac{\text{No. of quadrates in which a species occurs X 100}}{\text{Total Number of quadrates studied.}}$

Relative Density $= \frac{\text{Density of a speciesX100}}{\text{Total density of all species}}$

Relative Frequency $= \frac{\text{Frequency of a speciesX100}}{\text{Sum of frequencies of all species}}$

Relative basal area of species $= \frac{\text{Total basal area of a speciesX100}}{\text{Total basal area of all species}}$

IVI = RD+RF+RBAF

N.B: Biodiversity assessment of Forest Blocks is furnished as **Annexure- IX**

3.2.1 Principles of Biodiversity Index Calculation:

A **diversity index** (also called **phylogenetic or Simpson's Diversity Index**) is a quantitative measure that reflects how many different types (such as species) there are in a dataset (a community) and that can simultaneously take into

account the phylogenetic relations among the individuals distributed among those types, such as richness, divergence or evenness. These indices are statistically representations of biodiversity in different aspects (richness, evenness and dominance).

Richness *R* simply quantifies how many different types the dataset of interest contains. For example, species richness (usually noted *S*) of a dataset is the number of different species in the corresponding species list. Richness is a simple measure, so it has been a popular diversity index in ecology, where abundance data are often not available for the datasets of interest. Because richness does not take the abundances of the types into account, it is not the same thing as diversity, which does take abundances into account. However, if true diversity is calculated with $q = 0$, the effective number of types (^0D) equals the actual number of types (R).

3.2.2 Shannon Index:

The Shannon index has been a popular diversity index in the ecological literature, where it is also known as Shannon's diversity index, the Shannon–Wiener index, the Shannon–Weaver index and the Shannon entropy. The measure was originally proposed by Claude Shannon to quantify the entropy (uncertainty or information content) in strings of text. The idea is that the more different letters there are, and the more equal their proportional abundances in the string of interest, the more difficult it is to correctly predict which letter will be the next one in the string. The Shannon entropy quantifies the uncertainty (entropy or degree of surprise) associated with this prediction. It is most often calculated as follows:

$$\mathbf{H' = - \Sigma\, p_i \ln p_i}$$

Where p_i is the proportion of characters belonging to the i^{th} type of letter in the string of interest. In ecology, p_i is often the proportion of individuals belonging to the i^{th} species in the dataset of interest. Then the Shannon entropy quantifies the uncertainty in predicting the species identity of an individual that is taken at random from the dataset.

Although the equation is here written with natural logarithms, the base of the logarithm used when calculating the Shannon entropy can be chosen freely. Shannon himself discussed logarithm bases 2, 10 and e, and these have since become the most popular bases in applications that use the Shannon entropy. Each log base corresponds to a different measurement unit, which have been called binary digits (bits), decimal digits (decits) and natural digits (nats) for the bases 2, 10 and e,

respectively. Comparing Shannon entropy values that were originally calculated with different log bases requires converting them to the same log base: change from the base *a* to base *b* is obtained with multiplication by $\log_b a$.

It has been shown that the Shannon index is based on the weighted geometric mean of the proportional abundances of the types, and that it equals the logarithm of true diversity as calculated with q = 1:

$$H' = -\sum_{i=1}^{R} p_i \ln p_i = -\sum_{i=1}^{R} \ln p_i^{p_i}$$

This can also be written

$$H' = -(\ln p_1^{p_1} + \ln p_2^{p_2} + \ln p_3^{p_3} + \cdots + \ln p_R^{p_R})$$

which equals

$$H' = -\ln p_1^{p_1} p_2^{p_2} p_3^{p_3} \cdots p_R^{p_R} = \ln\left(\frac{1}{p_1^{p_1} p_2^{p_2} p_3^{p_3} \cdots p_R^{p_R}}\right) = \ln\left(\frac{1}{\prod_{i-1}^{R} p_i^{p_i}}\right)$$

Since the sum of the p_i values equals unity by definition, the denominator equals the weighted geometric mean of the p_i values, with the p_i values themselves being used as the weights (exponents in the equation). The term within the parentheses hence equals true diversity ${}^1D$, and H' equals ln (${}^1D$).

When all types in the dataset of interest are equally common, all p_i values equal to 1 / *R*, and the Shannon index hence takes the value ln(*R*). The more unequal the abundances of the types, the larger is the weighted geometric mean of the p_i values, and the smaller the corresponding Shannon entropy. If practically all abundance is concentrated to one type, and the other types are very rare (even if there are many of them), Shannon entropy approaches zero. When there is only one type in the dataset, Shannon entropy exactly equals zero (there is no uncertainty in predicting the type of the next randomly chosen entity).

3.2.3 Rényi entropy:

The Rényi entropy is a generalization of the Shannon entropy to other values of *q* than unity. It can be expressed:

$$ {}^{q}H = \frac{1}{1-q} \ln\left(\sum_{i=1}^{R} p_i^q\right) $$

which equals

$$ {}^{q}H = \ln\left(\frac{1}{\sqrt[q-1]{\sum_{i=1}^{R} p_i p_i^{q-1}}}\right) = \ln({}^{q}D) $$

This means that taking the logarithm of true diversity based on any value of *q* gives the Rényi entropy corresponding to the same value of *q*.

3.2.4 Simpson Index:

The Simpson index was introduced in 1949 by Edward H. Simpson to measure the degree of concentration when individuals are classified into types. The same index was rediscovered by Orris C. Herfindahl in 1950.The square root of the index had already been introduced in 1945 by the economist Albert O. Hirschman.As a result, the same measure is usually known as the Simpson index in ecology, and as the Herfindahl index or the Herfindahl–Hirschman index (HHI) in economics.

The measure equals the probability that two entities taken at random from the dataset of interest represent the same type. It equals:

$$ \lambda = \sum_{i=1}^{R} p_i^2, $$

Where *R* is the richness i.e. the total number of types in the dataset. This equation is also equal to the weighted arithmetic mean of the proportional abundances *p*of the types of interest, with the proportional abundances themselves being used as the weights. Proportional abundances are by definition constrained to values between zero and unity, but it is a weighted arithmetic mean, hence $\lambda \geq 1/R$, which is reached when all types are equally abundant.

By comparing the equation used to calculate λ with the equations used to calculate true diversity, it can be seen that 1/λ equals ${}^{2}D$, i.e. true diversity as calculated with $q = 2$. The original Simpson's index hence equals the corresponding basic sum.

The interpretation of λ as the probability that two entities taken at random from the dataset of interest represent the same type assumes that the first entity is replaced to the dataset before taking the second entity. If the dataset is very large, sampling without replacement gives approximately the same result, but in small datasets the difference can be substantial. If the dataset is small, and sampling without replacement is assumed, the probability of obtaining the same type with both random draws is:

$$\ell = \frac{\sum_{i=1}^{R} n_i(n_i - 1)}{N(N-1)}$$

Where n_i is the number of entities belonging to the ith type and N is the total number of entities in the dataset. This form of the Simpson index is also known as the Hunter–Gaston index in microbiology.

Since mean proportional abundance of the type's increases with decreasing number of types and increasing abundance of the most abundant type, λ obtains small values in datasets of high diversity and large values in datasets of low diversity. This is counterintuitive behaviour for a diversity index, so often such transformations of λ that increase with increasing diversity have been used instead. The most popular of such indices have been the inverse Simpson index (1/λ) and the Gini–Simpson index (1 − λ).[Both of these have also been called the Simpson index in the ecological literature, so care is needed to avoid accidentally comparing the different indices as if they were the same.

3.2.5 Inverse Simpson index

The inverse Simpson index equals:

$$\frac{1}{\lambda} = \frac{1}{\sum_{i=1}^{R} p_i^2} = {}^2D$$

This simply equals true diversity of order 2, i.e. the effective number of types that is obtained when the weighted arithmetic mean is used to quantify average proportional abundance of types in the dataset of interest.

The index is also as a measure of the effective number of parties.

3.2.6 Gini–Simpson index:

The original Simpson index λ equals the probability that two entities taken at random from the dataset of interest (with replacement) represent the same type. Its

transformation 1 − λ therefore equals the probability that the two entities represent different types. This measure is also known in ecology as the probability of inter-specific encounter (*PIE*) and the Gini–Simpson index. It can be expressed as a transformation of true diversity of order 2:

The Gibbs–Martin index of sociology, psychology and management studies,which is also known as the Blau index, is the same measure as the Gini–Simpson index.

The quantity is also known as the expected heterozygosity in population genetics.

3.2.7 Berger- Parker Index:

The Berger–Parkerindex equals the maximum $p_i$value in the dataset, i.e. the proportional abundance of the most abundant type. This corresponds to the weighted generalized mean of the $p_i$values when q approaches infinity, and hence equals the inverse of true diversity of order infinity ($1/^{\infty}D$).

3.2.8 Effective number of Species or Hill numbers:

When diversity indices are used in ecology, the types of interest are usually species, but they can also be other categories, such as genera, families, functional types or haplotypes. The entities of interest are usually individual plants or animals, and the measure of abundance can be, for example, number of individuals, biomass or coverage. In demography, the entities of interest can be people, and the types of interest various demographic groups. In information science, the entities can be characters and the types the different letters of the alphabet. The most commonly used diversity indices are simple transformations of the effective number of types (also known as 'true diversity'), but each diversity index can also be interpreted in its own right as a measure corresponding to some real phenomenon (but a different one for each diversity index).

Many indices only account for categorical diversity between subjects or entities. Such indices however do not account for the total variation (diversity) that can be held between subjects or entities which occurs only when both categorical and qualitative diversity are calculated.

True diversity, or the effective number of types, refers to the number of equally abundant types needed for the average proportional abundance of the types to equal that observed in the dataset of interest (where all types may not be equally abundant). The true diversity in a dataset is calculated by first taking the weighted

generalized mean M_{q-1} of the proportional abundances of the types in the dataset, and then taking the reciprocal of this. The equation is:

$$ {}^qD = \frac{1}{M_{q-1}} = \frac{1}{\sqrt[q-1]{\sum_{i=1}^{R} p_i p_i^{q-1}}} = \left(\sum_{i=1}^{R} p_i^q \right)^{1/(1-q)} $$

The denominator M_{q-1} equals the average proportional abundance of the types in the dataset as calculated with the weighted generalized mean with exponent q-1. In the equation, R is richness (the total number of types in the dataset), and the proportional abundance of the ith type is p_i. The proportional abundances themselves are used as the nominal weights. The numbers are called **Hill numbers of order q** or **effective number of species**.

When q = 1, the above equation is undefined. However, the mathematical limit as q approaches 1 is well defined and the corresponding diversity is calculated with the following equation:

$$ {}^1D = \frac{1}{\prod_{i=1}^{R} p_i^{p_i}} = \exp\left(-\sum_{i=1}^{R} p_i \ln(p_i) \right) $$

Which is the exponential of the Shannon entropy calculated with natural logarithms (see above). In other domains, this statistic is also known as the *perplexity*.

The value of q is often referred to as the order of the diversity. It defines the sensitivity of the diversity value to rare vs. abundant species by modifying how the weighted mean of the species proportional abundances is calculated. With some values of the parameter q, the value of M_{q-1} assumes familiar kinds of weighted mean as special cases. In particular, q =0 corresponds to the weighted harmonic mean, q = 1 to the weighted geometric mean and q =2 to the weighted arithmetic mean. As q approaches infinity, the weighted generalized mean with exponent q–1 approaches the maximum p_i value, which is the proportional abundance of the most abundant species in the dataset. Generally, increasing the value of q increases the effective weight given to the most abundant species. This leads to obtaining a larger M_{q-1} value and a smaller true diversity (^qD) value with increasing q.

When q =1, the weighted geometric mean of the p_i values is used, and each species is exactly weighted by its proportional abundance (in the weighted geometric

mean, the weights are the exponents). When q >1, the weight given to abundant species is exaggerated, and when q <1, the weightis given to rare species. At q =0, the species weights exactly cancel out the species proportional abundances, such that the weighted mean of the $p_i$values equals 1/R even when all species are not equally abundant. At q =0, the effective number of species, ${}^0D$, hence equals the actual number of species R. In the context of diversity, q is generally limited to non-negative values. This is because negative values of q would give rare species so much more weight than abundant ones that ${}^qD$ would exceed R. The general equation of diversity is often written in the form

$$ {}^qD = \left(\sum_{i=1}^{R} p_i^q \right)^{1/(1-q)} $$

3.2.9 Methods adopted to calculate Bio diversity:

There are seven Ranges in the division. Each Range is taken as strata. There are 1062 Sample plots of 0.1 ha (31.62 m Sq) in each range.Five sample points taken from Raikia, G.Udayagiri, Phiringia and Tikabali Ranges and four points from Sudrukumpa and six points from Phulbani Range.(total -35 sample point) data have been analysed for Bio Diversity index) to find out Shannon-Weiner Species Diversity Index, Evenness Index, Index of Dominance using the formula furnished below.

A) Shannon-Weiner Species Diversity Index has been calculated as per the following expression:

$$ \overline{H} = -\sum \frac{n}{N} \log_e \frac{n}{N} $$

where,

$\overline{H}$=Shannon-Weiner Species Diversity Index

n = No. of individuals per species

N = Total number of individuals of all species

B) Evenness Index has been calculated by the following expression:

$$ \mathbf{c} = \sum \left(\frac{n}{N} \right)^2 $$

Where,

c = Index of Dominance

n = No. of individuals per species

N = Total number of individuals of all species

Table No 3.1 Bio Diversity Index for different Sample points.

Sl. No.	Name of Range	Sample Point no	Name of Forest Block	Shannon-Weiner SDI	Evenness Index	Index of Dominance	Simpson index	Inverse Simpson index
1	Raikia	170	Bakingia PRF,C-1	1.04	0.947	0.375	0.375	2.667
2	Raikia	1024	Dipari RF	2.39	5.94	0.099	0.099	10.10
3	Raikia	202	Ganjuguda PRF, GANGU-A1	2.03	4.20	0.140	0.14	7.14
4	Raikia	112	Karada PRF	1.68	3.01	0.205	0.205	4.88
5	Raikia	1034	Lenrukira RF, C-1	1.32	2.74	0.427	0.427	2.34
6	G.Udaygiri	1000	Bakingia PRF	0.50	0.28	0.801	0.801	1.25
7	G.Udaygiri	993	Baliapata RF	1.94	0.68	0.270	0.27	3.70
8	G.Udaygiri	934	Bhanjapadara PRF	2.01	0.87	0.180	0.18	5.56
9	G.Udaygiri	1021	Dakapala RF &Lingagada beat	1.96	0.94	0.156	0.156	6.41
10	G.Udaygiri	1029	Gidipabali RF &Lingagada Beat	2.39	0.86	0.137	0.137	7.30
11	Karada	121	Badagada beat,C-1	1.77	0.81	0.252	0.252	3.97
12	Karada	1201	Baraba RF, C-5	0.78	0.48	0.650	0.65	1.54
13	Karada	1163	Machhaghat RF,C-04	2.05	0.82	0.174	0.174	5.75
14	Karada	229	Nandabali PRF/ Dangesi,C-02	2.21	0.92	0.128	0.128	7.81
15	Karada	1160	Ranaba RF,C-02	1.38	0.86	0.302	0.302	3.31
16	Phiringia	427	Baghanadi RF/Luisingh	2.36	0.82	0.150	0.15	6.67
17	Phiringia	503	Balandapada North PRF	1.84	0.84	0.189	0.189	5.29
18	Phiringia	554	Balandapada South PRF, C-02	1.97	0.77	0.188	0.188	5.32
19	Phiringia	709	Bandhagad A PRF, BND-2	2.02	0.84	0.173	0.173	5.78
20	Phiringia	718	Phiringia RF,C-01	2.20	0.96	0.124	0.124	8.06
21	Tikabali	3	Baradakhol/Arachangi RF	2.40	0.97	0.099	0.099	10.10
22	Tikabali	835	Burtanga (S)-RF	1.02	0.63	0.488	0.488	2.05
23	Tikabali	120	Chakapad RF/Gasamaha	2.02	0.84	0.178	0.178	5.62
24	Tikabali	210	Ghudukapadar R.F/Chakapad	1.94	0.84	0.191	0.191	5.24
25	Tikabali	147	Gatiguda RF	1.55	0.96	0.223	0.223	4.48
26	Sudurkumpa	1	Donga RF	2.60	0.94	0.087	0.087	11.49
27	Sudurkumpa	412	Ranipathar RF	2.11	0.88	0.145	0.145	6.90
28	Sudurkumpa	508	Sudreju RF	1.97	0.79	0.209	0.209	4.78

29	Sudurkumpa	396	Sudurkumpa RF , C-8	2.31	0.93	0.118	0.118	8.47
30	Phulbani	609	Balaskumpa RF	1.50	0.77	0.315	0.315	3.17
31	Phulbani	87	Bhaliapada RF	1.90	0.83	0.199	0.199	5.03
32	Phulbani	527	Dadaki RF	1.69	0.77	0.252	0.252	3.97
33	Phulbani	559	Dutipada RF	1.71	0.82	0.247	0.247	4.05
34	Phulbani	325	Kalabag RF	2.24	0.90	0.126	0.126	7.94
35	Phulbani	73	Panaspadar PRF	1.59	0.72	0.326	0.326	3.07

3.3 Status of biodiversity conservation in forests

3.3.1 Biological diversity or biodiversity is the variety of all life forms in earth. Its complexities are measured in terms of variation at genetic, species and ecosystem levels. The totality of genes, species and ecosystem of a region makes up the vital natural resource and a reduction in its frequency constitutes a loss of biodiversity.

3.3.2 No systematic scientific study has been carried out in the past in the forests of Phulbani Forest Division regarding the diversity of life forms. The natural forests possess myriad of living organisms that are inter-dependent for their survival. So depletion of any one species will adversely affect the population of other species. Present management of forests is aimed at maintaining this symbiotic relationship. In the previous working plan an attempt has been made to study the species richness of different flora. Therefore, it is more appropriate to say it Floristic Diversity instead of Bio diversity.

3.3.3 The earlier concept of forest management was revenue or rather timber oriented. In the recent past floristic diversity management has also been given weightage in the forestry planning and management. With better understanding of interdependence of species, floristic diversity importance has been realized of late. Now each and every tree, herb, shrub, climber, fungi, algae etc are equally weighted for the scientific research to prove it to be indispensable for the benefit of mankind. Hence emphasis has been laid on the floristic diversity studies in this Plan.

3.3.4 Method of Studies :-The division has been allotted 1062 sample points by ORSAC where the 0.1 ha sample plots has to be laid and the enumeration data has to be collected. Further the data related to carbon stock store in the forests has also to be obtained from these plots. Each sample plots location is give with their GPS location and Unique identification Number (UID). They are numbered from 01 to 1062. However the total is only 1062 as some of the intermediate number were deleted. The number allotted in each range is as follows.

Table No.-3.2 Information on sample points.		
Sl. No.	**Range**	**No. of Sample Plots**
1	Phiringia	291
2	Tikabali	190
3	Sudrukumpa	158
4	Phulbani	137
5	Karada	110
6	Raikia	92
7	G.Udayagiri	84
	Total	**1062**

3.4 Status of species prone to over exploitation

Phulbani Forest Division has medicine plants of importance which were subject to over exploitation. Important among them were Lodha, Medha, Amla, Bhuin neem, Patalgaruda, Gandhana, Madhabilata, Sambarsingha etc. All species are to be given equal importance for conservation of species biodiversity and development of the forest. The emphasis of management is on conservation of balanced forest in which the natural selection of the species will be encouraged. The fruit bearing and importance NTFP species such as Mahula, Amla, Chara, Kendu, Bahada, Harida, Siali and Bela will not be felled.

3.5 Conservation of genetic resources

Kalinga Research Garden, one of the oldest Research Garden of the Forest Department, was established in the year 1958 over an area of 37 ha. in Kalinga block of G.Udayagiri Range of Phulbani Forest Division. The area is situated at 701 meters above mean seal level between Latitude 20^0-09'-52"N and 84^0-09'-52"E.

3.5.1 Research Activities Undertaken:-

To meet the demand of pulp wood and fuel wood; Government of India had sponsored for taking up experiments on introduction of fast-growing exotic species since 1960. The exotics such as different species of Tropical pines, Eucalyptus were planted to study their growth behaviour and adaptability to this agro-climatic zone. Out of ten different species of Tropical pines and thirty different species of Eucalyptus, the following species like *Pinus kesiya, Inus carribaea, Pinus oocarpa, Eucalyptus hybrid, Eucalyptus saligna and Eucalyptus citriodora* have been found suitable for the locality.

Besides the above, some other exotics such as *Callitris glauca, C. Intertripica, Arauocaria sps, Agathis robusta, Simaruba glauca* have been tried successfully.

A large number of indigenous species with origin of different states of the country and also important species of Odisha were planted to study the growth behaviour. Out of these, the following species are promising in this area.

Swetenia mahagony, Swetenia macrophylla, Chukrasia tabularis, Cinamomum camphora, Mesua ferrea, Xylia xylocarpa, Dalbergia latifolia, Albizia procera, Dendrocalamus giganticous, Bambusa nutans and a number of medicinal herbs.

3.5.2 Trial of intercropping of economically important species:-

Experimental plantations were raised for growing coffee (*Coffea arabica*), Black pepper (*Pipernigrum*), Dalchini (*Cinamomum zeylanicum*) under the existing forest trees. The planting technique of these cash crops has been standardized.

Present status:-

- Though the planting technique of Tropical pines has been standardized but the species could not be multiplied due to environmental point of view. However, the Pine plantation can serve the purpose of Seed production area.
- This Research Garden with the planted exotics, important indigenous species and the natural flora can serve as an important gene bank to conserve the aesthetic value.

The Kalinga Research Range under Silviculture Division, Bhubaneswar is situated in Kandhmal District. The main purpose of the Range is to carry out the Forest Research Activities.

One bamboo setum was established during 2008-09. 252 Nos. Of Rhizomes were raised covering over an area of 0.5 ha.

3.5.3 Research Activities of 2018-19

1. Trial of Hill broom 1.0 ha.
2. Maintenance of Research station.
3. Collection of Black pepper and Cinnamon

3.5.4 Work proposed for development of Kalinga Research Garden.

1. Maintenance of Bamboo setum.
2. Maintenance and development of existing Coffee plantation with collection of Coffee beans for processing.
3. Maintenance of Research plots.
4. Maintenance of inspection path and setting up signboards.
5. Maintenance of Data regarding growth and adaptability of tried species.
6. Printing of booklet on Kalinga Research garden.

3.5.4.1. Bamboo setum

A Bamboo setum comprising of 22 Nos. of species have been established in Kalinga Research Garden over an area of 2.5 ha. Due to want of sufficient funds, maintenance work could not be taken up which is most essential for development of Bamboo clumps. An important variety of Bamboo giganteous has been established in the garden. It is proposed to propagate the above species for creation of future gene bank.

3.5.4.2. Black pepper (Piper nigrum)

There are 1280 Nos. of Black pepper climbers exist in this garden. These climbers are required to be maintained for production of Black Pepper, which can be supplied to Resources Survey Division for sale to the public.

3.5.4.3. Coffee (Coffea arabica)

It has been experimented that coffee is growing well in the local climatic condition. 200 nos. of coffee plants are existing in this garden, which are to be maintained. An area of 0.5 ha is proposed to take up Coffee plantation under the existing shade trees i.e. Sal forest in the garden.

3.5.4.4. Dalchini (Cinamomum zelyanicum)

Dalchini plantation over 1.25 ha. exists in this garden. The production of Dalchini could not be done due to lack of maintenance. Hence, maintenance needs to be done to have better production of Dalchini.

3.5.4.5. Research plots:-

The Research plots like Pine, Champa, Mahogany, Kangada etc. have been established. The Research plots are preserved for seed production area and germ-

plasma-bank. Proper maintenance like fire line tracing, staggered trenches, weeding, thinning etc are required to be taken up for proper establishment of the plots.

3.5.4.6. Maintenance of inspection path and signage:-

A good number of visitors are visiting the area in view of which maintenance of inspection path in between the trial plots need to be done every year.

3.6 Fauna and their habitats

3.6.1 General History:-

Nature has endowed Phulbani Forest Division with a great variety of flora and fauna in wilderness. The rich "Biodiversity" can be attributed to immense variety in physiography, undulating topography and climatic situations resulting in a diversity of ecological habitats. Importance of "wildlife" needs no elaboration as it has assumed its importance in our antiquity. We depend upon them for our basic existence. The interdependence of flora, fauna and micro-organism is well-known to mankind. Any change in the status of a particular species greatly influences other life forms and in turn the whole ecosystem and this delicate balancing needs to be maintained.

3.6.2. Mammals, Birds, Reptiles and Fishes :

3.6.2.1 Mammals (Class: Mammalia):-

They are warm blooded vertebrates (Homoiotherms) having four limbs (except for some aquatic species) and are distinguished from other "Chordates", as their females possess Mammary glands (milk secreting glands). This division sustains 'Mammalian Fauna', such as Elephants, Tigers, Leopards, Bears, Deer, Sambhars, as well as some other varieties of herbivores and carnivores.

3.6.2.2 Birds (Class: Aves):-

They are the members of the warm blooded (Homoiotherms), belonging to Vertebrate Class- 'Aves' and boasts of more than 10,000 species. They have a four chambered, like Mammalian heart. They respire through lungs and the lung capacity is increased by the presence of "Air Sacs" which are attached to them. Their fore limbs are modified into wings and hind limbs are meant for walking and perching. Female birds lay eggs (eggs with calcium containing shell) and all species incubate their eggs. The sense of sight is highly developed, but sense of smell (olfactory) is not very well developed. Birds are found worldwide in diversified habitats. Dietary preferences are variable. Humans use wild and domesticated birds and their eggs for

food and hunt wild birds for sports. Several 'Minor Irrigation Projects' have been taken up in this division for the purpose of 'Water-conservation and Irrigation'. These reservoirs are appropriate abode of "Avian Fauna" of both water birds and shore birds, along with the associated aquatic animals & plants.

3.6.2.3 Reptiles (Class: Reptilia):-

These vertebrates have exoskeleton made of scales and lay eggs outside and necessarily do not require water for fertilisation, as it is internal. They are cold blooded (Poikilotherms) and generally inhabit warmer regions. Most Reptiles have two pairs of pent dactyl (five digits) limbs, except snakes and some lizards. Heart is three chambered, except crocodile (it has four chambered heart- ventricle is incompletely divided into chambers). Respiration is by lungs only. Living reptiles include scaly reptiles such as snakes & lizards. Crocodiles & turtles are unique reptiles. During winter, reptiles undergo hibernation. Verities of kraits, vipers, Boas, Cobras, King Cobra and Pythons are mostly found in Sudrukumpa, Phiringia, Tikabali and Karada ranges respectively.

3.6.2.4 Fish (Class: Pisces):-

They are cold blooded "Vertebrates" (Poikilotherms) found throughout the world in fresh and brackish water. The body is generally tapering at both ends. Most species inhabit surface or mid water regions and are streamlined or are flattened on either side. Most bottom dwellers are flattened from top to bottom. Most species have paired fins. Skin is covered with bony or tooth like scales/plates and they respire through gills. They bear a swim bladder which is used to adjust swimming depth and maintain buoyancy. Most species lay eggs for their reproduction.

3.6.2.5 Habitats and micro habitats of flagship wild species

A wildlife habitat has four basic components, viz. Food, cover, water and space.

(a) Food:- Food is an essential pre-requisite for any organism. Food availability in a habitat changes with season. Herbivores depend on the plant material for their substance, whereas carnivores survive on the availability of prey animals. The quantity, quality and the spatial distribution of food are very important in a habit.

(b) Cover:- It can be considered as a variation seen in a habitat, which affords protection to animals from weather, predators by offering a better vantage point.

Various types of cover could be refuge cover, ambush cover, loafing cover breeding cover and roosting cover for birds.

(c) Water:- Water replenishment is essential for all wild animals. Presence of abundant food in a habitat is rendered useless, if water is not available in close proximity. A habitat becomes poor from the wildlife point of view if it is devoid of water source.

(d) Space:- Animals required physical space to live; its day to day requirements like procurement of food, water, cover and mates are met from this space.

3.6.2.6Microhabitats:

Habitat richness is dependent upon the size of the forest stands or the types of habitat which come together in the edge area. An edge is the place of contact between plant communities or successional stages. Habitat richness is also closely linked with the amount of contrast seen in an edge; more the contrast, greater will be the animal richness. Such a contrast can be very significant if an early successional stage is combined with a later one in a habitat. Snags are extremely important in wildlife management, since they are used by many wild animals in their day-to-day activity. Many species of fungi, Moses and lichens use decayed wood as substratum for growth; invertebrates use their space, which are present in between the bark and timber, as a habitat. Birds excavate cavities or use the existing ones for nesting, roosting or even perching. Mammals use them as dens or as escape cover; sometimes, they are also used by bats for their roosting. Each stage of snag succession is of importance to a particular wild animal in a habitat. The dead and down woody materials, on the floor of a forests, has many valuable functions in a wildlife habitat. The trunks of dead and down trees constitute a source of food for certain birds like wood-peckers; the branches may be used as perches by some birds, and in case they are hollow, these cavities are used for nesting purposes also by many arboreal species. The root portion is also used by many partridges for nesting; small vertebrates and invertebrates, use the space between the bark and woody material as a habitat. Many wild animals use the fallen logs for a number of purposes; generally they take shelter as hiding cover or sometimes, use them as sites for feeding or reproduction. Some wildlife habitats are unique in the sense they are constituted by certain geomorphic features, apart from plant communities. These unique habitats are usually constituted by cliffs, talus and caves. Cliffs provide considerable physical protection and concentrate a large number of birds, reptiles and mammals. If a cliff is

located at a considerable height, it is considered a more suitable. Many fissures may be used by bats for roosting, reproduction or hibernation. Shallow caves are used by many animals mammals; many carnivores, including tiger use such caves as dens for shelter and reproduction; lizards and snakes also prefer them for the purpose for shelter and hibernation and feeding. These features get an added value if they are in the close vicinity of a permanent water source. Many raptorial birds depend on the presence of cliffs for their survival. Caves provide total darkness. Some bats survive because of the presence of caves, which serve as their breeding habitat. Large concentration of vertebrates are seen in the talus and they include snakes, birds and small mammals. A talus should be sufficiently large to provide enough living space for the animals which occupy it; it should also have considerable depth, because some animals may prefer to move down while seeking the right conditions of humidity and temperature. Low- land riparian forest site that harbour diverse avian fauna, constitutes an important bird habitat.

3.6.2.7. Availability of wild fauna forest block wise

Table No. 3.3 Availability of WildFaunaForest Block Wise			
PhulbaniRange			
Sl. No.	**Name of the R.F/PRF.**	**Common wild fauna available**	
1	Balaskumpa R.F.	Mammals	Barking deer, Bear, Jackal, Fox, Hare
		Birds	Common green pigeon or Harada, Koili, Kapota, Kajalapati, Kundakhai, Baya
		Reptiles	Godhi, Russells Viper
2	Bhaliapada R.F.	Mammals	Barking deer, Bear, Jackal, Fox, Hare
		Birds	Common green pigeon or Harada, Koili, Kapota, Kajalapati, Kundakhai, Baya
		Reptiles	Godhi, Russells Viper
3	Burtang (N) R.F.	Mammals	Elephant, Leopard, Barking deer, Wild boar, Fox, Jackal, Monkey (Rhesus and Bonnet), Porcupine, Bear, Mouse deer, Hare, Indian Flying Squirrel
		Birds	Common green pigeon, Red and Grey jungle fowl, Hill Myna, Parrot, Koili, Kumbhatua.
		Reptiles	Python, Russells viper, Common krait, Banded krait, King Cobra
4	Khajuripada R.F.	Mammals	Elephant, Leopard, Barking deer, Wild boar, Fox, Jackal, Monkey (Rhesus and Bonnet), Porcupine, Bear, Mouse deer, Hare, Indian Flying Squirrel
		Birds	Common green pigeon, Red and Grey jungle fowl, Hill Myna, Parrot, Koili, Kumbhatua.
		Reptiles	Python, Russells viper, Common krait, Banded krait, King Cobra
5	Dakapalla 'A' R.F.	Mammals	Fox, Jackal, Barking deer, Bear, Hare, Monkey
		Birds	Koili, Baya, Kajalapati
		Reptiles	Russells viper
6	Dakapalla 'B' R.F.	Mammals	Fox, Jackal, Barking deer, Bear, Hare, Monkey
		Birds	Koili, Baya, Kajalapati

		Reptiles	Russells viper
7	Dutimendi R.F.	Mammals	Barking deer, Fox, Jackal, Bear, Hare, Monkey
		Birds	Koili, Red and Grey Jungle Fowl, Kumbhatua
		Reptiles	Russells viper, Godhi
8	Ghuglasahi R.F.	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Baya, Bani, Koili, Kajalapati
		Reptiles	Russells viper, Godhi, Gachha endua, House lizzard
9	Muskuli R.F.	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Baya, Bani, Koili, Kajalapati
		Reptiles	Russells viper, Godhi, Gachha endua, House lizzard
10	Pandrisuka R.F.	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Baya, Bani, Koili, Kajalapati
		Reptiles	Russells viper, Godhi, Gachha endua, House lizzard
11	Khaumunda R.F.	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Baya, Bani, Koili, Kajalapati
		Reptiles	Russells viper, Godhi, Gachha endua, House lizzard
12	Kalamuri R.F.	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Baya, Bani, Koili, Kajalapati
		Reptiles	Russells viper, Godhi, Gachha endua, House lizzard
13	Phulbani PRF	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Baya, Bani, Koili, Kajalapati
		Reptiles	Russells viper, Godhi, Gachha endua, House lizzard
14	Pilasalunki (E) R.F.	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Baya, Bani, Koili, Kajalapati
		Reptiles	Russells viper, Godhi, Gachha endua, House lizzard
15	Pilasalunki (W)R.F.	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Baya, Bani, Koili, Kajalapati
		Reptiles	Russells viper, Godhi, Gachha endua, House lizzard
16	Ganjuguda 'B' PRF	Mammals	Elephant, Leopard, wild boar, Barking deer, Hyena, Monkey, Bear, Porcupine, Indian Flying Squirrel
		Birds	Red and Grey Jungle Fowl, Kumbhatua, Hill Myna
		Reptiles	Python, King endua, Russells viper, Common krait, Banded Krait
17	Gumagarh R.F.	Mammals	Fox, Jackal, Hare, Monkey, Leopard
		Birds	Red and Grey Jungle Fowl, Kumbhatua, Hill Myna
		Reptiles	Python, King cobra, Russells viper, Common krait, Banded krait.
SudrukumpaRange			
18	Donga R.F.	Mammals	Leopard, Tiger, Barking deer, Sambar, Bison, Pangolin, Monkey (Rhesus and Bonnet), Fox, Jackal, Mouse deer, Jungle cat, Wild boar, Hare, Porcupine, Bear
		Birds	Hill Myna, Peacock, Kantiabaga, Eagle, Green pigeon, Kumbhatua, Baramasi, Red and Grey Jungle Fowl
		Reptiles	Python, King cobra, Russells viper, Common krait, Banded krait

19	Ranipathar R.F.	Mammals	Leopard, Tiger, Barking deer, Sambar, Bison, Pangolin, Monkey (Rhesus and Bonnet), Fox, Jackal, Mouse deer, Jungle cat, Wild boar, Hare, Porcupine, Bear
		Birds	Hill Myna, Peacock, Kantiabaga, Eagle, Green pigeon, Kumbhatua, Baramasi, Red and Grey Jungle Fowl
		Reptiles	Python, King cobra, Russells viper, Common krait, Banded krait
20	Sudrukumpa R.F.	Mammals	Elephant, Leopard, Tiger, Barking deer, Sambar, Bison, Pangolin, Monkey (Rhesus and Bonnet), Fox, Jackal, Mouse deer, Jungle cat, Wild boar, Hare, Porcupine, Bear
		Birds	Hill Myna, Peacock, Kantiabaga, Eagle, Green pigeon, Kumbhatua, Baramasi, Red and Grey Jungle Fowl
		Reptiles	Python, King cobra, Russells viper, Common krait, Banded krait
21	Sudreju R.F.	Mammals	Fox, Jackal, Hare, Monkey
		Birds	Red and Grey Jungle Fowl
		Reptiles	Russells viper, Common krait, Banded krait, Gachha endua, House lizard
TikabaliRange			
22	Archangi 'A' R.F.	Mammals	Leopard, Barking deer, Bear, Monkey, Fox, Jackal, Elephant, Porcupine, Wild buffaloes, Wild boar, Mouse deer, Jungle Cat, Hare
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhamana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
23	Archangi 'B' R.F.	Mammals	Leopard, Barking deer, Bear, Monkey, Fox, Jackal, Elephant, Porcupine, Wild buffaloes, Wild boar, Mouse deer, Jungle Cat, Hare
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhomana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
24	Burtang 'S' R.F.	Mammals	Leopard, Barking deer, Bear, Monkey, Fox, Jackal, Elephant, Porcupine, Wild buffaloes, Wild boar, Mouse deer, Jungle Cat, Hare
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhamana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
25	Chakapad R.F.	Mammals	Leopard, Barking deer, Bear, Monkey, Fox, Jackal, Elephant, Porcupine, Wild buffaloes, Wild boar, Mouse deer, Jungle Cat, Hare
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhamana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
26	Nandini 'A' PRF	Mammals	Bear, Monkey, Wild boar, Barking deer, Elephant,

			Hare
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhamana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
27	Nandini 'B' PRF	Mammals	Bear, Monkey, Wild boar, Barking deer, Elephant, Hare
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhamana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
28	Baridikia PRF	Mammals	Bear, Monkey, Wild boar, Barking deer, Elephant, Hare
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhamana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
29	Mundula PRF	Mammals	Bear, Monkey, Wild boar, Barking deer, Hare
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhamana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
30	Ghudukapadar R.F.	Mammals	Bear, Monkey, Wild boar, Barking deer, Hare, Leopard
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Python, King cobra, Common krait, Banded krait, Endua, Dhamana sapa, Godhi, Naga sapa, Boda sapa, Champeineul, Telia sapa, Dhanda sapa.
31	Linepada R.F.	Mammals	Wild boar, Barking deer, Bear, Jackal, Hare, Fox, Monkey
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Russells viper, Common krait
32	Shankarakhol R.F	Mammals	Wild boar, Barking deer, Bear, Jackal, Hare, Fox, Monkey
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Russells viper, Common krait
33	Beheragaon PRF	Mammals	Wild boar, Barking deer, Bear, Jackal, Hare, Fox, Monkey
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Russells viper, Common krait
34	Tudipaju PRF	Mammals	Wild boar, Barking deer, Bear, Jackal, Hare, Fox, Monkey
		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Russells viper, Common krait
35	Ragaguda PRF	Mammals	Wild boar, Barking deer, Bear, Jackal, Hare, Fox, Monkey

		Birds	Red and Grey Jungle Fowl, Common green pigeon, Kumbhatua
		Reptiles	Russells viper, Common krait
36	Tikabali R.F.	Mammals	Fox, Jackal
		Birds	Koili, Haladibasanta, Baya, Bani
		Reptiles	Gachha endua, House lizard, Scorpion
37	Budukakhol PRF	Mammals	Elephant, Wild bear, Barking deer, Leopard, Hare, Monkey, Fox, Jackal
		Birds	Hill Myna, Gharchatia, Kumbhatua, Red and Grey Jungle Fowl
		Reptiles	Russells viper, Banded krait, Godhi, Gachha endua
RaikiaRange			
38	Raikia R.F.	Mammals	Barking deer, Jackal, Porcupine, Fox, Hare
		Birds	Hill Myna, Baya, Koili, Haladi basanta
		Reptiles	Russells viper, Common krait, Banded krait
39	Dibari R.F.	Mammals	Fox, Jackal
		Birds	Bani, Baya
		Reptiles	Gachha endua, Telia sapa, House lizard
40	Kilundi R.F.	Mammals	Barking deer, Fox, Jackal, Hare, Mouse deer
		Birds	Hill Myna, Bani, Koili, Haladibasanta
		Reptiles	Russells viper, Telia sapa, Gachha endua, Champeineul, Godhi, Boda sapa
41	Lendrikia R.F.	Mammals	Leopard, Barking deer, Wild buffaloes, Wild boar, Fox, Hare, Porcupine, Monkey
		Birds	Hill Myna, Red and Grey Jungle Fowl, Peacock, Kumbhatua
		Reptiles	Russells viper, King cobra, Common krait, Banded krait
42	Ganjuguda 'A' PRF	Mammals	Fox, Jackal, Squirrels, Mongoose
		Birds	Baramasi, Grey jungle fowl
		Reptiles	Godhi, Gachha endua, Kraits
43	Karada PRF	Mammals	Leopard, Barking deer, Wild buffaloes, Wild boar, Fox, Hare, Porcupine, Monkey
		Birds	Hill Myna, Red and Grey Jungle Fowl, Peacock, Kumbhatua
		Reptiles	Russells viper, King cobra, Common krait, Banded krait
44	Sikabadi PRF	Mammals	Leopard, Barking deer, Wild buffaloes, Wild boar, Fox, Hare, Porcupine, Monkey
		Birds	Hill Myna, Red and Grey Jungle Fowl, Peacock, Kumbhatua
		Reptiles	Russells viper, King cobra, Common krait, Banded krait
45	Manikeswar PRF	Mammals	Barking deer, Fox, Jackal
		Birds	Bani, Baya, Haladi basant, Koili
		Reptiles	Gachha endua, House lizard, Telia sapa, Dhamana sapa
KaradaRange			
46	Ranaba R.F.	Mammals	Leopard, Elephant, Sambar, Wild boar, Indian flying squirrel, Pangolin, Porcupine, Wild buffaloes, Barking deer, Monkey, Fox, Jackal, Jungle cat, Civet cat
		Birds	Hill Myna, Peacock, Eagle, Red and Grey Jungle Fowl, Kumbhatua, Gharchatia, Bats, Machharanka, Baramasi
		Reptiles	Python, Cobra, Tampa sapa, Russells viper,

			Common krait, Banded krait
47	Barba R.F.	Mammals	Leopard, Elephant, Sambar, Wild boar, Indian flying squirrel, Pangolin, Porcupine, Wild buffaloes, Barking deer, Monkey, Fox, Jackal, Jungle cat, Civet cat
		Birds	Hill Myna, Peacock, Eagle, Red and Grey Jungle Fowl, Kumbhatua, Gharchatia, Bats, Machharanka, Baramasi
		Reptiles	Python, Cobra, Tampa sapa, Russells viper, Common krait, Banded krait
48	Machhaghat R.F.	Mammals	Leopard, Elephant, Sambar, Wild boar, Indian flying squirrel, Pangolin, Porcupine, Wild buffaloes, Barking deer, Monkey, Fox, Jackal, Jungle cat, Civet cat
		Birds	Hill Myna, Peacock, Eagle Red and Grey Jungle Fowl, Kumbhatua, Gharchatia, Bats, Machharanka, Baramasi
		Reptiles	Python, Cobra, Tampa sapa, Russells viper, Common krait, Banded krait
49	Nandabali PRF	Mammals	Leopard, Elephant, Sambar, Wild boar, Indian flying squirrel, Pangolin, Porcupine, Wild buffaloes, Barking deer, Monkey, Fox, Jackal, Jungle cat, Civet cat
		Birds	Hill Myna, Peacock, Eagle, Red and Grey Jungle Fowl, Kumbhatua, Gharchatia, Bats, Machharanka, Baramasi
		Reptiles	Python, Cobra, Tampa sapa, Russells viper, Common krait, Banded krait
50	Badegarh PRF	Mammals	Leopard, Elephant, Sambar, Wild boar, Indian flying squirrel, Pangolin, Porcupine, Wild buffaloes, Barking deer, Monkey, Fox, Jackal, Jungle cat, Civet cat
		Birds	Hill Myna, Peacock, Eagle, Red and Grey Jungle Fowl, Kumbhatua, Gharchatia, Bats, Machharanka, Baramasi
		Reptiles	Python, Cobra, Tampa sapa, Russells viper, Common krait, Banded krait
G.UdayagiriRange			
51	Rotingia R.F.	Mammals	Rabbit, Rat, Jackal, Monkey, Mongoose, Bats, Indian flying squirrels
		Birds	Parakeet, Hill Myna, Kundakhai, Dove, Haladibasanta, Baramasi, Kantia baga, Owlet, Kumbhatua
		Reptiles	Krait, Godhi, Naga, House lizard, Endua
52	Kanabagedi R.F.	Mammals	Leopard, Hare, Jackals, Monkey, Mongoose, Jungle cat, Civet cat, Squirrels, Rats
		Birds	Parrots, Haladibasanta, Kajalapati, Kundakhai
		Reptiles	Krait, Chiti, Green Snakes, Lizards, Naga sapa, Dhanda sapa, Dhamana sapa, Godhi
53	Bakingia PRF	Mammals	Wild boar, Jackals, Jungle cat, Mongoose, Rats, Hare
		Birds	Koel, Kite, Bani, Dove, Green pigeon, Kundakhai, Baramasi, Parrot, Hill myna
		Reptiles	Common krait, Lizards, Godhi
54	Katingia PRF	Mammals	Wild Boar, Jackals, Mongoose, Hare, Indian Civet cat, Porcupine, Monkey, Hyena, Bear

		Birds	Dove, Kantiabaga, Bani, Haladibasanta, Baramasi, Grey Jungle fowl, Parrot
		Reptiles	Godhi, Telia sapa, Krait, Endua,
55	Dakapalla RF	Mammals	Wild Boar, Bear, Porcupine, Barking deer, Indian Civet cat, Rat, Mongoose, Monkey, Hare
		Birds	Red Jungle fowl, Hill Myna, Kantiabaga, Parrot
		Reptiles	Krait, Boda, Cobra, Godhi, Lizard, Telia sapa
56	Talarimaha PRF	Mammals	Wild boar, Mouse deer, Jackal, Fox, Jungle cat, Indian Porcupine, Hanuman monkey, Rats, Mongoose
		Birds	Red Jungle Fowl, Grey Jungle Fowl, Parrot, Cuckoo, Kundakhai, Kajalapati, Doves
		Reptiles	Cobra, Banded krait, Common krait, Dhamana, Godhi
57	Bhanjapadar PRF	Mammals	Hanuman monkey, Wild pigs, Jackal, Fox, Rats, Mongoose, Mouse deer, Hare,
		Birds	Kajalapati, Hill myna, Bani, Kantiabaga, Eagle, Koel, Dove, Owl, Baramasi
		Reptiles	Cobra, Common krait, Dhamana, Godhi
58	Paburia PRF	Mammals	Indian Fox, Jackal, Mongoose
		Birds	Koili, Bani, Parrot, Kantiabaga, Kumbhatua, Owl
		Reptiles	Cobra, Banded krait, Tampa, Godhi, Scorpion
59	Sujeli R.F.	Mammals	Leopard, Wild Boar, Jackal, Hanuman Monkey, Mongoose, Hare
		Birds	Red Jungle Fowl, Hill Myna, Kumbhatua, Haladibasanta, Bani, Kundakhai, Baramasi
		Reptiles	Cobra, Godhi, Scorpion, Dhamana sapa, Gachha endua, Common krait
60	Kurmingia R.F.	Mammals	Leopard, Wild Boar, Jackal, Hanuman Monkey, Rhesus macaque, Indian Porcupine, Jungle cat,Indian fox, Mongoose,Mouse deer (Gurandi),Barking deer, Bats
		Birds	Red Jungle Fowl, Grey Jungle Fowl, Parrot, Hill Myna, Owl, Kumbhatua, Kajalapati, Koili, Bani, Kantiabaga
		Reptiles	Cobra, Russells viper, Common krait, Godhi, Dhamana sapa, Gachha endua
61	Baliapata R.F.	Mammals	Jackal, Indian Fox, Mongoose
		Birds	Hill myna, Parrots, Kajalapati, Baramasi, Red Jungle Fowl
		Reptiles	Godhi, Cobra, Dhamana, Common kraits, Russells viper
62	Godingia R.F.	Mammals	Mongoose, Hill rats, Jungle cat, Hare
		Birds	Baramasi, Parakeets, Dove
		Reptiles	Godhi, Krait, Gachha endua
63	Jobedi R.F.	Mammals	Indian fox, Jackal, Wild boar, Jungle cat, Mongoose,
		Birds	Baramasi, Owl, Dove
		Reptiles	Godhi, Gachha endua, Common krait
64	Pukulingia R.F.	Mammals	Indian fox, Leopard
		Birds	Doves, Baramasi, Owlets
		Reptiles	Godhi, Gachha endua, Krait, Naga sapa, Banded krait
65	Gedipabali R.F.	Mammals	Indian Porcupine, Wild boar, Mouse deer(Gurandi), Sloth Bear, Rabbit, Jackal,

			Mongoose, Hill rats, Hanuman monkey
		Birds	Red Jungle Fowl, Hill myna, Parrot, Grey Jungle Fowl, Baramasi, Koili, Owl, Dove, Kite, Kathakhumpa, Kumbhatua
		Reptiles	Godhi, Gachha endua, Krait, Naga, Python, Banded kraits, Russells vipers
66	Tudubali R.F.	Mammals	Sloth bear, Barking deer, Hare, Mongoose, Indian flying squirrel, Wild boar, Hill rats, Indian fox, Hanuman monkey, Jungle cat
		Birds	Parrots, Common green pigeon, Hill myna, Dove, Baramasi, Jungle grey fowl
		Reptiles	Russells viper, Banded krait, Common krait, Cobra, Dhamana sapa, Godhi, Gachha endua
67	Podangi R.F.	Mammals	Sloth bear, Jackal, Indian fox, Wild cat, Wild boar, Squirrels, Mongoose
		Birds	Parrots, Bani, Kantia baga, Baramasi, Kumbhatua, Kite, Jungle fowl
		Reptiles	Banded krait, Godhi, Gachha endua, Scorpion
68	Gutingia 'B' R.F.	Mammals	Wild boar, Jackal, Indian fox, Jungle cat, Hanuman monkey, Sloth bear, Mangoose, Squirrels
		Birds	Parrot, Kundakhai, Koili, Kajalapati, Kantia baga, Bani, Kumbhatua, Dove
		Reptiles	Banded krait, Gachha endua, Scorpion, Champeineul, Cobra, Godhi
Phiringia Range			
69	Baghanadi R.F.	Mammals	Leopard, Wild boar, Tiger, Mouse deer, Hyena, Jackal, Indian fox, Jungle cat, Indian Porcupine, Mongoose, Indian flying squirrel
		Birds	Red jungle fowl, Grey jungle fowl, Hill myna, Parrot, Kite, Owl, Common green pigeon, Kumbhatua, Kundakhai, Baramasi
		Reptiles	Russells viper, Common krait, Banded krait, Naga, Dhamana, Godhi, Lizards, Scorpion
70	Kalabagh R.F.	Mammals	Leopard, Wild boar, Jackal, Indian fox, Jungle cat, Mongoose, Squirrels, Bats, Rabbit
		Birds	Red jungle fowl, Parrot, Hill myna, Koili, Kumbhatua
		Reptiles	Russells viper, Krait, Dhamana sapa, Godhi, Lizards
71	Palchi R.F.	Mammals	Leopard, Wild boar, Mouse deer, Indian civet cat, Wild cat, Hanuman monkey, Mongoose, Hill rats, Indian flying squirrels, Rabbits, Jackal, Fox
		Birds	Parrot, Hill myna, Koili, Kite, Red jungle fowl, Dove
		Reptiles	Krait, Banded krait, Lizards, Godhi
72	Kerandibali 'W' R.F.	Mammals	Mouse deer, Wild boar, Indian porcupine, Indian civet cat, hare, Indian fox, Jackal, Hill rats, Hanuman monkey, Hyena, Leopard
		Birds	Hill Myna, Parrots, Kumbhatua, Haladibasanta, Koili, Kundakhai, Owl, Red jungle fowl, Baramasi
		Reptiles	Kraits, Russells vipers, Naga sapa, Godhi, Python, Lizards
73	Kerandibali 'E' R.F.	Mammals	Bear, Wild boar, Indian fox, Indian porcupine, Hare
		Birds	Crow, Koili, Kumbhatua, Kite, Kajalapati, Baramasi, Dove, Owl, Kundakhai, Common green pigeon
		Reptiles	Krait, Naga sapa, Russells viper, Lizards, Godhi
74	Gochhapada R.F.	Mammals	Mouse deer, Hare, Sloth bear, Mongoose,

			Hanuman monkey, Indian fox, Indian civet cat, Jungle cat, Indian flying squirrel, Indian porcupine
		Birds	Parrots, Green pigeon, Dove, Owlets, Baramasi, Haladibasanta, Koili, Kantiabaga, Kajalapati, Red jungle fowl, Bani
		Reptiles	Krait, Naga sapa, Banded krait, Russells viper, Godhi, Lizards, Gachha endua, Champeineul
75	Sadingia R.F.	Mammals	Bear, Mouse deer, Wild boar, Indian flying squirrels, Mongoose
		Birds	Koili, Dove, Kantia baga, Jungle fowl, Green pigeon
		Reptiles	Naga sapa, Krait, Russells viper, Lizards, Godhi
76	Nuapadar R.F.	Mammals	Hanuman monkey, mongoose, Indian flying squirrels, Hare, Red jungle cat, Bear
		Birds	Dove, Kumbhatua, Baramasi, Owlet, Kantia baga
		Reptiles	Kraits, Godhi, Gachha endua, Champeineul, Scorpion
77	Bandhagarh 'B' R.F.	Mammals	Mongoose, Indian fox, Jackal
		Birds	Bani, Crow, Dove, Kite
		Reptiles	Krait, Gachha endua, Scorpion, Dhamana sapa
78	Ladapadar R.F.	Mammals	Wild pig, Sloth bear, Mouse deer, Mongoose, Indian flying squirrel, Hare, Jackal, Indian fox, Jungle cat
		Birds	Dove, Owl, Parrots
		Reptiles	Krait, Gachha endua, Scorpion, Godhi
79	Daisara R.F.	Mammals	Indian flying squirrel, Indian fox, Jackal, Mongoose, Hill rats
		Birds	Dove, Kumbhatua, Kundakhai, Bani, Kantia baga
		Reptiles	Krait, Russells viper, Lizards, Godhi
80	Gerupada 'E' R.F.	Mammals	Mongoose, Jackal, Rabbit, Indian flying squirrels
		Birds	Parrot, Koili, Baramasi, Kantia baga
		Reptiles	Naga sapa, Dhamana sapa, Mati biradia sapa, Krait, Lizards, Godhi
81	Gerupada 'W' R.F.	Mammals	Mongoose, Indian fox, Hill rats, Hare
		Birds	Baramasi, Crow, Owl, Green pigeon, Parrot
		Reptiles	Common krait, Godhi, Lizards
82	Dariki R.F.	Mammals	Jackals, Indian fox, Sloth bear, Jungle cat, Hanuman monkey, Wild boar
		Birds	Parrot, Hill myna, Koili, Kundakhai, Baramasi, Wood pecker, Kite, Kantia baga, Kumbhatua
		Reptiles	Krait, Russells viper, Naga sapa, Dhamana sapa
83	Gutinga 'A' R.F.	Mammals	Fox, Jackal, Mongoose, Squirrel, Hare
		Birds	Parrot, Koili, Kantia baga
		Reptiles	Krait, Godhi, Lizards
84	Balandapada 'N' P.R.F.	Mammals	Wild boar, Sloth bear, Jackal, Indian fox, Hanuman monkey, Hare, Mongoose, Indian flying squirrel
		Birds	Kite, Kantia baga, Baramasi, Parrot, Parakeets, Koili
		Reptiles	Kraits, Russells viper, Naga sapa, Dhamana sapa, Godhi, Lizards
85	Balandapada 'S' PRF	Mammals	Wild boar, Sloth bear, Hanuman monkey, Jackal, Fox, Rabbit, Hyena
		Birds	Kumbhatua, Koili, Parakeet, Owl, Red & grey

			jungle fowl
		Reptiles	Naga sapa, Krait, Mati biradi sapa
86	Katringia PRF	Mammals	Wild pigs, Sloth bear, Mouse deer, Hare, Hanuman monkey, Mongoose, Indian flying squirrel, Jungle cat,
		Birds	Parrots, Hill myna, Wood pecker, Bani, Kantia baga, Kite, Koili
		Reptiles	Naga sapa, Dhamana sapa, Kraits, Russells vipers, Godhi, Lizards
87	Malikapada PRF	Mammals	Hanuman monkey, Mongoose, Indian flying squirrel, Hill rats
		Birds	Parrots, Baramasi, Bani, Kantia baga, Crow, Kumbhatua
		Reptiles	Kraits, Dhamana sapa, Telia sapa, Endua
88	Kalabagh Extn. PRF	Mammals	Jackal, Indian fox, Jungle, Cat, Mongoose, Indian flying squirrel, Sloth bear, Hanuman monkey
		Birds	Parrot, Red jungle fowl, Kumbhatua, Koili, Kite
		Reptiles	Kraits, Russells viper, Naga sapa, Godhi, Lizards
89	Bandhagarh 'A' PRF	Mammals	Wild boar, Sloth bear, Barking deer, Leopard, Mouse deer, Jackal, Indian fox, Jungle cat, Indian Porcupine, Hanuman monkeys, Mongoose, Hare, Indian flying squirrels
		Birds	Parrots, Hill myna, Kite, Spotted owl, Kumbhatua, Peacock, Grey and red jungle fowl, Haladi basanta, Koili, Bani, Kundakhai, Baramasi, Kathakhumpa
		Reptiles	Cobra, Russells viper, Banded krait, Common krait, Godhi, Chameleon, lizards
90	Damingia PRF	Mammals	Wild boar, Mouse deer, Jackal, Indian fox, Indian flying squirrels, Hanuman monkey, Mongoose, Hare
		Birds	Kumbhatua, Kathakhumpa, Bani, Haladi basanta, Doves
		Reptiles	Krait, Godhi, Dhamana sapa, Lizards
91	Damingia Extn. PRF	Mammals	Wild pig, Squirrels, Mongoose, Hanuman monkey
		Birds	Baramasi, Doves, Kumbhatua, Parrot, Wood pecker
		Reptiles	Kraits, Mati biradi sapa, Godhi, Lizards
92	Kiamunda PRF	Mammals	Wild pig, Wild boar, Jackal, Indian fox, Jungle cat, Hanuman monkey, Hare, Squirrels, Indian porcupine, Hill rats
		Birds	Peacock, Red & grey jungle fowl, Owl, Kite, Kundakhai
		Reptiles	Godhi, Lizards, Naga sapa, Kraits, Scorpion
93	Kelapada 'A' PRF	Mammals	Squirrel, Jackal, Hanuman monkey
		Birds	Kantia baga, Kajalapati, Dove, Bani, Baramasi
		Reptiles	Common krait, Banded krait, Mati biradi sapa, Godhi
94	Kelapada 'B' PRF	Mammals	Jackal, Fox, Wild pig, Squirrel, Mongoose, Hare
		Birds	Kite, Kumbhatua, Owl, Bani, Kantia baga,
		Reptiles	Naga sapa, Dhamana sapa, Krait, Godhi, Gachha

			endua, Scorpion
95	Kelapada 'C' PRF	Mammals	Jackal, Fox, Mongoose, Squirrel, Rabbits
		Birds	Parrot, Kite, Kantia baga, Bani
		Reptiles	Krait, Godhi, Lizards

3.7 Threats and challenges to wildlife

The wild lives are facing greater challenge due to:

(i) Fragmentation of Habitat due to construction / widening of Roads, Transmission lines.

(ii) Uncontrolled grazing.

(iii) Forest fire

(iv) Poaching and illegal trade.

(v) Scarcity of Water in interior & high altitude Forests in summer.

(vi) Depletion of Food stock and deterioration of quality Food / Fodder.

3.7.1 Habitat loss and fragmentation:

Poaching may be the primary cause of sudden decline in species numbers, but habitat loss and fragmentation are the insidious, long-term problems that threaten wildlife population of the division. Habitats are being lost largely because of the burgeoning needs of the human population. The enormous fuel and fodder requirement means more and more forests are being cut and pastures overgrazed. In addition, the timber needs further take a heavy toll of the forest reserves. Encroachment of forest lands by the landless and rampant shifting cultivation in the division have also led to fragmentation of the forest cover in and around the human habitation. As a necessary consequence, the small number of wildlife left in these areas face acute extinction pressures which is a matter of concern.

3.7.1.1 Uncontrolled Grazing:

Grazing causes enormous damage to the undergrowth, especially to the young regeneration. In recent years, cattle population in and around forest areas is increasing in geometric progression causing gradual depletion of forest growth. During grazing, trampling coupled with trails created by the hoofs of the cattle supplicates soil erosion. The herbivores face acute food scarcity in their habitat due to unregulated and uncontrolled grazing in the forest areas close to human habitation. It also affects natural food chain for herbivores as well as carnivores. As the domestic cattle are not being immunized properly at regular intervals, there is every

possibility of spread of diseases like Anthrax, foot and mouth diseases etc. to wild animals, particularly to mammals.

3.7.1.2 Forest fire:

Despite attractive provisions of benefit sharing mechanism in JFM, shrinkage of forest cover and forest fire continues to be the subject of great concern. Forest fires takes a heavy toll in tropical dry deciduous forest areas destroying grasses, ground flora and fauna, young regeneration and even the tall trees during scorching summer when ground fire occurs. Because at the slopes and in the valleys the wind velocity is high during dry seasons which ultimately spread the fire rapidly, thereby devastating the safe abode of wild animals. The intense heat generated during scorching fire also causes damages to eggs of birds and reptiles. Though, at times controlled fire is beneficial to forest and wildlife management, but it should be kept in mind that uncontrolled forest fire at repeated intervals not only causes serious damage to flora and fauna, but also, deteriorates the fertility of the soil to a great extent and in most cases it is the man-made fire resulting from grazing, encroachments, shifting cultivation, NTFP collection etc.

For sustainable forest management, integrated forest fire management with components like education, participation, engineering, and enforcement is desirable. Research, planning and management of forest fire is an important aspect for attaining the desired goal and objective. It is desirable to have an integrated forest fire schemes for different areas, which are generally prone to forest fires.

3.7.1.3 Poaching and Illegal Trade:

Poaching and illegal trade in animal parts is among the major threats facing wildlife. According to Interpol sources, international wildlife trade is the second largest illegal occupation in the world. There is no denying that despite ban of illegal trade in wildlife and its products is flourishing, fetching fabulous returns to the smugglers and traders involved in it.

The "National Wildlife Action Plan" has identified priority areas and a two-pronged strategy of strengthening enforcement machinery and to secure the borders of consumer countries. The unscrupulous traders engage middlemen to monetarily lure innocent poor tribal living in and around forest areas to capture and kill wild animals for their trade. The buyers are the rich elite, willing to pay anything to satisfy

their lust for wildlife products. The poachers have also improvised their techniques by using modern arms and ammunition coupled with better communication network at the time of poaching.

Mammals and reptiles are under threat due to lucrative trade of their body parts and derivatives. Primates, cats, bears and elephants are also threatened by the live animal trade. Traditional oriental medicine utilizes tiger bones, pangolin scales, leopard and tiger skin, bear bile and other products. The following table depicts a clear picture of the wildlife products of the division pertaining to the period from 2006-07 to 2016-17 for which appropriate legal action has been initiated in the court of law.

Table No. 3.4 -Wildlife and their derivatives seized in Phulbani Forest Division 2006-07 to 2019-20

Sl. No.	Year	Range	Case No.	Property seized
01	2006-07	Phulbani	OR Case No. 65 of 2006-07	RBT skin-02 Nos., Leopard skin-01 No., Spotted deer skin-04 Nos.
02	2006-07	G.Udayagiri	OR Case No. 38 of 2006-07	Pongolin scale-12 Kg.
03	2006-07	G.udayagiri	OR Case No. 104 of 2006-07	Barking deer skin-01 No.
04	2006-07	G.Udayagiri	OR Case No. 108 of 2006-07	Barking deer skin-01 No.
05	2007-08	Phulbani	OR Case No. 45 of 2007-08	Dead Hyaena head to tail=48"
06	2007-08	Phulbani	OR Case No. 77 of 2007-08	One dead wild pig
07	2007-08	Phulbani	OR Case No. 78 of 2007-08	One dead wild pig
08	2007-08	Phiringia	OR Case No. 105 of 2007-08	Leopard skin-01 No., Skull-01 No.,Teeth-02 Nos,. Big teeth-02 Nos,Lower jaw-03 teeth and tail-01 No.
09	2007-08	Phiringia	OR Case No. 208 of 2007-08	Deer Horn-03 Nos.
10	2008-09	Phulbani	OR Case No. 63 of 2008-09	Barking deer meat-3 Kg
11	2009-10	----------No cases detected----------		
12	2010-11	Sudrukumpa	OR Case No. 01 of 2010-11	Loaded gun-01 No, head light-01 No with 06 Volt battery, Axe- 01 Nos., Match box-01 No.
13	2010-11	Sudrukumpa	OR Case No. 185 of 2010-11	Loaded gun-01 No, head light-01 No with 06 Volt battery
14	2012-13	Sudrukumpa	OR Case No. 42 of 2012-13	Sambar head, neck and horn=13 Kg 500gm, Back leg-9 kg900 gm, , front leg-1 kg 200gm.
15	2013-14	Phulbani	OR Case No. 301 dt 2013-14	One male dead wild boar
16	2014-15	Sudrukumpa	OR Case No. 116 dt 2014-15	One wooden made catapult

17	2014-15	Tikabali	OR Case No. 57 of 2014-15	Wild pig meat=92 Kg
18	2014-15	Raikia	UD Case No. 01 of 2014-15	One dead adult female elephant size=7"(height), length=8'6" (old age death)
19	2015-16	Raikia	UD Case No. 08 of 2015-16	One dead wild elephant tusk=02 Nos.(cause of death could not detected)
20	2016-17	Raikia	UD Case No. 08 of 2015-16	Leopard skin-02 Nos. (1)Length-140cm, width-94cm, tail-100cm (2) Length-120cm, Width-51cm, tail-88cm (illegal trading)
21	2017-18	Karada	UD Case No.03 of 2017-18	One dead male elephant calf(length-7'3", height-3'2") Death due to anaemia and debility as per post-mortem report.
22	2017-18	Sudrukumpa	OR Case No. 36 of 2017-18	Wild boar meat=800 gm(poaching)
23	2018-19	----------NIL----------		
24	2019-20	----------NIL----------		

3.7.2: Scarcity of Water in interior & high altitude Forests in summer:

Now as it is observed the Forests are more or less confined to Hills / Ridges. Plain Forests are decreasing day by day and are subject to much biotic pressure. Animals are withdrawing from forest fringes and concentrating on inaccessible pockets of Forest. Day by Day the rainfall is erratic and number of Rainy days in a year is decreasing. The nalla / Rivulets are drying up and in summer it became dry. The animals face water scarcity. Sometimes, in search of water they come to nearby habitation and endangered their life.

3.7.3: Depletion of Food stock and deterioration of quality Food / Fodder:

The forests of the tract are becoming more dryer due to annual fire, reduced rainfall and reduced rainy days, grazing beyond its carrying capacity, compacting of soil, increased runoff, top soil erosion etc. The plant community is gradually regressing towards thorny, unpalatable, stunted serel stage rather than improving towards climax. In the process the forest lacks quality food / fodder to herbivorous. Due to lack of micro organisms, bears, wild boar etc are facing scarcity of food stock.

3.7.4 Other factors

The fauna are also facing threat to their habitat due to increasing incidence of encroachment; increasing demand for firewood, timber and NTFPs for the ever-rising population. The developmental activities like construction of roads, buildings and

canals etc has led to large-scale deforestation and fragmentation to the wildlife habitats of the division. The disturbance caused by this has led to animals stray in to the human habitations causing damage to the both life and properties and get killed retaliation. The large scale plantations raised inside forest area has not only reduce natural habitats of wildlife but also change the micro environment of the locality. There is also lack of awareness among the local public regarding importance of wildlife in present eco-system.

3.7.5 Man-animal conflict:

In modern times, a large segment of human population is living away from wildlife habitats and has developed the perception that every wild animal is dangerous to human life. Diversion of lifestyle from being a part of nature to one alienated from it has changed the perception about wild animals. Further, increase in human and livestock population in rural landscape at the edges of fragmented and degraded wildlife habitats has registered increase in the biotic stresses on natural ecosystems and, in their struggle for existence; incidents of direct confrontations between human beings and wild animals like elephants has manifested tremendously and has led people to become progressively less tolerant to the presence of wild animals in their vicinity.

Expansion of human settlements right up to the edge of wildlife habitat and greater freedom enjoyed by people in entering such areas has also escalated the problem. With decreased human tolerance level towards wild animals, whenever a human being is either injured or killed in a direct confrontation with wild animal, human reaction sets in by declaring predators like leopard, bear, elephant and tiger dangerous to human life and property. In addition, ever increasing incidences of cattle grazing, intentional forest fire for collection of NTFP items etc. has substantially reduced food availability for many wild animals and has gravely exposed them to be an easy prey to the insatiable greed of the humans for several reasons like meat, sports, wildlife derivatives, trophies etc.

3.7.6 Wildlife depredation:

Wildlife depredation has been increasing in recent years, the predominant reason being the loss of habitat, leading to increased man-wildlife confrontation. Wild animals are frequently straying into human habitations due to shrinkage in the forest cover and biotic interference. At present, elephant depredation has become one of the major management challenges in many forest areas of the division. The problem of depredation has two major aspects:

(a) Loss of human life.
(b) Loss of property.
The loss of property can be viewed in three main types:-
(i) Loss of food crops,

(ii) Loss of cash crop by trampling or otherwise, and

(iii) Damage to houses and other structures.

Agricultural crop raiding is mainly due to fact that plants being more attractive and sumptuous food of elephants than wild vegetation. Crop plants have a higher food value for elephants and they may feed on them as a matter of preference. Further, the damage caused by trampling is more phenomenal. At times, elephants also consume fermented mohua flower which is used for preparing country liquor near the water source in the forest. As a necessary consequence elephants get intoxicated and become violent, causing human injury/casualty.

Table No. 3.5 KILLING/INJURED BY WILD ANIMALS 2009-10 TO 2019-20

Year	Human Injury			Human Kill (In No.)	Compassionate Amount Paid (In Rs.)
	Temporary	Permanent	Amount Paid (in Rs.)		
2009-10	1	0	2000	1	100000
2010-11	2	1	37330	0	0
2011-12	1	0	2000	0	0
2012-13	2	0	10000	0	0
2013-14	0	0	0	0	0
2014-15	0	0	0	0	0
2015-16	0	0	0	0	0
2016-17	0	1	100000	0	0

2017-18	0	1	100000	0	0
2018-19	0	0	0	0	0
2019-20	4	0	20000	0	0

3.7.7Crop and house Damage:

Table No. 3.5 information on crop and house damage

Year	Crop Damage		House Damaged		
	Damage in ha.	Compassionate Amount Paid (In Rs.)	Partly damaged (in No.)	Fully damaged (in No.)	Compassionate Amount Paid (In Rs.)
2009-10	0	0	12	0	42000
2010-11	1.4	14000	4	0	12500
2011-12	0	0	0	0	0
2012-13	13.695	136950	0	0	0
2013-14	41.223	412230	0	0	0
2014-15	41.71	417100	0	3	30000
2015-16	9.183	91830	3	0	6000
2016-17	1.628	16280	1	0	2000
2017-18	1.628	16280	1	0	2000
2018-19	3.46	34600	0	0	0
2019-20	16.4974	164974	1	0	2000

3.8 Protection and management of fauna

3.8.1 Wild life Rules

In the past, the management of forest was timber oriented. The preservation of wild life could not find its place in the Forest policy of 1894, though there existed already the Wild Birds (Protection) Act of 1887. It was only in 1912 that the Wild Birds and Animals (Protection) Act of 1987. It was only in 1912 that the **Wild Birds and Animals (Protection) Act (Central Legislature Act VIII of 1912** was promulgated, which was more or less repetition of the Wild Bird (Protection) Act of 18887. This Act prescribed for observance of 'close time', besides penalties and confiscation in respect of some birds and animals. Birds included in the scheduled are'Bustard, Duck, Jungle fowl, Partridge, Peafowl, Pheasant, Pigeon, Quail, Sand grouse, Painted snipe, Spur fowl, Heron, Woodcock, Egret, Rollers and King fisher. The animals covered under the Act were Antelope, Ass, Bison, Buffalo, Deer, Gazelle, Goat, Hare, Ox, Rhinoceros and sheep.

3.8.1.1 The All India Conference on Wild Life, 1935e felt that further steps are necessary for preservation of wild life in various provinces. Accordingly, when the forest policy of 1952 was formulated, emphasis was laid on the protection of wild animal, particularly the rare species, which were fast disappearing. It also prescribed of wild life for regulating the wild life by special law and to set up National Parks and Sanctuaries for the purpose, a Central Board on Wild Life was constituted in 1952.

3.8.1.2 After independence, there was a growing realization to provide better protection to fauna in general and rare and endangered species in particular. It was also recognized that wildlife could not be effectively protected unless state's stakes were clearly define and legal status of these forests was comprehensively articulate. The All India Silviculture Conference recommended, *inter alia*, that "whereas wild life is an integral part of our forests and its preservation is admitted to be an urgent necessity, suitable forest of adequate extent be set apart in each State for preservation and perpetuation of wild life". Moreover, 1969, IUCN, at New Delhi conference, emphasized for an urgent need for a uniform law in India. With such initiatives, a comprehensive legislation was brough about in 1972, when the Wild Life (Protection) Act 1972 was promulgated.

3.8.1.3 A number of Acts and Rules have been framed by the Government from time to time such as Wild Life Protection Act 1972, Wildlife (Stock Declaration) Rule 1974, Wild Life Transaction and Taxidermy Rule 1974 by Government of India. The Govt. Of Orissa also framed the Orissa Forest Shooting Rule, 1973 under section 82 of the Forest Act, 1972 and the Wild Life (Protection) Rules, 1974. These Acts and Rules were amended as the Wild Life (Protection) Amendment Act, 2002. The Wild Life Stock Rules, 2003 has come up with detail procedure to be adopted by the individuals and the communities in possession of wild animals.

3.8.1.4. In addition, the Government of Orissa has prescribed the following procedures.

1) Procedures for compassionate payment on account of human killings by tigers, panthers, elephant, Bear etc has been amended. In 2017 vide Forest Dept. Notification No. 24352-FE-WL-WLF-0037F&E Dated 24th November, 2017. As per the amendment, the amount of compensation for human killing is increased to Rs.4,00,000/-. The compensation for permanent injury is

increased to Rs.1,00,000/- and for temporary injury there would be free medical treatment in the Govt. Hospital with compensation of Rs.2000/-.

As per Notification No. 6380/8F(WL)1/12 F&E dated.11th April 2012; in case of crop damage by wild animals specified in Rules 45-AA as well as by Deer and Antelope compassionate payment of Rs.10,000/-only per acre for crop like paddy and cereals shall be made and in case damage of vegetables, cash crops like Banana, Sugarcane, Mango the compassionate amount of Rs.12,000/-only per acre shall be paid to the victim.

2) Procedures for regulation of fishing inside sanctuary in 1976 vide Orissa Gazatte part III No. 41 dated. 08.10.1976.
3) Trade or commerce in wild animal articles and trophies in 1978 vide Orissa Gazatte part II No. 38 dated. 14.07.1978.
4) Rewards for destruction of wild animal articles and trophies in 1978 vide SRO No. 1309/78, Orissa Gazatte part II No. 38 dated. 14.07.1978.

3.8.1.5. Other Measures taken

The Division has also tried to create awareness among the villagers through VSS meetings, celebration of wild life weeks, Environment Days and publicity through newsletters, signboards, hoarding, distribution of brochures and organizing awareness on importance of wildlife in School and colleges etc.

3.8.1.6. Creation of Water bodies:

The Division has no. of existing natural water sources in shape of perennial streams; rivers reservoirs, water holes and other water bodies and salt licks. Numbers of water bodies/WHS are being constructed under different scheme by the Department in interior pocket of the forest to meet the water scarcity of the wild animals.

CHAPTER-IV

4.0 MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY

4.1 Status of Regeneration

The Regeneration survey was done along 1062 Nos. of UID points of different forest blocks of this Division. Plot has been prepared of size 3mtr X 3mtr in four numbers of quadrants i.e. NE, SE, NW & SWover 1062 Nos. of UID points for study of regeneration status. Measurement of each species of collar diameter≥2Cm and <10 cm diameter has been done and recorded. Plot of size 1mtrX1mtr in two quadrants i.e. NE & SW has been prepared and measured the height of species for individual <2 cm collar diameter. The value of all 1062 Nos. Of plots totalled to determine the status of regeneration. As per table No. 4.1

Table 4.1 STATUS OF REGENERATION

Sl. No.	Score	Status
1	0-50	Deficient
2	51-100	Fair
3	101-150	Moderate
4	151-200	Good
5	201-250	Established

4.1.2Assessment Of Regeneration Status

In current working plan assessment of Regeneration status has been done as per as per the prescription of National Working Plan Code-2014. Young plants of tree species up to 10 Cm diameter are taken into consideration for assessment of regeneration status. Data collected from the square plots of 3 MtrX3mtr for sapling / adults and from the square plot of 1 mtr X 1 mtr for seedlings will be used to access the regeneration status of species in the management unit. Based on Phyto-sociological data from Plot level enumeration. The regeneration status of the sampled species will be assessed in the following categories.

a) **Good Regeneration:-**if seedling are more in numbers then the sapling and likewise saplings are more than that of adults.

b) **Fair Regeneration**:- If seedlings are more in numbers that the saplings but the saplings are equal or less than that of adults.

c) **Poor Regeneration:-**If a species survives in only sapling stage, but not as seedlings (though sapling may be less, more or equal to adults).

d) **No Regeneration:-** If a species is absent both in sapling and seedling stage, but present as adult.

e) **New regeneration:-** If a species has no adults but only sapling and/or seedlings.

To categorise the seedlings, sapling and adults; the following criteria is followed.

Sl. No.	Category	Specification
1	Seedlings	<2cm Collar dia
2	Saplings	2-5cm collar dia/dbh
3	Adults	5-9.9 Cm collar dia/dbh

Basing on the above criteria; the regeneration status of the forest blocks are assessed. The details of which are furnished as **Annexure-VII**.

4.2 Area affected by Forest Fire

The information on the fire spots in Phulbani Forest Division is available from 2006-07. The information was obtained from FSI. The ground truth information on area affected or burnt area is available only from 2010-11. From the information the following forest blocks are severally affected due to forest fire: a) Baghanadi RF, b) Krandibali 'E' RF, c) Kalabagh RF, d) Khajuripada, e) Palchi RF, f) Donga RF, g) Ranipathar RF, h) SudrukumpaRF, i) Brutanga 'S' RF, j) Karada PRF, k) Sikabadi PRF, l) Bandhagada 'A' PRF. The WPO shall depict the fire spots on GIS platform showing the block boundary layers, administrative boundary layers and generate beat wise maps on toposheets. The WPO shall also prescribe specific management intimations to decrease fire incidents in the vulnerability of each forest block.

Table 4.2 FIRE POINT IN PHULBANI FOREST DIVISION OBTAINED FROM FSI

Name of the Range	Name of the forest block/village	Year of occurrence											
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Phiringia	Dongarjori			4					1				
Phiringia	Kochalpanga			1									
Phiringia	Kurunada			1									
Phiringia	Beladuli				1								

Phiringia	Gadapanga				4								
Phiringia	Adapikudi				3								
Phiringia	Domangpadar				1								
Phiringia	Sipadi					1		1					
Phiringia	Dongarpadar					1							
Phiringia	Dhubusora					1							
Phiringia	Kangasaru						2						
Phiringia	Kolampara						1						
Phiringia	Barajori							1					
Phiringia	Barhangiparbat								1				
Phiringia	Graobasi	1	2										
Phiringia	Pijubali	1											
Phiringia	Pindangi	2	7	1									
Phiringia	Gagarpata	1				1							
Phiringia	Surkapanga	2	2										
Phiringia	Karau	1			1								
Phiringia	Gujakarau	1											
Phiringia	Dongarsal	1					2						
Phiringia	Uchangi		1										
Phiringia	Meserigata		2			2							
phiringia	Dokari		1										
phiringia	Bondhali		1		1		4						
phiringia	Basangpanga		1			1							
Phiringia	Balliguta		1										
Phiringia	Takudi	1											
Raikia	Paderimaha									1			
Karada	Lambakehta									1			
karada	Chancharapali			1									
karada	Baraba			1							1	5	5
G.Udayagiri	Revenue Forest												39
Karada	Revenue Forest												20
Phiringia	Revenue Forest												217
Phulbani	Revenue Forest												91
Raikia	Revenue Forest												18
Sudrukumpa	Revenue Forest												40
Tikabali	Revenue Forest												26
G.Udayagiri	Mukulingia	1											
G.Udayagiri	Majumaha	1											
G.Udayagiri	Baliapeta RF												1
G.Udayagiri	Dakapalla RF	1						1	1			3	3
G.Udayagiri	Godingia 'A' RF											4	11
G.Udayagiri	Godingia 'B' RF										1	2	11
G.Udayagiri	Gidipabali RF	3					6	1	1		2	3	

G.Udayagiri	G.udayagiri 'A' (pukulingia) RF												1
G.Udayagiri	G.udayagiri 'B' (sujeli) RF												
G.Udayagiri	G.udayagiri 'C' (Rotingia)RF												
G.Udayagiri	Kalinga (sandal wood) RF											2	
G.Udayagiri	Kalinga (i) (jabedi) RF	1											1
G.Udayagiri	Kalinga(ii) (Gotingia) RF												
G.Udayagiri	Kalinga(iii) (Kurumingia) RF												
G.Udayagiri	Kanabagedi RF												2
G.Udayagiri	Pandagi RF												
G.Udayagiri	Tudubali RF	1					2					1	
Karada	Baraba RF									1			
Karada	Machhaghat RF												5
Karada	Ranaba RF			1			1				1		10
Phiringia	Baghanadi RF		5	3	6	1	6	2	5	4	5	61	110
Phiringia	Bandhagarh'B' RF						2						
Phiringia	Daisara RF												1
Phiringia	Gerupada (E) RF												2
Phiringia	Gerupada (W) RF											1	5
Phiringia	Gochhapada RF											36	45
Phiringia	Krandibali(E) RF		1	2	2	1	1					25	40
Phiringia	Krandibali (W) RF											42	65
Phiringia	Ladapadar RF							3			2	30	18
Phiringia	Nuapadar RF		1				1						3
Phiringia	Sadingia RF		2								11		8
Phulbani	Balaskumpa RF												
Phulbani	Bhaliapada RF		1				1	2				2	10
Phulbani	Burtang (N) RF				2							17	19
Phulbani	Dakapalla (A) RF												
Phulbani	Dakapalla (b) rf											1	
Phulbani	Darki RF												4
Phulbani	Dutimendi RF											1	1
Phulbani	Gugulasahi RF												
Phulbani	Gumagarh RF						1					2	6
Phulbani	Kalabagh RF		1		1		1	2	2	1	1	53	68
Phulbani	Kalamuri RF												
Phulbani	Khajuripada RF	1		2				2		2	2	46	23

Phulbani	Khaumunda RF												3
Phulbani	Muskuli RF												2
Phulbani	Palchi RF			1	1		2	2					14
Phulbani	Pandrisuga RF												4
Raikia	Dibari RF												
Raikia	Kilundi RF												
Raikia	Lendrikia RF	1									1		3
Raikia	Raikia RF												1
Sudrukumpa	Donga RF	1			1		5		4		2	66	77
Sudrukumpa	Raniphathar RF		1		3		5	11	7		1		80
Sudrukumpa	Sudreju RF												
Sudrukumpa	Sudrukumpa RF	2			1		5	1	1		3		
Tikabali	Archangi'A' RF							1				1	6
Tikabali	Archangi'B' RF							1					21
Tikabali	Burtang (S) RF	2	1		1		1	2	4		1	15	43
Tikabali	Chakapad RF		1	1			4			6	2	37	79
Tikabali	Ghudukapadar RF												1
Tikabali	Linepada RF	1		1			2		1		1	13	10
Tikabali	Sankarakhol RF						1						3
Tikabali	Tikabali RF	1											
G.Udayagiri	Katingia PRF										2	4	16
G.Udayagiri	Talarimaha PRF												
Phiringia	Balandapada 'N'PRF											12	15
Phiringia	Balandapada 'S' PRF									1	9	58	62
Phiringia	Damingia PRF											16	9
Phiringia	Katringia PRF			2	1			2	2			27	11
Phiringia	Kelapada 'B' PRF											1	
Phiringia	Kelapada 'C' PRF												1
Phiringia	Kiamunda PRF										7	45	97
Phiringia	Mallikpada PRF												3
Phulbani	Phulbani PRF												4
Phulbani	Pilasalunki 'E' PRF												
Phulbani	Pilasalunki 'W' PRF												
Raikia	Karada PRF	2		2	3	1	6		2		7	33	55
Raikia	ManikeswarpR F												
Tikabali	Bordikia PRF										1		
Tikabali	Beheragan PRF											1	2
Tikabali	Budukakhol PRF												5

G.Udayagiri	Bakingia PRF										1		
G.Udayagiri	Bhanjapadar PRF				1							7	5
G.Udayagiri	Paburia PRF										2		2
Karada	Badegarh PRF	1		2	1							12	10
Karada	Nandabali PRF	1		2	1		1		1		2		20
Raikia	Sikabadi PRF	1		2	1		1		1		2		25
Phiringia	Bandhagad "A" PRF			2		1	5					5	23
Phiringia	Damingia (extn.) PRF											1	7
Phiringia	Kelapada 'A' PRF												
Phulbani	Ganjuguda 'B' PRF							1				2	7
Phulbani	Kalabagha (extn.) PRF												3
Raikia	Ganjuguda 'A' PRF							1					
Tikabali	Mundula PRF												
Tikabali	Nandini 'A' PRF												2
Tikabali	Nandini 'B' PRF												3
Tikabali	Raghaguda PRF						1						2
Tikabali	TadipajupRF												
	Total	**33**	**32**	**32**	**37**	**11**	**70**	**37**	**34**	**16**	**69**	**692**	**1665**

4.2.1 Causes of Forest Fire

Major causes of forest fire in this Division are:-

1. Collectors of Kendu leaf set fire to increase the quality of leaves.
2. Collectors of Sal seed, Mahua flower set fire to clear the ground for collection.
3. Graziers put fire to induce the growth of new grass.
4. Fire is also resorted to when encroachments are made.
5. Sometimes it is set unintentionally through bidi and cigarette stubs by the people while walking in the forest.
6. Some people set fire to get ashes to their crop field through run off water.
7. Burning of charcoal in the forests leads to forest fire.
8. Forest fire intentionally caused by forest offenders.
9. During picnic or other camps, half burnt firewood left carelessly in the forest leads to forest fire.
10. Persons living around the forests use country made fire torches made of straw or fibers during their movement in the forest.

11. Fire caused by the poachers for poaching by scaring the wild animals from other areas in to their arena of hunting.
12. Disposal of felled materials for site clearance by fire as mode of podu cultivation (shifting cultivation).
13. People of adjoining villages sets fire in the forest to clear the foot path from dry leaves and debris.

4.2.2 Damages caused by Fire

The consequences of forest fire are disastrous. It adversely affects the regeneration of seedlings. The effect is more on Sal because of dying back phenomenon of Sal. The Fire results in degradation of forests, loss of soil fertility and accelerates soil erosion. The timber quality is also affected, with the repeated fires the timber develops hollowness and gets deteriorated. Such fire, if spreads to bamboo forests devastates the clumps. Fire destroys the organic elements and micro fauna in the soil and impoverishes its nutrient content. Repeated fire in the Dry Deciduous Forests causes retrogression of the vegetation towards a more xerophyte condition. It causes imbalance in the entire ecosystem. Some adverse effects of forest fire are listed below:

- ✓ Loss of Regeneration
- ✓ Loss of Water content and productivity of soil.
- ✓ This accelerates the surface run off and leads to heavy soil erosion.
- ✓ It affects micro flora and fauna adversely
- ✓ It reduces the nutrient content of the soil
- ✓ It affects the seed capacity.
- ✓ It has an adverse effect on insects, amphibians and reptiles.
- ✓ It effects the migration, nesting behaviours, habitat shrinkage of birds. Also effects the pollination and dispersal done by the birds.
- ✓ It effects the movement of animals, also effect the corridors, habitat for the bigger animals.
- ✓ Fire results in entry of intrusive species like Lantana, Eupatorium etc.
- ✓ Consequently, the economic timber value of the standing crop is reduced.

4.2.3 Tackling of Forest Fire.

In the past the amount spent on fire protection is very meagre. So it is not possible to mitigate the forest fire with low investments. In some cases the area are inaccessible and timely mitigation steps could not be taken up. It is gigantic task educate the people of the surrounding villages and seek their help in kindling the forest fires. At present Govt. has given much importance on control of forest fire and the allotment on forest protection has increased manifold. Fire lines are maintained every year. For the purpose Fire Fighting Squads are being deployed from 15th February to the end of June every year with a provision of vehicle for mobility with one squad in each Range. Awareness programmes are being organized in forest fringe villages, VSSs are being motivated for control of the forest fire. There is also provision made by the Govt. for payment of incentive to the VSS and forest fringe villages for control of forest fire. Control Room is being operated round the clock (24X7) during summer season in the Division and Range level for monitoring immediate action to tackle it. Whatsapp group has also been created to intimate the fire points from Control of the Division Office for taking immediate action to extinguish the forest fire and sharing of action taken report**.** The adequate allotment with existing interventions need to be continued to curve the forest fire incidences.

4.3 Area damaged by natural calamities

Phulbani Forest Division is situated within the effective zone of cyclonic winds and storms**.** Phulbani Forest Division was adversely affected by the cyclonic storms "Philin" on 12th& 13th October 2013. The major forest areas of Tikabali & Karada Ranges were affected. The detail uprooting of trees in selection working circle has been provided below.

Table No. 4.3- Philin uprooted trees removed from forest floor under selection working circle by Departmental salvaging / OFDC Ltd. as irregular lots

Name of the Range	Name of the Forest Block	Compt. No.	Coupe No.	Year of actual removal	No of trees uprooted by Philine
Tikabali	Chakapad RF	1	Chakapad 1 C/I	2013-14	329
	Chakapad RF	7	Chakapad 1 C/VI	2013-14	55
	Chakapad RF	8 (part)	Chakapad 1 C/VII	2013-14	449
	Chakapad RF	8 (part)	Chakapad 1 C/VIII	2013-14	430

	Chakapad RF	8 (part)	Chakapad 1 C/IX	2013-14	502
	Chakapad RF	8 (Bal)	Chakapad 1 C/X	2013-14	558
				Total	**2323**
Tikabali	Chakapad RF	9	Chakapad 2 C/I	2013-14	64
	Chakapad RF	16	Chakapad 2 C/III	2013-14	1358
	Chakapad RF	2	Chakapad 2 C/IV	2013-14	83
	Chakapad RF	17	Chakapad 2 C/V	2013-14	268
	Chakapad RF	18		2013-14	330
	Chakapad RF	14	Chakapad 2 C/VI	2013-14	166
	Chakapad RF	19 (part)		2013-14	269
	Chakapad RF	19 (Bal)	Chakapad 2 C/VII	2013-14	107
				Total	**2645**
Karada	Baraba RF	1	Baraba C/I	2013-14	100
	Baraba RF	2	Baraba C/II	2013-14	577
	Baraba RF	3	Baraba C/III	2013-14	398
	Baraba RF	4	Baraba C/Iv	2013-15	249
	Baraba RF	5 (part)	Baraba C/V	2013-14	73
	Badagarh PRF	1	Baraba C/VII	2013-14	67
				Total	**1464**
Karada	Nandabali PRF	2 (part)	Nandabali C/V	2013-14	409
		2 (part)	Nandabali C/VI	2013-14	480
		2 (part)	Nandabali C/VII	2013-14	218
		2 (part)	Nandabali C/VIII	2013-14	575
		2 (part)	Nandabali C/IX	2013-14	502
		2 (Bal)	Nandabali C/X	2013-14	306
				Total	**2490**
Karada	Ranaba RF	1	Ranaba C/I	2013-14	24
		3	Ranaba C/IV	2013-14	103
		4	Ranaba C/V	2013-14	107
		5	Ranaba C/VI	2013-14	79
Karada	MachhaghatRF	1	Ranaba C/VII	2013-14	300
		1	Ranaba C/VIII	2013-14	439
				Total	**1052**
				Grand Total	**9974**

Table No. 4.4 Statement Showing Total No. of Trees removed from Philin affected Selection working Circle							
Name of the Felling series	**Name of the Coupe**	**Year of due for felling**	**Area of the Coupe**	**No. of trees due for felling**	**No. of trees felled in regular coupe**	**No. of uprooted trees removed from the coupe area due to Philin in Oct' 13**	**Total no. of trees removed**
Baraba FS	I	2007-08	219.64	110	0	100	100
	II	2008-09	258.42	129	160	577	737
	III	2009-10	310.67	156	0	398	398
	IV	2010-11	244.6	122	96	249	345
	V	2011-12	192.76	96	184	73	257
	VI	2012-13	325.33	163	175	0	175
	VII	2013-14	516.23	258	0	67	67
	VIII	2014-15	357.59	179	16	0	16
	IX	2015-16	339.42	170			0
	x	2016-17	388.16	194			0
Total				**1577**	**631**	**1464**	**2095**
							0
Nandabali FS	I	2007-08	304.07	152	0	0	0
	II	2008-09	380.49	190	0	0	0
	III	2009-10	426.23	213	0	0	0
	IV	2010-11	502.75	251	71	0	71
	V	2011-12	311.36	156	341	409	750
	VI	2012-13	350.32	175	415	480	895
	VII	2013-14	326.18	163	0	218	218
	VIII	2014-15	378.23	189	11	575	586
	IX	2015-16	374.28	187		502	502
	X	2016-17	199.12	100		306	306
Total				**1776**	**838**	**2490**	**3328**
Ranaba FS	I	2007-08	355.73	178	0	24	24
	II	2008-09	361.61	181	0	0	0
	III	2009-10	248.71	125	0	0	0
	IV	2010-11	579.27	289	91	103	194
	V	2011-12	539.86	270	111	107	218
	VI	2012-13	730.22	365	71	79	150
	VII	2013-14	342.12	171	0	300	300

	VIII	2014-15	464.39	232	8	439	447
	IX	2015-16	529.62	265		0	0
	X	2016-17	573.02	287		0	0
Total				**2363**	**281**	**1052**	**1333**
Chakapad FS-1	I	2007-08	0	0	0		0
		2008-09	682.26	341	574	329	903
	II	2008-09	426.38	213	473	0	473
	III	2009-10	295.56	148	300	0	300
	IV	2010-11	661.61	331	605	0	605
	V	2011-12	525.36	263	525	0	525
	VI	2012-13	536.32	268	515	55	570
	VII	2013-14	161.51	81	0	449	449
	VIII	2014-15	140.32	70	0	430	430
	IX	2015-16	197.93	98		502	502
	X	2016-17	158.47	79		558	558
Total				**1892**	**2992**	**2323**	**5315**
Chakapad FS-2	I	2007-08	0	0	0		0
		2008-09	659.23	329	666	64	730
	II	2008-09	756.7	379	878	0	878
	III	2009-10	719.8	360	719	1358	2077
	IV	2010-11	1085.65	543	882	83	965
	V	2011-12	1121	560	981	598	1579
	VI	2012-13	719.35	360	740	435	1175
	VII	2013-14	483.25	242	0	107	107
	VIII	2014-15	563.46	281	81	0	81
	IX	2015-16	298.05	149		0	0
	X	2016-17	346.03	173		0	0
Total				**3376**	**4947**	**2645**	**7592**
Grand Total				**10984**	**9689**	**9974**	**19663**

4.4 Area protected from grazing

4.4.1 Grazing effect:-

Unregulated grazing has now assumed unmanageable proportions. Not only has the pressure on the forests had increased manifold due to increase in cattle population, but the will and zeal to enforce restrictions on grazing is lacking. Grazing is going to become more and more complex in the context of **forests status** because of many reasons:

1. Firstly, there is a status attached to the number of cattle one owns in rural areas.
2. Secondly, many of the cattle breeding communities believe that grazing in open forest areas are beneficial for better health and yield.
3. Thirdly, energy crisis will also have impact on grazing. Cattle are going to be a major source of energy in rural area. They are even needed in bio-gas schemes.
4. Improved varieties of cattle have been adopted for milk by many. But these varieties need more feed and more care.

Instead of being continuous and unlimited, grazing has to be controlled and restricted, so that it does not interfere with the productive functions of the forests.

4.4.2 Kandhamal is basically a tribal dominated area with primitive practice of agriculture. The enormous cattle population almost matches with the human population of the District. It is observed that cattle population stray in the adjoining or nearby forests for grazing and browsing for about 6-7 months in a year, as a result of which the regenerated forest species are seriously affected by trampling and browsing. In this District tribal people rarely milk cows for milk production and the practice of stall feeding of the cattle is totally absent.

4.4.3 Further, the depletion of the forest cover of the Division is attributed to the fact that large number of goat population which rear mostly in vast and spread out forest areas by the local inhabitants, thereby damaging the sapling crops by browsing practices. To sum up huge goat population coupled with sufficient number of stray cattle pose threatsimparting serious effects on establishment of successful plantation as well as establishment of natural regeneration of forest species.

4.4.4 Forest grazing was to be based on the following principles:

1. Continuous grazing in the same area by large herds is destructive and devastating to the better strains of grasses and leads to deterioration of the grass complex. Where ever it is permitted and is in great demand, effort should be made to introduce rotational grazing.
2. Cheap forest grazing has a demoralizing effect and leads to the vicious spiral of reckless increase in the number of cattle, inadequate forest grazing, reduced quality of the herds and further increase in the numbers to offset the fall in quality.
3. Grazing should not be looked upon primarily as a source of revenue. But the simple and obvious way is to institute a reasonable fee for the privilege of grazing.
4. Grazing must not be allowed in regeneration areas and young plantations.
5. Grazing incidence should be kept minimum in protection forests.

4.4.5 In addition to the above, it is also intended to introduce new varieties of grasses in an area with a view to improve the forage and such the species need careful selection and should have the following qualities:

1. Species should require no elaborate method of cultivation.
2. It should be able to grow easily without any special effort.
3. Species should be tough, hardy and tolerant to repeated cutting.
4. Species should have minimum water requirement.
5. It should grow faster so that it can suppress unwanted growth and obnoxious weeds quickly.
6. It should be capable of spreading and covering the land early.
7. It should be a high yielding variety.

4.4.6 Live Stock population:-

The domestic animals (cattle, buffalo, sheep and goat) population of Phulbani Forest Division of Kandhamal district. The damage done by the domestic animals is far more than wild animals. There is no concept of stall-feeding and the usual practice followed is mass grazing. The Silvi pasture plantation attempts agencies have not succeeded. The details of livestock population is furnished below.

Table No. 4.5- Information on livestock under Phulbani Division							
Name of the Block	**HH having Livestock**	**Cattle**		**Buff.**	**Sheep**		**Goat**
		CB	**Ind**		**CB**	**Ind**	
Khajuripada	8964	168	28809	6230	0	434	27744
Phulbani(R)	6953	151	21194	2945	15	374	19706
Phulbani(U)	1026	392	927	410	0	5	867
Phringia	15893	74	49230	6935	3	2393	45044
Raikia	7719	55	21334	2340	0	23	9882
G.Udayagiri(R)	4189	50	10597	1488	0	0	5558
G.Udayagiri(U)	269	128	494	65	0	43	372
Tikabali	6866	274	16896	3405	0	38	10771
Chakapad	10269	324	34748	5399	2	1946	24476
Total	**62148**	**1616**	**184229**	**29217**	**20**	**5256**	**144420**
Source:- Chief District Veterinary Officer, Phulbani							

4.5 Lopping Practices

Lopping practices for collection of fodder is not practiced in this Division area. However there are practices of lopping for collection NTFP like Tamarind, Tulo (Mahul seed), Char, Kendu, Sal seeds, Harida, Bahada, Amla and turmeric production etc. This is not in large scale as these are not collected for commercial purposes.

4.6 Area infested by invasive weed species in forests

Nature does not leave its notebook blank. When-ever, any blank-space in the forests is created by the local population, either for their fuel wood requirements, fencing material or collection of sal leaves in bundles for growing organic turmeric, such open areas gets infested with obnoxious weeds e.g. *Lantana camara*, *Eupatorium odoratum*& "Banatulasi" etc. At times, it becomes very expensive to eradicate them.

The climbers coil around the young seedlings and saplings. Gradually, when they grow up they become thicker and stronger and strangle young poles. On removal of climbers from young poles, marks of strangulation can be clearly seen. In general, *Acacia pinnata, Bauhinia vahlii, Butea parviflora, Butea superba, Combretum decandrum, Dioscorea bulbifera, Ichnocarpus frutescens, Milletia auriculata* and *Smilax macrophylla* cause damage to the young crop. Creation of forks and malformations in the young natural regenerations as well as the plantations are causes due to heavy infestation of climbers.

Despite the harmful effects, some climbers bear medicinal values and are useful for human beings. The species of climbers, bearing medicinal and food values are mentioned as follows: *Asparagus racemosus* (satabari), *Cryptolepsis buchanani* (gopakanu), *Dioscorea bulbifera* (pita alu), *Entadas candens* (gila) and *Hemidesmus indicus* (anantamula) etc.

4.6.1 Effects of Weeds on Forest Management:

Weed growth in forest blocks put hindrance in management. The effects are :

- Bringing the area under Plantations became difficult and weeds suppress the planted seedlings.
- Regeneration due to seed becomes extremely difficult as the recruits are suppressed if not attended.
- Removal of weeds become cost prohibitive.
- Weed seeds dispersed through by wind / animals and spreading to nearby forest area.
- Weeds when dry became fire hazards.
- It increases Rodent population in nearby area.

4.6.2 Practices to Control the weeds:

Controlling of weeds is of paramount importance to allow natural regeneration to establish and check invasion. It may be of Physical method, Chemical method by using weedicides and combination of both.

4.6.2.1 Physical Method:

Controlling the weeds can be possible by uprooting the weeds when it is green (in case of weeds those dies in summer and reappear during rains i.e. annual weeds). Cutting of weeds in green stage / before flowering is also practiced under which no seed formation or seed dispersal is allowed. There are weeds like lantana, those can be controlled / eradicated by cutting followed by controlled burning and uprooting the species. After uprooting, the area must be covered under plantation with extra weeding in first two years. Under tree cover the weeds growth will be substantially checked.

4.6.2.2 Chemical Method:

There are Chemicals / Weedicides available in the market which suppress the weeds to a greater extent. Application of such chemicals at pre-monsoon period is

more effective. These chemicals trade name along with its main constituents (Components) and application practices are furnished below.

i) Glyphosate 41% SL: It is an Amino Acid synthesis inhibiter. It inhibits the EPSP synthase enzyme, which leads to depletion of key amino acids that are necessary for protein synthesis and plant growth. This should be applied @0.5 Kg active ingredient+200 ltr water/acre or 1.2 Ltr formulation+ 200 ltr water/acre during growth phase. The plant can be pruned and applied with this solution after first rain. The soil must remain moist. Avoid inhalation, skin or oral contact with the weedicide. Do not chew tobacco, eat food or smoke during spraying. Follow normal precautions – keep away from food stuff containers and animal food; avoid contact with mouth, eyes and skin; avoid inhalation of the spray mist; spray in the direction of wind; wash thoroughly the contaminated cloths and parts of body after spraying; do not smoke, drink, eat or chew while mixing and spraying; and wear full protective clothing while mixing and spraying.

ii) 2,4-D Dimethyl Amine salt 58% SL: It affects weeds by causing uncontrolled cell division in vascular tissue. This should be applied @1 Kg active ingredient+120 ltr water/ acre or 1.8 Ltr formulation+ 120 ltr water/acre during growth phase. The plant can be pruned and applied with this solution after first rain i.e. during active growth phase. Follow normal precautions – keep away from food stuff containers and animal food; avoid contact with mouth, eyes and skin; avoid inhalation of the spray mist; spray in the direction of wind; wash thoroughly the contaminated cloths and parts of body after spraying; do not smoke, drink, eat or chew while mixing and spraying; and wear full protective clothing while mixing and spraying. **Precautions:** Chemical weedicides are poisons and it should not be used in wildlife concentrated area, near to water source where it is likely to be leached / washed to water body. This chemical method may be applied to area where physical control is difficult and not supported by financial provision.

4.7 Incidences of pest and diseases

4.7.1 Diseases caused by Fungi & Parasites:

Many Fungi as well as plant parasites cause immense damage to the forests crops. The details are depicted as follows:

(i) Fomes caryophylli:

The appearance of punk knots look like pox marks or like eyes of Sambhar. Hence, such pox marks are called as "Sambharankhi". This signifies 'heart rot' of Sal. This feature is commonly observed in all forest areas where Sal is the principal species. Initially, heartwood changes its colour from light dark to brown. Later on the affected wood becomes spongy. When the magnitude of the decay becomes appreciable, the fungus emerges through the sapwood onto the bark in shape of pink knots.

(ii) Fomes fastuous:

This category of fungus infects trees through the injury caused by fire and felling. Initially, the heartwood indicates dark brown stains in patches. These patches are developed in small pockets. Gradually, these pockets are filled with white coloured decayed fibres. In later stages, these pockets disintegrate and create empty brown pockets. These fungi cause 'heart rot' of sal in the butt region. At times, this fungus also attacks associate species of sal.

(iii) Ganoderma lucidum:

This category of fungus causes damage to Sisoo plantations. This pathogenic fungus initially attacks the bark and gradually affects the sapwood and cause white spongy rots. The affected trees should be completely removed from plantation sites to avoid further spread of these diseases.

(iv) Hymenochaete rubiginosa:

This category of fungus causes pocket rots in the heartwood of sal. The tissues get affected and become white and fibrous. Finally, they are surrounded by brown mass of wood. External sporophores are observed one above the other. They are found in close clusters from the stem of the affected trees. They are observed in sal forests and at times also affect Bija trees standing in the vicinity of sal patches.

(v) Hypoxylon annulatum:

This type of fungus generally affects the root portion of Eucalyptus tereticornis in the drought prone areas. Consequently, heart wood portion does not develop and gradually decay develops in the form of white spongy rots.

(vi) Loranthus scurrula:

Loranthus mostly attacks sal poles and trees. At times, it also affects char and mahul trees. The extent of damage caused by the loranthus has not yet been correctly assessed. It is understood that it causes unsoundness in sal crop. But it does not render absolute mortality to sal.

(vii) Polyporus shoreae:

In general, sal requires well-drained soil. In the lower valley portions, the moisture content in the soil increases due to the deposit of organic leaf litter. Due to improper soil drainage, water stagnates around the sal patches. Such a condition becomes congenial for this category of 'root fungus' in damper locations of forests. Due to lack of soil aeration, healthy sal trees gradually dry up consequent upon the destruction of their root system. Thus in damper areas, sal crop fail to absorb plant nutrients and water from the soil. This leads to the death of the plant. These affected trees are prone to uprooting by wind. The affected exposed portion of the root can be clearly visualized in the uprooted trees.

4.7.2 Insects

Insects cause damage to the forests and plantations by defoliation and boring into heartwood portion of the trees. Noteworthy harmful insects are enumerated as follows:

(a) Hapalia machaeralis (teak skeletoniser):

It causes damage to teak plantations during rains, especially in the month of September and October.

(b) Hoplocerambyx spinicornis:

This category of insects attacks the unbarked portion of sal trees during rainy season and start boring right into the heartwood portion. The poor dry type of sal forests are worst affected by this category of insects.

(c) Hybleapeuera (Teak defoliator):

In natural teak forests and plantations, this insect cause immense damage to teak leaves

(d) Weevalcytotrachelus longipes:

This category of insects damages the tips of new bamboo culms.

The other insect attacks are of *Batoceraru fomaculata*, seen sporadically damages young Simili (Bombax ceiba) by tunnelling and destroying the growing shoots. Termites are a menace in plantation-especially Eucalyptus plantations- and in the timber depots. In addition, bamboo weevil *Cytotrachelus longipes* and *Estigueno chinensis* damages new bamboo culms by tunnelling the nodes.

4.8 Forest degradation and its drivers

4.8.1 Unregulated grazing:-

Most of the Forest blocks are being protected through regular patrolling by para forest staff and other forest squad personnel. But in Kandhamal District the domestic cattle and other animals are left free after harvesting of paddy crop upto the month of May & June.During this period almost entire cattle population enter into nearby forest areas and damage forest crop. It is therefore necessary to know the grazing pressure. Excessive and uncontrolled grazing is also one of the factors affecting adversely natural regeneration and establishment of seedlings of Sal and other species. In some of the forest areas adjacent to the human habitations, uncontrolled and excessive grazing has led to the replacement of mesophytic flora by relatively more xerophytic, dry and thorny types of vegetation. In some places it has exposed forest floor and made it prone to soil erosion. The herbivores are unable to get sufficient food in forest. Grazing also causes irreparable harm to the young seedlings. The goat causes harm by eating even the unpalatable and thorny species. The ground becomes hard because of trampling and detrimental to the regeneration of forest species. Grazing increases the rate of degradation of the forests. In Phulbani Forest Division the grazing is a major problem to the forest, adjoining to the villages.

4.8.2 Illicit felling:-

Population explosion has imbibed adverse effect on the forests. Urban civilization has influenced people to construct modern houses with comfortable wooden amenities. Thus, lots of timber and firewood as well as Bamboos are being utilized for urbanization, running of hotels and restaurants etc. New houses are being constructed in the peripheries of Municipality's/N.A.C's/Block headquarters for domestic and shopping complexes. It is prominent around Phulbani, G.Udaygiri,

Tikabali, Phiringa, Gochhapada and Raikia etc. Phulbani Division is adopting different methods for checking illicit felling.

4.8.2.1 To check illicit felling the following strategies need to be adopted:

1. A good intelligence and information network is a pre-requisite to check illicit felling and smuggling of timber. Suspected places and routes should be patrolled by Division mobile squad at frequent intervals. In view of the present day smuggling and illicit felling practices by forest mafias in pre-planned, sophisticated and well-armed, it is desirable to develop a good communication network, armed mobile squad with supply of four wheeler vehicles to each territorial range so as to nab smugglers with a firm hand and check illicit felling as far as practicable.
2. The legal provisions as laid down in Orissa Forest Act, 1972, Wildlife protection Act, 1972, Forest Conservation Act, 1980 etc. should be enforced in appropriate manner with proper maintenance of case records and further follow up action in the relevant judicial forum in a meticulous manner. Effort should be made to award stringent punishment to the offenders so that others should not dare to practice illegal things in future for their personal gains.
3. The active members of the V.S.S. should be involved in forest protection works of the adjoining forest in a pre-planned manner. Regular meetings should be conducted and transparency, as far as practicable, should be maintained to overcome mutual distrust. Conflicts, if any, arising out of protection matters should be amicably resolved, so that bonding is strengthened. The assistance of other line departments like Police, Revenue, Agriculture etc. should be sought for when situation arises.
4. Today, the forest field functionaries have not only to act as natural resource managers with enforcement of provisions of relevant laws, but also as facilitators of community participation in sustainable development, protection and conservation of forest wealth. For facilitating community participation and involving people in decision making and planning, a suitable communication strategy is to be evolved.
5. Regular foot patrolling with the help of GPS-PDA device by the frontline staff of this Division may check and control illicit felling in highly illicit prone area.

Adequate mix of communication resources is to be evolved for effective communication. Intensive research and development support, incentive packages,

information sharing, education, strong feedback channels, media and message planning are continually required with image building. Communications through these modes are necessary between delivery system and recipient systems.

The challenge to curb illicit felling and sustainable development are to bring environmental issues, social requirements and economic necessities under the same umbrella of decision making. Communication aimed at achieving sustainable development must simultaneously promote the shift toward personal restraint and commitment and the introduction of systematic reforms to the institution of JFM.

4.8.2.2 Practice of Turmeric Cultivation:

Kandhamal is famous for good quality turmeric without application of chemical fertilizeri.e.purely organic. In the process the growers of turmeric require "Sal Gochha" which is collected from adjoining forest by indiscriminate cutting of sal regeneration, particularly pole crops, so as to provide cover to the turmeric rhizomes. The total area covered under turmeric cultivation is about 12000 Ha.

4.8.2.3 Encroachment:

Population explosion had resulted in 'land grab' by people living around forest areas. Especially, people who possess agriculture lands adjoining to the forest blocks intrude into the forest areas and gradually encroach forest land for agricultural use. It is a general trend that the notification of the reserved forests is to be exhibited during the trial of encroachment cases. But in actual practice, the authenticated copies of notification of the reserved forests cannot be produced at the time of trial. Due to non-production of the map, copies of notification, the case is decided in favour of the encroacher. Thus, the encroacher becomes the lawful owner of the forest land.

4.9 Pollution control and protection of environment

The Division is free from any industry, mining activities. Hence extent of forest degradation due to pollution (Soil, Water & Air) is negligible or almost nil.

Forest fire release pollutants like smoke, carbon monoxide, carbon dioxide into the atmosphere.The bigger the bushfire, the bigger emissions. It increases the air pollution subsequently, it increases atmospheric temperature. Hence now Govt. has taken prevention to minimize forest fire and air pollution.

4.9.1 Regulating Activities

Considering the importance and fragile nature of the eco-system, wildlife many regulations to protect the environment have been in force. These regulation / notifications are.

4.9.1.1 Ban on use of polythene of specified thickness.

The Government of Odisha, Forest & Environment Department has issued notification banning use of polythene, thermo cool etc. within the State:

(i) Polythene carry bags of any shape, thickness and size (excluding compostable);

(ii) Bottled drinking water Polyethylene Terephthalate (PET/PETE) bottles of less than 500 ml. capacity;

(iii) Single use disposable cutleries made up of thermocol (polystyrene) or plastic such as dish, spoon, cup, plate, glass, fork, bowl, straw, pouch to store liquid and container etc. of any size and shape &

(iv) Thermocol decorative materials (flowers and the like).

(Note: Compostable plastics shall conform to the Indian Standard: IS 17088:2008. The manufacturers or seller of compostable plastic carry bags shall obtain a certificate from the Central Pollution Control Board before marketing or selling.)

CHAPTER-5

5.0 CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

5.1. Area treated under soil and water conservation measures.

5.1.1 Water Resource Management

Water is the most critical limiting factor for many aspects of life, such as economic growth. Environmental stability, bio-diversity conservation, food security and health care. Thus, there is a constant need for conservation and management of water through-out the year. Soil is a natural resource with which the existence of the human being is closely associated. It is mantle on the land surface that act as a medium for plant growth. Soil may be defined as a sub aerial natural object at dynamic equilibrium with its environment. Soils are formed by many complex process of padogenic factors viz climate, relief, organisms, parent materials and time since different climatic zones have different characteristics, soils in different regions rejoins interims if regions colours, textures, depth, water reserves and nutrient supplying capacity. Since crop productions depends on the soil characteristics, it becomes mandatory to know about soils in a greater detail. The aim of soil conservation measures is to minimize soil loses for sustainable productivity. Soil loss or soil erosion occurs due to washing or blowing away of the top layer of soil by wind and water.

The loss of soil and water under natural vegetation is the lowest. But lands must be cultivated and grown with crops to produce food. This can be done without much harm to the soil if proper soil and water conservation methods are followed. Such methods aim at encouraging water to filtrate into the soil, reduce its velocity and check runoff losses.

The most common soil and water conservation methods are:-

1) **Management Practice**
   - Strip cropping
   - Mulching
   - Crop rotation
   - Contour cultivation
   - Planting of grasses for stabilizing bunds
   - Planting of trees and afforestation

2) Management Practice

- Terracing
- Gully or nallah control
- Control of stream and river banks

5.1. 2 Soil and water conservation measures.

5.1.2.1 Water Resource Management

A. Soil and water conservation IN-SITU – an innovative technique:

i. Techniques adopted:

Though there are several water harvesting measures, such as levelling of land, making of continuous contour trenches and other engineering measures, but, on sloppy, barren lands, a semi-circular ridge with the plant on the middle of the ridge, and a depression on the uphill side has proved most economical and effective.

This technique basically involves providing a depression on the uphill side and the soil, thus excavated, is used to construct a semi-circular ridge on the downhill side to act as a barrier to trap water. The stem of the plant, which is transplanted in a pit prior to making of depression, is embedded at the centre of the semi-circular ridge. The method of digging out soil and replacing excavated soil in the pit should also be explained to the people engaged in plantation work. Normally, soil is dug out and haphazardly thrown on the downhill side, where it is subjected to weathering. The entire dug out soil is not put back in the pit. A better approach would be to keep the organic matter rich top soil, and sub-soil separately. While re-filling the pit, the top soil should first be placed at the bottom of the pit, and the soil at top, after removing all pebbles and boulders, if any. Plants from the nursery should be transplanted such that only the portion upto collar level remains underground, and the pit does not remain sunken. After planting is over, the water harvesting structures should be made.

In case of sandy, sandy-loam and gravelly soils, where water does not stagnate, but percolates downward quickly, plants raised on berms of channels or embedded in semi-circular ridges, may not get adequate supply of moisture. In such areas, continuous contour trenches will be ideal. Vertical interval from channel to channel may vary from 5 m to 10 m, depending upon slope of the land. Depth of the 'V' shaped channel should be 30 cm and edge to edge distance will be 45 cm. Plants

will be raised in channels in pits. Grasses and shrubs to be raised on berms of channels. We may raise grasses, or horticultural trees in combination with grasses, or silvi-pasture, or only agriculture crops. Contour channels will hold rain water and collective action of so many channels will help in improving soil moisture regime and enhance overall productivity of the land. In due course of time, contour hedges will be created which will help in combating both, wind and water erosion.

ii. Result:

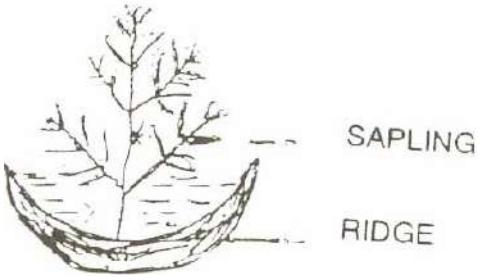
1. Root zone of plant gets optimum quantity of moisture for a longer period, since the tiny micro-watershed helps in percolation of water during rainy season into the deeper layers of soil.
2. Soil erosion is checked.
3. Collective action of large number of small reservoirs helps in improving ground moisture regime and recharging of aquifers. This water is available to agricultural crops at lower elevations.
4. Natural fodder grass quickly occupies intervening spaces, and its production increases with availability of moisture.
5. In degraded forest areas, naturally occurring species which exist in coppice form, attain rapid growth due to improvement in soil condition and more natural plant species and legumes appear in the area.
6. People can switch to stall feeding, when adequate quantities of grass leaf fodder are available.
7. Better moisture condition helps in better growth of bushes like Adhatodavasica.
8. An entire chain reaction starts as availability of more fodder and fuel wood means less time required for collection of these products. This in turn will enable people to devote more time to household and cottage industries.
9. Fruit trees can also give more returns in case harvesting structures are made.
10. Plants are firmly held and can thus withstand wind action to greater extent, in comparison to plants raised in sunken pits.
11. By adopting water harvesting technique, we can reduce expenditure on construction of irrigation canals, which are more damaging than beneficial, especially in the hills. In case government spends even half the money on water harvesting measures, as on irrigated areas, rainfed lands can produce much more food.

iii. <u>Conclusion:</u>

The water harvesting technique can help in exploiting the full potential of the land conserving both, soil and moisture. A key factor in future agricultural development in India is going to be efficient use of available water resources for crop production. The water harvesting technique, if sincerely adopted, will definitely play a pivotal role in helping increase overall productivity of forest and agricultural lands.

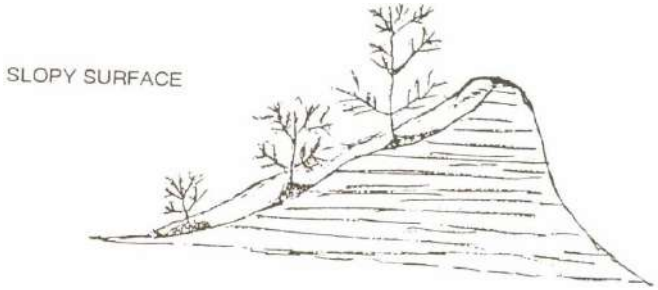
The Forest Department must take concerted efforts to generate technologies and extension material in local languages, for the benefit of people. We have to help in creating a massive people's movement for conservation, afforestation, forest protection and efficient use of forest products. The mass communication media and the extension network of forest and other Government agencies must join hands in dissemination of innovative techniques, especially water harvesting technique, for individual plants. This holds the key for rapid socio-economic development of rural areas and will effectively halt degradation of environment. The fig. 2 below depicts the innovative technique as regards to *In-situ* soil and moisture conservation measures to be adopted on sloppy land.

Fig. 2



TRAPPED: Rain Water in Depression made on uphill side

Water Harvesting Technique to assist soil and water conservation *In-situ*



Trapping surface water in small reservoirs; meant for individual plants; helps in maintaining optimum moisture and air regime in root zone which in turn facilitates uninterrupted availability of soil nutrients to plants for quick growth.

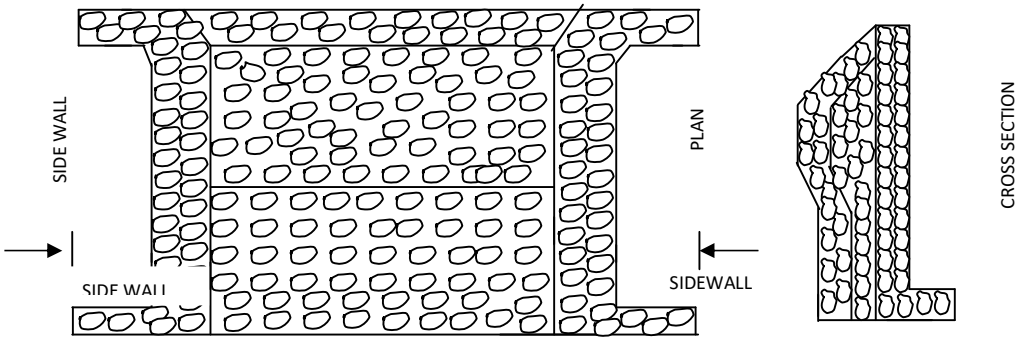
Hedge of bushes preferably of legume is raised on berm of 'V' shaped contour trench.

Continuous contour trenches on moderate slope of 20° - 30° along with small reservoirs for individual plants have proved very effective in conservation of soil and moisture *In-situ*.

B. <u>Soil and moisture conservation measures through traditional methods:</u>

1. **<u>Gully Plugging</u>**: Check dams are required to be erected across gullies. Loose boulder check dams are medium sized mechanical structures provided in the middle reaches of the gullies having a width of 1.0 mt to 3.0 mt. Rough stones of size of 0.15 to 0.3 cum are required for the construction of these structures. Earthen bunds should be provided in both sides of the structure. Height of the check dam should be regulated 1/3rd to ½ of the gully depth. These check dams should be constructed at regular intervals depending on the gradient, steeper the slope, more check dams are required. More number of check dams is required in category II areas since the slopes are steep and the velocity of runoff is high.

   <u>DESIGN OF A LOOSE BOULDER CHECK DAM</u>



2. Gully plugging can also be done with brushwood depending on the availability of material, requirements of sites and cost norms. The gully beds should be planted with soil- binders like Sabai grass, *Vetiver* grass, and *Agave*. Generally, for brushwood check dams, the height of the fall taken into consideration is 1mt. and the maximum width of the gully is 3mt and depth is 0.6 mts. The cost of brushwood check dam is given in the Chapter 20

3.Palisading, Agave Planting and Vegetative Bunding: With the available materials palisading has to be prepared along the contours to counteract the force of water movement 10- 20 mt apart, depending on the slope. Plantation of grass like Khus khus, Napier grass, Sachrum etc. should be done 10-20 mts from the second line and Agaves should be planted.

4.Contour Bunds: Contour bunds are constructed along the contours to arrest the water velocity. Grass turfing is given on the side slope and the top of the bund. The soil binding species like Vetiver grass are to be planted on the upper slope of the bund with a spacing of 0.23 mt.

5. **Staggered Trenches:** These trenches would be constructed along the contours. The trench should be of correct size (2mt x 0.5 mt x 0.5 mt), if it is undersize for any reason, equal trenches of more number to be dugout. The soil dug from the trenches should be kept at least one foot away from the trench in an inverted trapezium manner. This soil should be compacted and dribbled with the seeds. These trenches should not be resorted to when the slope is more than 30%. In these areas, trenches half the original size (2mt x 0.5 mt x 0.5 mt) can be taken up along the contour line. Generally the distance between the two trenches can be 3 mt along the contour and also 3 mts along the slope

6. Percolation Tanks: These tanks are to be constructed on flat areas of the highest point. Generally, each tank is to be dug out with dimensions of 5mt x 5mt x 0.5 mt. The width and the depth can vary depending on the availability

of the flat surface. The earth dugout from the tanks should be placed in an inverted trapezium and the soil should be compacted. No inlet and outlet to be provided from the percolation tank. The bunds should be treated with seeds Dhanicha (*Sesbania aculeala*), Sun hemp or even Horse gram.

5.2 Duration of water flow in the selected streams

This division has three major rivers namely, Salki, Bagh, Khadag. Baghanadi, forming the western boundary of the division separating it from Baliguda division to some extent in the Phiringia range. These three rivers are flowing from the southern part of the division towards the north; and they formulate the major perennial source of water supply. A number of tributaries are supplying water to these rivers. Salki & Baghnadi are the two main tributaries of river Mahanadi. But Khadagnadi is a tributary of Salkinadi. Salkinadi carries water from different parts of Raikia and G.Udaygiri range through a number of small nalas in one branch. Similarly, the other branch of Salkinadi, carries water from Khajuripada and Phulbani areas, in the name of Pilasalunki river, which remains perennial throughout the year. So the course of river Salki and its tributaries play a major role in supplying water to the local tribal people. Similarly, Khadag river, Baghnadi and its tributaries mostly remain perennial, along their course to supply water to the people of Phiringia range. In Karada range, Karada nala is the main tributary of the river Rusikulya supplying water to the Karada area and remains perennial throughout the year. Other tributary-nalas flowing in this area remain dry throughout the year except the rainy season.

The water supply in the eastern part of this division i.e. in Chakapad plateau depends on the tributary nalas of Burtangriver, originating from Burtang north & South and Chakapad hills. Burtang nala emerges as a stream from the Chakapad hills which subsequently meet Kalara nala to form Burtang nadi and runs downward through Nayagarh division to meet river Mahanadi. It is perennial throughout the year, but its tributaries remain dry except during rains. These are the major sources of water supply in this area besides the ground water. However water supply becomes scanty in summer when majority of the streams dry out.

This Division has collected information regarding duration of water flow in the some major seasonal streams/ rivers as below.

Table No. 5.1 Information on water flow in the selected streams

Sl. No.	Name of the Block	Name of stream/river	Original from	Passes through	Duration of water flow
1	Phulbani PRF	Panaspadar river	Bhetkhol	Adjacent to Phulbani PRF	10 month
2	Khaumunda RF	SakadiNala	Gumurukhol	Adjacent to Khaumunda PRF	8 month

3	Dakpala A RF	Luhurubali	Buluni village forest area	Adjacent to Dakpala Ä RF	10 month
4	Dadaki RF	Uleketanala	Uleketa	Pundali	Whole year
5	Kalabagh RF	Gunjimarinala	Gadapaju	Butumendi	10 month
6	Kalabagh RF	Orakajajhhora	Tadri	Krandijhari	Whole year
7	Katringia PRF	Kusumpaninala	Ranisbali	Palchi	Whole year
8	Palchi RF	Katramlanala	Mundasahi	Katramalanala	Whole year
9	Dutiemendi RF	Lambagudrinala	Arapaju	Balaskumpa, Sidingi	Whole year
10	Gumagada RF	Doninala	Doni	Gumagada	10 month
11	Gumagada RF	Bausa	Dubaghati	Gumagada	10 month
12	Gumagada RF	RangagudaNala	RingagaduNala	Badabhuin	10 month
13	Gumagada RF	Bhuktakanali	Bhuktakanali jungle	Bhuktakanali	10 month
14	Gumagada RF	Kuragadi	Koragadu	Dudulipadarasahi	June to April
15	Gumagada RF	Makarajharinala	Gumagada RF	Kambaguda village	Whole year
16	Brutanga N RF	Sakadi stream	Arapajku village	Sakadihatibadi	8 month
17	Pandrisuga RF	R.Nuagaon	Arapaju	Sidngi dam	10 month
18	Krandibali East RF	Baghanadi	Bandhagada	Bagali	Whole year
19	Ladapadar RF	Khadganadi	Khamankhol RF	Pandurgara	Whole year
20	Kiamunda PRF	Khadganadi	Khamankhol RF	Pijubali, Godapanga	Whole year
21	Gochhapada RF	Sunamudi river	Majhipada	Kanibali	Whole year
22	Baghanadi RF	Baghanadi	Bandhagada	Labangi, Murja	Whole year
23	Baghanadi RF	Budajornadi	Kaladi	Pindangi	Only rainy season
24	Krandibali (W) RF	Baghanadi	Bandhagada	Baladuli, Gadapanga	Whole year
25	Bandhagada A PRF	Baghanadi	Bandhagada	Panjapadar, Lambagudri	Whole year
26	Baghanadi RF	Kerengejodinala	Bandhagada	Kalamunda	Only rainy season
27	Sudrukumpa RF	Bananginala	Dadimari	Dadaki, Barpulia, Kholiapadara	July to April 10 month
28	Sudrukumpa RF	DodamaskaNala	Sarkesaru	Mallickpada	July to January 7 month
29	Ranipathar RF	NateikholaNala	Janmeni	Badghara, Badiguda, Panisal	July to March

5.3 Wetlands in forest areas

5.3.1Maintenance of water sources and wetlands

The hilly tracts of Phulbani are laden with several streams and perennial rivers in a criss-cross manner. The water sources need to be protected from silting, poisoning, and drain off. As the Dist. of Kandhamal is worst affected by the pernicious practice of shifting cultivation, appropriate soil and moisture conservation measures, both in degraded and barren sites, in the form of percolation tanks and appropriate

technique to tap and preserve rain water, should be carried out in specific sites which ultimately provides water source for the available wildlife population in the habitat.

The river systems of the Division constitute number of Watersheds and mini watersheds. The details of watersheds covering different forest blocks is furnished below.

Table No.- 5.2Watersheds Covering different blocks of Phulbani Forest Division

Sl. No.	MWS code	Type (Hill/Forest/ Reservoir)	Area in Ha.	Block name	MWS Area in Ha.
1	0406020306030203	Forest	623.09	Chakapad	778.92
2	0406020306040101	Forest	450.40	Chakapad	714.03
3	0406020306030101	Forest	394.74	Chakapad	619.47
4	0406020306030102	Forest	238.35	Chakapad	381.93
5	0406020306030201	Forest	252.39	Chakapad	548.23
6	0406020306030202	Forest	669.28	Chakapad	756.83
7	0406020306040102	Forest	714.22	Chakapad	1089.03
8	0406020306040202	Forest	310.86	Chakapad	537.37
9	0406020306040201	Forest	476.48	Chakapad	877.63
10	0406020306010201	Forest	542.20	Chakapad	733.41
11	0406020306010202	Forest	716.53	Chakapad	947.01
12	0406020306020104	Forest	380.98	Chakapad	562.26
13	0406020306020201	Forest	389.77	Chakapad	556.65
14	0406020306020202	Forest	368.55	Chakapad	601.52
15	0406020306020101	Forest	627.05	Chakapad	850.80
16	0406020306020102	Forest	534.99	Chakapad	679.64
17	0406020306020103	Forest	330.07	Chakapad	515.61
18	0407010307130102	Forest	84.37	Chakapad	1049.20
19	0407010304060101	Forest	816.88	Chakapad	1315.86
20	0407010304060102	Forest	581.71	Chakapad	941.15
21	0407010304060202	Forest	162.63	Chakapad	869.11
22	0407010304060201	Forest	594.80	Chakapad	778.33
23	0407010304050101	Forest	655.22	Chakapad	990.44
24	0407010304050201	Forest	111.28	Chakapad	1300.39
25	0407010304050102	Forest	478.23	Chakapad	786.86
26	0407010304070202	Forest	151.41	Chakapad	861.47
27	0407010304070102	Forest	80.57	Chakapad	520.43
28	0407010304070103	Forest	172.76	Chakapad	913.30
29	0407010304040202	Forest	33.20	Chakapad	542.08
30	0407010304030202	Forest	259.51	Chakapad	946.17
31	0407010304030102	Forest	448.16	Chakapad	704.51
32	0407010304030101	Forest	145.26	Chakapad	594.87
33	0407010304030201	Forest	341.91	Chakapad	1023.27
34	0407010304040201	Forest	202.41	Chakapad	593.55

35	0407010304010102	Forest	255.34	Chakapad	503.03
36	0407010304020102	Forest	531.24	Chakapad	912.29
37	0407010304140101	Forest	417.30	Chakapad	634.84
38	0407010304080203	Forest	1174.90	Chakapad	1670.79
39	0407010304080201	Forest	341.07	Chakapad	690.79
40	0407010307150202	Forest	221.60	Chakapad	960.67
41	0407010307150201	Forest	114.49	Chakapad	621.84
42	0407010307160203	Forest	249.50	Chakapad	1001.76
43	0407010307160102	Forest	208.30	Chakapad	835.69
44	0407010307160101	Forest	456.68	Chakapad	1051.66
45	0407010307160202	Forest	345.85	Chakapad	1069.70
46	0407010307160201	Forest	292.77	Chakapad	619.03
47	0407010307220101	Forest	441.26	Chakapad	909.35
48	0407010307220202	Forest	169.31	Chakapad	862.90
49	0407010307220201	Forest	459.44	Chakapad	993.25
Sub. Total			**19019.30**		**39818.87**
50	0407010304040203	Forest	271.99	Khajuripada	877.95
51	0407010304040102	Forest	155.40	Khajuripada	955.50
52	0407010306110102	Forest	405.25	Khajuripada	1257.65
53	0407010306110201	Forest	719.88	Khajuripada	1199.68
54	0407010306110202	Forest	661.14	Khajuripada	1024.61
55	0407010304090203	Forest	199.27	Khajuripada	843.90
56	0407010304090202	Forest	767.22	Khajuripada	1205.07
57	0407010305010102	Forest	654.89	Khajuripada	654.91
58	0407010305010101	Forest	946.23	Khajuripada	1110.05
59	0407010304080101	Forest	708.35	Khajuripada	813.03
60	0407010304080102	Forest	389.93	Khajuripada	948.67
61	0407010306100201	Forest	499.97	Khajuripada	646.95
62	0407010306100202	Forest	596.30	Khajuripada	1008.37
63	0407010306110101	Forest	343.22	Khajuripada	1064.42
64	0407010306100203	Forest	865.76	Khajuripada	946.54
65	0407010306080201	Forest	450.10	Khajuripada	530.42
66	0407010306080102	Forest	633.59	Khajuripada	977.19
67	0407010306080101	Forest	556.74	Khajuripada	724.15
68	0407010306090101	Forest	241.79	Khajuripada	825.26
69	0407010306070203	Forest	768.30	Khajuripada	802.19
70	0407010306090201	Forest	1133.05	Khajuripada	1464.68
71	0407010306080202	Forest	807.34	Khajuripada	1068.24
72	0407010306090102	Forest	159.70	Khajuripada	603.55
73	0407010307310101	Forest	380.98	Khajuripada	1253.63
74	0407010307360101	Forest	555.73	Khajuripada	1142.99
75	0407010307310102	Forest	252.90	Khajuripada	818.97
76	0407010307300101	Forest	173.35	Khajuripada	1231.57
77	0407010307340101	Forest	751.82	Khajuripada	1281.22
78	0407010307330102	Forest	230.81	Khajuripada	533.31
79	0407010307320202	Forest	379.20	Khajuripada	620.92
80	0407010307340102	Forest	383.40	Khajuripada	609.01

81	0407010307330101	Forest	628.80	Khajuripada	1110.99
82	0407010307340103	Forest	788.34	Khajuripada	1033.23
83	0407010307320101	Forest	184.14	Khajuripada	842.44
84	0407010307310202	Forest	555.68	Khajuripada	1029.07
85	0407010307310201	Forest	335.50	Khajuripada	777.07
86	0407010307320201	Forest	267.91	Khajuripada	1029.05
87	0407010307320102	Forest	228.01	Khajuripada	896.96
88	0407010307320103	Forest	54.67	Khajuripada	513.54
89	0407010307260102	Forest	40.56	Khajuripada	801.09
90	0407010307260202	Forest	32.63	Khajuripada	773.18
91	0407010307360104	Forest	390.21	Khajuripada	707.67
92	0407010307360102	Forest	662.17	Khajuripada	1061.95
93	0407010307240103	Forest	49.28	Khajuripada	683.26
94	0407010307240102	Forest	89.16	Khajuripada	806.41
95	0407010307240201	Forest	176.17	Khajuripada	851.42
96	0407010307240104	Forest	37.73	Khajuripada	412.68
97	0407010307230201	Forest	69.75	Khajuripada	1026.38
98	0407010307240101	Forest	73.79	Khajuripada	591.87
99	0407010307230103	Forest	26.35	Khajuripada	819.05
100	0407010307230202	Forest	41.82	Khajuripada	797.08
101	0407010307250202	Forest	28.18	Khajuripada	797.21
102	0407010307260101	Forest	175.51	Khajuripada	882.87
103	0407010307250203	Forest	248.59	Khajuripada	810.25
104	0407010307250101	Forest	71.22	Khajuripada	609.15
105	0407010307250201	Forest	3.77	Khajuripada	745.05
106	0407010307250102	Forest	57.82	Khajuripada	771.12
107	0407010307240202	Forest	150.71	Khajuripada	949.46
108	0407010307210202	Forest	81.89	Khajuripada	546.41
109	0407010307210201	Forest	148.37	Khajuripada	737.39
110	0407010307210101	Forest	253.23	Khajuripada	1234.93
111	0407010307210103	Forest	68.32	Khajuripada	938.29
112	0407010307210102	Forest	125.87	Khajuripada	999.13
113	0407010307230101	Forest	28.88	Khajuripada	607.43
114	0407010307230102	Forest	77.15	Khajuripada	871.12
Sub. Total			**22295.78**		**57108.83**
115	0407010502080202	Forest	489.82	Phiringia	497.00
116	0407010502050101	Forest	718.85	Phiringia	1319.72
117	0407010502050102	Forest	605.43	Phiringia	814.94
118	0407010502050201	Forest	581.05	Phiringia	860.99
119	0407010502070103	Forest	652.96	Phiringia	652.96
120	0407010502050202	Forest	415.25	Phiringia	731.57
121	0407010502080201	Forest	587.60	Phiringia	1067.04
122	0407010502080102	Forest	377.35	Phiringia	377.35
123	0407010502080101	Forest	673.83	Phiringia	779.85
124	0407010502070101	Forest	612.11	Phiringia	627.79
125	0407010502050203	Forest	795.54	Phiringia	833.56
126	0407010502070102	Forest	559.24	Phiringia	654.32

127	0407010502060201	Forest	536.43	Phiringia	681.51
128	0407010502060202	Forest	369.45	Phiringia	627.24
129	0407010502060101	Forest	1091.17	Phiringia	1134.42
130	0407010502060102	Forest	745.52	Phiringia	821.45
131	0407010502170202	Forest	431.97	Phiringia	896.17
132	0407010502170203	Forest	492.77	Phiringia	786.51
133	0407010503270101	Forest	332.19	Phiringia	1313.08
134	0407010503270201	Forest	328.05	Phiringia	1880.53
135	0407010503260104	Forest	388.13	Phiringia	907.30
136	0407010307100201	Forest	297.33	Phiringia	1382.90
137	0407010307100103	Forest	120.26	Phiringia	721.04
138	0407010307100202	Forest	264.09	Phiringia	854.75
139	0407010307280201	Forest	246.90	Phiringia	752.20
140	0407010309040103	Forest	218.31	Phiringia	1006.76
141	0407010309040202	Forest	301.71	Phiringia	1267.99
142	0407010309040104	Forest	190.63	Phiringia	693.86
143	0407010309040201	Forest	84.10	Phiringia	1103.95
144	0407010309030201	Forest	67.63	Phiringia	652.47
145	0407010309030202	Forest	202.96	Phiringia	762.49
146	0407010309030103	Forest	2.76	Phiringia	825.66
147	0407010309040101	Forest	388.38	Phiringia	1432.96
148	0407010309030203	Forest	446.70	Phiringia	1038.60
149	0407010309060102	Forest	685.74	Phiringia	988.14
150	0407010309060101	Forest	162.57	Phiringia	769.83
151	0407010309070102	Forest	166.72	Phiringia	612.44
152	0407010309070101	Forest	340.55	Phiringia	1037.55
153	0407010309060201	Forest	59.14	Phiringia	542.69
154	0407010309060202	Forest	202.97	Phiringia	798.92
155	0407010309050102	Forest	522.23	Phiringia	984.88
156	0407010309050101	Forest	427.25	Phiringia	949.59
157	0407010309050202	Forest	291.17	Phiringia	986.28
158	0407010309050201	Forest	395.06	Phiringia	1030.28
159	0407010309030102	Forest	139.03	Phiringia	725.03
160	0407010309010201	Forest	188.12	Phiringia	940.39
161	0407010309010202	Forest	151.37	Phiringia	915.05
162	0407010309010203	Forest	145.92	Phiringia	1049.36
163	0407010309010101	Forest	24.98	Phiringia	908.54
164	0407010309010103	Forest	58.76	Phiringia	737.32
165	0407010309010102	Forest	136.49	Phiringia	868.48
166	0407010309020201	Forest	85.00	Phiringia	1082.87
167	0407010309030101	Forest	102.30	Phiringia	821.72
168	0407010309020202	Forest	186.31	Phiringia	1145.53
169	0407010309020101	Forest	117.67	Phiringia	719.95
170	0407010309010204	Forest	58.68	Phiringia	834.46
171	0407010309020103	Forest	178.75	Phiringia	838.77
172	0407010309020102	Forest	20.22	Phiringia	551.25
173	0407010307180201	Forest	446.96	Phiringia	1039.47

174	0407010307180102	Forest	285.92	Phiringia	1157.23
175	0407010307180101	Forest	417.18	Phiringia	1311.40
176	0407010307190101	Forest	334.17	Phiringia	982.15
177	0407010307190201	Forest	220.45	Phiringia	934.05
178	0407010307190102	Forest	464.47	Phiringia	1044.84
179	0407010307170101	Forest	391.63	Phiringia	798.62
180	0407010309170203	Forest	628.46	Phiringia	900.97
181	0407010309170204	Forest	562.60	Phiringia	869.94
182	0407010309170102	Forest	323.83	Phiringia	711.58
183	0407010309170202	Forest	225.42	Phiringia	717.65
184	0407010309170201	Forest	432.17	Phiringia	683.43
185	0407010309160102	Forest	3.40	Phiringia	666.95
186	0407010309160101	Forest	128.22	Phiringia	554.23
187	0407010309150201	Forest	418.84	Phiringia	824.72
188	0407010309150202	Forest	255.05	Phiringia	519.77
189	0407010309160202	Forest	297.99	Phiringia	953.07
190	0407010309170101	Forest	493.15	Phiringia	1269.96
191	0407010309160103	Forest	225.20	Phiringia	907.24
192	0407010309160201	Forest	126.35	Phiringia	696.96
193	0407010309220201	Forest	747.54	Phiringia	890.01
194	0407010309200202	Forest	745.71	Phiringia	753.19
195	0407010309200203	Forest	804.02	Phiringia	936.96
196	0407010309230101	Forest	450.47	Phiringia	956.39
197	0407010309220102	Forest	63.01	Phiringia	709.45
198	0407010309240103	Forest	719.37	Phiringia	961.56
199	0407010309240102	Forest	422.00	Phiringia	935.73
200	0407010309240203	Forest	495.61	Phiringia	574.04
201	0407010309240201	Forest	440.67	Phiringia	1021.09
202	0407010309230102	Forest	630.84	Phiringia	645.03
203	0407010309200201	Forest	641.43	Phiringia	699.57
204	0407010309240101	Forest	173.29	Phiringia	755.04
205	0407010309230103	Forest	1011.97	Phiringia	1052.97
206	0407010309150203	Forest	185.40	Phiringia	805.89
207	0407010309100104	Forest	383.16	Phiringia	923.37
208	0407010309080102	Forest	147.92	Phiringia	697.85
209	0407010309070201	Forest	529.91	Phiringia	1096.80
210	0407010309080101	Forest	454.34	Phiringia	974.64
211	0407010309080103	Forest	101.90	Phiringia	529.43
212	0407010309080201	Forest	297.24	Phiringia	951.26
213	0407010309080202	Forest	459.98	Phiringia	852.77
214	0407010309140103	Forest	570.98	Phiringia	819.89
215	0407010309130202	Forest	527.28	Phiringia	786.59
216	0407010309140102	Forest	3.13	Phiringia	442.63
217	0407010309140101	Forest	372.23	Phiringia	932.69
218	0407010309130102	Forest	1042.29	Phiringia	1208.74
219	0407010309130201	Forest	198.70	Phiringia	667.50
220	0407010309150101	Forest	343.82	Phiringia	935.87

221	0407010309140203	Forest	367.88	Phiringia	693.02
222	0407010309150102	Forest	408.15	Phiringia	718.16
223	0407010309140202	Forest	296.33	Phiringia	706.56
224	0407010309140201	Forest	305.36	Phiringia	822.14
225	0407010309110202	Forest	498.89	Phiringia	790.41
226	0407010309110104	Forest	10.19	Phiringia	777.64
227	0407010309110201	Forest	186.75	Phiringia	757.19
228	0407010309110101	Forest	0.98	Phiringia	811.20
229	0407010309120202	Forest	325.41	Phiringia	690.63
230	0407010309120201	Forest	264.14	Phiringia	757.20
231	0407010309130101	Forest	339.30	Phiringia	820.94
232	0407010309120101	Forest	175.50	Phiringia	712.62
		Sub. Total	**42287.99**		**101719.10**
233	0407030407270202	Forest	102.79	Phulbani	519.13
234	0407010307300202	Forest	150.70	Phulbani	852.96
235	0407010307310103	Forest	139.50	Phulbani	666.20
236	0407010307290202	Forest	306.86	Phulbani	884.51
237	0407010307290201	Forest	27.82	Phulbani	748.35
238	0407010307300201	Forest	195.31	Phulbani	492.57
239	0407010307300102	Forest	159.56	Phulbani	675.05
240	0407010307350102	Forest	712.86	Phulbani	1102.08
241	0407010307350101	Forest	622.66	Phulbani	698.53
242	0407010307270101	Forest	72.89	Phulbani	806.86
243	0407010307260203	Forest	189.90	Phulbani	899.23
244	0407010307270102	Forest	115.08	Phulbani	695.15
245	0407010307260201	Forest	111.11	Phulbani	830.22
246	0407010307270103	Forest	204.04	Phulbani	492.47
247	0407010307280202	Forest	69.93	Phulbani	871.34
248	0407010307290102	Forest	233.77	Phulbani	818.09
249	0407010307290101	Forest	28.07	Phulbani	948.46
250	0407010307280103	Forest	170.30	Phulbani	1027.90
251	0407010307270201	Forest	174.12	Phulbani	698.15
252	0407010307280101	Forest	217.38	Phulbani	808.76
253	0407010307280102	Forest	105.75	Phulbani	679.89
254	0407010307180202	Forest	104.71	Phulbani	709.33
255	0407010307170202	Forest	217.93	Phulbani	609.71
256	0407010307200202	Forest	363.87	Phulbani	942.63
257	0407010307200201	Forest	56.91	Phulbani	676.24
258	0407010307200102	Forest	80.64	Phulbani	878.34
259	0407010307200101	Forest	557.44	Phulbani	1069.41
260	0407010307190202	Forest	139.64	Phulbani	795.85
261	0407010309180201	Forest	293.99	Phulbani	818.77
262	0407010309190101	Forest	92.17	Phulbani	982.98
263	0407010309180202	Forest	51.56	Phulbani	557.70
264	0407010309180101	Forest	66.76	Phulbani	963.45
265	0407010309180102	Forest	255.56	Phulbani	668.83
266	0407010309220103	Forest	331.57	Phulbani	737.85

267	0407010309220101	Forest	1.51	Phulbani	773.93
268	0407010309190201	Forest	3.09	Phulbani	809.89
269	0407010309190202	Forest	73.30	Phulbani	836.38
270	0407010309190102	Forest	248.04	Phulbani	871.59
271	0407010309190103	Forest	467.23	Phulbani	853.66
272	0407010309200103	Forest	196.96	Phulbani	832.11
273	0407010309200104	Forest	132.44	Phulbani	702.66
274	0407010309200102	Forest	162.66	Phulbani	895.33
275	0407010309200101	Forest	87.96	Phulbani	462.50
276	0407010309090202	Forest	162.18	Phulbani	887.87
277	0407010309090203	Forest	247.49	Phulbani	570.15
278	0407010309100202	Forest	340.35	Phulbani	1151.19
279	0407010309090201	Forest	251.88	Phulbani	1035.98
280	0407010309100201	Forest	705.55	Phulbani	843.43
281	0407010309100101	Forest	303.35	Phulbani	704.69
282	0407010309100102	Forest	150.81	Phulbani	485.04
283	0407010309100103	Forest	335.13	Phulbani	635.61
284	0407010309070202	Forest	256.47	Phulbani	598.73
285	0407010309090101	Forest	258.99	Phulbani	991.35
286	0407010309090102	Forest	190.51	Phulbani	864.97
		Sub. Total	**11299.05**		**42434.04**
287	0406020308150201	Forest	653.03	Raikia	799.01
288	0406020308150202	Forest	104.09	Raikia	396.73
289	0406020308150203	Forest	713.02	Raikia	1011.34
290	0406020305030202	Forest	759.50	Raikia	983.28
291	0406020305030201	Forest	757.46	Raikia	1017.69
292	0406020305030102	Forest	502.69	Raikia	1044.13
293	0406020305030203	Forest	276.99	Raikia	289.79
294	0406020305040101	Forest	224.12	Raikia	1150.94
295	0406020308140102	Forest	750.20	Raikia	1096.01
296	0406020308140201	Forest	337.21	Raikia	795.62
297	0406020308140202	Forest	396.02	Raikia	610.90
298	0406020305030101	Forest	332.89	Raikia	477.90
299	0406020308150103	Forest	311.45	Raikia	532.02
300	0406020308150102	Forest	495.06	Raikia	785.43
301	0406020305020201	Forest	370.03	Raikia	608.93
302	0406020305020102	Forest	466.55	Raikia	678.31
303	0406020305020202	Forest	411.29	Raikia	706.67
304	0406020308140101	Forest	522.58	Raikia	873.30
305	0406020305010103	Forest	578.68	Raikia	578.68
306	0406020305010201	Forest	341.85	Raikia	493.36
307	0406020305020101	Forest	594.69	Raikia	682.80
308	0406020308100102	Forest	659.78	Raikia	785.78
309	0406020308100103	Forest	560.50	Raikia	583.13
310	0406020308090203	Forest	519.85	Raikia	628.39
311	0406020308100101	Forest	698.52	Raikia	819.27
312	0406020308110101	Forest	775.06	Raikia	1080.89

313	0406020308100202	Forest	950.53	Raikia	1025.82
314	0406020308090102	Forest	507.03	Raikia	699.67
315	0406020308090101	Forest	588.91	Raikia	860.01
316	0406020308070102	Forest	665.17	Raikia	810.30
317	0406020308130201	Forest	467.84	Raikia	952.66
318	0406020308130202	Forest	455.22	Raikia	890.81
319	0406020308120201	Forest	646.48	Raikia	1336.45
320	0406020308120102	Forest	183.55	Raikia	208.29
321	0406020308120101	Forest	2.80	Raikia	1081.15
322	0406020308130102	Forest	540.88	Raikia	932.33
323	0406020308120202	Forest	991.28	Raikia	1310.17
324	0406020308130101	Forest	520.35	Raikia	867.82
325	0406020308110201	Forest	494.07	Raikia	994.74
326	0406020308110102	Forest	619.83	Raikia	769.76
327	0406020308110203	Forest	581.80	Raikia	911.34
328	0406020308110202	Forest	602.60	Raikia	879.73
329	0407010503010103	Forest	576.64	Raikia	864.27
330	0407010503100202	Forest	669.23	Raikia	1571.99
331	0407010503100201	Forest	427.24	Raikia	1013.48
332	0407010503100103	Forest	395.64	Raikia	1783.17
333	0407010503110101	Forest	193.24	Raikia	909.37
334	0407010503110102	Forest	262.61	Raikia	1027.58
335	0407010503110201	Forest	268.65	Raikia	1043.27
336	0407010503110202	Forest	51.43	Raikia	916.06
337	0407010503010101	Forest	198.76	Raikia	1102.20
338	0407010307080102	Forest	194.43	Raikia	1055.71
339	0407010307080101	Forest	34.71	Raikia	780.11
340	0407010307070101	Forest	53.49	Raikia	725.08
341	0407010307060101	Forest	95.08	Raikia	1024.21
342	0407010307010201	Forest	93.10	Raikia	696.68
343	0407010307010202	Forest	81.09	Raikia	1146.74
		Sub. Total	**25526.81**		**49701.29**
344	0407010307070203	Forest	320.18	Tikabali	585.48
345	0407010307070202	Forest	35.63	Tikabali	685.62
346	0407010307060201	Forest	225.81	Tikabali	1035.04
347	0407010307060202	Forest	574.07	Tikabali	832.91
348	0407010307080201	Forest	701.13	Tikabali	1327.91
349	0407010307130202	Forest	45.31	Tikabali	1021.42
350	0407010307130201	Forest	235.01	Tikabali	956.90
351	0407010307040202	Forest	41.86	Tikabali	719.78
352	0407010307050101	Forest	90.35	Tikabali	1049.25
353	0407010307050202	Forest	46.10	Tikabali	919.20
354	0407010307060102	Forest	208.04	Tikabali	739.65
355	0407010307080202	Forest	560.96	Tikabali	1235.17
356	0407010307090102	Forest	49.97	Tikabali	658.56
357	0407010307090101	Forest	428.03	Tikabali	1353.68
358	0407010307120103	Forest	254.26	Tikabali	632.98

359	0407010307130101	Forest	49.99	Tikabali	1031.25
360	0407010307110103	Forest	161.17	Tikabali	820.05
361	0407010307120102	Forest	321.60	Tikabali	587.81
362	0407010307110101	Forest	83.48	Tikabali	816.72
363	0407010307110102	Forest	369.67	Tikabali	952.19
364	0407010307120101	Forest	184.21	Tikabali	671.84
365	0407010307110202	Forest	149.88	Tikabali	763.82
366	0407010307110201	Forest	25.61	Tikabali	699.46
367	0407010304020201	Forest	551.92	Tikabali	649.85
368	0407010304020202	Forest	480.91	Tikabali	668.54
369	0407010304020101	Forest	761.62	Tikabali	1139.97
370	0407010307170201	Forest	156.58	Tikabali	610.87
371	0407010307150103	Forest	383.48	Tikabali	1054.83
372	0407010307150102	Forest	52.45	Tikabali	825.23
373	0407010307150101	Forest	91.37	Tikabali	915.80
374	0407010307140202	Forest	153.32	Tikabali	885.83
375	0407010307170102	Forest	284.23	Tikabali	627.66
376	0407010307170103	Forest	385.28	Tikabali	630.25
		Sub. Total	**8463.45**		**28105.51**
377	0406020305040103	Forest	547.67	G.Udayagiri	970.74
378	0406020305060101	Forest	631.23	G.Udayagiri	799.33
379	0406020305040201	Forest	933.60	G.Udayagiri	1619.44
380	0406020305040102	Forest	41.53	G.Udayagiri	833.09
381	0406020305080201	Forest	103.83	G.Udayagiri	769.21
382	0406020305060102	Forest	329.32	G.Udayagiri	752.31
383	0406020305080101	Forest	105.31	G.Udayagiri	947.41
384	0407010307040201	Forest	95.83	G.Udayagiri	982.61
385	0407010307030201	Forest	16.66	G.Udayagiri	1162.83
386	0407010307030202	Forest	192.87	G.Udayagiri	651.55
387	0407010304010202	Forest	460.44	G.Udayagiri	1036.08
388	0407010304010101	Forest	224.89	G.Udayagiri	637.27
389	0407010304010201	Forest	109.45	G.Udayagiri	968.21
390	0407010304010203	Forest	337.92	G.Udayagiri	596.24
391	0407010307020102	Forest	387.60	G.Udayagiri	1229.40
392	0407010307020101	Forest	139.62	G.Udayagiri	888.68
393	0407010307010102	Forest	463.41	G.Udayagiri	1092.13
394	0407010307010101	Forest	297.86	G.Udayagiri	1017.22
395	0407010307020203	Forest	34.93	G.Udayagiri	577.48
396	0407010307030101	Forest	255.84	G.Udayagiri	932.22
397	0407010307030102	Forest	105.70	G.Udayagiri	1043.50
398	0407010307020201	Forest	586.90	G.Udayagiri	1128.14
399	0407010307020202	Forest	182.24	G.Udayagiri	778.87
400	0407010307140201	Forest	22.96	G.Udayagiri	900.69
		Sub. Total	**6607.63**		**22314.66**
		Grand Total	**135500.02**		**341202.30**

5.3.2Addition of new wetlands and waterbodies:

The list of new wetlands and water bodies created under different scheme in Phulbani Sub- Division area is furnished below;

Table No.-5.3 List of Water bodies created under different schemes.

Year of construction	Name of the scheme	Range	Site	No. Created	Rate	Amount Spent
2012-13	CAMPA APO 2011-12 (WILD LIFE MGMT)	Tikabali	Chakapad RF (Jitaghati)	2	200000	400000
		Phiringia	Tetekapadar	1	200000	200000
			Total	**3**		**600000**
2013-14	CAMPA APO 2012-13	Phiringia	Gocchapada RF (Derakumpa)	1	250000	250000
		Phiringia	Bandhagada B RF	1	250000	250000
		Sudrukumpa	Ranipathar RF	3	250000	750000
		Phulbani	Dakpalla RF	1	250000	250000
		Phulbani	Phulbani PRF	1	250000	250000
		G.Udayagiri	Pukulingia RF	2	250000	500000
		Tikabali	Nediguda(Kadami)	1	250000	250000
			Total	**10**		**2500000**
2013-14	CAMPA APO 2011-12 (WILD LIFE MGMT)	Tikabali	Chakapad RF (Jenaguda)	3	250000	750000
		Raikia	Karada PRF	1	250000	250000
			Total	**4**		**1000000**
2014-15	CAMPA APO 2013-14	Phiringia	Kellapada "B" PRF	1	250000	250000
		Phiringia	Gerupada East RF	1	250000	250000
		Phiringia	Krandibali East RF	1	250000	250000
		Phulbani	Mularujangi-1	1	250000	250000
		Phulbani	Mularujangi-2	1	250000	250000
		Phulbani	Mularujangi-3	1	250000	250000
		Phulbani	Sarupada-1	1	250000	250000
		Phulbani	Sarupada-2	1	250000	250000
		Phulbani	Kalamburi-1	1	250000	250000
		Phulbani	Kalamburi-2	1	250000	250000
		Phulbani	Sakadi-1	1	250000	250000
		Phulbani	Sakadi-2	1	250000	250000
		Phulbani	Baikhol	1	250000	250000
		Phulbani	Dedibali	1	250000	250000
		Phulbani	Bulungi	1	250000	250000
		Phulbani	Damigaon	1	250000	250000
		Phulbani	Kanidani	1	250000	250000

		Phulbani	Pusipaju	1	250000	250000
		Phulbani	Landreju	1	250000	250000
		Phulbani	Pabedi	1	250000	250000
		Phulbani	Bhaliapada	1	250000	250000
		Phulbani	R.Nuagaon	1	250000	250000
		Phulbani	Medrikhole	1	250000	250000
		Phulbani	Sarachud	1	250000	250000
		Phulbani	Lambagudri	1	250000	250000
		Phulbani	Landrupada	1	250000	250000
		Phulbani	Arasahi	1	250000	250000
		Phulbani	Gedripaju	1	250000	250000
			Total	**28**		**7000000**
2014-15	CAMPA APO 2011-12 (WILDLIFE MGMT)	Phulbani	Katringia PRF (Sraki)	1	250000	250000
		Phulbani	Katringia PRF (Pabedi)	1	250000	250000
		Phulbani	Gumagada RF (Kenpaju)	1	250000	250000
		Phulbani	Gumagada RF (Dubaghati)	1	250000	250000
			Total	**4**		**1000000**
2015-16	CAMPA APO 2011-12 (WILD LIFE MGMT)	Raikia	Karada PRF (Kendukhari)	1	250000	250000
		Raikia	Karada PRF (Podhamari)	1	250000	250000
			Total	**2**		**500000**
			GRAND TOTAL	**51**		

5.4 Water level in the wells in the vicinity (up to 5 Km) of Forest area.

5.4.1 Ground Water

Estimation of Ground Water Resource is essential before planning any programme for development of ground water resource. It involves study of various factors affecting ground water recharge and discharge and demarcation of potential area of ground water development. Rainfall, seepage from tanks & ponds are some of the principal source of recharge to ground water. As per the study group for the year 2009 the following facts of ground water resource of Phulbani district is revealed. The Phulbani district has an annually replenishable ground water resource of 70266 Hectare Meter (HM), out of which 8748 HM is committed for the

domestic and industrial requirements for coming 25 years based on the projected population. The block wise ground water resource as estimated by the study group has been presented in the following table. The present draft for irrigation use has been estimated as 1745 HM .The overall stage of ground water development which includes both domestic and irrigation in the district as a whole is 12.45% . Based on the hydrogeological, as well as availability of other source for irrigation, the ground water development in some blocks has been found to be very low. The stage of ground water development for all purpose (Irrigation + Domestic etc) has been found to be maximum in Tikabali block (16.85%) with the net ground water available for future development is 4532.

The water level information of this Division those which has been provided by the Hydrology department were collected on the following basis.

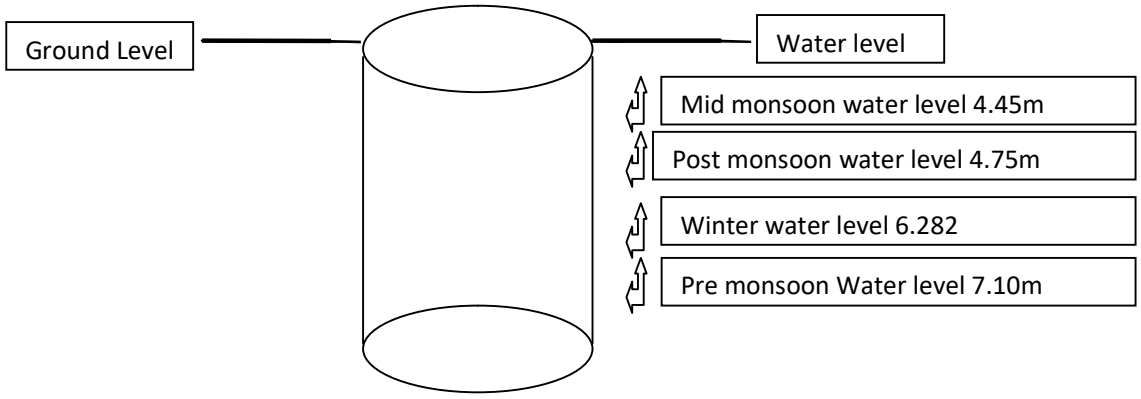
Table No.-5.4 Information on Ground water level

BLOCK	Location of Observation wells	2017 Winter	2017 Pre Mon	2017 Mid Mon	2017 Post Mon	2018 Winter	2018 Pre Mon	2018 Mid Mon	2018 Post Mon
Chakapada	Pasara; RHS of the road from Tikabali to Chakapada	5.07	6.16	1.5	1.47	4.14	5.02	0.73	0.8
Chakapada	Chakapada; inside Birupakhya temple	4.51	6.2	2.61	3.07	5.34	5.79	2.07	2.11
Chakapada	Patharkata; RHS of the road from Chakapada to Bajragada	4.47	5.83	0.75	3.17	4.27	5.23	0.4	1.65
Chakapada	Bajragada; RHS of road , inside the village	4.06	5.33	1.75	3.16	3.92	4.88	0.9	2.28
G.Udayagiri	Behind Forest Range Office	11.64	13.82	10.88	10.57	11.74	12.25	8.15	10.27
G.Udayagiri	Rishuguda; inside the UP School campus	8.07	9.74	8.06	8.48	7.86	8.95	5.68	7.58

G.Udayagiri	Kalingajn; RHS of road Phulabani to BAM	4.77	5.9	0.51	3.61	4.67	4.57	2.91	3.97
G.Udayagiri	Balumaha; LHS, entrance of the village 5 kms from Kalinga.	6.7	7.9	6.9	5.97	7.44	6.7	4.6	5.1
Khajuripada	Khajuripada; Block Colony Campus	8.98	9.8	5.75	7.25	8.98	9.81	5.03	4.70
Khajuripada	Nuagaon; inside ME School campus	9.6	9.87	3.68	6.47	6.94	8.44	2.50	5.33
Khajuripada	Khajuripada; Back side of Block office	8.35	8.45	5.87	8.1	8.21	8.77	4.21	4.82
Khajuripada	Dutimendi; Back side of the house of SatyabadiDe huri	7.05	8.13	1.67	0.86	5.52	9.14	0.85	0.68
Khajuripada	Dutipada; inside UP School campus	5.7	6.01	4.65	5	5.7	5.82	3.84	4.45
Khajuripada	Gudari; near Air strip Gudari on SH-1	8.67	8.82	4.35	5.5	7.22	8.75	1.70	5.10
Phiringia	Phiringia; Block office campus	12.71	13.7	8.35	11.81	12.93	13.54	6.11	10.9
Phiringia	Bandhagada Anganabadik endra	8.22	8.15	5.96	7.6	8.4	8.89	6.08	4.94
Phiringia	Kelapada; infront of KadapaPadap adma society.	8.17	9.17	7.35	6.67	8.09	8.78	6.12	5.58
Phiringia	Nuapadar; near Shiva Sharma U.P. School	5.45	7	4.91	4.18	5.65	6.78	3.7	3.09
Phiringia	Gochhapada; near a culvert	2.31	4.93	3.75	1.15	2.23	3.55	3.63	0.75

Phiringia	Salaguda; infront of the U.P.School near a pond.	1.05	3.37	2.16	1.77	1.28	2.13	2.29	0.87
Phulbani	Phulbani; GWS&I Sub-division, Campus, Kendupadar	9.59	9.08	2.61	7.27	7.95	8.01	3.22	6.23
Phulbani	Keridi; near the house of SadanandaDigal	6.84	10.21	3.82	5.68	6.51	9.79	2.63	4.43
Phulbani	Kasakathi; LHS of road from Bisipada to Phiringia	8.14	10.63	5.76	6.45	7.69	9.90	3.98	3.43
Phulbani	Rujangi; near the house of Damodargayantia	8.27	10.13	4.73	4.91	7.53	9.11	3.38	5.13
Phulbani	Tudipaju; RHS of road Phulbani to Kataringia,in the field	10.35	11.16	2.13	7.65	9.86	10.53	2.95	5.12
Raikia	Raikia; Block Office Campus	8.07	10.15	10.58	5.75	7.63	9.05	9.53	7.25
Raikia	Mandasara; in front of the Teacher's colony	5.56	8.5	5.87	4.57	5.17	7.87	4.63	3.42
Raikia	Petamaha; in front of the U.P.School	10.44	13.56	9.05	9.36	9.48	12.38	7.38	9.45
Raikia	Lengumaha; at Lengumahachakka- near Trinath temple	7.78	8.9	6.78	5.97	7.15	8.75	5.65	5.6
Raikia	Adasikumpa; LHSp-6 kms from Paburia on MDR 15.	10.11	7.96	6.02	7.15	8.89	10.43	2.8	6.37
Tikabali	Tikabali; Block Office Campus	8.35	8.45	5.77	6.1	8.23	5.2	1.96	3.3

Tikabali	Boriguda; inside village	12.48	14.08	9.91	10.01	11.82	12.48	4.65	8.88
Tikabali	Sarathaguda; in front of the house of BiswanathPradhan.	6.65	6.98	3.41	4.62	6.55	5.48	2.35	3.62
Tikabali	Kainjhara; infront of Vterinary Office	10.8	11.07	8.49	5.54	10.22	11.96	5.34	4.73



5.4.2 Availability of drinking water facilities:-

Table No.-5.5 Status of drinking water supply as on 31.03.2017			
CD block name	**Spot sources tube well/ Sanitary well**	**Solar and Pump PWS**	**Commissioned pipe w/s scheme**
Chakapad	1269	14	17
G.Udayagiri	848	15	13
Khajuripada	1231	36	16
Phiringia	1740	28	25
Phulbani	1136	22	20
Raikia	1255	23	16
Tikabali	1088	28	19
Total	**8567**	**166**	**126**

5.5 Status of aquifers

There is no such data available in this Division.

CHAPTER-VI

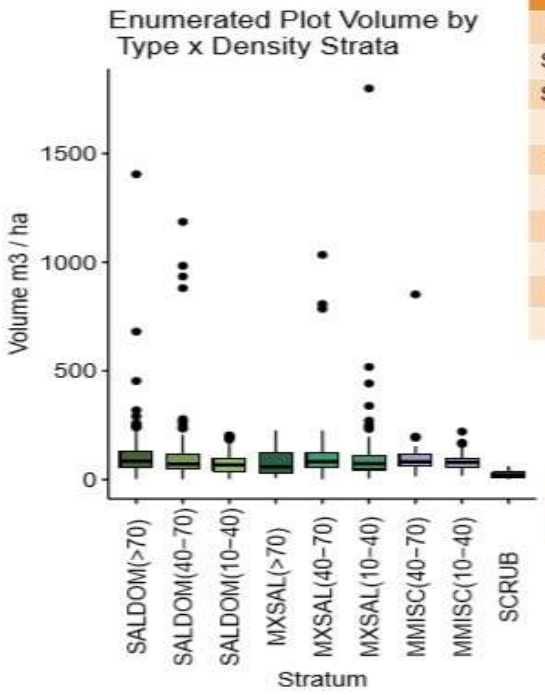
6.0 MAINTENANCE AND ENHANCEMENTOF FORESTRESOURCE PRODUCTIVITY

6.1 Growing stock of wood:

Sample point enumeration of trees has been carried out in 1062 Nos. Of UID points provided by FSI. The area of each point was 0.1 ha (31.62 mtr X 31.62 mtr) basing upon the nos. of trees available and volume of single tree as per local volume table. The volume of growing stock of wood (cum) has been calculated.

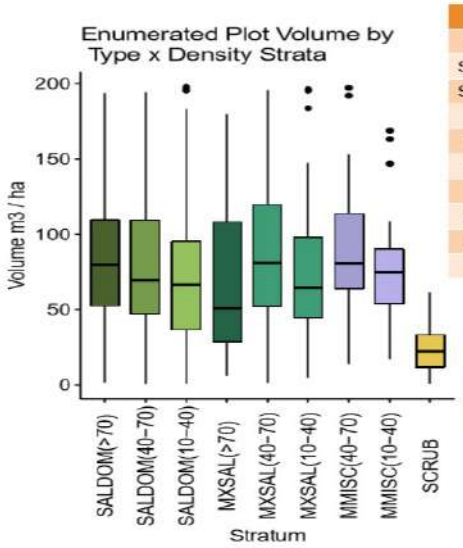
Table No. 6.1 Stand volume parameters – Phulbani Division.

No. of trees / ha.	Basal Area per Ha. (in M^3)	Volume per ha (in M^3)	Mean Volume (in M^3)	Standard Error	LB (in M^3)	UB(in M^3)
300.51	10.8	77.38	80.41	0.02	77.29	83.53



Stratum	Numpt	MeanPerHa
SALDOM(>70)	219	104.99
SALDOM(40−70)	309	95.18
SALDOM(10−40)	161	72.35
MXSAL(>70)	24	77.91
MXSAL(40−70)	163	102.73
MXSAL(10−40)	77	117.39
MMISC(>70)	3	94.48
MMISC(40−70)	34	107.92
MMISC(10−40)	27	84.45
SCRUB	43	25.81

TreesPerHa	BAPerHa	VolPerHa
306.58	12.54	93.44



Stratum	Numpt	MeanPerHa
SALDOM(>70)	202	84.88
SALDOM(40–70)	298	79.47
SALDOM(10–40)	160	71.53
MXSAL(>70)	23	71.46
MXSAL(40–70)	156	84.96
MXSAL(10–40)	69	71.65
MMISC(>70)	3	94.48
MMISC(40–70)	33	85.37
MMISC(10–40)	26	79.22
SCRUB	43	25.81

TreesPerHa	BAPerHa	VolPerHa
300.51	10.8	77.38

MeanVol	SE	LB	UB
80.41	0.02	77.29	83.53

6.2 Growing Stock of Bamboo

During Sample enumeration Bamboo has been recorded in Sample points confined to Chakapad RF, Kalabagh RF, Palch RF, Archangi 'A' RF, Archangi 'B' RF, Karada PRF, Nandbali PRF, Machaghat RF, Ranaba RF Sudrukumpa RF, Ranipathar RF, Donga RF. The bamboo forest of this Division is estimated to be 68.6 %.

6.3 Increment in volume of identified timber species

Field exercise has been conducted to find out the increment of important timber species like Sal, Bija, Asan, Arjun, and Teak. The Age has been ascertained, its Girth at Breast Height and Top height measured. The data so collected are furnished below.

Table 6.2: Increment in volume of identified Timber species

Name of Species	Age	10 yr	20 yr	30 yr	40 yr	50 yr	60 yr
Sal	GBH in cm	20	31	61	75	95	125
	Height in Meter	3.3	6.2	11	18	24	28
	Volume in cum	0.036716	0.04287	0.14777	0.26607	0.50603	1.02255
Bija	GBH in cm	23	37	71	90	116	140
	Height in Meter	4	7.8	14	19	21	26
	Volume in cum	0.01869	0.04403	0.26162	0.47951	0.88954	1.38277
Asan	GBH in cm	22.5	36	68	85	105	132

	Height in Meter	4.1	8.1	13.8	19.2	22.5	26.9
	Volume in cum	0.03436	0.04287	0.2122	0.38749	0.66954	0.96563
Arjun	GBH in cm	24	42	80	95	116	150
	Height in Meter	5.2	9.8	16.2	21.5	24	28.5
	Volume in cum	0.00988	0.05705	0.34214	0.64032	1.06572	2.11613
Dhaura	GBH in cm	23	41	78	89	104	141
	Height in Meter	5	8.9	15.4	19.8	24.2	27.5
	Volume in cum	0.00873	0.04937	0.30919	0.51756	0.86377	1.8042
Teak	GBH in cm	25	43	60	92	130	152
	Height in Meter	5.5	9.5	15.8	23.5	25.2	30.4
	Volume in cum	0.01134	0.05797	0.1877	0.65638	1.4054	2.31779

From the above growth data recorded during field exercise & with the volume calculated using Volume equation published by FSI, the annual increment is calculated as follows.

Table 6.3: Volume equation as derived and annual increment

Name of Species	Growth in (10-20 year) in cum					Annual increment predicted	Remark.
	10-20 Yr	20-30 Yr	30-40 Yr	40-50 Yr	50-60 Yr		
Sal	0.027714	0.1157	0.1183	0.23996	0.51652	0.020364	
Bija	0.02534	0.21759	0.21789	0.41003	0.49323	0.027282	
Asan	0.00851	0.16933	0.17529	0.28205	0.29609	0.018625	
Arjun	0.04717	0.28509	0.29818	0.4254	1.05041	0.042125	
Dhaura	0.04064	0.25982	0.20837	0.34621	0.94043	0.035909	
Teak	0.04663	0.12973	0.46868	0.74902	0.91239	0.046129	

6.4 Efforts towards enhancement of forest productivity through quality plantation activities.

Plantation have been raised in different forest blocks and outside area by the Divisional Forest Officer, Phulbani Forest Division. The list of ANR plantations under different scheme is as under;

List of ANR Plantation in Phulbani Forest Division

During2007-08 TO 2017-18

Year	Scheme	Range	Site	Area
2007-08	4406-SP-B.Economic lntn.	Phulbani	Muskuli RF	40
			Ghughulasahi	30
		Phiringia	Kelapada PRF	55
		G.Udayagiri	Tudubali RF	13
			Padangi RF	12
		Sudrukumpa	Sudreju RF	25
		Tikabali	Nandini A PRF	50
		Raikia	Raikia RF	25
			Total	**250**
2010-11	CAMPA-APO-2009-10	Phulbani	Dadaki	157.87
			Jhampi	90.5
			Panaspadar	200
		Phiringia	Derakumpa	200
			Sadingia	150
		G.Udayagiri	Kambaguda	50
		Sudrukumpa	Adimunda	200
			Kurteli	200
		Raikia	Lendrikia	100
			Sikabadi	0
			Raikia	100
			Budhiapanga	100
		Tikabali	Ragaguda	200
			Tikabali	20
		Karada	Machhaghata	20
			Total	**1788.4**
2011-12	**ANR without Gap Plantation**			
	4406-SP (ACA)	Phiringia	Bandhagada A PRF	100
2011-12	**CAMPA-APO-2010-11**	Phiringia	Damigaon PRF	180
			Bandhagada A PRF	150
			Kelapada A PRF	120
			Baghanadi RF	150
			Balandapada A PRF	100
		Sudrukumpa	Sudreju RF	300
			Sudrukumpa RF	300
		Tikaballi	Line pada RF	400
		G.Udayagiri	Paburia PRF	50
			Tudubali RF	50
		Raikia	Ganjuguda PRF	100

		Phulbani	Ganjuguda PRF	50
			Dakpala B RF	50
			Gumagada RF	50
			Phulbani PRF	50
			Total	**2200**
2012-13	**CAMPA-APO-2011-12**	Tikabali	Linepada RF	397
		Phiringia	Krandibali W RF	150
			Gerupada W RF	150
			Kelapada B PRF	100
			Gochapada RF	150
			Balandapada PRF	150
		Raikia	Lendrikia	100
		G.Udayagiri	Paburia PRF	50
			Gutingia B RF	50
		Phulbani	Palchi	50
			Khajuripada	50
			Total	**1397**
2013-14	**MGNREGS**	Tikabali	Sandhijargi	100
		Tikabali	Sirkakuti	80
		Tikabali	Andharkuti	120
		Raikia	Kumbharkhadi	20
		Raikia	Alimaha	20
		Raikia	Bruhabadi	30
		Raikia	Paderimaha	30
		Sudrukumpa	Jakreju	40
		Sudrukumpa	Adimunda	40
		Sudrukumpa	Barhapada	20
		Sudrukumpa	Kurteli	20
		Sudrukumpa	Chuchurudi	20
		Sudrukumpa	Badiguda	20
		Sudrukumpa	Tadameru	20
		Sudrukumpa	Mallickpada	20
		G.Udaygiri	Dakedi	40
		G.Udaygiri	Pidikamaha	40
		G.Udaygiri	Penabida	40
		G.Udaygiri	Argadi	40
			Total	**760**
2014-15	**MGNREGS**	G.Udayagiri	Mahanaju	50
		G.Udayagiri	Lingagada	50
		G.Udayagiri	Rattingia	50
		G.Udayagiri	Dugudi	80
		G.Udayagiri	Bilabadi	80

		G.Udayagiri	Darapida	70
		Tikabali	Breka	75
		Tikabali	Bujulimendi	50
		Tikabali	Bedasuga	75
		Phulbani	Luhurabali	60
		Phulbani	Jamjhari	60
		Phulbani	Pakadei	70
		Phulbani	Tikiripada	40
		Phulbani	Dalapada	60
		Sudrukumpa	Goudapada	50
		Sudrukumpa	Jargisaru	40
		Sudrukumpa	Sitkapanga	50
		Sudrukumpa	Nuasahi	10
		Sudrukumpa	Ranipathar	80
		Sudrukumpa	Sarkesaru	40
		Raikia	Dalabali KF	30
		Raikia	Gumamaha KF	40
		Raikia	Sunapali (Karada GP)	80
		Raikia	Bakingia KF	60
		Raikia	Patalipanga KF	70
		Raikia	Sidingipata	60
		Raikia	Bakadamaha KF	40
		Phiringia	Balkidadi	50
		Phiringia	Gochhapada	60
		Phiringia	Baghanadi	70
		Phiringia	Bandhagada A PRF	50
		Phiringia	Gochhapada	50
		Phiringia	Gerapada E RF	50
		Phiringia	Sadingia RF	50
			Total ANR	**1900**
2014-15	**NAP**	Tikabali	Sikapada	15
		Phiringia	Kadipari	15
			Khajurigam	10
			Jargipadar	10
			Sasipadar	10
		G.Udaygiri	Kalinaju	20
			Kuansahi	0
		Sudrukumpa	Sarkesaru	10
			Tadameru	10
		Phulbani	Duduli	10
			Subarnakhol	10
			Total	**120**

2014-15	2406-SP-RDF	Phiringia	Bandhagada A PRF	250
		Raikia	Kilundi RF	100
			Total	**350**
2015-16	CAMPA APO-2014-15	Phulbani	Muskuli RF	100
		Phulbani	Gumagada RF	50
		Phulbani	Balaskumpa RF	50
		Phulbani	Katringia PRF	100
		Phulbani	Phulbani PRF	150
		Phiringia	Gochhapada RF	100
		Phiringia	Balandapada North PRF	80
		Phiringia	Balandapada South PRF	120
		Phiringia	Nuapadar RF	200
		Phiringia	Krandibali East RF	200
		Phiringia	Bandhagada A PRF	100
		G.Udaygiri	Bakingia PRF	100
		G.Udaygiri	Kanabagedi RF	50
		G.Udaygiri	Katingia PRF	150
		G.Udaygiri	Talarimaha PRF	50
		G.Udaygiri	Padangi RF	50
		G.Udaygiri	Tudubali RF	100
		Tikabali	Linepada RF(Near Lada)	300
		Tikabali	Ghudukapadar RF	100
			Total	**2150**
2016-17	CAMPA APO-2015-16	Phulbani	Phulbani PRF (Near Kalamburi)	50
		Phulbani	Phulbani PRF (Near Dakangi)	100
		Phulbani	Katringia PRF (Near Budenipanga)	100
		Phulbani	Palchi RF (Near Nedipadar)	50
		Phulbani	Brutanga North RF (Near Khetapaju)	100
		Phulbani	Khajuripada RF(Near Jhadpadar)	110
		Phulbani	Khajuripada RF (Near Raidalia)	90
		Phulbani	Gumagada RF(Near Tengeri)	150
		Phulbani	Gumagada RF (Near Doni)	100
		Phulbani	Kalabagh RF(Near Ranisbali)	150
		Phiringia	Krandibali East RF(Gopingia)	180
		Phiringia	Krandibali East RF(Tantingia)	230

		Phiringia	Balandapada South RF (Sarupaju)	110
		Phiringia	Balandapada South RF (Ganjupriya)	160
		Phiringia	Bandhagada A PRF(Dengagadu)	175
		Phiringia	Bandhagada B RF(Podapada)	175
		Phiringia	Damingia PRF(Katapanga)	260
		Phiringia	Baghanadi RF(Rakadi)	230
		Phiringia	Krandibali West RF	230
		G.Udaygiri	Ratingia RF (Near Balupanga)	100
		G.Udaygiri	Katingia PRF(Near Betikola)	140
		G.Udaygiri	Katingia PRF(Near Khariapada)	60
		G.Udaygiri	Bakingia PRF(Near Jhimapadikia)	100
		G.Udaygiri	Bakingia PRF(Near Dakedi)	200
		G.Udaygiri	Bakingia PRF(Near Gutuguda)	150
		G.Udaygiri	Sujeli RF	100
		G.Udaygiri	Pukulingia	150
		G.Udaygiri	Talarimaha PRF	100
		G.Udaygiri	Padangi RF (Near Sapaganda)	100
		G.Udaygiri	Paburia PRF (Near Penabida)	150
		G.Udaygiri	Giruti KF	100
		G.Udaygiri	Jobedi RF	50
		Tikabali	Linepada RF(Near Sanabada)	100
		Tikabali	Linepada RF(Near Talajhir)	100
		Tikabali	Chakapad RF (Near Kadami)	100
		Sudrukumpa	Danga RF (Banardei)	75
		Sudrukumpa	Danga RF (Kutibari)	75
		Raikia	Raikia RF (Colony Sahi)	80
		Raikia	Raikia RF(Bakingia)	30
		Raikia	Karada PRF(Kendukhari)	90
		Raikia	Karada PRF(Barapali)	30
		Raikia	Sikabadi PRF(Mangalpur)	30
		Raikia	Ganjuguda PRF (Bedaguba)	40
			Total	**5000**

2016-17	MGNREGS	Phulbani	Dakapala B RF	50
		Phulbani	Badabhuin KF & Gumagarh RF	50
		Phulbani	Muskuli RF	50
		Phiringia	Sumangi KF	20
		Phiringia	Gadarama KF	20
		Phiringia	Banduli KF	40
		Phiringia	Damingia PRF	40
		Phiringia	Bandhagada B RF	40
		Phiringia	Krandibali East RF	40
		Raikia	Malanpanga KF	50
		Tikabali	Kadama KF	50
		Tikabali	Nandini A PRF(at Patharkata)	50
		G.Udayagiri	Saradamaha KF	50
		G.Udayagiri	Kundasahi KF	50
		G.Udayagiri	Badenaju KF	100
		G.Udayagiri	Jakamaha KF	50
			Total	**750**
2017-18	MGNREGS	Phulbani	Gumagada RF	50
		Phulbani	Khaumunda RF	50
		Phulbani	Nagleju KF	50
		Tikabali	Khudutentuli	50
		Tikabali	Bapalmendi	50
		Tikabali	Sramudi	50
		Tikabali	Sunapanga	50
		G.Udayagiri	Rudangia KF	50
		G.Udayagiri	Gadabisa KF	50
			Total	**450**
2017-18	CAMPA APO-2016-17	Phulbani	Mularujangi(Dakpala B RF)	100
		Phulbani	Damigaon(Dakpala A RF)	100
		Phulbani	Panduli(Phulbani PRF)	100
		Phulbani	Dediganda(Gumagada RF)	150
		Phulbani	Subarnakhol(Gumagada RF)	75
		Phulbani	Gedripaju(Balaskumpa RF)	75
		Phulbani	Betinpada Jamujhori(Kalabagh PRF Extn)	75
		Phulbani	Pusipaju(Kalabagh RF)	125
		Phulbani	Bagali (Katringia PRF)	100

		Phulbani	Gadiapada(Ganjugud a PRF)	150
		Phulbani	Mardigochha(Khajuri pada RF)	50
		Phulbani	Budarakadi(Bhaliapa da RF)	100
		Phiringia	Bagali(Krandibali East RF)	200
		Phiringia	Dagarpadar(Krandiba li East RF)	200
		Phiringia	Gochhasahi(Bandhag ada PRF)	200
		Phiringia	Pathakhol(Bandhaga da PRF)	100
		Phiringia	Sadingia(Sadingia RF)	100
		Phiringia	Sunardei-Damingia(Damingia PRF)	100
		Phiringia	Dangerisahi-Kiamunda(Kiamunda PRF)	200
		Phiringia	Magamunda-1(Bandhagada A PRF)	100
		Phiringia	Magamunda-2(Bandhagada A PRF)	100
		Phiringia	Kadari-Salaguda (Baghanadi RF)	150
		Phiringia	Kadipari (Gochhapada RF)	200
		Phiringia	Karnada(Balandapad a North PRF	100
		Phiringia	Kenduguda(Balandap ada North PRF)	100
		G.Udaygiri	Duguripari (Kurmingia RF)	150
		G.Udaygiri	Pradhanpada (Bhanjapadar RF)	150
		G.Udaygiri	Talabalumaha (Bhanjapadar RF)	100
		G.Udaygiri	Retudi(Sujeli RF)	100
		G.Udaygiri	Mundakanga (Bakingia PRF)	150
		G.Udaygiri	Lingagada(Bakingia PRF)	100
		G.Udaygiri	Pukulingia(Pukulingia RF & KF)	130
		G.Udaygiri	Kurmingia(Kurmingia RF& KF)	70
		G.Udaygiri	Pajimaha(Pukulingia RF)	100
		G.Udaygiri	Darapida(Padangi RF)	150
		G.Udaygiri	Burbinaju(Tudubali	150

			RF)	
		G.Udaygiri	Luburumaha(Paburia PRF)	150
		Tikabali	Kilusuga(Tudubali RF)	100
		Tikabali	Sankarakhol(Linepada RF)	200
		Raikia	Lamungia(Raikia RF)	100
		Raikia	Ganjuguda(Ganjuguda PRF)	50
				5000
2018-19	MGNREGS	Phulbani	Pangapaju KF	50
		Phulbani	Gumagada RF near Duduli	50
		Phulbani	Lambabadi KF	50
		Phiringia	Daisara RF	50
		Phiringia	Panjapadar	50
		Phiringia	Damingia PRF	50
		Tikabali	Bastingia	150
		Tikabali	Baradikia	50
		Tikabali	Patapadara	50
		G.Udayagiri	Gadingia	50
		G.Udayagiri	Paburia PRF	50
		Raikia	Plangamaha - Ganjuguda PRF	30
		Raikia	Alimaha - Ganjuguda PRF	70
	TOTAL ANR(MGNREGS)			**750**
2018-19	N.A.P	G.Udaygiri	Betikala	50
2018-19	CAMPA	Phulbani	Betinpada	75
		Phulbani	Pusupaju	125
		Phulbani	Bagali	100
		Phulbani	Gadiapada	150
		Phulbani	Madigochha	50
		Phulbani	Budharakadi	100
		Phulbani	Subarnakhol	75
		Phulbani	Gedripaju	75
		Phulbani	Dedigunda	150
		Phulbani	Mularujhangi	100
		Phulbani	Damigaon	100
		Phulbani	panduli	100
		G.Udaygiri	Kurmingia	220
		G.Udaygiri	Pradhanpada	100
		G.Udaygiri	Talabalumaha	150
		G.Udaygiri	Sujeli	100
		G.Udaygiri	Mundakanga	150

		G.Udaygiri	Lingagada	100
		G.Udaygiri	Pukulingia	130
		G.Udaygiri	Pajimaha	100
		G.Udaygiri	Padangi	150
		G.Udaygiri	Tudubali	150
		G.Udaygiri	Paburia	150
		Tikabali	Linepada	200
		Tikabali	Tudubali	100
		Phiringia	Dagarpadar	200
		Phiringia	Bagali	200
		Phiringia	Gochhasahi	200
		Phiringia	Pathkhol	100
		Phiringia	Damingia	100
		Phiringia	Kiamunda	200
		Phiringia	Sadingia	100
		Phiringia	Kadadi	200
		Phiringia	Kadipari	150
		Phiringia	Karnada	100
		Phiringia	Kenduguda	100
		Phiringia	Magamunda	200
		Raikia	Lamungia	100
		Raikia	Basantipali	50
	Total CAMPA			**5000**
2019-20	CAMPA APO 2019-20-ANR@200 seedlings per ha	Phulbani	Muskuli RF	50
	do	Phulbani	Dakpalla B RF(Dalapadri)	100
	do	Phulbani	Dadki RF(Sarupada)	50
	do	Phulbani	Balaskumpa RF(Gabasaru)	50
	do	Phiringia	Kelapada B PRF	200
	do	Phiringia	Balandapada North PRF	100
	do	G.Udaygiri	Pukulingia RF	50
	do	G.Udaygiri	Talarimaha PRF(Dandapanga)	50
	do	G.Udaygiri	Darapida Padangi RF(Darapida)	50
	do	Tikabali	Tudubali RF(Panganaju)	100
	Total CAMPA 2019-20(ANR)			**800**
2019-20	NAP	Tikabali	Raibhanja	55
2019-20	MGNREGS (ANR)	G.Udayagiri	Banjamaha	100
2020-21	CAMPA	Phulbani	Pakanagaon	75
		Phulbani	Bhuktakanali	50
		Phulbani	Gumagada	75

		Phulbani	Singapada	100
		Phulbani	Hatimasa	100
		Phulbani	Pradhanpada	100
		Phulbani	Kunda	100
		Phulbani	Mulrujangi	100
		Sudrukumpa	Krandimaska	75
		Sudrukumpa	Ranipathar	75
		Sudrukumpa	Kakendri	50
		Tikabali	Ragaguda	100
		Tikabali	Pakhalkhia	100
		Phiringia	Taragbali	100
		Phiringia	Bisipadar	100
		Phiringia	Taladandikia	100
		Phiringia	Nuapadar	150
		Phiringia	Gerupada	50
		Phiringia	Panapanga	100
		Phiringia	Burungibali	100
		Phiringia	Kalampadar	100
		Phiringia	Balampadar	100
		G.Udaygiri	Gutingia	100
		G.Udaygiri	Retudi	50
		G.Udaygiri	Pradhanpada	50
		Raikia	Gudrisahi	100
		Raikia	Achintapur	50
		Raikia	Dumudupanga	50
		Raikia	Pukimaha	100
2020-21	CAMPA-RET	Tikabali	Tikabali	20
		Phiringia	Jargipadar	20
		G.Udaygiri	Kalinga	5
		G.Udaygiri	Pukulingia	20
	Total CAMPA			**2565**
2020-21	IGC	G.Udaygiri	Katingia PRF (Betikala)	80
2020-21	IGC	Tikabali	Ragaguda PRF (Tikabali)	50
	Total IGC			**130**
2020-21	NAP	G.Udaygiri	Dandapanga	60
2020-21	NAP	G.Udaygiri	Dupepada	50
	Total NAP			**110**
2020-21	MGNREGS-ANR	Phulbani	Ghugulasahi	50
		Phulbani	Kalamburi	50
		Phulbani	Adananda	50
		Phulbani	Nilapadar	25

		Phulbani	Dangulu	25
		Phulbani	Rakadipadar	50
		Phiringia	Burungibali	50
		Phiringia	Dimuriguda KF	50
		Phiringia	Sapiguda	50
		Phiringia	Baghanadi RF	50
		Phiringia	Gerupada E RF	50
		Sudrukumpa	Sudreju	30
		Sudrukumpa	Pakadei	40
		Sudrukumpa	Kuaghara	30
		Tikabali	Lakidikia	100
		G.Udayagiri	Betikala KF	30
		G.Udayagiri	Tumusingia KF	30
		G.Udayagiri	Pradhanpada	50
		G.Udayagiri	Petapanga KF	50
		G.Udayagiri	Bearpanga	20
		G.Udayagiri	Penala	20
		Raikia	Gomandi	50
		Raikia	Asaramah	45
		G.Udayagiri	Kalinaju	70
	Total MGNREGS			**1065**

List of Block Plantation in Phulbani Forest Division during 2007-08 to 2017-18

Year	Scheme	Range	Site	Area
2007-08	4406-SP-B.Economic Plntn.	G.Udayagiri	Ratingia RF	15
			Padangi RF	15
		Raikia	Dibari RF	20
			Total	**50**
2008-09	**MGNREGS**	**Raikia**	**Beredikia**	**5**
2009-10	MGNREGS	Raikia	Gedingia	7
			Malaguda	9
			Beredikia	6
			Total	**22**
2010-11	MGNREGS	Phulbani	Ranapatuli	5
			Lamabgudri	5
			Amabapada	1.5
			Total	**11.5**
2010-11	CAMPA-APO-2009-10	Phulbani	Dadaki	15
			Jhampi	20
			Panaspadar	15

		Phiringia	Derakumpa	20
			Sadingia	10
		Sudrukumpa	Adimunda	20
			Kurteli	20
		Raikia	Lendrikia	10
			Raikia	10
			Budhiapanga	20
		Tikabali	Ragaguda PRF	50
			Tikabali RF	15
			Takalamendi KF	5
		Karada	Machhaghata	20
			Total	**250**
2011-12	13th FC Grant-SP			
	Inside WP Area	Phulbani	Balaskumpa RF	10
		Phiringia	Bandhagada A PRF	20
			Sadingia RF	20
		G.Udayagiri	Padangi RF	10
		Tikabali	Chakapad RF	20
		Karada	Baraba RF	20
			Total	**100**
	Outside WP Area	Phulbani	R.Nuagaon	15
		Phiringia	Sarukoi	15
			Totla	**30**
2011-12	MGNREGS -Woodlot	Phiringia	Penagiri	5
		Tikabali	Ghatiguda	5
			Total	**10**
2012-13	13th FC Grant-SP			
	Inside WP Area	Phiringia	Krandibali E RF	10
		G.Udayagiri	Tudubali RF	10
		Tikabali	Chakapad RF	20
			Sankarakhole RF	10
			Nandini A PRF	20
		Raikia	Sikabadi PRF	20
			Raikia RF	10
			Total	**100**
	Outside WP Area	Phulbani	Garakumpa	17
			R.Nuagaon	3
		Phiringia	Katapanga	10
		Tikabali	Brutanga	20
		Karada	Nuagaon	10
		Sudrukumpa	Chuchurudi	20
			Total	**80**

2013-14	13th FC -NP			
	Outside WP Area	Phulbani	Gedripaju	10
		Phiringia	Saitingia	10
		Tikabali	Rangamatia	10
			Total	**30**
2013-14	**MGNREGS**	Tikabali	Kadapadar	10
		Tikabali	Sikapada	20
		Tikabali	Budeni	10
		Tikabali	Chahali	10
		Tikabali	Malabhuin	10
		Tikabali	Chhatijhar	11
		G.Udaygiri	Pakari	5
		G.Udaygiri	Penabida	10
		G.Udaygiri	Sugamaha	10
		Raikia	Kumbharkhadi	5
		Raikia	Gomandi	5
		Raikia	Dalbali	5
			Total	**111**
2014-15	**13th FC Grant-NP**			
	Inside WP Area	Tikabali	Rasudi	20
		Phiringia	Manipadar	15
			Tanasu	15
			Total	**50**
	2406-SP-Economic Plntn.	Tikabali	Chakapad RF	20
		Raikia	Sikabadi PRF (Malaguda)	10
			Beredikia	10
		Phiringia	Gerupada E RF	10
			Total	**50**
2016-17	**Urban Tree Plantation**	Phulbani	Kutibari (Phulbani Municipality)	**1.25**
		G.Udayagiri	G.Udayagiri NAC	**1.25**
	MGNREGS (OBDP converged)	**Phulbani**	Khajuripada RF	15
		Phiringia	Balandapada PRF	15
			Total	**32.5**
2017-18	MGNREGS	Phiringia	Uparadamingia	6.25
		Phiringia	Seskajodi	5.625
		Phiringia	Santinagar	6.25
		Phiringia	Damaraju	6.25
		Phiringia	Kuaghera	6.25
		Phiringia	Biluri	5.625
		Phiringia	Karnada	6.25

		Phiringia	Nuapadar	3.75
		Phiringia	Sakhipada	3.75
		Tikabali	Raipada	10
			Total	**60**
2018-19	MGNREGS	Phiringia	Jagarpadar	6.25
2018-19	MGNREGS	Phiringia	Shantinagar(A)	2.5
2018-19	MGNREGS	Phulbani	Lambabadi	5
			Total AR(MGNREGS)	**13.75**
2018-19	MGNREGS(NTFP) Mahul Plantation	Phulbani	Gudari	5
2018-19	MGNREGS(NTFP)Mahul Plantation	Phiringia	Bhrungijodi	1
2018-19	MGNREGS(NTFP)Mahul Plantation	Phiringia	Minia	1
			Total NTFP	**7**
2019-20	CAMPA APO 2019-20 Bamboo Plantation@400 seelings per Ha	Phulbani	Ganjuguda PRF	25
2019-20	do	Phiringia	Krandibali East RF (Galesuga)	25
2019-20	do	Tikabali	Tudubali RF	20
	Total CAMPA 2019-20(Bamboo Plnt)			70
2019-20	IGC-State Plan Bald Hill Plantation@1600 seedling/Ha	Phulbani	Bhaliapada RF	5
2019-20	do	Phiringia	Kelapada A PRF	5
2019-20	do	G.Udaygiri	Dhangadamaha kF	3
2019-20	do	G.Udaygiri	Banjamaha KF	2
2019-20	do	Tikabali	Tikabali RF	5
			Total	**20**
2019-20	MGNREGS (Bald Hill)	Phiringia	Bald Hill Pltn at Kelapada A PRF 10 ha	10
2019-20	MGNREGS (Bald Hill)	G.Udayagiri	Baldhill Dhangdamaha	3
2019-20	MGNREGS (Bald Hill)	G.Udayagiri	Bald hill Banjamaha	4
2019-20	MGNREGS (Bald Hill)	Phulbani	Bald Hill Arapaju	5
2019-20	MGNREGS (Bald Hill)	Tikabali	Bald hill pltn at Tikabali RF & KF	10
			Total MGNREGS (Bald Hill)	**32**
2020-21	CAMPA-Bald hill pltn	Tikabali	Sunapanga	10
2020-21	CAMPA-Bamboo pltn	Phiringia	Majhipada	20
	Total CAMPA			**30**
2020-21	IGC	Raikia	Basantipali KF	10
			Total IGC	**10**
2020-21	MGNREGS-AR	Phulbani	Maniduba	3

2020-21	MGNREGS-AR	Phulbani	Bhuktakanali	3
2020-21	MGNREGS-AR	Phulbani	Gedripaju	4
2020-21	MGNREGS-AR	Sudrukumpa	Bidihari	15
2020-21	MGNREGS-AR	Tikabali	Sunapanga	10
2020-21	MGNREGS-AR	Raikia	Kandabada	10
2020-21	MGNREGS-AR	Raikia	Kantibana KF	15
2020-21	MGNREGS-AR	G.Udayagiri	Retudi	5
2020-21	MGNREGS-AR	G.Udayagiri	Tala Balumaha	5
2020-21	MGNREGS-AR	Phiringia	Bakapali KF	10
2020-21	MGNREGS-AR	Phiringia	Tetelpada KF	10
2020-21	MGNREGS-AR	Tikabali	Basiamba KF	5
2020-21	MGNREGS-AR	Tikabali	Panduli KF	4
2020-21	MGNREGS-AR	Tikabali	Gumagarh KF	3
2020-21	MGNREGS-AR	Tikabali	Andharakuti KF	3
2020-21	MGNREGS-Econ.Pltn	Raikia	Lendrikia RF	10
2020-21	MGNREGS-Econ.Pltn	Tikabali	Katimaha	5
2020-21	MGNREGS-Econ.Pltn	Tikabali	Dasaguda KF	5
2020-21	MGNREGS-Bald Hill Pltn	Tikabali	Sarunju KF	5
2020-21	MGNREGS-Bald Hill Pltn	Raikia	Chunapali K.F	5
2020-21	MGNREGS-Bald Hill Pltn	Phiringia	Kelapada A PRF	5
2020-21	MGNREGS-Bamboo Pltn	Phulbani	Rakadipadar	10
2020-21	MGNREGS-Bamboo Pltn	Tikabali	Patharkata	10
	Total MGNREGS			**160**

6.5 CARBON STOCK:-

Carbon stock assessment and carbon sequestration studies play vital role in forest management planning. Increased focus to studies on environmental and ecosystem functions are need of the hour. To clearly understand the environmental and functional role of forests, a well-defined scientific approach is necessary, which prescribes methodology to quantify, measure and monitor carbon sequestration and GHG fluxes using suitable techniques and databases.

A through assessment of the division's terrestrial ecosystem that is, extent of forests, distribution of species, grasslands, wetlands, aquatic eco-systems above ground and below ground biomass, soil organic matter, dead and uprooted timbers by both natural and anthropogenic reasons, contribution of forest fires to CO_2 emission will be carried out to generate valuable database.

A base line data will be fixed on various parameters related to carbon stock and sequestration. It will be useful for comparative analysis of any vital change which may happen in future. This data will be generated with the cooperation from

scientists, experts and all other stakeholders. Baseline data will consists of assessment of existing inventory and future potential component. Once present stock inventory is prepared, based on that one can plan necessary modifications at policy level.

Carbon sequestration is nothing but the process of removing carbon from the atmosphere and depositing it in a reservoir. It is a form of geo-engineering which consists of various physical chemical and biological methods. Reforestation is one of the potential and natural methods of carbon sequestration. But it should be noted that re-entry of CO_2 to atmosphere by burning and decomposition of trees/forest produce should be discouraged. Control of deforestation is very important to reduce the re-entry of carbon to atmosphere, which is arrested in the form of biomass. Forest fire also significantly contributes to increasing carbon pool in the atmosphere. Efforts are being done to reduce forest fire incidence and damage but still more focus has to be given to further reduce the negative consequences of forest fire.

The carbon sink of Phulbani Forest Division is furnished as **Annexure-XII**

6.6Carbon Sequestration and mitigation:-

6.6.1 Forest and wood products can effectively reduce the process of climate change in several ways. Growing trees absorb carbon dioxide from the atmosphere and store the carbon so efficiently that about half the dry weight of a tree is carbon. This carbon remains locked up in the form of wood and wood products. Sustainably grown and harvested wood (and other biomass) also provides a renewable alternative to fossil fuels and enhance carbon storage. Enhanced carbon sequestration through recognized and innovative silvicultural practices, eco-restoration of degraded/mined out forestlands, improved biomass productivity, etc. will help in improving forest health and vitality. Forest soil must be kept health and fertile. The growth of forest crops must be kept vigorous to attain the most desirable level of biomass production within an optimal time scale. Efforts have been made to preserve the forests in keeping with the above importance. The present revision should aim at enhanced carbon sequestration and mitigation.

6.6.2 Mitigation Measures:

It is a common knowledge that Green House Gases are the cause of Global Warming. The entire world is greatly concerned to increase of GHG specially the CO2. Photosynthesis is the simplest method to reduce the GHG in the atmosphere. The mitigation measures that can be practiced by a Forester are:

- Increase tree cover by woody vegetation on Blank Areas.
- Enrich the existing forest by plantation and crop density may be maintained above 70%.
- Allow Ground Flora to cover the Forest Floor.
- Long term Rotation to be adopted than a short term rotation.
- Reduce incidents of Forest Fire and release of CO2.
- Allow a good humus cover to be retainedfor soil fertility and vigour.
- Reduce Fire wood consumption in rural areasthrough improved chulla / Fire Place and supply of LPG Gas.
- Increase life of wooden materials through seasoning & treatment.

CHAPTER-7

7.0OPTIMIZATION OF FOREST RESOUCE UTILIZATION

7.1 Recorded removal of timber

The timber and firewood harvested from different coupes of the selection working circle are furnished below.

7.1.1 Chakapad-I Felling Series- Chakapad RF

Table No.-7.1 Tikabali- Timber coupe- Chakapad-I

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC (Rs.)
1	2	3	4	5	6	7	8	9
	2006-07	--	--	--	--	--	--	--
Chakapad RF	2007-08	CHKP-I SWC-I	574	574	574	250.0957	30	866185
Burtang (S) RF	2008-09	CHKP-I SWC-II	473	473	473	46.2181	18	422630
Chakapad RF	2009-10	CHKP-I SWC-III	300	300	300	181.3347	6	673510
Chakapad RF	2010-11	CHKP-I SWC-IV	605	605	605	471.8114	24	1536700
Chakapad RF	2011-12	CHKP-I SWC-V	525	525	525	516.4474	36	1637244
Chakapad RF	2012-13	CHKP-I SWC-VI	515	515	515	400.0115	24	1782000
Chakapad RF	2013-14	CHKP-I SWC-VII	449	449	449	191.528	12	885946
Chakapad RF	2014-15	CHKP-I SWC-VIII	--	--	--	--	--	--
Chakapad RF	2015-16	CHKP-I SWC-IX	--	--	--	--	--	--
Chakapad RF	2016-17	CHKP-I SWC-X	--	--	--	--	--	--

7.1.2 Chakapad-II Felling Series- Chakapad RF

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC
1	2	3	4	5	6	7	8	9
	2006-07	--	--	--	--	--	--	
Chakapad RF	2007-08	CHKP-I SWC-I	666	666	666	312.5346	42.5	1274645
Chakapad RF	2008-09	CHKP-I SWC-II	878	878	878	384.2331	61	1437410
Chakapad RF	2009-10	CHKP-I SWC-III	719	719	719	470.6379	19.5	1619903

Chakapad RF	2010-11	CHKP-I SWC-IV	882	882	882	627.8107	18	2508948
Chakapad RF & Budukakhole PRF	2011-12	CHKP-I SWC-V	981	981	981	851.6795	102	4143900
Chakapad RF	2012-13	CHKP-I SWC-VI	740	740	740	772.3853	60	2695032
Chakapad RF	2013-14	CHKP-I SWC-VII	107	107	107	37.249	0	135898
Chakapad RF	2014-15	CHKP-I SWC-VIII	81	81	81	75.1	18	475384
Chakapad RF	2015-16	CHKP-I SWC-IX	--	--	--	--	--	--
Chakapad RF	2016-17	CHKP-I SWC-X	--	--	--	--	--	--

7.1.3 Phulbani Range- Burtang (N) Felling series

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC
1	2	3	4	5	6	7	8	9
	2006-07	--	--	--	--	--	--	--
Archangi A /Archangi B/ Burtang (N)	2007-08	BURT (N) SWC-I	266	266	266	99.0195	30	558085
Burtang (N)	2008-09	BURT (N) SWC-II	405	405	384	234.289	64	870085
Burtang (N)	2009-10	BURT (N) SWC-III	488	488	488	200.288	79	1403460
Khajuripada	2010-11	BURT (N) SWC-IV	--	--	--	--	--	--
Khajuripada	2011-12	BURT (N) SWC-V	--	--	--	--	--	--
Khajuripada	2012-13	BURT (N) SWC-VI	--	--	--	--	--	--
Khajuripada	2013-14	BURT (N) SWC-VII	20	20	20	13.487	6	54440
Kalabagh	2014-15	BURT (N) SWC-VIII	85	85	85	64.1	20	323960
Kalabagh	2015-16	BURT (N) SWC-IX	203	203	203	79.56	97	931867
Kalabagh	2016-17	BURT (N) SWC-X	45	45	45	20.299	10	123585

7.1.4 Karada Range- Baraba Felling series

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC
1	2	3	4	5	6	7	8	9
	2006-07	--	--	--	--	--	--	--

Barba RF	2007-08	BRB SWC-I	--	--	--	--	--	--
	2008-09	BRB SWC-II	160	160	160	84.9972	30	328245
	2009-10	BRB SWC-III	--	--	--	--	--	--
	2010-11	BRB SWC-IV	96	96	96	100.5266	25	353290
	2011-12	BRB SWC-V	184	184	184	167.267	24	656400
	2012-13	BRB SWC-VI	175	175	175	207.523	60	839160
Badagada PRF	2013-14	BRB SWC-VII	67	67	67	30.1775	10	101598
	2014-15	BRB SWC-VIII	16	16	16	9.5338	3	58968
	2015-16	BRB SWC-IX	--	--	--	--	--	--
	2016-17	BRB SWC-X	23	23	23	11.0784	11	83460

7.1.5 Karada Range- Nandabali Felling series

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC
1	2	3	4	5	6	7	8	9
	2006-07	--	--	--	--	--	--	--
Nandabali PRF	2007-08	NDBL SWC-I	--	--	--	--	--	--
	2008-09	NDBL SWC-II	--	--	--	--	--	--
	2009-10	NDBL SWC-III	--	--	--	--	--	--
	2010-11	NDBL SWC-IV	71	71	71	45.161	22	174820
	2011-12	NDBL SWC-V	341	341	341	333.7469	42	1228800
	2012-13	NDBL SWC-VI	415	415	415	382.9195	78	1402920
	2013-14	NDBL SWC-VII	218	218	218	98.0887	30	332325
	2014-15	NDBL SWC-VIII	11	11	11	4.07	0	15288
	2015-16	NDBL SWC-IX	--	--	--	--	--	--
	2016-17	NDBL SWC-X	--	--	--	--	--	--

7.1.6 Karada Range- Ranaba Felling series

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC	Remarks
1	2	3	4	5	6	7	8	9	10
	2006-07	--	--	--	--	--	--	--	
Ranaba RF	2007-08	BRB SWC-I	--	--	--	--	--	--	
	2008-09	BRB SWC-II	--	--	--	--	--	--	

	2009-10	BRB SWC-III	--	--	--	--	--	--	
	2010-11	BRB SWC-IV	91	91	91	75.867	6	223420	
	2011-12	BRB SWC-V	111	111	111	87.642	24	297000	
	2012-13	BRB SWC-VI	71	71	71	48.2075	21	268920	
Machaghat RF	2013-14	BRB SWC-VII	300	300	300	109.3077	30	529959	
	2014-15	BRB SWC-VIII	8	8	8	5.5352	2	27664	
	2015-16	BRB SWC-IX	51	51	51	57.2962	15	314155	
	2016-17	BRB SWC-X	41	41	41	46.3341	16	293715	

7.1.7 Sudrukumpa Range, Ranipathar Felling series

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC	Remarks
1	2	3	4	5	6	7	8	9	10
	2006-07	--	--	--	--	--	--		
Ranipathar RF	2007-08	RANP SWC-I	251	251	251	145.875	30	496800	
	2008-09	RANP SWC-II	616	616	616	286.002	60	1489540	
	2009-10	RANP SWC-III	221	221	221	91.846	42	569700	
	2010-11	RANP SWC-IV	--	--	--	--	--	--	
Sudrukumpa RF	2011-12	RANP SWC-V	219	219	219	180.694	80	800100	
Donga & Sudrukumpa	2012-13	RANP SWC-VI	202	202	202	110	60	649296	
Sudrukumpa RF	2013-14	RANP SWC-VII	143	143	143	72.651	20	565549	
Sudrukumpa RF	2014-15	RANP SWC-VIII	121	121	121	105.251	20	472472	
Sudrukumpa RF	2015-16	RANP SWC-IX	91	91	91	42.188	20	265329	
Sudrukumpa RF	2016-17	RANP SWC-X	141	141	141	85.309	30	561750	

7.1.8 Sudrukumpa Range, Donga Felling series

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC	Remarks
1	2	3	4	5	6	7	8	9	10
	2006-07	--	--	--	--	--	--		
Donga RF	2007-08	DONG	200	200	200	118.86	18	503280	

		SWC-I							
Donga RF	2008-09	DONG SWC-II	494	494	276	222.317	50	721760	Obstruction of people balance tree could not be felled
Donga RF	2009-10	DONG SWC-III	65	65	37	33.235	18	132030	
Donga RF	2010-11	DONG SWC-IV	170	170	170	144.302	21	291600	
Donga RF	2011-12	DONG SWC-V	244	244	244	203	50	705600	
Donga RF/ Ranipathar RF	2012-13	DONG SWC-VI	257	257	257	205.309	90	673920	
Ranipathar RF	2013-14	DONG SWC-VII	119	119	119	68.876	25	425809	
Ranipathar RF	2014-15	DONG SWC-VIII	48	48	48	27.167	6	162344	
Ranipathar RF	2015-16	DONG SWC-IX	84	84	84	78.475	30	442845	
Ranipathar RF	2016-17	DONG SWC-X	90	90	90	72.267	25	373965	

7.1.9 Phringia Range, Kiamunda Felling series

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC	Remarks
1	2	3	4	5	6	7	8	9	10
	2006-07	--	--	--	--	--	--	--	
Krandibali (E) RF	2007-08	KMD SWC-I	--	--	--	--	--	--	
	2008-09	KMD SWC-II	--	--	--	--	--	--	
	2009-10	KMD SWC-III	--	--	--	--	--	--	
	2010-11	KMD SWC-IV	--	--	--	--	--	--	
Kiamunda PRF	2011-12	KMD SWC-V	--	--	--	--	--	--	
	2012-13	KMD SWC-VI	--	--	--	--	--	--	
	2013-14	KMD SWC-VII	220	220	220	85.029	39	1271186	
	2014-15	KMD SWC-VIII	--	--	--	--	--	--	--
	2015-16	KMD SWC-IX	--	--	--	--	--	--	
	2016-17	KMD SWC-X	--	--	--	--	--	--	

7.1.10 Raikia Range, Karada Felling series

Name of the RF	Year	Coupe No.	No. of trees	No. of trees marked	Nos. of trees felled	Timber production (in cum)	F.W. (in stack)	Royalty paid by OFDC	Remarks
1	2	3	4	5	6	7	8		9
	2006-07	--	--	--	--	--	--	--	
Karada PRF	2007-08	KRD SWC-I	--	--	--	--	--	--	
	2008-09	KRD SWC-II	--	--	--	--	--	--	
	2009-10	KRD SWC-III	--	--	--	--	--	--	
	2010-11	KRD SWC-IV	--	--	--	--	--	--	
	2011-12	KRD SWC-V	158	158	158	120.7797	24	445488	
	2012-13	KRD SWC-VI	224	224	224	214.4323	24	627588	
	2013-14	KRD SWC-VII	73	73	73	42.95	12	216358	
	2014-15	KRD SWC-VIII	35	35	35	24.98	8	104832	
Sikabadi PRF	2015-16	KRD SWC-IX	42	42	42	10.435	5	104844	
	2016-17	KRD SWC-X	101	101	101	50.472	32	307358	

7.2 Recorded removal of fuel wood

The sources of firewood are forest, agricultural wastes, dung cakes of these, forest is the major source. The fuel wood requirement of the division is calculated based on the research done by FSI

7.3 Recorded removal of bamboo/rattans

The working circle covers potentially rich bamboo areas. Bamboo survey has been carried out in Ranipathar RF, Donga RF, Sudrukumpa RF, Burtang(N) RF, Khajuripada RF, Kalabagh RF, Palchi RF, Baghanadi RF, Ladapadar RF, Krandibali(W) RF, KLrandibali (E) RF, Gocchapada RF, Chakapad RF, Ghudukapadar RF, Archangi "A"RF, Archangi "B"RF, Burtang(S) RF, Ganjuguda "B"PRF, Balandapada (N) PRF, Balandapada (S) PRF, Baradakia PRF, Buduakokhole PRF, Nandini "A" RF, Nandini "B" RF & Mundula PRF.

Out of five only one bamboo Felling Series was worked out in Ranipathar north by Heilgers & Co. subsequently Ranipather south was worked out. All the three felling series of Donga forest block were left unworked due to inaccessibility of the area.

Total area allotted to this working circle is 99937.682 Hectares.

Table No. 7.1 RECORDED REMOVAL OF BAMBOO

Year of working	Name of the coupe	No. Of bamboo	Production of bamboo (in su)			Production of commercial bamboo	Royalty paid by OFDC Ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	BRUTANGA(SOUTH) 'B'	8389	168.829	--	168.829	0	Royalty paid centrally	Economically not viable
2007-08	BRUTANGA(SOUTH) 'C'	167537	3371.682	--	3371.682	5366		
2008-09	BRUTANGA(SOUTH) 'D'	4500	90.563	--	90.563	0		
2009-10	BRUTANGA(SOUTH) 'A'	0	0	--	0	0		Economically not viable
2010-11	BRUTANGA(SOUTH) 'B'	0	0	--	0	0		Economically not viable
2011-12	BRUTANGA(SOUTH) 'C'	127139	2558.672	--	2558.672	1000		
2012-13	BRUTANGA(SOUTH) 'D'	0	0	--	0	0		Economically not viable
2013-14	BRUTANGA(SOUTH) 'A'	0	0	--	0	0		Economically not viable
2014-15	BRUTANGA(SOUTH) 'B'	0	0	--	0	0		Economically not viable
2015-16	BRUTANGA(SOUTH) 'C'	97632	1964.850	--	1964.850	0		
2016-17	BRUTANGA(SOUTH) 'D'	0	0	--	0	0		Economically not viable

7.4 Recorded removal of locally important NTFPs including MAPs.

Non-timber forest products are plentifully available and extensively extracted from the forests of Phulbani forest division and their role in rural and forest economies is immense. Prior to March 2000, different NTFP items were worked out by AMCS. Tikabali, OFDC Ltd, TDCC Ltd. They were purchasing NTFP items from primary collectors at administered prices fixed by District price fixation committee or Government for certain NTFP items like Sal seeds etc. and paid fixed royalty to the forest department.

The Range wise/ Block wise distribution and availability of various NTFPs.

Table No.-7.2 Criteria for NTFP availability status		
S.N	**Plants/ha.**	**Availability Status**
1.	More than 625 plants per Hectare	Abundant
2.	Between 400 to 625 plants per Hectare	Good
3.	Less than 400 plants per Hectare	Sparse
4.	No NTFP plants available	Nil

Table No- 7.3 The Range-wise/Block-wise distribution and availability of various NTFPs		
Forest block	**Major NTFP items found.**	**Status**
Range:- Karada		
1. Baraba RF	(i) Sal seeds &leaves, Siali leaves & fibre.	Good
	(ii) Banahaladi, Char seeds, Mahua flowers & seeds, Honey, Genduligum, Kusum seeds, Bhuineem, Bana kolathi, Hill brooms, Banakhajuri, Kamalagundi, Fruits, Dhatki, Satabari, Palas leaves, Kendu leaves, Myrabolan.	Sparse
2. Machhaghat RF	(i) Bana Haladi, Sal leaves.	Abundant
	(ii)Siali leaves, Siali fibre, Char seeds, Bhuineem.	Good
	(iii) Satabari, Bana khajuri, Bana tulasi, Aonla, Harida, Bahada, Dhatki, Char seeds, Mahula flower & seeds, Kamalagundi, Kendu leaves, Modafal, Satabari, Hill brooms, Kusum seeds etc.	Sparse
3. Ranaba RF	(i) Sal leaf & seed, Siali leaves & fibre, Banahaladi.	Good
	(ii) Bhuineem, Aonla, Harida, Bahada, Char seeds, Dhatki, Satabari, Kamalagundi, Hill broom, Bana khajuri, Kusum seed, Kendu leaves, Genduli gum, Honey etc.	Sparse
4.Badegarh PRF	(i) Bana Haladi, Sal leaves & seeds.	Abundant
	(ii) Siali leaves & fibre, Bhui neem, Char seeds, Kusum seeds.	Good
	(iii) Kendu leaves, Bana Khajuri leaves, kusum seeds, Kamalagundi, Dhatki, Palas leaves & loi, Aonla, Harida, Bahada, Genduli gum, Char seeds, Hill broom, Honey, Satabari.	Sparse
5. Nandavali PRF	(i) Bana Haladi, Sal leaves & seeds, etc.	Abundant
	(ii) Siali leaves & fibre, Bhuineem, Genduli gum.	Good
	(iii) Bana Khajuri, Kusum seeds, Aonla, Harida, Bahada, Char seeds, Hill brooms, Honey, Kendu leaves, Bana kolathi, Bana tulasi, Kamalagundi, Dhatki, Satabari.	Sparse

(II) Range:- Sudurukumpa		
1. Ranipathar RF	(i) Sal leaves & seeds, Genduli gum, Siali leaves.	Good
	(ii) Mohua flower & seed, Aonla, Harida, Bahada, Kamalagundi, Bana haladi, Bhuineem, Satabari, Patalgaruda, Bana khajuri, Bana kolathi, Hill brooms, Dhatki, Kendu leaves, Kusum seeds, Char seeds, Bana tulsi, Palas leaves, Kusum seeds, Honey.	Sparse
2. Donga RF	(i) Sal leaf & seed, Genduli gum, Siali leaf & fibre.	Good
	(ii) Kamalagundi, Aonla, Harida, Bahada, Banakolathi, Bhuineem, Banahaladi, Satabari, Kendu leaf, Char seed, Mahula flower & seed, Hill broom, Palas leaf & loi, Honey, Bana tulsi, Kusum seed etc.	Sparse
3. Sudurukumpa RF	(i) Sal leaves & seed.	Abundant
	(ii)Kendu leaves, Kusum seeds, Char seeds, Satabari, Mahua flower & seed, Hill brooms, Bana kolathi, Bhuineem, Palas leaves & loi, Atundi, Dhatki, Aonla, Harida, Bahada, Kamalagundi, Bana tulsi etc.	Sparse
4. Sudreju RF	(i) Sal leaves & seeds, Kendu leaves, Genduli gum, Siali leaves & fibre, Mahula seeds & flower, Hill brooms, Bhuineem, Banakolathi, Aonla, Harida, Bahada, Char seeds, Bana Tulsai, Satabari, Banakhajuri, Kamalagundi, Palash leaves, Bana Haldi.	Sparse
(III) Range: Raikia		
1. Dibari RF	Siali leaves, Bhuineem, Bana kolathi, Bana Khajuri, Satabari, Mahua flowers & seeds, Kendu leaves, Sal leaves.	Sparse
2. Kilundi RF	Sal seeds & leaves, Mahua flower & seeds, Siali fibre & leaves, Satabari, Bhuineem, Bana kolathi, Kamalagundi, Bana haladi, Palas leaves, Aonla, Harida, Bahada, Char seeds, Bana khajuri,	Sparse
3. Raikia RF	(i) Sal leaves & seeds.	Good
	(ii) Char seeds, Aonla, Harida, Bahada, Siali leaves & fibre, Bhuineem, Bana kolathi, Satabari, Banakhajuri, Kamalagundi, Dhatki, Modafal, Banatulsi, Bana haladi, Kendu leaves.	Sparse
4. Lendrikia RF	Sal leaves, Banatulsi, Bhui neem, Satabari, Bana khajuri, Dhatki, Modafal, Bana haladi,	Sparse

	Palas, Kendu leaves.	
5. Manikeswar PRF	(i) Sal leaves.	Good
	(ii) Satabari, Bhui neem, Palas leaves, Aonla, Harida, Bahada, Bana haladi, Bana tulasi, Kendu leaves, Kamala gundi, Modafal, Datki, Char seeds, Mahua flower & seed, Siali leaves & fibre.	Sparse
6. Ganjuguda 'A' PRF	Sal leaves, Siali leaves & fibre, Bana haladi, Bana tulasi, Kendu leaves, Char seeds, Satabari, Datki, Bana khajuri, Bana Kolathi.	Sparse
7. Karada PRF	(i) Sal leaves & seed, siali fibres & leaves.	Good
	(ii) Mahuaflower & seed, Genduli gum, Honey, Kamalagundi, Bana khajuri, Bana haladi, Satabari, Bhuin neem, Bana kolathi, Bana tulasi, Kendu leaves, Aonla, Harida, Bahada, Hill broom, Kusum seeds, Dhatki, Char seeds.	Sparse
8. Sikabadi PRF	(i) Sal leaves & seed, Siali fibre & leaves	Good
	(ii) Bana haladi, Bana tulasi, Aonla, Harida, Bahada, Hill brooms, Bana khajuri, Bhuin neem, Satabari, Dhatki, Genduli gum, Char seed, Kusum seed, Kamalagundi, Kendu leaves, Modafal.	Sparse
(IV) Range:-Tikabali		
1. Tikabali RF	Sal leaves, Siali leaves, Bana tulasi, Bhuineem, Bana haladi, Satabari, Kendu leaves etc.	Sparse
2. Shankarkhole RF	Sal leaves & Seeds, Siali leaves & fibre, Bhuineem, Bana tulasi, Kendu leaves, Broom grass, Mahul flower & seed, Aonla, Harida, Bahada, Bana khajuri, Kamalagundi, Dhatki, Bana kolathi.	Sparse
3. Archangi 'A' RF	(i) Siali leaves & fibre, Sal leaves & seeds, Bhuineem, Genduli gum, Bana tulsi.	Good
	(ii) Bana haladi, Char seeds, Mahula flower & seed, Bana khajuri, Bana kolathi, Bhalia seeds, Kamalagundi, Dhatki, Aonla, Harida, Bahada, Palas leaves, Hill broom, Honey, Satabari, Kendu leaves.	Sparse
4. Archangi 'B' RF	(i) Siali leaves & fibre, Sal leaves & seeds, Bhuineem.	Good
	(ii) Satabari, Hill broom, Bana khajuri, Dhatki, Mohua flower & seed, Char seeds, Bana haladi, Kendu leaves, Bhalia seeds, Kusum seeds.	Sparse
5. Ghudukapadar RF	Siali leaves, Sal leaves, Satabari, Bhuineem, Dhatki, Chara seed, Aonla, Harida, Mahua	Sparse

	flower & seeds, Kendu leaves, Bana tulasi.	
6. Lionpada RF	Sal leaves & seeds, Siali fibre & leaves, Dhatki, Kamalagundi, Aonla, Harida, Bahada, Bana khajuri, Bana kolathi, Bana tulasi, Bana haladi, Kendu leaves, Satabari, Bhuineem, Genduli gum.	Sparse
7. Burtang(s) RF	(i) Sal leaves & seed, Siali fibres & leaves.	Good
	(ii) Genduli gum, Dhatki, Kamalagundi, Bhalia, Aonla, Harida, Bahada, Hill broom, Satabari, Bana khajuri, Char seeds, Kendu leaves, Palas leaves, Mahua flower & seed, Kusum seed, Bana haladi, Bana kolathi.	Sparse
8. Chakapad RF	(i) Sal leaves & seed, Siali fibres & leaves.	Abundant
	(ii) Mahua flower & seed, Kusum seeds, Genduli gum, Dhatki, Kamalagundi.	Good
	(iii) Bana khajuri, Kendu leaves, Bana haladi, Bana tulasi, Aonla, Harida, Bahada, Hill brooms, Satabari, Char seeds, Honey.	Sparse
9. Beheragaon PRF	(i) Sal leaves & seed, Bana haladi, Aonla, Harida, Bahada, Kendu leaves, Bana tulasi, Siali leaves, Siali fibres, Char seeds, Bhuineem, Bana khajuri, Mahua flower & seed, Genduli gum etc.	Sparse
10. Budukakhole PRF	Aonla, Harida, Bahad, Kusum seeds, Mahua flower & seed, Bhuineem, Bana tulasi, Siali leaves & fibre, Bana khajuri, Genduli gum, Sal leaves & seed, Satabari.	Sparse
11. Baradikia PRF	Kusum seeds, Genduli gum, Satabari, Siali leaves, Sal leaves, Siali fibre, Bana tulasi, Bhuineem, Bana khajuri, Char seeds, Aonla, Harida, Bahada, Mohua leaves & seeds, Palas, Honey, Kendu leaves.	Sparse
12. Nandini 'A' PRF	Siali leaves & Siali fibres, Aonla, Harida, Bahada, Dhatki, Kamalagundi, Char seeds, Mahua flower & seed, Bana tulasi, Satabari Bhuineem, Bana khajuri, Genduli gum.	Sparse
13. Nandini 'B' PRF	Dhatki, Aonla, Harida, Bahada, Char seeds, Mahua flower & seed, Bana tulasi, Bhuineem, Satabari, Kendu leaves, Bana khajuri, Siali leaves, Sal leaves.	Sparse
14. Tudipaju PRF	(i) Sal leaves & Sal seeds, Genduli gum, Hill broom, Char seeds, Mahua flower & seed, Bana haladi, Bhuineem, Aonla, Harida, Bahada.	Good
	(ii) Satabari, Bana khajuri, Char seeds, Dhatki, Kamalagundi, Kendu leaves, Suamo loi.	Sparse
15. Ragaguda PRF	(i) Sal leaves & seed, Siali leaves & fibres.	Good

	(ii) Bana khajuri, Mahua flower & seed, Char seeds, Kendu leaves, Dhatki, Kamalagundi, Satabari, Genduli gum, Bana tulasi, Bhuineem, Bana khajuri, Bana haladi, Aonla, Harida, Bahada.	Sparse
16. Mundula PRF	(i) Sal leaves & seed, Siali leaves & fibre.	Good
	(ii) Bana haladi, Kendu leaves, Aonla, Harida, Bahada, Bhuineem, Bana khajuri, Bana kolathi, Genduli gum, Bana tulasi, Satabari, Mahua flower & seed, Suamo loi.	Sparse
(V) Range: Phulbani		
1. Balas kumpa RF	(i) Sal leaves.	Abundant
	(ii) Kamalagundi, Gilri, Bhuineem, Dhatki.	Good
	(iii) Siali leaves & fibre, Bana khajuri, Bana kolathi, Aonla, Harida, Bahada, Kendu leaves, Bana haladi, Mahua leaves & seeds, Suamo loi.	Sparse
2. Bhaliapada RF	(i) Dhatki, Kendu leaves, Bhuineem, Gilri, Satabari, Siali leaves, Genduli gum, Bana tulasi, Char seeds, Sal leaves & seed, Atundi, Siali leaves.	Sparse
3. Burtang(N) RF	(i) Sal seeds & leaves, Genduli gum, Satabari, Mahua flower & seed, Aonla, Harida, Bel.	Good
	(ii) Dhatki, Bana kolathi, Bana tulasi, Char seeds, Atundi, Hill brooms, Suamo loi, Bana haladi, Bana khajuri, Honey, Kendu leaf, Kusum seeds, Siali leaves & fibres, Sal resin, Bhalia seeds.	Sparse
4. Dakapalla 'A' RF	(i) Sal leaves Siali leaves.	Good
	(ii) Satabari, Bhuineem, Bana kolathi, Bana tulasi, Aonla, Char seeds, Bana khajuri, Dhatki, Kendu leaves Suamo loi.	Sparse
5. Dakapalla 'B' RF	(i) Sal leaves.	Good
	(ii) Siali leaves, Bhuineem, Dhatki, Bana tulasi, Satabari, Kamalagundi, Bana kolathi, Bana khajuri leaves, Kendu leaves, Aonla, Char seeds.	Sparse
6. Dutimendi RF	(i) Sal leaves & seed.	Good
	(ii) Aonla, Char seeds, Dhatki, Kendu leaves, Satabari, Bana khajuri, Bana haladi, Siali leaves, Suamo loi, Bhuineem, Bana tulasi, Bana kolathi.	Sparse
7. Ghugulasahi RF.	Siali leaves, Suamo loi, Kendu leaves, Satabari, Char seeds, Bana haladi, Bana khajuri, Bhuineem, Dhatki, Atundi, Tunga Alu.	Sparse

8. Gumagarh RF.	Sal leaves, Siali leaves & fibres, Mahua flower & seed, Satabari, Bhalia seeds, Genduli gum, Bana khajuri, Suamo loi, Bhuineem, Kendu leaves, Char seeds, Bana tulasi.	Sparse
9. Kalamuri RF	Siali leaves, Bana khajuri, Char seeds, Sal seeds and leaves, Kendu leaves, Aonla, Suamo loi, Gilri, Dhatki, Satabari, Bhuineem.	Sparse
10. Khajuripada RF	(i) Sal seeds & Sal leaves.	Abundant
	(ii) Siali leaves & fibres, Bhuineem, Mahua flower & seed, Kendu leaves, Genduli gum, Sal resin, Honey, Bhalia seeds,Charseeds, Kusum seeds, Dhatki,Hill broom, Suamo loi, Atundi, Aonla, Harida, Bahada, Satabari.	Sparse
11. Muskuli RF	Sal leaves, Siali leaves, Suamo loi, Char seeds, Bhuineem, Bana tulasi, Siali fibres, Kendu leaves, Atundi, Satabari, Kendu leaves, Dhatki.	Sparse
12. Pandrisuka RF	Suamo loi, Siali leaf, Dhatki, Bana kolathi, Bhuineem, Kendu leaves, Bana tulasi, Bana haladi, Char seeds.	Sparse
13. Ganjuguda 'B' PRF	(i) Sal leaves & seeds.	Abundant
	(ii) Siali leaves & fibre, Satabari, Bhalia seeds, Char seeds.	Good
	(iii) Bhuineem, Bana kolathi, Bana tulasi, Hill broom, Genduli gum, Kendu leaves, Mahua flower & seeds, Kamalagundi, Suamo loi, Bana khajuri.	Sparse
14. Phulbani PRF	Sal leaves & seed & leaves, Siali fibres, Bhuineem, Char seeds, Satabari, Bana kolathi, Bana tulasi, Bhalia seed, Suamo loi, Mahua flower & seed, Kamalagundi.	Sparse
15. Pilasalunki(E) PRF	Sal leaves & seeds, Siali leaves & fibre, Bhalia seeds, Dhatki, Chara seeds, Mahua flower & seed, Kendu leaves, Bhuineem, Satabari, Char seeds, Genduli gum, Suamo loi.	Sparse
16. Pilasalunki(W) PRF	Sal leaves & seeds, Siali leaves & fibre, Bhalia seeds, Dhatki, Chara seeds, Mahua flower & seed, Bhuineem, Satabari, Char seeds, Genduli gum, Suamo loi, Kendu leaves.	Sparse
17. Khaumunda RF	Sal leaves, Siali leaves, Suamo loi, Siali fibre, Bhalia, Satabari, Bhuineem, Bana kolathi, Bana tulasi etc.	Sparse
18. Kalabagh Ext. PRF	(i) Sal seeds & leaf	Good
	(ii) Myrabolans, Mahua flower & seeds, Bel, Genduli gum, Mango kernel, Sikakai, Hill broom, Siali leaf, fibres & seeds.	Sparse

19. Dariki RF	Sal seeds & leaves, Char seeds, Bhalia seeds, Mankada kednu, Sidha fruits, Kusum seeds, Mango kernels, Mahua flower & seeds, Dhataki flower, Indragaba, Khajuri patti, Bana haladi, Bhuineem, Suamo loi / Krushna sharika, Atundi loi, Simul cotton, Bana tulasi,	Sparse
20. Kalabagh RF	(i) Sal seeds & leaves	Good
	(ii) Siali leaves, seeds & fibres, Mahua flower & seeds, Bhalia, Seeds, Char seeds, Genduli gum, Mankada kendu, Aonla, Harida, Bahada, Satabari, Sidha fruits, Honey, Bee wax, Bel, Suamo lai, Atundi lai & fruits, Bana haladi, Rasna.	Sparse
21. Palchi RF	(i) Sal seeds & leaves.	Good
	(ii) Siali leaves & seeds, Char seeds, Sal resin, Mohua flower & seeds, Simul cotton, Mango kernel, roots of patala garuda, Karanga seeds, Aonla, Bahada, Harida, Genduli gum, Bana kolathi, Gillo seeds, Rasna.	Sparse
Range:- G.Udaygiri		
1. Rotingia RF	Siali leaf, Siali fibre, Sal seed, Bhuineem, Palas seeds, Aonla, Harida, Bahada, Char seeds, Gilo seeds, Kaincha seeds, Bana tulasi, Atundi lai, Satabari.	Sparse
2. Sujeli RF	Tentuli, Mango, Bhalia, Myrabolan, Hill broom, Siali leaf & fibres, Palas seeds, Char seeds, Bhuineem, Kendu, Atundi lai.	Sparse
3. Pukulingia RF	Palas seeds, Kusum seeds, Bana haladi, Bana kolathi, Aonla, Harida, Bahada, Atundi seeds & lai, Satabari, Kurei, Bhalia, Chara, Sal seeds, Bel, Bana tulasi.	Sparse
4. Kalinga-I (Jobedi-RF)	Palas seeds, Kusum seeds, Tamarind seeds, Char seeds, Bhalia seeds, Kendu, Mango, Atundi seeds & loi, Siali leaf fibre, Sal seeds, Gilo seeds, Genduli gum, Bana haladi etc.	Sparce
5. Kalinga-II (Godingia)	Palas seeds, Sal seeds, Bana haladi, Bana kolathi, Mahua flower & seed, Kendu, Mango, Bana tulasi, Kamalagundi, Satabari, Moda fruits, Bhuineem, Atundi seeds & lai, Suamo loi etc.	Sparce
6. Kalinga-II (Kurmingia RF)	Hill broom, Siali fibres & leaves, Myrabolans, Neem seeds, Karanja seeds, Bana haladi, Bana kolathi, Bhuilimba, Sabai grass, Gilo seeds, Genduli Gum, Honey, Bhalia seeds, Atundi fruits & Lai, Kusum seeds, Mango kernel, Bel, Suamo lai,	Good

7. Kalinga-IV (Kalinga Sandal wood RF)	Sal seeds, Satabari, Bhalia seeds, Char seeds, Siali leaf & seeds, Bana kolathi, Bana haladi.	Sparse
8. Kanabagedi RF	Atundi seeds & lai, Bana kolathi, Bana haladi, Bhuineem, Neem seeds, Karanga seeds, Anantmula, Wood mushroom, Satabari, Phenphena fruit, Bel, Gillo seeds, Palas seeds, Dhataki flower, Bhalia, Aonla, Harida.	Sparse
9. Gedipabali RF	Hill broom, Sabai grass, Bhalia seeds, Char seeds, Sal seeds, Kendu fruits, Palua, Bana kolathi, Siali leaf, Seeds etc.	
10. Gutingia-A-RF	Sal seeds, Mahua flower & seed, Bhalia seeds, Char seeds, Lodha, Medha, Phenphena, Genduli gum, Honey, Kamalagundi fruit, Gilo seeds, Siali leaf & fibres,	Good
11. Gutingia-B-RF	Palas seeds, Gillo seeds, Mahua flower & seeds, Karanga seeds, Bhalia seeds, Kusum seeds, Char seeds, Bana khajuri, Dhatki flower, Simuli cotton, Sikakai, Honey, Myrabolans, Sal seeds, Hill brooms, Siali leaf & fibres.	Sparse
12. Dakapalla RF	Sal seeds, Palas seeds, Bhalia seeds, Char seeds, Hill brooms, Myrabolans, Palua, Siali leaf & fibres.	Good
13. Baliapatta RF	Bhalia seeds, Char seeds, Kendu, Mahula seeds & flower, Myrabolans, Siali leaf & fibres, Honey, Palas seeds, Satabari etc.	Sparse
14. Tuduballi RF	Sal seeds, Char seeds, Bhalia seeds, Kusum seeds, Karanga seeds, Mahua flower & seeds, Mango kernel, Myrobolans, Baghanakhi, Bel, Hill broom, Siali leaf & fibres, Atundi seeds & lai, Satabari, Baidanka seeds etc.	Sparse
15. Podangi RF	Sal seeds, Myrabolans, Kusum seeds, Karanga, Char, Bhalia seeds, Kendu, Atundi seeds & lai, Siali leaf & fibres, Phoenix broom etc.	Sparse
16. Bakingia PRF	Sal seeds, Kendu, Atundi seeds & lai, Palas seeds & flower, Suamo loi, Aonla, Harida, Bahada, Kusum seeds, Bana kolathi, Bana haladi, Phenphena, Lodha, Medha, Sikakai, Dhataki flower, Mango kernel, Siali leaf & fibres, Bhalia seeds, Kochila seeds, Tamarind seeds, Baghanakhi seeds, Gillo seeds, Satabari, Mushroom, Neem seeds etc.	Sparse
17. Katingia PRF	Sal seeds, Mahula flower & seeds, Kendu, Bhalia seeds, Char seeds, Bhuineem, Bana	Sparse

	haladi, Myrabolans, Sidha fruits.	
18. Paburia PRF	(i) Char seeds, Bhalia seeds, Kusum seeds, Mahua flower & seeds, Kendu, Bana haladi, Bana Kolathi etc.	Sparse
	(ii) Sal seeds.	Good
19. Talarimaha PRF	(i) Sal seeds.	Good
	(ii) Mahua flower & seeds, Bhalia seeds, Char seeds, Kendu, Aonla, Siali leaf, & fibre, Bhuikhajuri, Bana haladi, sidha fruits.	Sparse
20. Bhanjapadar PRF	(i) Sal seeds.	Good
	(ii) Bhalia seeds, Char seeds, Kendu, Mahula flower & seeds, Suamo loi, Atundi loi, Palas flower & seeds, Bhuineem, Bana haladi, Bana kolathi, Bel, Sidha fruits etc.	Sparse
Range:-Phiringia		
1. Bandhagarh A PRF	(i) Sal seeds, Sal leaf, Bhalia seeds, Char seeds, Mahua seeds & flower.	Good
	(ii) Myrabolans, Kendu, Genduli gum, suamo loi, Khelua loi, Bana kolathi, Palasa flower & seeds, Siali fibre & leaf, Bhuikhajuri, Gillo seeds, Satabari, Atundi lai & fruits, Kusum seeds, Mango kernel, Phenphena fruits, Palua.	Sparse
2. Balandapada (S) PRF	Mahua flower & seeds, Harida, Bahada seeds, Kendu fruits, Char seeds, Siali leaves & fibre, Hill broom, Gillo seeds, Aonla, Bana khajuri & Bana haladi.	Sparse
3. Balandapada (N) PRF	(i) Sal seeds, Sal leaves	Good
	(ii) Hill broom, Bhalia seeds, Char seeds, Sikakai, Siali leaves, Seeds, Fibres, Simuli cotton, Mahua flower, seeds, Genduli gum, Aonla, Bel & Patala garuda root	Sparse
4.Damingia PRF	Sal seeds & leaf, Mahua flower & seeds, Bhalia seeds, Karanga seeds, Bel, Dhatki flower, Root of Patalagaruda, Sikakai, Bana haladi, Bana kolathi, Aonla.	Sparse
5. Damingia Ext. PRF	(i) Sal seeds & leaves	Good
	(ii) Myrabolans, Mahua flower & seeds, Siali leaves, Seeds, Bel, Sikakai, Simuli cotton, Char seeds, Genduli gum, Bhuineem, Khajuri patta, Gillo seeds, Sidha fruits.	Sparse
6. Katringia PRF	(i) Sal seed & leaves. (ii) Kendu, Char seeds, Bhalia seeds, Mahua seeds & flower, Siali leaves, fibres & seeds, Myrabolans, Kusum seeds, Palas seeds, Sidha fruit, Baidanka seeds, Atundi lai & fruits, Dhataki flowers, Hill brooms, Genduli gum, Bana haladi, Kurei seeds/Indragaba,	Sparse

	Khajuri patti, Bhuineem, Suamo loi, Karanga seeds, Rasna, Nirmala etc.	
7. Kelapada A PRF	Sal seeds & leaves, Mankada kendu, Bhalia seeds, Char seeds, Khajuri patti, Rohini fruits, Dhataki flower, Kurei seeds / Indragaba, Bhuineem, Rasna, Sidha fruits, Satabari, Suamo loi, Atundi lai & fruits, Mahua flower & seeds, Kusum seeds & Palas seeds.	Sparse
8. Kelapada B PRF	Sal seeds & leaves, Mahua seeds & flower, Bhalia seeds, Char seeds, Khajuripatti, Indragaba, Palas seeds, Sidha fruits, Bhuineem, Bana haladi, Atundi lai & fruits.	Sparse
9. Kelapada C PRF	Myrabolans, Mahua flower & seeds, Bhalia seeds, Mankada kendu, Kusum seeds, Char seeds, Sal seeds & leaves, Palas fruits, Siali leaves & fibres, Seeds, Bana haladi, sidha fruits, Indragaba, Khajuri patti, Bhuineem, Landa Baguli, Kochila seeds.	Sparse
10. Kiamunda PRF	(i) Sal seeds & leaves.	Good
	(ii) Harida, Bahada, Amla, Fruits, Bhalia seeds, Char seeds, Mankada kendu, Sidha fruits, Indragaba, Kusum seeds, Palas seeds, Siali leaves, seeds & fibres, Atundi loi & fruits, Satabari, Khelua lai, Katha chhatu, Bana kolathi & Bana haladi, Bel Khajuri patti.	Sparse
11. Mallikapada PRF	(i) Sal seeds & leaves.	Good
	(ii) Bhalia seeds, Char seeds, Mahua flower, seeds, Siali leaves, seeds & fibres, Myrabolans, Satabari, Sikakai, Palas seeds, Simuli cotton, Bana haladi, Khajuri patti & Indragaba, Genduli gum, Suamo loi, Atundi loi & fruits.	Sparse
12. Baghanadi RF	(i) Sal seeds & leaves	Good
	(ii) Mahua flowers, Seeds, Bhalia seeds, Char seeds, Mankada kendu, Myrabolans, Sidha fruits, Palas seeds, Genduli gum, Karangia seeds, Kusum seeds, Hill brooms, Khajuri patti, Siali leaves, seeds & fibres, Simuli cotton, Palua, Dhatki flower, Sikakai, Satabari, Nirmasa/Kataka, Indragaba, Phenphena fruits, Atundi loi & fruits, Rasna, Bana haladi, Bana kolatha, Bhuin neem.	Sparse
13. Bandhagarh 'B' RF	(i) Sal seeds & leafs	
	(ii) Genduli gum, Palas seeds, Atundi lai & fruits, Indragaba, Gaba, Char seeds, Bhalia seeds, Landa baguli, Gillo seeds, Simuli cotton, Aonla.	Sparse

14. Dahisara RF	Sal seeds & leaves, Bhalia seeds, Char seeds, Kusum seeds, Palas seeds, Genduli gum, Indragaba, Mango kernel, Harida, Bahada, Aonla, Mankadakendu, Dhataki flower, Atundi loi & fruits.	Sparse
15. Gerupada(E) RF	Sal seeds & leaves, Mankada kendu, Bhalia seeds, Khajuri patti, Harida, Bahada, Simul cotton, Palas seeds, Kusum seeds, Indragaba, Sidha fruits.	Sparse
16. Gerupada(W) RF	Sal seeds & leaves, Mankada kendu, Bhalia seeds, Indragaba, Char seeds, Khajuri patti, Palas seeds, Bana haladi, Bana kolathi, Hill broom, Aonla, Gillo seeds, Bhuineem etc.	Sparse
17. Gochhapada RF	(i) Sal seeds & leaves.	Good
	(ii) Mahua seeds, Flower, Char seeds, Bhalia seeds, Kusum seeds, Karanga seeds, Siali leaves, seeds & fibres, Mankada kendu, Palas seeds, Kamalagundi, Bel, Myrabolans, Hill brooms, Kochila seeds, Nirmala, Honey, Wax, Simul cotton, Dhatki flower, Sikakai, Indragaba, Bel, Satabari, Phenphena, Simo loi, Atundi loi & fruits, Sidha fruits, Bana haladi, Bana kolathi, Bhuineem,	Sparse
18. Kerandibali (E) RF	(i) Sal seeds & leaves	Good
	(ii) Siali leaves & seeds, fibres, Kusum seeds, Mahua flower & seeds, Simul cotton, Bel, Genduli gum, Mankada kendu, Char seeds, Bhalia seeds, Sidha fruits, Rasna, Myrabolans, Hill brooms, Kanta brooms, Baidanka seeds, Indragaba, Gillo seeds.	Sparse
19. Kerandibali (W) RF	(i) Sal seeds & leaves, Mahua seeds & flower	Good
	(ii) Genduli gum, Char seeds, Bhalia seeds, Kusum seeds, Karanga seeds, Palas seeds, Kendu, Bel, Rohini fruits, Sidha fruits, Satabari, Myrabolans, Mango kernel, Atundi lai & seeds, Suamo lai etc.	Sparse.
20. Ladapadar RF	(i) Sal seeds &leaves, Mahua flower & seeds.	Good
	(ii) Mango kernels, Char seeds, Bhalia seeds, Karanga seeds, Palas seeds, Genduli gums, Roots of Patala garuda, Mankada kendu, Aonla & bahada.	Sparse
21. Nuapadar RF	(i) Sal seeds & leaves	Good
	(ii) Mahua flower & seeds, Siali leaves & seeds, Mango kernel, Aonla, Bhalia seeds, Char seeds, Kusum seeds, Satabari, Indragaba, Bhuineem, Bana haladi.	Sparse
22. Sadingia RF	(i) Sal leaves & seeds	Good

	(ii) Char seeds, Bhalia seeds, Dhataki flower, Indragaba, Satabari, Bhuineem, Myrabolans, Kusum seeds, Palas seeds, Siali leaves, fibres & seeds, Suamo loi, Atundi loi & seeds, Khajuri patti, Sidha fruits, Simul cotton & Palua.	Sparse
Source: Field study by grid/strip sampling method		

7.4.1 Medicinal Plants

Medicinal plants and their derivatives have a promising ready market, but their price and market potential has not yet been properly and judiciously assessed. For this human world where population is increasing in a geometric progression and people's awareness and caution towards health and longevity has further intensified the importance of medicinal plants for their natural prophylactic and curative values. Table No.7.4 below depicts important medicinal plants available in Phulbani forest division.

TABLE NO. 7.4 IMPORTANT MEDICINAL PLANTS AVAILABLE IN PHULBANI FOREST DIVISION

Sl. No.	Vernacular Name	Botanical name	Family	Parts Used	Treatment of Diseases
			Tree		
1.	Achhu	Morinda tinctoria	Rubiaceae	Root,leaf	Cataract/Tonic
2.	Achiadi	Calycopteris floribunda	Combretaceae	Leaves, Fruits	Worm, Malaria, Leprosy, Dysentery, Jaundice, Ulcer,
3.	Ankula	Alangium lamarkii	Alangiaceae	Leaves	Conjunctivitis
4.	Araguna	Cycas circinalis	Cycadaceae	Bark, Tender leaves, Seeds	Sores, Swellings, Flatulence, Vomiting.
5.	Ata	Annona squamosa	Annonaceae	Root, Leaves, Fruit, Seeds	Mental depression, Spinal disorder.
6.	Bahada	Terminalia belerica	Combraetacea e	Fruit, Bark	Cough/Astringent.
7.	Barakoli	Ziziphus mauritiana	Rhamnaceae	Root, Bark, Leaves, Fruits	Fever, Wound, Ulcer, Cephalalgia, Gingivitis, Boils, Obesity, Hyperdipsia, Vomiting, Constipation, General debility.
8.	Baruna	Crataeva religiosa	Capparaceae	Bark, Leaves	Dyspepsia, Colic, Cough, Flatulence, Asthma, Renal diseases.
9.	Baula	Mimusops elengi	Sapotaceae	Bark, Flower, Fruit, Seeds	Odontopathy, Ulitis, Ulemorrhagia.
10.	Bela	Aegle marmelos	Rutaceae	Leave, Fruit, Plant.	Diarrhea, Dysentery.
11.	Bhalia	Semecarpus anacardium	Anacardiaceae	Kernel (seed)	Pharyngitis, Cuts.

12.	Chara	Buchanania lanzan	Anacardiaceae	Root, Leaves, Fruits	Skin diseases, Depurative, Diarrhea, Dysentery, Laxative.
13.	Dhaman	Grewia tiliaefolia	Tiliaceae	Bark, Fruits,	Kapha, Pitta, Hyperdipsia, Rhinopathy,pharyngopathy, Skin diseases, Seminal weakness.
14.	Dhauranja	Holoptelea integrifolia	Ulmaceae	Bark, Leaves	Inflammations, Dyspepsia, Flatulence, Vomiting, Skin diseases, Leprosy, Diabetes, Rheumatism.
15.	Dimiri	Ficus glomerata	Moraceae	Latex	Pain
16.	Gohira	Acacia leucophloea	Mimosaceae	Bark	Cough, Inflammation, Skin diseases.
17.	Gurudu	Gardenia gummifera	Rubiaceae	Resin	Neuropathy, Cough, Bronchitis, Anorexia, Dyspepsia, Colic, Flatulence,
18.	Harida	Terminalia chebula	Combretaceae	Fruit, Bark	Astringent, Laxative.
19.	Jamu	Syzigium cuminii	Myrtaceae	Bark	Food poisoning
20.	Kanchan	Bauhinia purpurea	Caesanpiniaceae	Bark, Root	Astringent, Snake Bite.
21.	Karanja	Porgamia pinnata	Fabaceae	Root, Barks, Leaves, Flowers, Seeds.	Scrofulous enlargement, Hemorrhoids, Flatulence, Diarrhea, Leprosy, Rheumatism, Scabies, Lumbago.
22.	Katakoli	Strychnos potatorum	Loganiaceae	Seeds	Kapha & Vatta, Hepatopathy, Nephropathy, Leucorrhoea, Gystropathy, Bronchitis, Diabetes, Conjunctivitis.
23.	Kochila	Strychnos nuxvomica	Loganiaceae	Bark, Leaves, Seeds	Cholera, Wounds, Ulcer, Asthma, Bronchitis, Insomnia,
24.	Kurei	Holarrhenaantidysenterica	Apocynaceae	Stem, Bark	Dysentery, Body ache.
25.	Kurum	Haldina cordifolia	Rubiaceae	Roots, Bark	Wounds, Ulcer, Skin diseases, Gastropathy, Fever,

					Burning Sensation.
26.	Ludha	Symplocos recemosa	Symploaceae	Bark	Pimples, Leucorrhea, Wound, Skin disorders, Menstrual disorder, Liver diseases, Menorrhagia, Ulcers,
27.	Mahi	Guruga pinnata	Burseraceae	Root, Stem, Leaves, Fruits, Gall,	Pulmonary affections, Asthma, Roundworm, Gystropathy, Obesity, Ulcer, Odontalgia,
28.	Makha	Schrebera swietenioides	Oleaceae	Root, Bark, Leaves, Fruits	Dyspepsia, Colic, Flatulence, Skin diseases, Anemia, Boils, Vesical calculi, Diabetes,
29.	Munga	Moringa pterigosperma/ oleifera	Moringaceae	Root, Bark, Leaves, Seeds	Dyspepsia, Anoresia, Verminosis, Kapha & Pitta, Neuralgia.
30.	Nageswar	Mesua ferrea	Clusiaceae	Flower, Oil,	Vata, Pitta, Asthma, Cough, Halitosis, Leprosy, Scabies, Leucorrhoea.
31.	Neem	Azadirachta indica	Meliaceae	Stem, Bark	Dermatitis, Diabetes.
32.	Padel	Stereospermum suaveolens	Bignoniaceae	Root, Leaves, Flowers, Fruits, Seeds	Vata, Dyspepsia, Renal calculi, Otalgia, Odontalgia, Malaria, Cardiopathy.
33.	Palasa	Butea monosperma	Fabaceae	Root,Bark, Seed,	Goitre, Colic, Pimples, Diuretic, Apetiser.
34.	Patua	Randia dumetarum	Rubiaceae	Bark, Fruits	Ostalgia, Diarrhea, Bruises, Kapha & Pitta, Gout, Leprosy, Skin diseases, Inflammations, Flatulence, Colic,
35.	Phanphana	Oroxylum indicum	Bignoniaceae	Roots, Leaves, Fruit, Seeds	Vata & Kapha, Inflammation, Dropsy, Sprains, Neuralgia, Cough, Bronchitis, Purgative.
36.	Salai	Boswellia serrata	Burseraceae	Bark, Gum-resin	Ashma, Dysentery, Ulcer, Hemorrhoids, Skin diseases, Antipyretic.
37.	Tentuli	Tamarindus indica	Caesalpiniaceae	Bark	Injuries, Scalds

38.	Tinia	Albizzia odoratissima	Mimosaceae	Bark	Astringent, Ulcer, Expectorant, Bronchitis, Skin diseases.
39.	Toon	Toona ciliate	Meliaceae	Bark, Flowers	Chronic infantile, dysentery, Cough, Bronchitis, Verminosis, Dermatopathy, Menstrual disorder,
40.	Antia	Helicteres isora	Sterculiaceae	Root, Bark, Fruits	Colic, Scabies, Diabetes, Diarrhea, Dysentery, Verminosis, Ulcer, wounds
41.	Bainchakoli	Flacourtia jangomos	Flacourtiaceae	Bark, Leaves, Fruits	Ulemorrhagia, Odontalgia, Diarrhea, Stomachic, Liver Tonic, Skin diseases, Diabetes, Jaundice, Tumours
42.	Banakhajuri	Phoenix acaulis	Arecaceae	Fruits	Vatta & Pitta, Hyperdipsia, Burning sensation, Fever, Cardiac debility, Seminal weakness, Gystropathy
43.	Begunia	Vitex nigundo	Verbenaceae	Root, Leaves, Flower	Vatta, Cephalalgia, Otalgia, Arthritis, Inflammation, Gout, Otorrhoea, Hepatopathy, Cardiac disorder.
44.	Bhuineem	Andrographis paniculata	Acanthaceae	Whole Plant	Laxative, Antipyretic, Cough, Bronchitis, Dyspepsia.
45.	Dhatuki	Woodfordia fruticosa	Lythraceae	Flowers	Kapha & Pitta, Leprosy, Skin diseases, Leucorrhea, Menorrhagia, Stimulant in pregnancy.
46.	Gilri	Indigofera pulchella	Labaceae	Root, Stem, Leaves	Growth of hair, Gastropathy, Chronic bronchitis, Asthma, Ulcer, Epilepsy, Neuropathy
47.	Gangasiuli	Nyctanthes arbor-tristis	Oleaceae	Leaves, Flowers, Seeds	Kapha & Pitta, Sciatica, Inflammation, Chronic fever,

					Asthma, Baldness, Scurvy & Affections of the Scalp,
48.	Ghantal	Zizyphus glaberima	Rhamnaceae	Fruit	Poor appetite, General fatigue, Loss bowels, Palpitation insomnia, Night sweats, Hysteria.
49.	Jagangi	Phyllanthus reticulates	Euphorbiaceae	Whole plant	Pitta, Burning sensation, Gystropathy, Ulmorrhagia, Sores, Burns, Skin eruptions, Bleeding of Gums, Asthma, Syphilis,
50.	Kanteikoli	Ziziphus oenopila	Rhamnaceae	Roots	Hyperacidity, Ascaris infection, Healing of wounds, Stomachalgia.
51.	Lajakuli	Mimosa pudica	Mimosaceae	Roots, Leaves	Pitta, Leucoderma, Vaginopathy, Metropathy, Fistula, Conjunctivitis, Cuts, Wounds.
52.	Mersinga	Murraya koenigii	Rutaceae	Roots, Bark, Leaves	Kapha & Pitta, Hyperdipsia, Leprosy, Leucoderma, Dysentery.
53.	Naguari	Lantana camara	Verbenaceae	Whole plant	Tetanus, Malaria, Epilepsy, Gastropathy, Cuts, Wounds, Tumors, Rheumatism,
54.	Patalgaruda	Rauvolfia serpentine	Apocynaceae	Root	Snake bite, Blood Pressure, Mild anxiety.
55.	Anantamula	Hemidesmus indicus	Asclepiadaceae	Roots, Leaves, Stems	Leucoderma, Burning sensation, Leprosy, Skin diseases, Asthma, Bronchitis, Leucorrhoea, Inflammation.
56.	Baidanka	Mucuna pruriens	Fabaceae	Roots, Leaves, Seeds, Hairs	Vata & Pitta, Constipation, Nephropathy, Ulcer, Cephalagia, Sterility,
57.	Banamalli	Jasminum arborescens	Oleaceae	Leaves	Menstrual disorder, Colic, Flatulence, Cough, General debility.

58.	Gajapippali	Scindapsus officinalis	Araceae	Dried matured inflorescence	Vatta & Kapha, Diarrhea, Cough, Bronchitis, Helminthiasis,
59.	Kaincha	Abrus precatorius	Fabaceae	Root, Leaves, Seeds.	Cough, Phryngites, Inflammation, Leucoderma, Skin diseases, Wounds, Asthma,
60.	Muturi	Smilax macrophylla	Liliaceae	Root	Urinary Diseases, Dysentery
61.	Madang	Loranthus longiflorus	Loranthaceae	Bark,	Menstrual Problem
62.	Satabari	Asparagus recemosus	Liliaceae	Root, Branch	Bleeding, Urinary Discharge
Source: Field Survey					

7.5 Demand and supply of timber and important non-timber forest produce.

7.5.1 Timber

The timber is required for various purposes like wooden posts, household wooden panels, doors and window leaves, furniture, agricultural implements, cart wheels etc. Generally Sal, Bija, Sisoo, Asan, Kasi, Bandhan are used for ridge pieces, door and window frames. The important timber species available in the Division and their uses for different purposes are elaborated in the following table.

Table No.-7.5

Sl. No.	Local name	Botnical name	Uses	Remarks
1	Saguan	Tectona grandis	House buidling, bridge and wharf construction, Furniture and cabinet work	It resists the action of water and not attacked by Termites and white ants
2	Sal	Shorea robusta	House building, railway sleepers, door and window frames, rafters, ploughs, boats, centering for bridges	Sal seeds are used for extraction of oil leaves and sticks are used locally as plates and tooth brush
3	Piasal(Bija)	Pterocarpus marsupium	Furnitures, planks and door pannels	Locally used and exported.
4	Sisoo	Dalbergia latifolia	Furnitures, Agricultural implements ornamentals wood works	Stands water logged area, locally used and exported, it is recknoed the best furniture wood.
5	Bandhan	Ougeinia oojeinensis	Cart wheels and agricultural implements	It is a large straight timber used and also exported.
6	Gambhar	Gmelina arborea	Cart yokes, furniture, cabinet making bus bodies	Locally used and exported.

7	Asan	Terminalia tomentosa	Fore Building materials not in contact with ground, house building Rafters and Beams	Tassar cultivation is done on the leaves and the leaves are used for leather dying, locally a good substitute for Sal.
8	Kasi	Bridelia retusa	Furniture, agriculture implements	It is resistant to white ants and fire.
9	Kurum	Adina cordifolia	Planks, furniture, box wood and ceilings	Locally used and exported.
10	Mundi or Mitkania	Mitragyna parviflora	Planks, furnituure, box wood and ceilings	Locally used and exported.
11	Dhaura	Anogeissus latifolia	Axles of carts, Axe handle, plough	Locally used and exported.
12	Kendu	Diospyros melanoxylon	Used for rafters and neams	Used locally
13	Jamu	Syzygium cumini	Planks, door frames, Agricultural implements and house construction	The fruit is eaten raw and locally used.
14	Mohula	Moduca indica	No timber value, used as firewood, planks, house post	Flower and seeds produce spirit and oil respectively.
15	Siris	Albizia lebbeck	Agricultural implements, planks, furniture	used to produce timber and fuel, for forage, environmental management, and medicine. It is an astringentand used for coughs, boils, lung problems, flu, and gingivitis, among others. Its bark is used to treat inflammation and as fish poison.
16	Kusum	Schleichera oleosa	Agriculture implements	Seeds are used for oil extraction.
17	Mango	Mangifera indica	House building material, used in plywood industries	Fruits used for pickle making, ripen are edible and kernels are also used locally
18	Sidha	Lagerstroemia parviflora	House poles and rafter.	Used locally
19	Arjun	Terminalia arjuna	House building pupose like rafter and beams	Bark is used for tanning, tassar being reared on these plants.
20	Simili	Bombax ceiba	Match splints	Exported for match sticks
22	Tentra	Albizzia procera	Planks and furniture making in carpentery units	Usaed locally.

As of 2011 India census, Phulbani had a population of 79,171. Males constitute 58,481 of the population and females 20,690. Per capital requirement for different activities like housing, furniture and agricultural implements have been calcualted by FSI in 1996 and usigng those per capita data the total requirement is calculated and

provided. The requirement projected are only indicative of the needs of the people in the Division. It is seen that most of rural requirements are met from vast stretch of Revenue and Village forests present in the Division.

Table No.- 7.6 Timber requirement projections in different years

Purpose	Type	Per capita consumption	Annual requirement (cum)	
Housing and Allied uses	Rural	0.04	3114	4258
	Urban	0.047	99	179
Furniture	Rural	0.008	622	851
	Urban	0.015	31	44
Agricultural implements	Rural & Urban	0.053	4238	5574
Total requirement			**8104**	**10906**

There is no coupe working in the forest since 1992-93 after imposition of ban ongreen felling by Govt. Of Orissa. Only small quantities of tinber is produced through the seizures and salvaging of the timber fallen from the forest floot.

7.5.2 Fodder

The domestic animal (cattle, cow, buffalo, sheep and goat) population of Phulbani Division is 3,67,758. There is no concept of stall-feeding and usual practice followed is mass grazing. Genrerally the herdsman taken the animals of one or two villages to thenearby forest from morning to evening. Also there is a religious sentiment in disposal of unproductive cattle. The annual requirement of the fodder by these domestic animals is calculated based on the field observations and the report of Forest Survey of India. It is generally observed that each cow takes food 2-3% of its body weight, it consumes the fodder quantity of 5 kg/day approximately. FSI investigation shows that nearly 30% of the fodder requirement is met from the froests. Bufallo consumes fodder aproximately two times of cow and sheep and goat consumes half that of the cow (FSI report, 1996). Based on the above observation a rough calculation has been made to know the fodder requirement and the fodder being consumed from the forest. The results are given below';

Table No.-7.7 ANNUAL REQUIREMENT OF FODDER				
Sl. No.	**Lovestock**	**Total population**	**Fodder requirement per year (M.T)**	**Fodder obtained from forests**
1	Cattle	185845	339167	101750
2	Buffalo	29217	106642	31993
3	Sheep	5276	4811	1443
4	Goat	144420	131711	39513
TOTAL		**364758**	**582331**	**174699**

It is clear from the table that the total fodder taken from the forests roughly comes to 174699 MT. If it is converted into monetary values it comes to 29.11 Crore by taking minimum market price of green fodder as Rs.500/MT. Mostly the fodder requirement is met from the Khesra Forests, protected Reserved Forests and Reserved Forests. Some amount of fodder is also met from the agricultural fields up to March and April. There is more grazing pressure on the forest from July to November when the agricultural lands are under crops.

7.5.3 Bamboo

Bamboo is considered to be poor man's timber and is extracted from natural forests for human and animal consumption. Its tender shoots are edible and used as food, during rainy season (lean period of employment) whereas karadi bamboo is used for basket making and pakal bamboo for house construction and agricultural implements. Industrial bamboo is procured by JK Paper industry, being RMP (Raw Material Procurer) situated at JayKayPur, Rayagada district and rest long/commercial bamboo is procured by OFDC Ltd. for disposal. The production and disposal of bamboo is reflected in table below.

Table No.-7.8 DETAILS OF BAMBOO PRODUCTION / ROYALTY				
Year	**Production**		**Royalty in Rs.**	
	Industrial in S.U	**Commercial in No**	**I.B**	**C.B**
2006-07	111868.47	10727	Royalty demand and payment made centrally in the O/o the PCCF, Bhubaneswar	
2007-08	16025.5	26301		
2008-09	7012.79	21500		
2009-10	5138.42	6535		
2010-11	6875.51	11240		

2011-12	11738.36	7584	
2012-13	0	0	
2013-14	445.16	8500	
2014-15	60.38	2500	
2015-16	2462.44	0	
2016-17	0	28000	

7.5.4 Non- Timber Forest Produce (NTFPs)

Non-timber forest products are plentifully available and extensively extracted from the forests of Phulbani forest division and their role in rural and forest economies is immense. Prior to March 2000, different NTFP items were worked out by AMCS. Tikabali, OFDC Ltd, TDCC Ltd. They were purchasing NTFP items from primary collectors at administered prices fixed by District price fixation committee or Government for certain NTFP items like Sal seeds etc. and paid fixed royalty to the forest department.

7.6 Import and Export of wood and wood products

Kandhmal is not linked to railway network till date. It is a land locked district and forest produce are transported only through a network of different roads linking it to Sambalpur and Bolangir via Boudh, Bhawanipatna (Kalahandi) via Balliguda; Bhubaneswar and Khurda via Nayagarh and Dasapalla; Berhampur via Bhanjnagar and Aska; Muniguda via Baliguda. The condition and maintenance of roads is good and it is further strengthened after the implementation of "Pradhanmantri Gramya Sadak Yojna".

Although Salki and Baghnadi rivers are present in Phulbani division, but are not negotiable for exporting or transporting forest or other due to undulating terrain.Table no.7.9 reflects network of forest roads and table 7.10 depicts road network and their categories for ready reference and understanding their routes.

Table 7.9:List of Forest Roads of Phulbani Forest Division

Sl. No	Name of the Forest road	Name of the Range	Length in K.M.	Remarks	Remarks
1.	Panisal-Samapaju	Sudurukumpa	16.0	3 km Black topped	Forest Diversion is to be submiited by E.E.RD.
2.	Ranipathar-Bhaliapada	Sudurukumpa	16.0	7 km Converted	

				to jungle due to non-use.	
3.	Kutibari – Banardei	Sudurukumpa	19.0	7 km Converted to jungle due to non-use.	
4.	Rengali – Banardei	Sudurukumpa	16.00	Converted to jungle due to non-use.	
5.	Tikiripada – Samapaju	Sudurukumpa	3.0	Converted to jungle due to non-use.	
6.	Sikadi – Dalapada	Phulbani	5.0		
7.	Datapaju – Panasapadar	Phulbani	8.0		
8.	Tikiripada – Panasapadar	Phulbani	16.00	Converted to jungle	
9.	Katringia – Katramala	Phulbani	17.0	3 km Black topped	Forest Diversion is to be submiited by E.E.RD.
10.	Palchi – Kalabagh	Phulbani	3.00		
11.	Gochapada – Murja	Phiringia	3.0		
12.	Balandapada – Narayanprasad	Phiringia	10.0	10 km black topped	
13.	Pasara – Mundagaon	Tikabali	10.0	10km Black topped	
14.	Kupati – Chahali	Tikabali	9.0		
15.	Chahali – Rupagaon	Tikabali	9.0	9 km Black topped	
16.	Rupagaon – Budakakhele	TikabaliRange	6.0		
17.	Gosama – Andrigada	TikabaliRange	8.5		
18.	Kupati – Gosama	TikabaliRange	5.5	Converted to jungle due to non-used	
19.	Nediguda – Andrigada	TikabaliRange	4.5	Converted to jungle due to non-used	
20.	Burbinaju – Katadi	G.Udaygiri	6.5	6.5 km black topped	
21.	Approach Road to Forest to Forest Colony	G.Udaygiri	1.5	1.5 black topped	
22.	Karada – Baraba	KaradaRange	12.0	12 km blacktopped	

23.	Karada – Pokasunga	KaradaRange	10.2	10.2 km Black Topped	
24.	Malapanka – Baraba	KaradaRange	3.0	3km Black Topped	
25.	Baraba – Mundapathar	KaradaRange	3.0	Converted to jungle due to non use.	
26.	Sahajakol – Ranaba	KaradaRange	10.0	10km Black topped	
27.	Sahajakhola – Hatimunda	KaradaRange	3.0	Converted to jungle due to non use.	
28.	Ranaba - Baraba	KaradaRange	8.3	3.3 km Black topped	
Total			**242.00 Kms**.		

Abstract:

i.	Length of Forest Road with Black topped condition –	81.5 km
ii.	Length of Forest Road converted to Jungle due to non-use.-	65.0 km
iii.	Proposal for Blacktopping to be submitted by E.E, RD	27.00 km
iv.	Length of Forest Road made C.C.	05.00 km
v.	Length of Forest Road to be repaired	63.5 km
	Total	242.00 km

Table 7.10 Road of Phulbani (R&B) Division As on 31/10/2018

Sl.No.	Name of the road.	Category	Length in km.	Remarks
1	2	3	4	5
1	Banigocha Boarder Madhapur Khajuripada Phulbani Sarangada road.(142.800km. to 178.838km. and 188.090 to 219.518 km)	S.H-1	67.466	Transeferred to NH-157
2	Kalinga G.Udayagiri Raikia Nuagaon road.(0.0 to 58.210km.)	S.H. - 7-A	58.210	
3	G.Udayagiri Paburia Serangada road.(0.0 to 32.0km.)	M.D.R. - 15	31.183	
4	Phulbani Town Circular road.	O.D.R	8.149	
5	Sankarakhole Khajuripada road.	O.D.R	21.31	
6	Phulabani-Gochapada	O.D.R	28.056	
7	Phiringia-Gochapada	O.D.R	22.997	
8	Sankarchol-Koinjhar-Paburia road	O.D.R	38.306	

9	Anita Bakery to Phulbani Sahi	ODR	2.015	Tr. From H&UD Deptt. Vide W/D notification No.4911 dt. 03.05.2013
10	Narayani Mandir Circular Road	ODR	0.853	
11	Tangadapathar Chakapada Nediguda Badingi Road	ODR	39.678	Tr. From R.D. Deptt. Vide W/D notification No.2094 dt. 18.02.2015
12	Air Strip at Gudari road.	ODR	0.68	New road constructed by Division
13	Masiripada Kelapada Sadingia & Balandapada (MKSB) linked road up to village Nuapadar.	ODR	55.331	Tr. From R.D. Deptt. Vide W/D notification No.4829 06.04.2017
14	Raikia Simanbadi road(0/0-9/0km.)	ODR	9.000	Baliguda
11	Raikia Gandhasila Nallah Mediaganda Sarangada road	ODR	22.125	Baliguda
Total			**405.355**	
ABSTRACT				
	State Highway	**S.H**	**125.676**	
	Major District Road	**M.D.R**	**31.183**	
	Other District Road	**O.D.R**	**248.496**	
TOTAL			**405.355**	

7.7 Import and Expot of NTFPs

The following table is showing the import and Export status of NTFPs.

Table No.- 7.11 IMPORT AND EXPORT OF NTFPs			
Sl. No.	**NTFP items**	**Purchase price in Rs./ Kg**	**Marketing Price in Rs./ Kg**
1	**2**	**3**	**4**
1	Tamarind, de-seeded Tamarind, Tamarind seeds	68 M.F.P. Items handed over to Gram Panchayat vide G.O. F&E Deptt. No. 5503 dated 31.03.2000 for trading.	
2	Mahua flower		
3	Hill Brooms		
4	Thorn Brooms (Jhadu or Ghoda Lanji)		
5	Phula Jhadu		
6	Broom Grass		
7	Nux Vomica (Kochila Seeds)		
8	Harida		
9	Bahada		

10	Amla	
11	Soap Nut (Ritha Phala)	
12	Marking Nut (Bhalia)	
13	Clining Nut (Nirmala)	
14	Honey	
15	Siali Leaves	
16	Sabai Grass	
17	Mango Kernel	
18	Thatch Grass	
19	Simuli Cotton	
20	Arrow Root (Palua)	
21	Dhatuki Flower	
22	Putrani	
23	Sikakai	
24	Jungal Jada or Gaba	
25	Palasa Seed	
26	Siali seed	
27	Indra Jaba (Korai seed)	
28	Gila (Seed & Coat)	
29	Benachera	
30	Bana Haladi	
31	Gaba	
32	Basil	
33	Bana Kolatha	
34	Mekhena Seed (Kanta Padma)	
35	TalaMakhana seed	
36	Baidankha seeds	
37	Baghanakhi seeds	
38	Kamala Gundi fruit	
39	Landa Baguli	
40	Bela	
41	Chiraita (Bhuin Neem)	
42	Khajuripata	
43	Rohani Fruit	
44	Brusunga Leaves	
45	Phenaphena Fruit	68 M.F.P. Items handed over to Gram Panchayat vide G.O. F&E Deptt. No. 5503 dated 31.03.2000 for trading
46	Rasana Fruit	
47	Sidha Fruit	
48	Setabari	
49	Katha Lai	
50	Atundi Lai	
51	Khelua Lai	
52	Swan Lai	
53	Eksira Fruit	
54	Katha Chhatu (Mushroom)	

55	Mat Reed (Sapa Masina Grass)	
56	Ananta Mula (Sugandhi)	
57	Antia pata	
58	Nageswar Flower	
59	Mankada Kendu	
60	Atundi Fruit	
61	Mahula Seed	
62	Kusuma Seed	
63	Karanja Seed	
64	Neem Seed	
65	Char Seed	
66	Chakunda Seed	
67	Babul Seed	
68	Baibiranga Seed	
69	Sal seed	Sal Seed handed over to Gram Panchayat vide G.O. F&E Deptt. No. 3695 dated 02.03.2006 for trading

7.8 Removal of Fodder

No recorded information are available in this Division.

7.9 Valuation of the Products

Table No.-7.12 Information on bamboo

Year	Production of I.B in S.U	Rate per S.U	Royalty amount/ realization
2007-08	1602.5	750	1201875
2008-09	7012.79	750	5259592.5
2009-10	5138.42	750	3853815
2010-11	6875.51	750	5156632.5
2011-12	11738.36	750	8803770
2012-13	Not worked by OFDC Ltd.		
2013-14	445.16	198	88309
2014-15	67.52	Centrally paid. Royalty rate not available.	
2015-16	2462.44		
2016-17	Not worked by OFDC Ltd.		
2017-18			
2018-19			
2019-20			

Table No.-7.13 Information on Timber				
Year	Production		Rate (per unit)	Royalty amount/ realization
	Timber (in CUM)	Firewood(Stack size12'X3'X3')		
2007-08	926.3848	150.5	1040	3698995
2008-09	1258.0564	283	1040	5269670
2009-10	897.0706	95.5	1080	4398603
2010-11	1465.4787	116	1080	5088778
2011-12	2105.2942	382	1200	9914532
2012-13	2340.7881	417	1296	8938836
2013-14	749.3442	184	1387	3701778
2014-15	315.737	77	1456	1640912
2015-16	267.9542	167	1514	2059040
2016-17	285.7595	124	1605	1743833
2017-18	392.545	93	1717	462286
2018-19	325.8551	50	1803	2681895
2019-20	442.0585	50	1929	1452538

CHAPTER-VIII

8.0 MAINTENANCE AND ENHANCEMENT OF SOCIAL, ECONOMIC, CULTURAL AND SPIRITUAL BENEFITS.

8.1 Number of JFM committees and areas protected by them:

Phulbani forest division altogether has 759 nos of VSS, basically constituted on the guidelines of joint forest management (JFM). The field works undertaken are baseline survey, PRA exercise, micro-planning, forest development, silvicultural activities, community development activities and awareness campaign through participatory approach. The field interventions executed through VSS mainly include Assisted Natural Regeneration (ANR), Artificial Regeneration (AR), bamboo plantation, mixed plantation having MFP, medicinal and economic values, entry point activities, micro-planning, soil and moisture conservation measures. The extent of forest area under JFM is as under.

Table No. 08.1 EXTENT OF FOREST AREA UNDER JFM

Total No. of VSS	Extent of Forest Area				Total Area in Ha.
	RF (ha.)	PRF Area	VF Area	Rev. Forest Area	
1	2	3	4	5	6
759	18266.4	6501.853	1064.83	30536.77	56369.853

The JFM resolution of 2011 was modified vide resolution No. 9182/F&E dt.01.06.2015. As per the current rule in force, the committees should be reconstituted in all the VSS and a micro plan has to be drawn by the Divisional Forest Officer to do the same within a time frame of 06 months.

Going by the JFM resolution of 2011, the area of forest assigned to a particular VSS should be decided based the area of forest that was customarily being protected by the VSS and claims of adjacent villages. The resolution also provides that the area previously assigned may be changed in consultation with village community.

8.2 Status of Empowerment of JFMs:

The State Govt. Vide resolution No. 17240 dtd 01.08.1988 and 13638 dtd 01.10.1988 introduced the concept of Joint Forest Management(JFM) in the State for the protection of degraded Reserved Forest by communities. Subsequently, another resolution was issued by Govt. Vide No. 29825 dtd 11.12.1990, which envisages

usufructs. By virtue of the said resolution, they were granted certain concessions as per section-24 of the Orissa Forest Act, 1972 to meet their bona fie requirement of firewood and small timber.

The concept of participatory forest management, a modified form of the JFM, was introduced vide Govt. Resolution No. 16700 did 03.07.1993 emphasis was laid on formation of Vana Samrakshynana Samiti(VSS) in each village(s) adjoining the forests. As per the said resolution the VSS members are required to protect and manage the degraded forests through JFM. In turn, they were granted usufruct rights for collection of royalty free small timber and firewood along with 100% of the intermediate yield and 50% of the final harvest. Incentives to villagers for protection of forests and conferment of right to usufruct in respect of forests protected by villagers have been envisaged vide Resolution No.22180/F&E dtd 30.09.1996. The National Forest Policy 1988, envisaged co-operation of the people in conservation and development of forests. In keeping with this policy Govt. Of Odisha adopted the Joint Forest Management (JFM) approach and short community participation for protection, regeneration and management of the forest wealth. JFM has not only been a tool for forest regeneration but also a means of employmentregeneration and social empowerment of the forest fringe dwellers.

Participatory Forest Management in JFM mode is an evolving concept encompassing ecological, Socio- Cultural and Economic dimension. People have played an important role in protection and regeneration of forests all over the State of Odisha. Villagers have either formed VSS or as per JFM resolution or Community Forest Management groups outside the existing JFM framework.

The community forest resource has been defined under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Right's) act 2006 (Popularly known as Forest Rights Act's). As per the said act, Community Forest Resource means customary common Forest land within the traditional and customary boundary of the village and seasonal use of the landscape in case of pastoral communities etc. The minor Forest Produce has been defined under the Forest Right Act which includes all Non- Timber Forest produce of plant origin such as bamboo, brushwood, Stumps cane, Tassar, Cocoons, Honey, Wax, Lac, Kenduleaf, Medicinal plants and herbs, roots, tubers and the like.

Among the 759 VSS that are registered in Phulbani division information on aspects of empowerment such as, the periodicity of VSS meetings, attendance in GBM & EC meetings, savings in VSS & VFDP accounts, benefit sharing etc. is available for 240nos VSS under OFSDP,220 nos. VSS under AJY, 01 nos. VSS in ETG, & 16 VSS funded under FDA/NAP. For the remaining 281 VSS the information is not available in the division. As per the records the rest of the VSS which were not funded by any scheme have remained dormant in all the activities. These 281 VSS have been protecting their customary forest lands but have not imbibed the procedural aspects of JFM. Most of them did not have VSS accounts and no EC or GB meetings are being neither conducted or regular elections being conducted for ECs.

Further, regarding economic activity and empowerment of VSS, the information is available for the 240 OFSDP villages. These villages have been provided with an initial revolving fund of Rs 1 lakh and further additional revolving fund of upto 1.5 lakh for the eligible VSS. A total 616 nos. SHGs were formed in OFSDP VSS. In the project activity of OFSDP special attention and support was given for development of SHGs. A third party was roped in to support SHGs by developing business development plans. Support was also given by way of infrastructure development at the cluster level. In total 6 cluster infrastructure places were developed and operationalized.

A study on status of empowerment of JFMCs was taken up on the following criteria in Phulbani Forest Division.

- ✓ Extent of forest area under effective control, protection and management of VSS.
- ✓ Regularity and frequency of holding meetings of the General Body and Executive Committee of the VSS, proper attendance in these meetings, deliberation of vital issues and record keeping.
- ✓ Improved status of forest protection.
- ✓ Quality control, exercised by the VSS on day to day management of the forest.
- ✓ Resolution of conflicts.
- ✓ Sustainable collection of NTFP.
- ✓ Effective preservation and control of forest fire.
- ✓ Reduction in day to day dependency on the produce of the forest.
- ✓ Effectiveness in-implementation of afforestation, soil moisture conservation measures and silvicultural operation.

- ✓ Equity and gender equity.

8.3 Labour Welfare:

Phulbani Forest Division has been providing direct employment to labourers while executing various development works under different schemes. The labourers were paid minimum wages as per Govt. Notification modified from time to time. Table shows the minimum wages in force in Odisha during various period of time in the current working plan. With respect to the welfare scheme and expenditure no special welfare scheme was in operation during the current working plan period. No cases are pending in the labour courts. With respect to provisions of drinking water, childcare, first aid etc. the labourers are being provided as a matter of right in case of schemes under MGNREGS. However for others departmentally funded schemes no such information is available.

Table no.- 8.1 Different wage rates notified for unskilled workers

Year	Wage Rate
2007-08	70
2008-09	70
2009-10	90
2010-11	90
2011-12	90
2012-13	150
2013-14	150
2014-15	150
2015-16	200
2016-17	200
2017-18	280
2018-19	280
2019-20	298
2020-21	308

8.4 Use of indigenous knowledge:-

The use of indigenous knowledge and documentation of the same has been initiated in this Division. 92 Nos. Biodiversity Management Committee (BMC) have been formed in 92nos GP of seven Blocks i.eTikabali, Chakapad, Phulbani,

Phiringia, G.Udayagiri, Raikia&Khajuripada blocks of Phulbani Forest Division. District level BMC has been constituted for Kandhamal District. Block level BMC have been constituted.

In order to preserve the traditional indigenous knowledge on biodiversity, People's Biodiversity Register (PBR) have been prepared in Sugadabadi and Gumamaha GPs of Raikia block of this Division.

8.5 Extent of Cultural/Sacred Groves:-

8.5.1 List of Sacred Groves in Phulbani Division

The sacred grove identified in the division is 63. The information pertaining to their area, location and worship is available. However the species diversity and richness in these sacred groves has not been documented. In OFSDP funding 10 sacred groves, have been taken up for protection. The works that were executed include studying the diversity and IGA. The remaining 53 sacred groves are to be taken for development under the state plan scheme progressively over the next 4 years. In the year 2015-16 ,20nos of VSS are being taken up at a cost outlay of Rs. 1 Lakh.

Table No. 8.2 List of Sacred Groves identified for development in Phulbani Division

Sl. No	Name of the Duistrict/Subdivision/CD/Block/GP	Name of the Division/Rnge/Section/Beat	Name of the Revenue Village & Community	Name of the Site & extent of area in ha	Name of the worshipping god/Goddess/others
1	Phulbani/G.Udayagiri/Lingagada	Phulbani/G Udayagiri/G.Udayagiri/Lingagada	Katingia/ST	5.0	Ram Matha - Katingia
2	Phulbani/Tikabali/Koinjhar	Phulbani/Tikabali/Tikabali/Sankarakhole	Kalikheta/ST	1.0	Maa Lachhama- Kalikheta
3	Phulbani/Tikabali/Beheragaon	Phulbani/Tikabali/Tikabali/Tikabali	Nepasaru/ST	1.0	Maa Petapenu- Nepasaru
4	Phulbani/Chakapad/Bapalamendi-B	Phulbani/Tikabali/Tikabali/Tikabali	Mallickpada/ST	1.0	Rathapenu - Mallickpada
5	Phulbani/Raikia/Manikeswar	Phulbani/Raikia/Raikia/Raikia	Lendrikia/ST	2.0	Bhagabata Gadimatha-Dumudupanga(lendrikia)
6	Phulbani/Raikia/Dadingia	Phulbani/Raikia/Raikia/Raikia	Piserama/ST	1.0	Pise Rama Matha - Piserama
7	Phulbani/Raikia/Indiragada	Phulbani/Karada/Indiragada/Dimiripali	Badadali	2.0	Bapangi (banadurga Temple) in Machhaghat RF
8	Phulbani/Raikia/Indiragada	Phulbani/Karada/Badabarba/Badabarba	Badabarba	1.0	Kandhunidevi- Panipujapitha Badabarba
9	Phulbani/Phiringia/Kasinipadar	Phulbani/phiringia/Phiringia/Phiringia	Uadurga/ST	2.0	Ram Temple at Uadurga
10	Phulbani/Phiringia/Phiringia	Phulbani/phiringia/Phiringia/Phiringia	Phiringia/ST	5.0	Kusasaru Hanuman Pitha-Phiringia
11	Phulbani/Phiringia/Kasinipadar	Phulbani/phiringia/Phiringia/Phiringia	Majhipada/ST	0.8	Purnanandagosti Majhipada
12	Phulbani/Phiringia/Katringia	Phulbani/phiringia/Phiringia/Phiringia	Kanibali/ST	2.0	Kali Mandir Urmagardha
13	Phulbani/Phiringia/Kasinipadar	Phulbani/phiringia/Phiringia/Phiringia	Kutinipadar/ST	2.0	Jakangisaru, Kutunipadar
14	Phulbani/Phiringia/Phiringia	Phulbani/phiringia/Phiringia/Phiringia	Sitikapati/ST	1.5	Maa Laxmi Mandir, Sitikapati
15	Phulbani/Phiringia/Phiringia	Phulbani/phiringia/Phiringia/Phiringia	Nahanagaon/ST	1.0	Katumarapenu, Nahangoan
16	Phulbani/Phiringia/Kelapada	Phulbani/Phiringia/Nuapadar/Rabingia	Kurukunapali/ST	2.0	Maa Laxmi Mandir,Kurkunapalli
17	Phulbani/Phiringia/Kelapada	Phulbani/Phiringia/Nuapadar/Rabingia	Jayalamba/ST	1.0	Bamachhatra, Jayalamba

18	Phulbani/Phiringia/Kelapada	Phulbanai/Phiringia/Nuapadar/Nuapadar	Gurupada/ST	2.0	Hanuman Mandir, Gurupada
19	Phulbani/Phiringia/	Phulbani/Phiringia/Nuapadar/Nuapadar	Kamankama/ST	2.0	Patiada Puja , Kamankama
20	Phulbani/Phiringia/Kelapada	Phulbani/Phiringia/Nuapadar/Kelapada	Kelapada/ST	2.0	Saraswati MandirBairikumpa
21	Phulbani/Khajuripada/Bilabadi	Phulbani/Sudrukumpa/Sudrukumpa/Tikiripada	Tikiripada/ST	1.0	Maa Pitabali Pitha- Tikiripada
22	Phulbani/Khajuripada/Sudreju	Phulbani/Sudrukumpa/Sudrukumpa/Bhetkhole	Kilupadar/ST	0.4	Debatasala, Kilupadar
23	Phulbani/Khajuripada/Sudrukumpa	Phulbani/Sudrukumpa/Sudrukumpa/Sudrukumpa	Sudrukumpa/ST	0.4	Gramaseni, Malliksahi
24	Phulbani/Khajuripada/Sudrukumpa	Phulbani/Sudrukumpa/Sudrukumpa/Sudrukumpa	Mallickpada/ST	0.4	Maa prabaligudi, MallikPada
25	Phulbani/Khajuripada/Sudreju	Phulbani/Sudrukumpa/Sudrukumpa/Sudreju	Ganesaru/ST	0.4	Jhakirikuti, Ganesaru
26	Phulbani/Khajuripada/Adasipada	Phulbani/Phulbani/Bisipada/Balaskumpa	Pudunisuga/ST	5.0	Omm Bhagabate Basudebaya Pitha-Pudunisuga
27	Phulbani/Khajuripada/Dutimendi	Phulbani/Phulbani/Dutimendi/Khajuripada	Dutimendi/ST	0.8	Maa Gramaseni, Dutimendi
28	Phulbani/Khajuripada/Khajuripada	Phulbani/Phulbani/Khajuripada/Khajuripada	Ganjuguda/ST	0.4	Maa Baral Devi, Ganjuguda
29	Phulbani/Phulbani/Ganjuguda	Phulbani/Phulbani/Bisipada/Bisipada	Ambapada/ST	0.4	Matidebata, Ambapada
30	Phulbani/Khajuripada/Khajuripada	Phulbani/Phulbani/Khajuripada/Khajuripada	Badripaju/ST	0.4	Gramaseni, badripaju
31	Phulbani/Phulbani/Ganjuguda	Phulbani/Phulbani/Bisipada/Bisipada	Biraguda/ST	0.8	Pitabali, Biraguda
32	Phulbani/Khajuripada/Khajuripada	Phulbani/Phulbani/Khajuripada/Khajuripada	Ghugulasahi/ST	0.6	Basangi, Ghugulasahi
33	Phulbani/Khajuripada/Gudari	Phulbani/Phulbani/Bisipada/Bisipada	Kaladi/ST	0.4	Baraligudi, Kaladi
34	Phulbani/Khajuripada/Pirikudi	Phulbani/Phulbani/Phulbani/Pirikudi	Khaumunda/ST	0.4	Jhakarkuti, Khaumunda
35	Phulbani/Phulbani/Keredi	Phulbani/Phulbani/Bisipada/Bisipada	Lahabadi	0.4	Dharanipenu, Lahabadi
36	Phulbani/Khajuripada/Dutimendi	Phulbani/Phulbani/Khajuripada/Khajuripada	Lambagudri/ST	0.4	Laxmi thakurani, Lambagudri
37	Phulbani/Khajuripada/Dutimendi	Phulbani/Phulbani/Khajuripada/Dutipada	Mallicksahi/ST	0.6	Bagdevi, MallickSahi
38	Phulbani/Khajuripada/Gudari	Phulbani/Phulbani/Phulbani/Phulbani	Mulagudari/ST	0.4	Brahmanidevi, Mulagudari
39	Phulbani/Phulbani/Ganjuguda	Phulbani/Phulbani/Bisipada/Bisipada	Pokangaon	0.6	Genduli, Pokanagoan
40	Phulbani/Khajuripada/R.Nuagaon	Phulbani/Phulbani/Khajuripada/Khajuripada	Pandrisuga/ST	0.8	Gramaseni, Pandrisuga
41	Phulbani/Khajuripada/Dutimendi	Phulbani/Phulbani/Khajuripada/Dutimendi	Pindabadi/ST	0.6	Sambaradenga, pindabadi
42	Phulbani/Khajuripada/R.Nuagaon	Phulbani/Phulbani/Khajuripada/Dutimendi	Ranapatuli/ST	0.6	Basangi, Ranapatuli
43	Phulbani/Khajuripada/Dutipada	Phulbani/Phulbani/Khajuripada/Khajuripada	Sidingi	0.4	Gramaseni, Sidingi
44	Phulbani/Khajuripada/Gudari	Phulbani/Phulbani/Phulbani/Pirikudi	Suduli/ST	0.6	Basangi, Suduli

45	Phulbani/Phulbani/Alami	Phulbani/Phulbani/Phulbani/Phulbani	Alami/ST	1.0	Basangi, Alami
46	Phulbani/Phulbani/Dadki	Phulbani/Phulbani/Dubagada/Dubagada	Belapadar	0.4	Laxmigudi, Belapadar
47	Phulbani/Khajuripada/Khajuripada	Phulbani/Phulbani/Khajuripada/Khajuripada	Dimirikhole	0.4	Gramaseni Dimirikhol
48	Phulbani/Khajuripada/R.Nuagaon	Phulbani/Phulbani/Khajuripada/Dalapada	Garakumpa	0.6	Pitabali, Garakumpa
49	Phulbani/Khajuripada/R.Nuagaon	Phulbani/Phulbani/Khajuripada/Dalapada	Gumagada	0.6	Lachhama, Gumagardha
50	Phulbani/Khajuripada/Arapaju	Phulbani/phulbani/Khajuripada/Bhaliapada	Jhadapadar	0.8	Gramaseni, Jhadapadar
51	Phulbani/Phulbani/Tudipaju	Phulbani/Phulbani/Phulbani/Tudipaju	Kalamburi/ST	0.8	Badadeuli, Kalamburi
52	Phulbani/Khajuripada/Arapaju	Phulbani/phulbani/Khajuripada/Bhaliapada	Karuna/ST	0.4	Brahmanidevi, Karuna
53	Phulbani/Khajuripada/Arapaju	Phulbani/phulbani/Khajuripada/Bhaliapada	Kulthasahi/ST	0.4	Sibamandir, Kulthasahi
54	Phulbani/Phulbani/Alami	Phulbani/Phulbani/Phulbani/Phulbani	Luhurubali/ST	0.6	Lachhama Devi gudi, Luhurbali
55	Phulbani/Phulbani/Tudipaju	Phulbani/Phulbani/Phulbani/Tudipaju	Majuribida	0.4	Bagdevi, Majuribida
56	Phulbani/Khajuripada/Arapaju	Phulbani/Phulbani/Khajuripada/Dutimendi	Malabhuin	0.4	Maa Haladiaseni, Malabhuin
57	Phulbani/Khajuripada/Arapaju	Phulbani/Phulbani/Khajuripada/Khajuripada	Premjhari/ST	0.4	Haladiaseni, Premajhari
58	Phulbani/Khajuripada/Dutimendi	Phulbani/Phulbani/Khajuripada/Khajuripada	Sambepadar/ST	0.8	Bagdevi, sambepadar
59	Phulbani/Phulbani/Alami	Phulbani/Phulbani/Phulbani/Phulbani	Sarupada/ST	0.8	Basangi, Sarupada
60	Phulbani/Khajuripada/Arapaju	Phulbani/phulbani/Khajuripada/Bhaliapada	Mundakruti/ST	0.4	Gramseni, Mundakruti
61	Phulbani/Khajuripada/Baikumpa	Phulbani/Phulbani/Khajuripada/Dutimendi	Sitagudri/ST	0.4	Laxmithakurani, Sitagudri
62	Phulbani/Phulbani/Phulbani	Phulbani/Phulbani/Phulbani/Phulbani	Baikhole/ST	0.6	Bindheswari, Baikhole
63	Phulbani/Phulbani/Muncipality	Phulbani/Phulbani/Phulbani/Phulbani	Phulbani, Narayanisahi	2.0	Maa NarayaniPitha, NarayaniSahi

1. Maa Kadeswari Devi Temple:-

Name of Scared Grove	MaaKadeswari Devi Temple			
(A)Location	Badagada			
(i) Village Name	Badagada			
(ii) Latitude & Longitude	N 19 51 42, E 84 23 25			
(iii) C.D Block/ Beat	Raikia/Badagada			
(iv)Gram Panchayat	Ranaba			
(v)RF/PRF	___			
(vi) Name of the Deity	MaaKadeswari Devi Temple			
(vi)Worship period	18.06.2018 to 23.06.2018			
(c) Name of the VSS involved	Badagada			
(d)Trees/Species present around the Sacred Grove	Name of the Plant	Local Name	Scientific Name	
	Neem, Bel, Chakunda, Bahada, Amla, Sisoo, Baruna, Ashoka, P.Sala, Harida, Krushnachuda, Radhachuda, Ouo, Chatiana	Neem, Bel, Chakunda, Bahada, Amla, Sisoo, Baruna, Ashoka, P.Sala, Harida, Krushnachuda, Radhachuda, Ouo, Chatiana		
(E) Development Work	Machinery work of Mandapa			
i) Masonary work in detail	Activity		Amount spent	
	Year	Name of the plant planted	No. Of plant	Total Expenditure made
	2018	Neem, Bel, Chakunda, Bahada, Amla, Sisoo, Baruna, Ashoka, P.Sala, Harida, Krushnachuda, Radhachuda, Ouo, Chatiana	101	Rs.47930/-
F) Brief note about the Sacred Grove	This Sacred Grove is situated in Badagada Beat,Ranaba Section of Karada Range Which is under Ranaba GP. Raikia Block MaaKadeswari Devi is worshiped by local tribal people from many year ago.			

8.5.2 Importance of Sacred Groves

Sacred Groves provide shelter to thousands of species of other plants and animals.

- Sacred Groves have great powers to heal body and spirit.
- Sacred Groves are important reservoirs of biodiversity.
- These are last refuge for endemic and endangered plant and animal species.

- These are store houses of Medicinal plants valuable to village communities as well as modern pharmacopoeia.
- Sacred Groves contain relatives of crop species that can help to improve cultivated varieties.
- Sacred Groves help to keeping the water cycle in local areas.
- These improve soil stability, prevent top-soil erosion and provide irrigation for agriculture in drier climates.

8.5.3 Need for conservation of Sacred Groves

The Sacred groves are the history of our culture. In the past, protection and conservation of the sacred grove were closely linked with the religious beliefs and traditional culture of the indigenous tribal communities, the cultural heritage survived through generation. But unfortunately the religious beliefs taboos that were in the centre of sacred grove preservation are now fast are now eroding due to change in social set up. Increase consumerism for better living and change in the belief system of the people attributable to modern system of education. Therefore it is extremely difficult to protect sacred groves only on the basis of religious belief .there is a need to revitalize. The age old ethos of culture of traditional societies by supplementing with scientific knowledge about the crucial role of sacred grown in conserving biodiversity and providing large number of valuable goods and vital ecological service to the people living around the sacred grove. Therefore urgent interventions are required for the conservation of sacred grove.

8.6Ecotourism areas and Activities:-

There are 5 ecotourism sites inside forest area where ecotourism development work was undertaken in the past, by the department. The sites are mostly waterfalls and areas around the water courses and valleys. A brief note on the ecotourism sites is as follows.

8.6.1.Pokadajhar Waterfalls:

The waterfall is inside Donga RF near the village Kurumuni of Sudrukumpa Range. The forest road from Panisal to Samapaju connects the site and is 2km away NH 157. It is season and water flows from June to March. The place was developed through BRGF funding in the year2003. However the local Kurumuni VSS was not included in its management. Over the years the site was mismanaged and the infrastructure developed was damaged. All the masonry constructions developed close

to the water fall have been washed away during floods in the past. In the year 2014-15 funding was taken under IAP by the department for renovation and further development of the site by involving Kurumuni VSS. The work is currently under progress. As ecotourism group was formed in Kurumuni VSS for management of the site.

8.6.2. Mandasur Ecotourism site :

The site is on the edge of a valley near Landrikia RF. The site itself is on a revenue forest land. OFSDP has funded the development of the site as a day visitors' centre. The Mandasaru Ecotourism site was initially developed as day tourism centre under OFSDP. After the initial success as a day tourism centre , it was decided to develop night staying facilities at the site. Accordingly funds were provided by the district administration of kandhamal under IAP scheme. The project included construction of wooden cottage(Two rooms and dining) , renovation of watch tower, provision of water , electricity, beautification etc. The facility is managed by 19 women SHG members who are a part of Mandasaru ETG. The group has been managing day tourism centre since last 2 years .Mandasur ETG is now capable of managing the site by providing room services, catering services and also guide services. Catering is provided to the guest by the ETG women members . A separate menu has been prepared with rate chart which can be ordered by the guest. The catering facility is currently running to cater the day visitors. A separate kitchen is being operated successfully. The site was operational since 2013 December. Further the department has taken additional funding under IAP to develop this site as a fully-fledged tourist place by developing accommodations. The work is currently under progress.

8.6.3. Katramal waterfalls :

The waterfall is located in Palchi RF of Phulbani Range. It becomes dry in summer. The area was developed under BRGF funding. The approach bridge, toilet water facilities were provided. There are fish in the water pools and feeding them is very popular among tourist. The waterfall has one of the highest tourist inflows.

8.6.4. Putudi Waterfalls :

The waterfall is located in Phulbani PRF of Phulbani Range and is about 15km from Phulbani. The waterfall is perennial but is greatly reduced in summer. The site was not developed under except an approach was constructed by the block office.

8.6.5.Urmagada Waterfall :

This is also a seasonal waterfall and was developed under BRGF funding. It is 25 km from Phulbani and is located in Gochhapada RF of Phiringia Range. The water fall is a seasonal stream and attracts tourists in winters.

Except for Mandasur site, which was developed in participation with the local village/VSS, the infrastructure developed in other places have not been maintained and are in various stages of ruin. Regarding the documentation of the ecotourism site no such information is available with the division. There is also no information on tourist inflow for these sites.

8.7 Social Customs

Kandhamal district has more than a 3rd area concerned with forest and is largely populated with tribes consisting 53.6% of the total population. The customs and traditions are invariably linked with different places and practices.KandhaTribes is the only tribe of Phulbani Sub-Division. The word Kandha is spelt variously which are synonyms such as Kond,Khond, Kandha. But they identify themselves as Kuilaku or Kuinga. The language they speak as Kui, which has no script.

The Kandhas are identify from their names. Some writers have attempted to trace out the Telegu derivation from the word Konda means feels. Those living on the hill tops are named as Kandha. It is a fact that the kandha like to leave in hill tops and their subject people the Panos liked to leave beneath their settlement. The common surnames of Kandhas are Pradhan, Mallick, Konhar, Majhi. And those worship deities have surnames like Dehury, Jharkar, Jani etc. According to the 1991 census the ST population of the district is 2.81 lakhs which constitutes 51.5% of the total population.

Many of the tribal villages have Thengapalli system of protecting their forests. The cattle populations are managed during different times of the year by their own customs and therefore defiantly has a bearing on forest health. The current working plan did not codify such customs and practices that have a bearing on forestry.

People of Kandhamal district observed various social customs. Being one of the most important festival of the Kondhs of Phulbani, the Kedu Festival was well-known for the human sacrifice Meria which was stopped during the British Rule in

India. Today, guard the religious sentiments of the tribals the festival is celebrated by substituting it with buffalo- sacrifice.

8.7.1 Kedu Festival

Renowned as the most important festivals of the tribal districts of Ganjam, Phulbani, and Koraput, Kedu is a five-day celebration. The festival is celebrated by the Kondhs to please and commemorate the Mother Earth. On the third day of this famous Odishan festival, buffalo is sacrificed to propitiate the deity. However, in the ancient days, instead of buffalo, human sacrifice was made which got banned during British rule in India. Coming on the Kedu celebration, the men and women celebrate it by getting drunk, dancing, and slaughtering the animal in the cruellest way (which happens on the third and fourth day of the festival). The locals bury the meat piece of the animal along with the blood at the place where they yield turmeric. According to them, this gesture would give them a healthy crop. This whole festival runs for five long days and on each day different rituals and customs are performed. The timing of the festival changes every year. The famous Kedu dance is performed by the locals to celebrate the festival. Songs in the Kui language are also sung by the locals to pay homage to the Mother Earth.

8.8 Status of compliance of Forest Right Act (FRA)

As far as individual claims are concerned a total 57657 no of claims involving 87227 acres or 34900 ha. of land was settled as on March 2020. Out of these **1309.278ha**.of land falls in working plan area of this Division. However the list of individuals, their area & location is furnished as **Annexure –VIII**available with the DFO.

Further the demarcation of individual beneficiary land has not been done in the field by the revenue staff. Therefore the boundaries in the field of these individual entitlements are not known to the department. No lat./long position is also available. However the list of beneficiaries, area entitled, in each forest block is available.

In case of community rights, a total 2219 no. of community claims entitlements were given as on March 2020. The area demarcation is however very sketchy. Therefore area is not available under each right. The process of area demarcation with GPS is now being correctly done by the ITDA.

With respect to the status of management in community rights granted forest area, there has been no micro plan preparation in all plans except one Priyedi

village in Krandibali GP, Gochhapada RF of Phiringia Range which had prepared a management plan for bamboo resources.

8.9 Other Rights and Concessions:

The Kondhs are the primitive tribe of Kandhamal district. In most of the forest blocks, the rights and concessions have been permitted to the Kondhs as well as other tribals & non tribals who are the bonafide residents of Kandhamal district. During the British regime, the rights of the tenants have been recorded as per the standing circular order no.338 dt.10-10-1940 of the then Agent & Deputy Commissioner, Kandhamal. Admitted rights provide all concessions to the Kondhs of this tract for free collection of M.F.P as per availability of quantity of materials in a forest block for their bonafide domestic use. Similarly, dry fuel wood can be procured free of cost @4 head loads per individual or 8 head loads per family per month in different forest blocks as specified in the notification. Concessions allowed for the collection of bamboos for repairing, thatching and construction of their houses are stipulated as 30nos, 50nos & 100nos in different blocks. This is specified in different quantities in different forest blocks. Similar concession of timber and poles are allowed for domestic use only for their plough as well as other agricultural implements. This concession varies in different quantities for different forest blocks. Collection as well as removal of dry fuel wood, bamboo poles and timber is allowed free of cost.

In different forest blocks perennial rivers & nalas pass through the forests. Rights and concessions are allowed free of any charge for fishing in those water bodies inside RF/PRF for domestic purpose. Grazing restrictions have been imposed for goats & pigs in all forest blocks. Only cattle are allowed in summer. But grazing is restricted in the RF/PRF blocks especially in regeneration and plantation areas for five years or as specified in the notification.

The concessions & rights have lost relevance with the enactment of some legislations. They are

1.PESA Act.

2.Forest Rights Act

3.Odisha Gram Panchayat (MFP Administration Rules) 2002.

4.JFM resolutions of Govt. of Odisha

As per the PESA Act the ownership of the minor forest produce lies with the Gram Panchayat in scheduled areas. Similarly the forest rights act recognises the

right of ownership, access to collect; use and dispose of minor forest produce which have been traditionally collected within or outside village boundaries or customary boundaries. The act also gives the right to protect, regenerate or conserve or manage any community forest resources which have been traditionally protecting and conserving for sustainable use. As per this act the extraction of MFP from forest lands falling within the community forest rights granted, will be the right of the communities provided the management plans prescribe the sustainable level of extraction in such areas. However at present the CFR title holders or communities have not yet prepared any management plan.

As per the 2002 Rules of Odisha Gram Panchayat (Minor Forest Produce Administration). The Govt. had liberalised the control on extraction of MFP of 68 items and placed some powers to regulate procurement and trading of MFP. Therefore the GPs had the power to register traders & issue permits for extraction & transport of MFP within their area no matter the kind of forest involved. However it is to be understood here that there was no method of controlling the extraction within the sustainable limits. The working plan prescriptions could not be enforced on the Gram Panchayats. Also no information was available on the number of traders registered, the quantity of MFP extracted, yearly etc as such reports were not supplied to the DFO.

As per the JFM resolutions and the current being the 2011, of the Govt. of Odisha, the VSS had the right to collect & use sell the MFP items from these forest area as per their micro plan. The Micro plan shall detail out the carious MFP items that can be collected. This shall be done with due regard to the carrying capacity, by the executive committee will be scrutinized by the Forest Range Officer from the General Body for deliberation and approval.

As per the Joint Forest Management Resolution, 2011; the VSS/EDC shall be entitled to the usufructuary benefits from the assigned forests as under;

a) Usufructs like fallen leaves, fodder grasses, thatch grass, broom grass, fencing materials, brushwood, fallen lops, tops and twigs to be used as fuel shall be available to the members free of cost.
b) All intermediate yields in the shape of small wood, poles, firewood etc as may be obtained as a result of silvicultural operations and bamboo harvested in manner as ay be decided by the EC. If sold at a price, the funds so obtained shall be deposited in the VSS/EDC account.

c) In case of Kendu leaves and specified forest produce other than bamboo, if any, the VSS will have the right to collect the same from the assigned forest but these items will be disposed of as per the prevailing provisions of Government and practices.

d) While maintaining the forest cover in perpetuity, if any major harvest or final felling occurs in the assigned forest, the same shall be taken up by the forest department as per the prescription of the working plan/duly approved micro plan. In case of natural calamities, harvesting of wind fallen trees shall be treated as final harvest. Priority will be given to the members of the VSS/EDC for salvaging and harvesting work. Valuation of the produce so obtained shall be done and information shared with the VSS/EDC and the produce will be sold/disposed of by the forest department or by the agents of the forest department. The VSS/EDC will receive 50% share of the sale price after deduction of proportionate harvesting cost and this will be deposited in the "VSS Account". The VSS may also opt for 50% of the forest produce so harvested if it is for their bonafidedomestic use and they agree to pay the proportionate cost of harvesting.

e) In case of village woodlots created and maintained by the VSS/EDC on non-forest land, all usufructs including interim and rotational harvests shall go the VSS/EDC.

f) In the event of a natural calamity occurring in the village may be a demand for fouse building materials and other forest produce from the assigned forest. In such cases, the VSS/EDC may go for harvesting the required assigned forest. In such cases, the VSS/EDC may go for harvesting the required quantity of timber or other forest produce as a deviation to the micro plan with due approval of the DFO concerned.

g) The EC shall be responsible for the distribution of the usufruct benefits equitably among the members of the VSS. Need of the group or community who do not have any livelihood support other than depending on the forests, should be specially considered.

h) In cases where member/ a group of members of the VSS/EDSC play a major role in the collection of intelligence, detection and seizure of illegal forest produce in transit the concerned VSS/EDC shall be entitled to the prescribed percentage of the sale price of the forest produce as per Rule4(3) of the Orissa Rewards for Detection of Forest Offences Rule;2004. Such amount shall be deposited by the DFO in the "VSS Account/EDC Account "after disposal of the seized produce following due procedure of law.

i) All forest produce requiring permits for transit as per provisions of Orissa Timber and Other Produce Transit Rules, 1980 shall be removed from the assigned forest area in accordance with a permit to be issued jointly by the President and the Secretary in the prescribed format (Form-4). The permit shall be valid only within the limits of the area to which the VSS members belong. In case of transportation outside the above limit, the permit will be issued by the competent forest officer on receipt of application from VSS/EDC.

As per the above discussion it is now legitimate for communities to collect, use or sell the MFPs from their forest areas that they were traditionally managing or within their Gram Jurisdiction. The collection or judicious use of these rights within the sustainable levels, has also been placed with the communities itself through a management plan. The major hurdle at this juncture is that the preparation of management plan and decision of sustainable levels is a scientific process where support of the communities are to be ensured.

8.10 Dependency of local people on NTFPs

The availability of NTFP has been described under Para 7.4. The major NTFP on which the livelihood of people depends are Kendu Leaf, Sal leaf, Sal Seed, Mahua Flower & Cornel, Siali Leaf & fibre and Bamboo to a major extent. It's collection & earning supports about 60% of their income annually. Kendu leaf wing of the Forest Department has lunched various welfare schemes for the labour engaged in Kendu leaf operation. Besides group insurance, support for children's education, daughter's marriage and other facilities to improve their skill & efficiency are being provided.

8.11 Other aspects:

Forest plays a vital role in the life of the people of this Division as most of the population is tribal. It provides recreational avenue to local as well as people of nearby districts. Lendrikia RF (Mandasaru) Hill acts as a store house of medicinal& aromatic plants, orchids and house of many wild animals. This place has been developed as Eco-Tourism site which attracts the visitors from different parts of our State and outside states.

CHAPTER-IX

9.0ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.

9.1 Existing Policy and legal framework and their compliance.

9.1.1 National Forest Policy-1988:-The principal aim of Forest Policy must be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which are vital for sustenance of all life forms, human, animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim.

9.1.1.1 Essential of Forest Management:-

- Existing Forests and Forest lands should be fully protected and their productivity improved.
- Diversion of good and productive agriculture lands to forestry should be discourage in view of the need for increased food production.
- Provision of sufficient fodder, fuel and pasture, especially in areas adjoining forest is necessary in order to prevent depletion of forests beyond the sustainable limit.
- Minor forest produce provides sustenance to tribal population and to other communities residing, in and around the forests. Such produce should be protected, improved and their production enhanced with due regard to generation of employment and income.
- Diversion of forest land for any non-forest purpose should be subject to the most careful examinations by specialists from the stand point of social and environmental cost and benefits.

9.1.1.2The Biological Diversity Act 2002 and Rules 2004:-

The Biological Diversity Act 2002 is a law meant to achieve three main objectives;

- The conservation of biodiversity.
- The sustainable use of biological resources.
- Equity in sharing benefits from such use of resources.

It is keeping this in mind that we need to look at some provisions directly relevant to local communities , the most critical of them being the Biodiversity Management Committee (BMC), Section 41 of the Act states: Every local body shall constitute a Biodiversity Management Committee (BMC), within its area for the purpose of promoting conservation, sustainable use and documentation of biological

diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.

9.1.1.3 Panchayats (Extension to the Scheduled Areas) Act 1996:-

The 73rd amendment Act 1992 had made constitutional provisions for the three tier Panchayats all over the country. The salient provisions of PESA Act are:

- In the Scheduled areas, village will have a Gram Sabha consisting of persons whose names are included in the electoral rolls for the Panchayats at the village level.
- In the scheduled areas, there will be a minimum of 50% seats reservation for Scheduled tribes (STs) at all the tiers of Panchayats.
- If the area has different tribal communities, the reservation of different tribal communities shall be on the basis of proportion to their population.
- The chairpersons at all levels of the Panchayats in Scheduled areas shall be reserved for STs.
- If there are no ST member at intermediate or district level panchayats, the state government shall nominate such underrepresented STs by maximum of one-tenth of the total elected members of the Panchayats.
- Every legislation on the on the Panchayats in scheduled area shall be in conformity with the customary law, social and religious practices and traditional management practice of the community resources.

9.1.1.4 Gram Sabha and Panchayat have right to regulate the:

- Ownership of minor forest produce;
- To prevent alienation of land;
- To manage village markets;
- To exercise control over money lending
- To exercise control over institutions and functionaries in all social sectors.
- To control over local plans and resources for such plans including tribal sub-plants;
- Planning and management of minor water bodies shall be entrusted to panchayats at appropriate level.

The PESA Act has been an important legislative framework to be enacted by the State legislature for the tribals to have their control and rights over natural resources and conserve and preserve their identity and culture and that too in a participatory manner through the institution of **Gram Sabha.**

9.1.1.5 The Scheduled Tribes and Other Traditional Forest Dwellers(Recognition of Forest Rights) Act, 2006 & Rules, 2008:-

Notwithstanding anything contained in any other law for the time being in force; and subject to the provisions of this Act; the Central Government hereby recognises and vest forest rights in-

- The Forest Dwelling Scheduled Tribes in States or areas in States where they are declared as Scheduled Tribes in respect of all forest rights as mentioned in Section 3 of the said Act.
- The Other Traditional Forest Dwellers in respect of all forest rights as mentioned in Section 3 of the said Act.

  NB: Other Traditional Forest Dwellers means any member or community who has for at least three generations prior to the 13th day of December 2005 primarily resided in and who depend on the forest or forest land for bonafide livelihood needs. Generation means a period comprising of twenty-five years.
- Notwithstanding anything contained in the Forest (Conservation) Act, 1980, the central Government shall provide for diversion of forest land for the following facilities managed by the Government which involve felling of trees not exceeding seventy-five trees per hectare, namely;(a) school, (b) dispensary or hospital,(c) anganwadis, (d) fair price shops, (e) electric and telecommunication lines; (f) tanks and other minor water bodies; (g) drinking water supply and water pipelines, (h)water or rain water harvesting structures; (i) minor irrigation canals (j) non-conventional source of energy, (k) skill upgrading or vocational training centres; (l) Roads and (m) community centers.

  Provided that such diversion of forest land shall be allowed only if,
- The forest land to be diverted for the purposes mentioned in this sub-section is less than one hectare in each case; and
- The clearance of such developmental projects shall be subject to the conditions that the same is recommended by the Gram Sabha.

9.2 Status of approved working plan and compliance:-

9.2.1 Summary of prescription of approved working plan:

9.2.1.1 The Selection Working Circle:

This working circle has been formed with an objective to further improve the growing stock. In fact, the blocks covered under this circle are mostly Sal forests with associates which are un-even aged with good tree growth. These forest blocks have forests with good crown density and matured trees. Conservative selection cum improvement felling for harvest of some matured trees is prescribed. All the forest blocks included in the last working plan are also proposed to be included in this working circle. As such the total area allotted to this working circle is **45943.04** hectares which is approximately 31.5 % of the total forest area covered in the plan **.**

9.2.1.2 The Rehabilitation Working Circle:

This Working Circle includes mainly denuded/degraded forest blocks with degraded Sal and other miscellaneous forests. These blocks have adequate rooted waste and coppice growth which can be improved by cultural operations supplemented with artificial regeneration. These areas are in need of rehabilitation and restoration measures. All such areas are found to be in close proximity to human habitation and therefore attempt has to be made to involve the local in the protection and regeneration of these degraded forests by formation of V.S.S. and their effective functioning. An area of **91946.806**hectares has been allotted to this working circle which is approximately 63.08% of the total forest area covered in the plan.

9.2.1.3 The Plantation Working Circle:

This Working Circle includes all the forest blocks, where block plantations under different schemes have been raised. This includes the old plantations that were covered under the current working plan and also the new plantations that were under taken in the current working plan period. This working circle does not include the bamboo plantations as they are tendered under bamboo overlapping circle. This working circle is not overlapping and is exclusive. The total area allotted to this Working Circle is **3176.8** hectares which is approximately **2.18 %** of the total forest area covered in the plan.

9.2.1.4 The Forest Protection Working Circle:

This circle includes all the forest areas, which are prone to human interferences like illicit felling, encroachment, poaching, shifting cultivation and fire. In addition ecologically fragile areas and those forest areas existing in steep precipitous hill slopes, which required to be protected, have also been included in this Working Circle. Special protection measures will be accorded to the forest blocks allotted to this working circle. The total area included in this working circle is **4680.13** hectares which is approximately 3.2 % of the total forest area covered in the plan.

9.2.1.5 The Bamboo (Overlapping) Working Circle:

This working circle covers the potentially rich bamboo areas of the division areas where bamboo occurs either gregariously or in scattered manner. This Working Circle overlaps with the Selection and Rehabilitation Working Circle. The bamboo forest of this division are suffering from degradation due to frequent fire, heavy grazing illicit and unscientific felling. Gregarious flowering of bamboo clumps has not yet been noticed in the forest blocks of the Division. The total area allotted to this Working Circle is **99988.373** hectares which is approximately 68.6 % of the total forest area covered in the plan.

9.2.1.6 The NTFP (Overlapping) Working Circle:

This working circle is also an Overlapping circle covering the entire plan area. The object of this working circle is to give suitable prescription for conservation, regulation, value addition and marketing of all NTFPs found in the division. The total area under this overlapping working circle works out to be **145746.8**hectares.

9.2.1.7 The Wild life (Overlapping) Working Circle:

This is an overlapping circle covering almost the entire working plan area of the Division. However, special management prescriptions are provided for some forest blocks, where there is adequate concentration of wild life. During this plan period it is proposed to identify and maintain special wildlife habitats, unique wildlife habitat and also critical wildlife habitats which have been neglected in the past. Steps will be taken to prevent wildlife crimes and wildlife depredation by appropriate protection measures with peoples' participation in detection and disposal of cases.

9.2.1.8 The Joint Forest Management (Overlapping) Working Circle:

This overlapping working circle overlaps with mainly the Rehabilitation Working Circle. All the forest blocks which have been allotted to the Vana Samarkashayna Samities for protection and management as per the JFM resolution of the State have been included in this working circle. The forest under this overlapping circle will be managed through site specific microplans prepared by the village committees which will be in consonance with the prescriptions of the main Working circle to which the forest block has been allotted. The need should be empowering the V.S.S. and making them accountable.

9.2.1.9. Statement showing deviations from working plan prescriptions Phiringia Range

Serial No. of deviation	Control book name, form no. page	Reference to working plan		Nature of deviation requiring sanction
		Paragraph	Nature of prescription	
Phiringia Range/KMD-I 2007-08	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non-availability of trees of exploitable girth.
Phiringia Range/KMD-II 2008-09	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non-availability of trees of exploitable girth.
Phiringia Range/KMD-III 2009-10	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non-availability of trees of exploitable girth.
Phiringia Range/KMD-IV 2010-11	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non-availability of trees of exploitable girth.
Phiringia Range/KMD-V 2011-12	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non-availability of trees of exploitable girth.
Phiringia Range/KMD-VI 2012-13	Control form enclosed in	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division	Commercially not viable as reported by OFDC Ltd.vide

	separate sheet		chapter-II of Part-2	their Letter No. 8216 dtd. 06.12.2012.
Phiringia Range/KMD-VII 2013-14	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Out of 220 trees, 147 nos. trees could not be felled due to obstruction of adjacent villagers.
Phiringia Range/KMD-VIII 2014-15	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	No tree of exploitable girth is available for marking.
Phiringia Range/KMD-IX 2015-16	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	No tree of exploitable girth is available for marking.
Phiringia Range/KMD- X 2016-17	Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	No tree of exploitable girth is available for marking.
Phiringia Range/KMD-SWC-I 2017-18	Control form enclosed in separate sheet	As per the specific condition laid down in Ltr No. 13-FCWPOS-PLB dt. 14.03.2008 of GOI in para no. 3 of revised working plan 2007-08 to 2016-17	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	No tree of exploitable girth is available for marking.
Phiringia Range/KMD-SWC-III 2019-20	Control form enclosed in separate sheet	As per working scheme 2019-20 page no. 32 to 34 para no. 4.1	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division	No tree of exploitable girth is available for marking.

Tikabali Range

Serial No. of deviation	Control book name, form no. page	Reference to working plan		Nature of deviation requiring sanction
		Paragraph	Nature of prescription	
Tikabali Range/ CHKP1-I 2007-08	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Tikabali Range/ CHKP1-II 2008-09	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Tikabali Range/CHK P1-III 2009-10	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Tikabali Range/CHK P1-IV 2010-11	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Tikabali Range/CHK P1-V 2011-12	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.

Tikabali Range/CHK P1-VII 2012-13	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Tikabali Range/CHK P1-VIII 2013-14	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Tikabali Range/ CHKP1-VIII 2014-15	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Huge numbers of trees have been uprooted due to Philin during 2013. Hence coupe exempted from work.
Tikabali Range/ CHKP1-IX 2015-16	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Huge numbers of trees have been uprooted due to Philin during 2013. Hence coupe exempted from work.
Tikabali Range/CHK P1-X 2016-17	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Huge numbers of trees have been uprooted due to Philin during 2013. Hence coupe exempted from work.
Tikabali Range/CHK P2-I 2007-08	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.

Tikabali Range/CHK P2-II 2008-09	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Tikabali Range/CHK P2-III 2009-10	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	2.12.2-Point-2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Tikabali Range/ CHKP2-IV 2010-11	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non availability of wind fallen/uprooted trees for marking as per general conditions SL. No.05 vide letter No.13-FCWP-OS-PLB Dtd. 30.03.2017 of Govt. of India , MOEF, Forest & Climate Change, Eastern Regional Office, Bhubaneswar.
2) Tikabali Range/ CHKP2-V 2011-12	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non availability of wind fallen/uprooted trees for marking as per general conditions SL. No.05 vide letter No.13-FCWP-OS-PLB Dtd. 30.03.2017 of Govt. of India , MOEF, Forest & Climate Change, Eastern Regional Office, Bhubaneswar.
3) Tikabali Range/ CHKP2-VI 2012-13	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	The OFDC Ltd has not taken delivery of the coupe as the same is not commercially viable.

4) Tikabali Range/ CHKP2-VII 2014-15	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Massive number of trees have been uprooted due to Philin. So coupe exempted fro work.
4) Tikabali Range/ CHKP2-VIII 2015-16	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP, removal of trees due in the felling series have exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
4) Tikabali Range/ CHKP2-IX 2015-16	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP, removal of trees due in the felling series have exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
5) Tikabali Range/ CHKP2-X 2016-17	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP, removal of trees due in the felling series have exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
6) Tikabali Range/ CHKP2- 2016-17	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP, removal of trees due in the felling series have exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
6) Tikabali Range/ CHKP2-IX 2015-16	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP, removal of trees due in the felling series have exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.

7) Tikabali Range/ CHKP2-X 2016-17	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP, removal of trees due in the felling series have exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
8)Tikabali Rang / Burtanga South SWC-I-2017-18	Control form enclosed in separate sheet	As per working scheme of Forest Phulbani Forest Division 2017-18 page no. 17 to 20 para no. 2.9 to 2.9.6	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Due to non availability wind fallen/ uprooted trees for marking.
Tikabali Rang / CHKP-I SWC -3 2019-20	Control form enclosed in separate sheet	As per working scheme of Forest Phulbani Forest Division 2019-20 page no. 32-34 para no. 4.1.	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division.	The OFDC. Ltd. has not worked the coupe stating the reason that coupe is not economically viable. Hence, coupe un-worked.

Phulbani Range

Serial No. of deviation	**Control book name, form no. page**	**Reference to working plan**		**Nature of deviation requiring sanction**
		Paragraph	**Nature of prescription**	
1) Phulbani Range/ BURT(N)-1 2007-08	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.

2) Phulbani Range/ BURT(N)-II 2008-09	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Out of 405 marked trees, tree felled 384 Nos. Balance 21 trees could not be felled due to protest of local people as it is situated in a religious place.
3) Phulbani Range/ BURT(N)-III 2009-10	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
4)Phulbani Range/ BURT(N)-IV 2010-11	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
5)Phulbani Range/ BURT(N)-IV 2011-12	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
6)Phulbani Range/ BURT(N)-V 2012-13	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	OFDC LTd has not taken delivery of coupe as the coupe is not commercially viable
7)Phulbani Range/ BURT(N)-VI 2013-14	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.

8)Phulbani Range/ BURT(N)-VIII 2014-15	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
9)Phulbani Range/ BURT(N)-IX 2015-16	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
10)Phulbani Range/ BURT(N)-IX 2016-17	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet	Para No. 2.12.1 & 2.12.2	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Phulbani Range/ BURT(N)-I 2017-18	Control form enclosed in separate sheet	Para No. 2.9 to 2.9.6 of working scheme 2017-18	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Due to non availability wind fallen uprooted trees for marking as per general condition laid down in ltr no. 13 dated. 30.03.2017 of GOI. Hence, coupe remain unworked.
Phulbani Range/ BURT(N)-III 2019-20	Control form enclosed in separate sheet	Para No. 4.1 of working scheme 2019-20	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division	Due to non availability of exploitable girth class tree. Hence, coupe remain unworked.

Karada Range

Serial No. of deviation	Control book name, form no. page	Reference to working plan		Nature of deviation requiring sanction
		Paragraph	Nature of prescription	
Karada Range/Ranaba SWC-1 2007-08	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Demarcation/ marking could not be taken up due to maoist problem.

Karada Range/Ranaba SWC-II 2008-09	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non-availability of trees for marking as per prescription of working plan.
Karada Range/Ranaba SWC-III 2009-10	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Demarcation/ marking could not be taken up due to maoist problem.
Karada Range/RNB-IV 2010-11	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-3	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range /RNB-V 2011-12	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/RNB-VI 2012-13	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/RNB-VII 2013-14	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range /RNB-VIII 2014-15	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/RNB-IX 2015-16	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.

Karada Range/RNB-X 2016-17	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/BRB-1 2007-08	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-3	Demarcation/ marking could not be taken up due to maoist problem.
Karada Range/BRB-II 2008-09	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/BRB-3 2009-10	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	Demarcation/ marking could not be taken up due to maoist problem.
Karada Range/BRB-IV 2010-11	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	Demarcation/ marking could not be taken up due to maoist problem.
Karada Range/ BRB-V 2011-12	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	Due-199, Felled-184. No deviation.
Karada Range/BRB-VI 2012-13	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/BRB-VII 2013-14	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.

Karada Range/BRB-VIII 2014-15	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
5) Karada Range/BRB-IX 2015-16	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-5	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Karada Range/BRB-X 2016-17	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/NDBL-I 2007-08	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	Demarcation/ marking could not be taken up due to maoist problem.
Karada Range/NDBL-II 2008-09	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	Non availability of trees of exploitable girth class.
Karada Range/NDBL-III 2009-10	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	Demarcation/ marking could not be taken up due to maoist problem.
Karada Range/NDBL-IV 2010-11	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/NDBL-V 2011-12	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	Due-388,Felled-341 No deviation.

Karada Range/NDBL-VI 2012-13	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	Though trees due for felling 405 Nos. but actually felled 415Nos.due to availabilities of excess dead, uprooted and fallen trees
Karada Range/NDBL-VII 2013-14	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
NDBL-VIII 2014-15	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Karada Range/NDBL-IX 2015-16	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Karada Range/NDBL-X 2016-17	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	As per prescription of WP removal of trees due in the felling series exceeded through regular coupe work and philine salvage operation. Hence coupe exempted from work.
Karada Range/Ranaba SWC-I 2017-18	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	The D.M., OFDC Ltd. Vide his letter no. 112 dt.09.01.2018 has intimated that the working cost will be more than the sale value of anticipated production as the trees have been marked scattered over a vast area in hilly terrain. The coupe is not economically viable for working. Hence, coupe remain un-worked.

Karada Range/Nandabali SWC-II 2017-18	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division 2017-18, page no 17 to 20 para no. 2.9 to 2.9.6.	The D.M., OFDC Ltd. Vide his letter no. 112 dt.09.01.2018 has intimated that the working cost will be more than the sale value of anticipated production as the trees have been marked scattered over a vast area in hilly terrain. The coupe is not economically viable for working. Hence, coupe remain un-worked.
Karada Range/Nandabali SWC-III 2019-20	Control form enclosed in separate sheet	---	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division 2019-20, page no 32 to 34 para no.4.1	The D.M., OFDC Ltd. has intimated that the working cost will be more than the sale value of anticipated production as the trees have been marked scattered over a vast area in hilly terrain. The coupe is not economically viable for working. Hence, coupe remain un-worked.

Sudrukumpa Range

Serial No. of deviation	Control book name, form no. page	Reference to working plan		Nature of deviation requiring sanction
		Paragraph	Nature of prescription	
Sudrukumpa Range/DONG-I 2007-08	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-3	In comparison to due for felling trees, excess trees felled due to availability wind fallen uprooted trees.
Sudrukumpa Range/DONG-II 2008-09	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Though trees marked 494 for felling but felled 276 Nos. Rest trees could not be felled due to disagreement of OFDC Ltd. relating to trees marked in slopy terrain.

Sudrukumpa Range/DONG-III 2009-10	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/DONG-IV 2010-11	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/DONG-V 2011-12	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/DONG-VI 2012-13	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/DONG-VII 2013-14	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/DONG-VIII 2014-15	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/DONG-IX 2015-16	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.

Sudrukumpa Range/DONG-X 2016-17	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/RANP-1 2007-08	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-3	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/RANP-II 2008-09	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, excess trees felled due to availability wind fallen uprooted trees.
Sudrukumpa Range/ RANP-III 2009-10	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-5	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/RANP-IV 2010-11	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	commercially not viable. Reported to RCCF, Berhampur vide this office Memo No. 294 dt.19.01.11. coupe remain un-worked
Sudrukumpa Range/RANP-V 2011-12	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-3	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/RANP-VI 2012-13	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.

Sudrukumpa Range/RANP-VII 2013-14	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-5	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/RANP-VIII 2014-15	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/RANP-IX 2015-16	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-7	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/RANP-X 2016-17	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-8	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Sudrukumpa Range/DONG-SWC-I 2017-18	Control form enclosed in separate sheet	Working scheme of Phulbani Forest Division 2017-18 page no. 17 to 20 para no. 2.9 to 2.9.6	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Coupe has offer to OFDC. Ltd for working. But, OFDC Ltd. did not take delivery of the coupe. Hence, coupe remain un-worked.
Sudrukumpa Range/DONG-SWC-III 2019-20	Control form enclosed in separate sheet	As per working scheme of Forest Phulbani Forest Division 2019-20 page no. 32-34 para no. 4.1.	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division.	The OFDC. Ltd. has not worked the coupe stating the reason that coupe is not economically viable. Hence, coupe un-worked.

Raikia Range

Serial No. of deviation	Control book name, form no. page	Reference to working plan		Nature of deviation requiring sanction
		Paragraph	Nature of prescription	
Raikia Range/KRD-I 2007-08	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Podu cultivation affected since last 15 years & the area was having sapling and pole. Hence marking was done.
Raikia Range/KRD-II 2008-09	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Podu cultivation affected since last 15 years & the area was having sapling and pole. Hence marking was done.
Raikia Range/KRD-III 2009-10	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	Non-availability of trees of exploitable girth
Raikia Range/KRD-IV 2010-11	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-2	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Raikia Range/KRD-V 2011-12	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-3	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Raikia Range/KRD-VI 2012-13	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-4	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.

Raikia Range/KRD-VII 2013-14	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-5	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Raikia Range/KRD-VIII 2014-15	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-6	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Raikia Range/KRD-IX 2015-16	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-7	In comparison to due for felling trees, excess trees felled due to availability wind fallen uprooted trees.
Raikia Range/KRD-X 2016-17	Working Plan Code-2014 Selection Working Circle Page No.330, Para-2.15.1. Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division chapter-II of Part-8	In comparison to due for felling trees, actually felled less trees due to non-availability of exploitable girth class.
Raikia Range/KRD-I 2017-18	Control form enclosed in separate sheet		Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division 2017-18, page no 17 to 20 para no. 2.9 to 2.9.6.	Coupe has offered to OFDC, Ltd. for working. But, OFDC Ltd. did not take delivery of the Coupe. Hence, coupe remain un-worked.
Raikia Range/KRD-III 2019-20	Control form enclosed in separate sheet	Para no. 4.1 of working scheme 2019-20	Demarcation & marking as prescribed in Selection Working Circle of PLB forest Division 2019-20, page no 32 to 34.	Coupe has offered to OFDC, Ltd. for working. But, OFDC Ltd. have not worked the coupe as coupe is not economically viable for working. Hence, coupe remain un-worked.

9.2.1.10.Deviation of Bamboo Coupe:

Serial No. of deviation	Control book name, form no. page	Reference to working plan		Nature of deviation requiring sanction
		Paragraph	Nature of prescription	
Working of Bamboo Coupe 2017-18	List of Bamboo Coupes 2017-18.	---	For improvement	Due to typographical error the working of bamboo coupes have been furnished as 'C' coupe instead of 'A' coupe in approved working scheme 2017-18 of Phulbani Forest Division.

9.3 Number of Forest Offence

The details of forest offence cases registered & cases booked under section 56 of the Orissa Forest Act, 1972 and number of cases disposed off and to be disposed off during the period from 2006-07 to 2019-20

Table No.-9.1 Information on Forest offence

Year	No. of cases U/S 56 booked	No. of cases disposed off	Balance for disposal
2006-07	--	--	--
2007-08	02	02	
2008-09	--	--	--
2009-10	01	01	--
2010-11	02	02	--
2011-12	08	08	--
2012-13	05	05	--
2013-14	04	04	--
2014-15	05	05	--
2015-16	07	06	01
2016-17	09	06	01 trial, & 2 pending
2017-18	03	01	02
2018-19	02	01	01
2019-20	01	--	01

9.3.1 Offence cases booked in Phulbani Division 2006-07 to 2019-20

Table No.-9.2

Year	OR cases	UD cases	Timber seized (in Cum)	Person booked in OR case
2006-07	1231	198	51.074	1231

2007-08	1114	198	184.315	1133
2008-09	1054	298	112.952	1056
2009-10	1274	151	113.273	1276
2010-11	1400	92	20.836	1404
2011-12	1439	113	81.480	1455
2012-13	1268	94	20.919	1306
2013-14	1450	48	38.699	1459
2014-15	1599	109	29.84	1612
2015-16	1579	131	65.59	1590
2016-17	1577	119	52.219	1589
2017-18	1791	68	53.832	1806
2018-19	1365	35	43.7044	1372
2019-20	1549	45	47.4938	1551

9.3.2 Assault cases on forest staff

There is no assault and death incidences of forest staff during outgoing working period2007-08 to 2019-20.

9.4 Status of research and development.

No specific research work has been taken up.

9.5 Human Resource capacity building efforts:

Training of the staff is being done in the Division under CAMPA Scheme between 2010-11 to 2014-15. This training relate to Technical Forest matters, Forest Laws and Computer knowledge. This training are being done at the Division level itself. In addition the staffs are being sent for weekly refresher courses at training school.

Table No.-9.3 Details about training taken by field staff/ministerial staff/officers of Phulbani Forest Division

Years	Name Of trainees	Subject	Duration of training	Training institution
2007	Manoj Kumar Jha, FG	FG Training	6 month	OFRC, Angul
	Ajit Kumar Pradhan, FG			
	Mamita Sahu, FG			
	Ursila Pradhan, FG			

2007	Biswaseni Pradhan, Sr. Clerk	Accounts Training	3 months	MDRAFM, BBSR
2008	Sri Bibhuti Bhusan Patra, Jr. Clerk	Basic Computer Application	6 days	OFRC Angul
	Miss. Bimala Pattnaik, FG			
2008	Sri Gopinath Bhoi, Junior Steno	Basic Computer Application	6 days	OFRC, Angul
	Sri Bibhuti Bhusan Patra, Jr. Clerk			
	Miss. Bimala Pattnaik, FG			
	Miss Bishnupriya Panigrahi, FG			
2008	Sri Simanchal Nayak, Sr. Clerk	Accounts Training	3 months	MDRAFM, BBSR
2008	Miss Bishnupriya Panigrahi, FG	FG Training	6 month	OFRC, Angul
	Miss Lata Sahani, FG			
	Sri Abakash Amat, FG			
	Miss Rashmita Kumari Panda, FG			
	Sri Pratap Jundi, FG			
2009	Sri Debendra Nath Patra, Jr. Clerk	Basic Computer Application for Ministerial Staff	6 days	OFRC, Angul
	Sri Gopinath Bhoi, Junior Steno			
2009	Manoj Kumar Jha, FG	General Refresher Course	7 days	OFRC, Angul
2009	Sri Debendra Nath Patra, Jr. Clerk	Human Resource Development	6 days	OFRC, Angul
	Sri Sunil Kumar Sahu, Forester	programme	5 days	OFRC, Angul
	Sri Manoj Kumar Jha, FG			
2009	Sri Prasants Kumar Bhoi, Jr. Clerk	Basic Computer Application	6 days	OFRC Angul
	Smt. Bishnupriya Panigrahi, FG			
2009	Sri Satapathy Pradha, Sr. Clerk	Accounts Training	3 months	MDRAFM, BBSR
	Sri Nityananda Sahu, Sr. Clerk			
2010	D. Lachhniya Reddy, FG	FG Training	6 months	FTS, Bhubaneswar
2010	Ranjit Kumar Apat, FG	FG Training	6 months	OFRC, Angul
	Manoj Kumar Mohapatra, FG			
	Rejendra Konhar, FG			
2010	Suryakanti Behera, FG	FG Training	6 months	OFRC, Angul
2010	Andeswar Kanhar, FG	FG Training	6 months	NFTS, Champua
2010	Indra Digal, Forest Ranger	Human Resource Development programme	5 days	OFRC, Angul
2010	Sri Kumuda Chandr Patra, Sr. Clerk	Basic Computer Application	7 days	OFRC, Angul
2010	Sri Bhuban Mallick, Dy. Ranger	Human Resource Development programme	5 days	OFRC, Angul
2010	Sri Dibya Ranjan Sahu, Forester	Basic Computer Application	6 days	OFRC, Angul
2010	Sri R.K. Padhi, H/C	Basic Computer Application	Basic Computer Application	OFRC, Angul

	Sri Panchanan Dehury, Jr. Clerk		6 days	
	Sri Niranjan Nayak, Jr. Clerk			
	Sri Prakash Sahani, Jr. Clerk			
	Sri Prabin Ku. Mahakud, Fr			
	Sri Rabindra Ku. Patra, Fr			
	Sri Sadananda Behera, Fr			
	Miss Manikeswari Pattnaik, Fr			
2010	Sri Satrughna Mohanty, Dy. Ranger	Thematic Course for Forest Range Officer – Charge in Governance	5 days	OFRC, Angul
2010	Sri Indra Digal, Forest Ranger	Refresher course for ACF/Forest Range Officer	5 days	OFRC, Angul
2010	Sri Dibya Ranjan Sahu, Forester	Basic Computer Application for front line staff	6 days	OFRC, Angul
2010	Sri Kumuda Chandra Patra, Sr. Clerk	Basic Computer Application for Ministerial Staff	6 days	OFRC, Angul
2010	Sri Biswamohan Mishra, Sr. Clerk	Accounts Training	3 months	MDRAFM, BBSR
2011	Rashmita Baxi, FG	FG Training	6 months	OFRC, Angul
2011	Bisnu Prasad Rath, Forester	Forester Training	12 months	FTS, Bhubaneswar
2012	Bulsan Pradhan, Forester	Short term introductory training	10 days	FTS, G.Udayagiri
	Kamalkanta Pradhan, Forester			
	Mamata Mallick, Forester			
	Prasant Kumar Sahu, Forester			
	Ajit Kumar Pradhan, Forester			
	Braja Sundar Das, Forester			
	Monalisha Panda, Forester			
	Rashmita Baxi, Forester			
	Ranjit Kumar Apat, Fr			
2012	Ritarani Behera, FG	FG Training	6 months	OFRC, Angul
	Mobasara Begum, FG			
	Bidyutlata Kanhar, FG			
	Narendra Bhoi, FG			
	Tuimsa Kanhar, FG			
	Simanchal Biswal, FG			
2012	Suryakanti Behera, FG	FG Training	6 months	OFRC, Angul
2012	Ranjit Apat, FG	Refresher Course	16 days	NFTS, Champua
	Rajendra Kanhar, FG			
2012	Angad Digal, FG	FG Training	6 months	OFRC, Angul
2012	Pradeep Kumar Mallick	FG Training	6 months	NFTS, Champua
2012	Sri Sarat Ch. Sahu, Sr. Clerk	Accounts Training	1 months	MDRAFM, BBSR
	Sri Panchanan Dehury, Sr. Clerk			
	Sri Pradeep Kumar Mukhi, Sr. Clerk			
2013	Jhumuri Kanhar, FG	Refresher Course	Two week	FTS, G.Udayagir
2013	Ch. Anita Patra, FG	FG Training	6 months	OFRC, Angul
	Sujeet Kumar Pradhan, FG			

2013	Bikash Bisoi, FG	FG Training	6 months	NFTS, Champua
2014	Nilendri Nayak, FG	Refresher Course	Two week	FTS, G.Udayagiri
2014	Sri Premananda Patra, FG	FG Training	6 months	FTS, G.Udayagiri
	Sri Krushna Chandra nayak, FG			
2014	Ajit Kumar Ganda, FG	FG Training	6 months	FTS, G.Udayagiri
	Achyutananda Ganda, FG			
2014	Ursila Pradhan, FG	Refresher Course	Two week	FTS, G.Udayagiri
2014	Kasturi Kanhar, FG	FG Training	6 months	OFRC, Angul
	Sunita Kanhar, FG			
2014	Sri Ghasiram Pradhan, Fr	Refresher Course	4 months	OFRC, Angul
	Sri Chaturbhuja Mallick, Fr			
	Sri Keshan Sahani, Fr			
	Sri Sriram Mukhi, Fr			
	Sri Promodini Pradhan, Fr			
	Sri Jitendra Rout, Fr			
	Sri Ajit Kumar Sahani,Fr			
2014	Sri Subash Chandra Dash, Fr	Induction Training Course	01 year	OFRC, Angul
2015	1 Gayatri Gouda	Human Resource Development programme	6 days	OFRC, Angul
2015	1 Rashmita Baxi, Fr	Human Resource Development programme	6 days	OFRC, Angul
2015	Smt. Priyambada Sahoo	Human Resource Development programme	6 days	OFRC, Angul
2015	Dibyeswari Padhi	IT Training	6 days	Gopabandhu Academy of Administration, BBSR
2015	Smt. Mamata Mallick	IT Training	6 days	Gopabandhu Academy of Administration, BBSR
2015	Jhumuri Kanhar, FG	FG Training	6 months	OFRC, Angul
2015	Sangram Keshari Digal, FG	FG Training	6 months	FTS, G.Udayagiri
	Arun Kumar Patra, FG			
	A. Santosh Patra, FG			
	Bibhuranjan Samantray,FG			
2015	Lili Mallick, FG	FG Training	6 months	OFRC, Angul
2015	Nilendri Nayak, FG	FG Training	6 months	OFRC, Angul
2015	Sri Pratap Behera, FG	FG Training	6 months	FTS, G.Udayagiri
	Sri Gopabandhu Pradhan, FG			
2015	Sri Manoranjan Amat, FG	FG Training	6 months	FTS, Ghatikia, BBSR
2015	Fakiruddin Khan, Fr	Induction Course Training	1 year	FTS, Ghatikia, BBSR
	Sri Udhaba Mallick, Fr			
2015	Sri Ajit Pradhan, Fr	Induction Course Training	1 year	OFRC, Angul
	Sri Monalisha Panda, Fr			

	Dillip Kumar Bisoi, Fr			
2015	Sri Pradeep Kumar Mukhi, Sr. Clerk	Accounts Training	1 months	MDRAFM, BBSR
	Sri Debendranath Patra, Sr. Clerk			
2016	Sri Chandra Sekhar Mallick, Fr	Induction Course Training	4 months	FTS, G.Udayagiri
2016	Sri Mahendra Biswal	Induction Course Training	4 months	OFRC, Angul
2016	Smt. Rashmita Baxi, Fr	Induction Course Training	1 year	FTS, Ghatikia, BBSR
2016	Sri Prasant Kumar Sahu, Fr	Induction Course Training	1 year	FTS, Ghatikia, BBSR
2016	Sri Kamal Kant Pradhan, Fr	Induction Course Training	1 year	FTS, Ghatikia, BBSR
2016	Sri B.N. Panda, Dy. Ranger	Preparation of Working Plan	1 day	Ghumusur South Division, Bhanjanagar
	Sri Abhimanyu Nayak, Dy. Ranger			
	Sri Sadananda behera, Fr.			
2016	Dr. Prakash Ch. Gogineni, DFO, Phulbani Division	Capacity Building	2 days	Range Office, Phulbani
	Sri. Adwit Ch. Rout, ACF	Soil and Moisture Conservation in hilly Forest blocks		
	Fakir Charan Behera, FR			
	Bijaya Kumar Mallick, FR			
	Bijaya Kumar Mohanty, FR			
	Rabindra Kumar Patra, Fr			
	Prabin Dash, Fr			
	D. Subash Chandra, Fr			
	Tuimsa kanhar, FG			
	Gopabandhu Pradhan, FG			
	Manoj Kumar Jha, FG			
	D. Lachhniya Reddy, FG			
	Pratap Kumar Behera, FG			
	Pradeep Kumar Mallick, FG			
	Sujeet Kumar Pradhan, FG			
2017	Gayatri Gouda, FG	FG Training	6 months	FTS, G.Udayagiri
2017	Rashmi Ranjan Pattnaik, FG	FG Training	6 months	OFRC, Angul
	Bhagirathi Meher,FG			
2017	Rukmini Kanhar, FG	FG Training	6 months	FTS, G.Udayagiri
	Manas Ranjan Bisoi, FG			
2017	Sri Rabi Sankar Digal, Fr	Training of Promotee Foresters	4 months	FTS, Ghatikia, Bhubaneswar
	Sri Saroj Kumar Mishra, Fr			
	Sri Ushat Kanhar, Fr			

9.6 Forest Resource Accounting

9.6.1 Tangible Benefits:

The Tangible benefits obtained from forest include the Timber and Firewood extracts and NTFP produce. During the period of field work, the values of different NTFPs have been obtained during Socio Economic survey of fringe villagers.

9.6.2 Siali Fibre:

Siali fibre is being collected from the forest for its use in kendu leaf bundling. The details of kerries collected, production in quintals and amount paid towards royalty is furnished below;

Year	Production (In Qtl)
2012-13	340.71
2013-14	335.82
2014-15	288.13
2015-16	109.26
2016-17	119.37
2017-18	139.84

9.6.3 Kendu Leaf:

Phulbani Kendu Lead Division is working for collection of kendu leaves. The purchase price, bush cutting expense are furnished in table below.

Head of service	2007-08	2008-09	2009-10	2010-11	2011-12
Bush cutting	3156985	3717080	3850000	4943999	4956772
Repair and maintenance of phadi	2800000	3154920	3839948	4961000	5300000
Purchase price of KL	26871812	25463340	28926493	33220918	24830751
Transportation	881998	853598	948418	1077763	907871
Seasonal staff	8177443	7757691	10125333	11408664	10976570
Cost of binding	8507797	8976157	12607059	11888596	9098726
Misc. Contingency	1086366	1200984.57	1552856	2076105	2133505

Head of service	2012-13	2013-14	2014-15	2015-16	2016-17
Bush cutting	5047550	8168500	8160000	8335000	9129540
Repair and maintenance of phadi	5035001	6242000	7950000	5900000	6545675
Purchase price of KL	38629112	59272290	54726249	44016669	49361440
Transportation	1349211	1369999	1597000	1334000	166756
Seasonal staff	11676310	14516397	14339562	15080561	14949700
Cost of binding	12950115	19890388	17027332	15861281	11816699
Misc. Contingency	2522364	2382822	2690000	2055000	1368449

9.6.4. Timber and Firewood:-

The timber and firewood delivered during the previous plan period is furnished in below table:

Year	Total Round Timber in cum	Firewood (in Stack 12'X3'X3')	Royalty received in Rs.
2006-07	172.98	158	11919
2007-08	21.554	110.5	672999
2008-09	53.5061	0	161466
2009-10	2246.1362	435	0
2010-11	1622.408	165.25	5398743
2011-12	2204.254	52.53	1409375
2012-13	1807.376	30.04	153787412
2013-14	1481.27	36.74	6020793
2014-15	1884.72	89.44	14642530
2015-16	493.684	80.8	4869043
2016-17	1539.96	769.195	10527804
2017-18	195.05	41.175	627435
Total	**13722.8983**	**1968.67**	**198129519**

9.6.5 Bamboo

The Bamboo produced during the previous plan period is furnished in below table.

BURTANGA SOUTH COUPE

Year of working	Name of the coupe	No. of bamboo	Production of bamboo (in SU)			Production of commercial bamboo	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Brutanga (South) 'B'	8389	168.829	--	168.829	0	Royalty paid centrally	Economically not viable
2007-08	Brutanga (South) 'C'	167537	3371.682	--	3371.682	5366		
2008-09	Brutanga (South) 'D'	4500	90.563	--	90.563	0		
2009-10	Brutanga (South) 'A'	0	0	--	0	0		Economically not viable
2010-11	Brutanga (South) 'B'	0	0	--	0	0		Economically not viable
2011-12	Brutanga (South) 'C'	127139	2558.672	--	2558.672	1000		
2012-13	Brutanga (South) 'D'	0	0	--	0	0		Economically not viable
2013-14	Brutanga (South) 'A'	0	0	--	0	0		Economically not viable
2014-15	Brutanga (South) 'B'	0	0	--	0	0		Economically not viable
2015-16	Brutanga (South) 'C'	97632	1964.850	--	1964.850	0		
2016-17	Brutanga (South) 'D'	0	0	--	0	0		Economically not viable

2017-18	Brutanga (South) 'A'	0	0	0	0	0		
2018-19	Brutanga (South) 'B'	0	0	0	0	0		
2019-20	Brutanga (South) 'C'	0	0	0	0	0		

Chakapad RF

Year of working	Name of the coupe	No. of bamboo	Production of bamboo (in SU)			Production of commercial bamboo	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Chakapad "B"	22570	454.221	--	454.221	0	Royalty paid centrally	
2007-08	Chakapad "C"	43645	878.356	--	878.356	0		
2008-09	Chakapad "D"	15028	302.439	--	302.439	0		
2009-10	Chakapad "A"	1357	27.310	--	27.310	0		
2010-11	Chakapad "B"	6736	135.562	--	135.562	0		
2011-12	Chakapad "C"	10508	211.474	--	211.474	0		
2012-13	Chakapad "D"	0	0	--	0	0		
2013-14	Chakapad "A"	0	0	--	0	0		
2014-15	Chakapad "B"	0	0	--	0	0		
2015-16	Chakapad "C"	0	0	--	0	0		
2016-17	Chakapad "D"	0	0	--	0	0		
2017-18	Chakapad "A"	0	0	--	0	0		
2018-19	Chakapad "B"	0	0	--	0	0		
2019-20	Chakapad "C"	0	0	--	0	0		

Chakapad PRF

Year Of Working	Name Of The Coupe	No. Of Bamboo	Production Of Bamboo(In Su)			Production Of Commercial Bamboo	Royalty Paid By OFDC Ltd.	Reason For Not Working
			Salia	Daba	Total			
2006-07	Chakapad PRF "C"	5129	103.221	--	103.221	0	Royalty Paid Centrally	
2007-08	Chakapad PRF "D"	9945.5	200.153	--	200.153	0		
2008-09	Chakapad PRF"A"	4072	81.949	--	81.949	0		
2009-10	Chakapad PRF "B"	1524	30.671	--	30.671	0		

2010-11	Chakapad PRF"C"	920	18.515	--	18.515	0		
2011-12	Chakapad PRF "D"	0	0.000	--	0.000	0		
2012-13	Chakapad PRF "A"	0	0.000	--	0.000	0		
2013-14	Chakapad PRF "B"	0	0.000	--	0.000	0		
2014-15	Chakapad PRF"C"	0	0.000	--	0.000	0		
2015-16	Chakapad PRF "D"	0	0.000	--	0.000	0		
2016-17	Chakapad PRF "A"	0	0.000	--	0.000	0		
2017-18	Chakapad PRF "B"	0	0.000	--	0.000	0		
2018-19	Chakapad PRF"C"	0	0.000	--	0.000	0		
2019-20	Chakapad PRF "D"	0	0.000	--	0.000	0		

Machaghat RF

Year Of Working	Name Of The Coupe	No. Of Bamboos	Production Of Bamboo (In Su)			Production Of Commercial Bamboo	Royalty Paid By OFDC Ltd.	Reason For Not Working
			Salia	Daba	Total			
2006-07	Machaghat "B"	5129	103.221		103.221	0	Royalty paid centrally	Economically not viable
2007-08	Machaghat "C"	39434	793.609		793.609	718		
2008-09	Machaghat "D"	31894	641.867		641.867	2500		
2009-10	Machaghat "A"	49365	993.471		993.471	1000		
2010-11	Machaghat "B"	14451	290.826		290.826	0		
2011-12	Machaghat "C"	45074	907.114		907.114	0		
2012-13	Machaghat "D"	0	0		0	0		Economically not viable
2013-14	Machaghat "A"	0	0		0	0		Economically not viable
2014-15	Machaghat "B"	0	0		0	0		Economically not viable
2015-16	Machaghat "C"	0	0		0	0		Economically not viable
2016-17	Machaghat "D"	0	0		0	4000		
2017-18	Machaghat "A"	0	0		0	0		
2018-19	Machaghat "B"	0	0		0	0		
2019-20	Machaghat "C"	0	0		0	0		

Karada PRF

Year Of Working	Name Of The Coupe	No. Of Bamboos	Production Of Bamboo (In Su)			Production Of Commercial Bamboo	Royalty Paid By OFDC Ltd.	Reason For Not Working
			Salia	Daba	Total			
2006-07	Karada PRF 'C'	0	0	--	0	0	Royalty paid centrally	
2007-08	Karada PRF 'D'	73705.5	1483.323	--	1483.323	3935		
2008-09	Karada PRF 'A'	22124	445.246	--	445.246	0		
2009-10	Karada PRF 'B'	6025	121.253	--	121.253	0		
2010-11	Karada PRF 'C'	5651	113.726	--	113.726	0		
2011-12	Karada PRF 'D'	53838	1083.490	--	1083.490	0		
2012-13	Karada PRF 'A'	0	0	--	0	0		Economically not viable
2013-14	Karada PRF 'B'	0	0	--	0	0		Economically not viable
2014-15	Karada PRF 'C'	0	0	--	0	0		Economically not viable
2015-16	Karada PRF 'D'	0	0	--	0	0		Economically not viable
2016-17	Karada PRF 'A'	0	0	--	0	0		Economically not viable
2017-18	Karada PRF 'B'	0	0	--	0	0		
2018-19	Karada PRF 'C'	0	0	--	0	0		
2019-20	Karada PRF 'D'	0	0	--	0	0		

Badagada PRF

Year Of Working	Name Of The Coupe	No. Of Bamboos	Production Of Bamboo (In Su)			Production Of Commercial Bamboo	Royalty Paid By OFDC Ltd.	Reason For Not Working
			Salia	Daba	Total			
2006-07	Badagada PRF "C"	38670	778.234	--	778.234	0	Royalty paid centrally	
2007-08	Badagada PRF "D"	49835.5	1002.939	--	1002.939	3600		
2008-09	Badagada PRF "A"	24937	501.857	--	501.857	2500		
2009-10	Badagada PRF "B"	5108	102.799	--	102.799	0		
2010-11	Badagada PRF "C"	13179	265.227	--	265.227	0		
2011-12	Badagada PRF "D"	33398	672.135	--	672.135	0		
2012-13	Badagada PRF "A"	0	0	--	0	0		Economicly not viable
2013-14	Badagada PRF "B"	3700.3727	74.470	--	74.470	0		

2014-15	Badagada PRF "C"	0	0	--	0	0		Economicly not viable
2015-16	Badagada PRF "D"	0	0	--	0	0		Economicly not viable
2016-17	Badagada PRF "A"	0	0	--	0	0		Economicly not viable
2017-18	Badagada PRF "B"	0	0	--	0	0		
2018-19	Badagada PRF "C"	0	0	--	0	0		
2019-20	Badagada PRF "D"	0	0	--	0	0		

Baraba RF

Year Of Working	Name of the Coupe	No. Of Bamboo	Production Of Bamboo (In Su)			Production Of Commercial Bamboo	Royalty Paid By OFDC Ltd.	Reason For Not Working
			Salia	Daba	Total			
2006-07	Baraba "B"	101331	2039.276	--	2039.276	0	Royalty paid centrally	
2007-08	Baraba "C"	58519	1177.695	--	1177.695	0		
2008-09	Baraba "D"	24835	499.804	--	499.804	3000		
2009-10	Baraba "A"	34688	698.096	--	698.096	0		
2010-11	Baraba "B"	47686	959.681	--	959.681	0		
2011-12	Baraba "C"	48686	979.806	--	979.806	0		
2012-13	Baraba "D"	0	0	--	0	0		Economically not viable
2013-14	Baraba "A"	0	0	--	0	0		Economically not viable
2014-15	Baraba "B"	0	0	--	0	0		Economically not viable
2015-16	Baraba "C"	0	0	--	0	0		Economically not viable
2016-17	Baraba "D"	0	0	--	0	0		Economically not viable
2017-18	Baraba "A"	0	0	--	0	0		
2018-19	Baraba "B"	0	0	--	0	0		
2019-20	Baraba "C"	0	0	--	0	0		

Ranaba RF

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo(in SU)			Production of commercial bamboo	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Ranaba "B"	29177	587.187	--	587.187	0	Centrally paid	Economically not viable
2007-08	Ranaba "C"	76994.5	1549.514	--	1549.514	4682		
2008-09	Ranaba "D"	32109	646.194	--	646.194	3500		
2009-10	Ranaba "A"	20049	403.486	--	403.486	535		
2010-11	Ranaba "B"	36531	735.186	--	735.186	3030		
2011-12	Ranaba "C"	150060	3019.958	--	3019.958	5650		
2012-13	Ranaba "D"	0	0	--	0	0		Economically not viable
2013-14	Ranaba "A"	1469	29.57	--	29.57	0		
2014-15	Ranaba "B"	0	0	--	0	0		Economically not viable
2015-16	Ranaba "C"	0	0	--	0	0		Economically not viable
2016-17	Ranaba "D"	0	0	--	0	24000		
2017-18	Ranaba "A"	0	0	--	0	0		
2018-19	Ranaba "B"	0	0	--	0	0		
2019-20	Ranaba "C"	0	0	--	0	0		

Baraba PRF

Year of working	**Name of the coupe**	**No. Of bamboos**	**Production of bamboo (in SU)**			**Production of commercial bamboo**	**Royalty paid by OFDC ltd.**	**Reason for not working**
			Salia	Daba	Total			
2006-07	Baraba "C"	85257	1715.797	--	1715.797	0	Centrally paid	
2007-08	Baraba "D"	38651	777.851	--	777.851	0		
2008-09	Baraba "A"	13943	280.603	--	280.603	0		
2009-10	Baraba "B"	0	0	--	0	0		Economically not viable
2010-11	Baraba "C"	45127	908.181	--	908.181	0		
2011-12	Baraba "D"	0	0	--	0	0		Economically not viable

2012-13	Baraba "A"	0	0	--	0	0		Economically not viable
2013-14	Baraba "B"	0	0	--	0	0		Economically not viable
2014-15	Baraba "C"	0	0	--	0	0		Economically not viable
2015-16	Baraba "D"	0	0	--	0	0		Economically not viable
2016-17	Baraba "A"	0	0	--	0	0		Economically not viable
2017-18	Baraba "B"	0	0	--	0	0		
2018-19	Baraba "C"	0	0	--	0	0		
2019-20	Baraba "D"	0	0	--	0	0		

Baghanadi RF

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo (in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Baghanadi "B"	46389	933.569	--	933.569	1500	Centrally paid	
2007-08	Baghanadi "C"	29080	585.235	--	585.235	2000		
2008-09	Baghanadi "D"	21917	441.080	--	441.080	3000		
2009-10	Baghanadi "A"	26101	525.283	--	525.283	0		
2010-11	Baghanadi "B"	31942	642.833	--	642.833	0		
2011-12	Baghanadi "C"	40061	806.228	--	806.228	934		
2012-13	Baghanadi "D"	0	0	--	0	0		Economically not viable
2013-14	Baghanadi "A"	0	0	--	0	0		Economically not viable
2014-15	Baghanadi "B"	0	0	--	0	0		Economically not viable
2015-16	Baghanadi "C"	0	0	--	0	0		Economically not viable
2016-17	Baghanadi "D"	0	0	--	0	0		Economically not viable
2017-18	Baghanadi "A"	0	0	--	0	0		

2018-19	Baghanadi "B"	0	0	--	0	0		
2019-20	Baghanadi "C"	0	0	--	0	0		

Balandapada PRF

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo(in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Balandapada PRF "C"	6068	122.108		122.108	0		
2007-08	Balandapada PRF "D"	51117	1028.730		1028.730	0		
2008-09	Balandapada PRF "A"	40933	823.767		823.767	0		
2009-10	Balandapada PRF "B"	24803	499.160		499.160	0		
2010-11	Balandapada PRF "C"	22375	450.297		450.297	0		
2011-12	Balandapada PRF "D"	0	0		0	0	Centrally paid	Economically not viable
2012-13	Balandapada PRF "A"	0	0		0	0		Economically not viable
2013-14	Balandapada PRF "B"	0	0		0	0		Economically not viable
2014-15	Balandapada PRF "C"	0	0		0	0		Economically not viable
2015-16	Balandapada PRF "D"	0	0		0	0		Economically not viable
2016-17	Balandapada PRF "A"	0	0		0	0		Economically not viable
2017-18	Balandapada PRF "B"	0	0	--	0	0		
2018-19	Balandapada PRF "C"	0	0	--	0	0		
2019-20	Balandapada PRF "D"	0	0	--	0	0		

Burtanga North RF

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo(in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Brutanga(N) "B"	36031	725.124	--	725.124	0	Centrally paid	
2007-08	Brutanga(N) "C"	0	0.000	--	0.000	0		
2008-09	Brutanga(N) "D"	27666	556.778	--	556.778	0		
2009-10	Brutanga(N) "A"	16293	327.897	--	327.897	0		
2010-11	Brutanga(N) "B"	17717.5	356.565	--	356.565	0		
2011-12	Brutanga(N) "C"	0	0	--	0	0		Economically not viable
2012-13	Brutanga(N) "D"	0	0	--	0	0		Economically not viable
2013-14	Brutanga(N) "A"	5100	102.64	--	102.64	3000		
2014-15	Brutanga(N) "B"	0	0	--	0	0		Economically not viable
2015-16	Brutanga(N) "C"	0	0	--	0	0		Economically not viable
2016-17	Brutanga(N) "D"	0	0	--	0	0		Economically not viable
2017-18	Brutanga(N) "A"	0	0	--	0	0		
2018-19	Brutanga(N) "B"	0	0	--	0	0		
2019-20	Brutanga(N) "C"	0	0	--	0	0		

Bilabadi

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo (in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Bilabadi "B"	12832	258.244	--	258.244	0	Centrally paid	
2007-08	Bilabadi "C"	33460	673.383	--	673.383	2300		
2008-09	Bilabadi "D"	4000	80.500	--	80.500	0		
2009-10	Bilabadi "A"	0	0	--	0	0		Economically not viable
2010-11	Bilabadi	11420.5	229.838	--	229.838	0		

	"B"							
2011-12	Bilabadi "C"	25099	505.117	--	505.117	0		
2012-13	Bilabadi "D"	0	0	--	0	0		Economically not viable
2013-14	Bilabadi "A"	0	0	--	0	0		Economically not viable
2014-15	Bilabadi "B"	0	0	--	0	0		Economically not viable
2015-16	Bilabadi "C"	9622	193.64	--	193.64	0		
2016-17	Bilabadi "D"	0	0.000	--	0.000	0		
2017-18	Bilabadi "A"	0	0	--	0	0		
2018-19	Bilabadi "B"	0	0	--	0	0		
2019-20	Bilabadi "C"	0	0	--	0	0		

Donga East

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo (in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Donga East "B"	4194	84.404		84.404	0		
2007-08 to 2016-17			0.000		0.000			

Donga West

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo (in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Donga West "B"	31324	630.385		630.385	0		
2007-08	Donga West "C"	43896	883.407		883.407	0		
2008-09	Donga West "D"	7683	154.620		154.620	0		
2009-10	Donga West "A"	5555	111.794		111.794	0		
2010-11	Donga West "B"	27861	560.703		560.703	1140		
2011-12	Donga West "C"	39693.5	798.832		798.832	0		
2012-13	Donga	0	0.000		0.000	0		

	West "D"							
2013-14	Donga West "A"	3600	72.450		72.450	5500		
2014-15	Donga West "B"	0	0.000		0.000	0		
2015-16	Donga West "C"	15103	303.95		303.95	0		
2016-17	Donga West "B"		0.000		0.000			
2018-19	Donga West "C"	0	0	0	0	0		
2019-20	Donga West "D"	0	0	0	0	0		
	Donga West "A"	0	0	0	0	0		

Gochapada RF

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo (in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Gochapada "B"	0	0.000		0.000	0		
2007-08	Gochapada "c"	0	0.000		0.000	0		
2008-09	Gochapada "D"	18383	369.958		369.958	0		
2009-10 to 2019-20		0	0	0	0	0	0	

Kalabagh RF

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo(in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC Ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Kalabagh "B"	31127	626.431		626.431	3175		
2007-08	Kalabagh "C"	0	0.000		0.000	0		
2008-09	Kalabagh "D"	19033	383.029		383.029	2000		
2009-10	Kalabagh "A"	4370	87.946		87.946	0		
2010-11	Kalabagh "B"	29699	597.692		597.692	0		

2011-12	Kalabagh "C"	0	0.000		0.000	0		
2012-13	Kalabagh "D"	0	0.000		0.000	0		
2013-14	Kalabagh "A"	0	0.000		0.000	0		
2014-15 to 2016-17			0.000		0.000			

Ladapadar PRF

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo(in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Ladapadar "B"	15500	311.938		311.938	0		
2007-08	Ladapadar "C"	33790	680.024		680.024	3000		
2008-09	Ladapadar "D"	8715	175.389		175.389	0		
2009-10	Ladapadar "A"	6070	122.159		122.159	0		
2010-11	Ladapadar "B"	16499	332.042		332.042	0		
2011-12	Ladapadar "C"	2557	51.460		51.460	0		
2012-13 to 2016-17			0.000		0.000			

Ranipathar North RF

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo(in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Ranipathar North "B"	18649	375.311		375.311	1000		
2007-08	Ranipathar North "C"	14010	281.951		281.951	700		
2008-09	Ranipathar North "D"	4708	94.749		94.749	0		
2009-10	Ranipathar North "A"	3500	70.438		70.438	0		
2010-11	Ranipathar North "B"	11070.5	222.794		222.794	950		
2011-12	Ranipathar North "C"	0	0.000		0.000	0		
2012-13	Ranipathar North "D"	0	0.000		0.000	0		

2013-14	Ranipathar North "A"	8250	166.030		166.030			
2014-15 to 2019-20			0.000		0.000			

Ranipathar South

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo (in SU)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Ranipathar South"B"	6055	121.857		121.857	900		
2007-08	Ranipathar South"C"	0	0.000		0.000	0		
2008-09	Ranipathar South"D"	0	0.000		0.000	0		
2009-10	Ranipathar South"D"	3500	70.438		70.438	0		
2010-11 to 2019-20			0.000		0.000			

Sudrukumpa

Year of working	Name of the coupe	No. Of bamboos	Production of bamboo(in su)			Production of commercial bamboo (in nos.)	Royalty paid by OFDC ltd.	Reason for not working
			Salia	Daba	Total			
2006-07	Sudrukumpa "B"	57200	1151.150		1151.150	5052		
2007-08	Sudrukumpa "C"	32677	657.625		657.625	0		
2008-09	Sudrukumpa "D"	30225	608.278		608.278	5000		
2009-10	Sudrukumpa "A"	25569	514.576		514.576	5000		
2010-11	Sudrukumpa "B"	62000.5	1247.760		1247.760	4150		
2011-12	Sudrukumpa "C"	7159	144.075		144.075	0		
2012-13	Sudrukumpa "D"	0	0.000		0.000	3000		
2013-14	Sudrukumpa "A"	0	0.000		0.000	0		
2014-15	Sudrukumpa "B"	0	0.000		0.000	2500		
2015-16 & 2019-20			0.000		0.000			

9.7 Budgetary allocation to the forestry sector

The data on budgetary allocation to the forest sector of Phulbani Forest Division is provided in **Annexure-XI**

9.8 Existence of monitoring, assessment and reporting mechanism:

The control forms has been prescribed for monitoring, assessment and reporting mechanism for all prescription /suggestions under respective working circles to be monitored assessed and reported on annual basis during the period of the Working Plan, Control Forms should be prepared to include each of this prescription.

9.9 Public awareness and education:

Public awareness and education is being organized in Phulbani Forest Division through conduction of Essay Competition, drawing competition during work environment day celebration, work forestry day, wildlife day celebration, Vanamahotsav celebration with the active participation of the local people. The public awareness programmes celebrated during 2010-11 to 2015-16 is furnished in as follows.

Table No.-9.5

Year	Type of the programme	Location	Activities undertaken
2010-11	World Forestry day	Division/District Hqrs	Awards & prizes for outstanding contribution in the field of forest, wildlife and environment.
	World environment day	Division/ Range	Awareness programmes on global warming & climate change
	Vanamahotsava week	Division/ Range	Sit & Draw competition were organized in the school level
	Wildlife week	Division/ Range level	Sit & draw competition were organized in the school level, distribution of prizes & certificates, mobilization of Public regarding wildlife and protection.
2011-12	World Forestry day	Division/District Hqrs	Awards & prizes for outstanding contribution in the field of forest, wildlife and environment.
	World environment day	Division/ Range	Awareness programmes on global warming & climate change
	Vanamahotsava week	Division/ Range	Sit & Draw competition were organized in the school level
	Wildlife week	Division/ Range level	Sit & draw competition were organized in the school level, distribution of prizes & certificates,

			mobilization of Public regarding wildlife and protection.
2012-13	World Forestry day	Division/District Hqrs	Awards & prizes for outstanding contribution in the field of forest, wildlife and environment.
	World environment day	Division/ Range	Awareness programmes on global warming & climate change
	Vanamahotsava week	Division/ Range	Sit & Draw competition were organized in the school level
	Wildlife week	Division/ Range level	Sit & draw competition were organized in the school level, distribution of prizes & certificates, mobilization of Public regarding wildlife and protection.
2013-14	World Forestry day	Division/District Hqrs	Awards & prizes for outstanding contribution in the field of forest, wildlife and environment.
	World environment day	Division/ Range	Awareness programmes on global warming & climate change
	Vanamahotsava week	Division/ Range	Sit & Draw competition were organized in the school level
	Wildlife week	Division/ Range level	Sit & draw competition were organized in the school level, distribution of prizes & certificates, mobilization of Public regarding wildlife and protection.
2014-15	World Forestry day	Division/District Hqrs	Awards & prizes for outstanding contribution in the field of forest, wildlife and environment.
	World environment day	Division/ Range	Awareness programmes on global warming & climate change
	Vanamahotsava week	Division/ Range	Sit & Draw competition were organized in the school level
	Wildlife week	Division/ Range level	Sit & draw competition were organized in the school level, distribution of prizes & certificates, mobilization of Public regarding wildlife and protection.
2015-16	World Forestry day	Division/District Hqrs	Awards & prizes for outstanding contribution in the field of forest, wildlife and environment.
	World environment day	Division/ Range	Awareness programmes on global warming & climate change
	Vanamahotsava week	Division/ Range	Sit & Draw competition were organized in the school level
	Wildlife week	Division/ Range level	Sit & draw competition were organized in the school level, distribution of prizes & certificates, mobilization of Public regarding wildlife and protection.
2016-17	World Forestry day	Division/District Hqrs	Awards & prizes for outstanding contribution in the field of forest, wildlife and environment.
	World environment day	Division/ Range	Awareness programmes on global warming & climate change
	Vanamahotsava week	Division/ Range	Sit & Draw competition were organized in the school level

	Wildlife week	Division/ Range level	Sit & draw competition were organized in the school level, distribution of prizes & certificates, mobilization of Public regarding wildlife and protection.

9.9.1 LIST OF PRAKRUTI MITRA AND PRAKRUTI BANDHU AWARD WINNERS

Table No.-9.6

YEAR	Pakruti Mitra	Prakruti Bandhu
2011	Saraswati Bidyamandir, Balliguda	Sri Sadasiba Patra, Amalapada
	Gandamahul VSS	Sri Kishore Chandra Kanhar, Lambagudri
	Takramal UP School	Sri Prasana Ku. Sahu, Bhrungujodi
	Adivasi Gramya Unayan Samiti	
	Judabali VSS	
	Damigaon Residential Sevashram	
	Pajimaha VSS	
	Tilakabata VSS	
	Jalespata VSS	
	Banaduguda UP School	
	Govt. High School,Dutipada	
	Public School, Phulbani	
2012	Carmel English Medium school, Phulbani	Purna Ch. Mahapatra, Balliguda
	Ranapatuli VSS	Ms. Sunita Pradhan, Chikitabara
	Diabhanja High School, Bandhagda	Sri Ramhari Pradhan, SUdhipada
	Bastingia Ashram School	Sri Goutam Pradhan, Ranapatuli
	Milimon High School, Gudripadi	Sri Satyabhama Kanhar, Biraguda
	Raikhol VSS	Sri Sankar Pattnaik, Raikia
	Katedikia VSS	Sri Debendra Kanhar, Ganjuguda
	UG Govt. High School, SImanbadi	Sri Mahendra Kanhar, Sarapada
	Biraguda UGME School	Sri Sudhir Dehury, Premajhari
	Sarangada Govt. High School	Sri Jadab Pradhan, Burupati
	Badabandha VSS	Sri Debendra Kanhar, Mallickpada
	Durgapanga VSS	Sri Sandhyarani Panigrahi, Sunapalli
2013	Sarapada VSS	Sri Narayan Parida. Simanbadi
	Govt. High School, Khajuripada	Sri Purcna Ch. Nayak, Balliguda
	Govt. High School, Nuapadar	Sri Padmalocshan Mohanty, K.Nuagaon

	Gopingia High School, Gopingia	Sri Ajay Ku Sahoo, Tumudibandha
	Aresmin Janta High School, Gresingia	Sri Meher Pradhan, Ora
	Gurukul Sanskiri Vidyalaya, Chakapad	
	Balumaha VSS	
	Ashakiran High School, Tillory	
	Nuasahi Primary School, Baliguda	
	Govt. High School, K.Nuagaon	
	Govt. Girl's High School, Jalespata	
	Govt. High School, Kotagada	
2014	Govt. High School, Badagaon	Sri Santosh Kumar Rath
	Majyapada VSS	Sri Krutibash Kanhar
	UG Govt. High School, Badapada	Sri Bijaya Nayak
	Bariguda VSS	Sri Baxi Pradhan
	Govt. Girl's High School, Duryaganda	Sri Babula Kanhar
	Govt. High School, Phiringia	Sri Pitabash Padhi
	Slukimaha Project UP School	Sri Prasanta Kumar Mahapatra
	Arapadi VSS	Sri Prabina Kumar Mohanty
	Kurtipada UP School	Sri Shyam Sundar Sahoo
	Badaketa Project UP School	Smt. Jayanti Khuntia
	Lambagudri VSS	
	Biraguda VSS	
2015	Project UP School, Baliguda	Sri Mahendra Mallick
	Barada Balunkeswar High School, Linepada	Sri Bikram Bihari Behera
	Rapdabadi N.U.P School	Sri Subash Chandra Nayak
	Panchayat High School	Sri Manoranjan Padhi
	Govt. Girls High School, Nedipadar, Phiringia	Smt. Krishna Mohanty
	Sugadabadi High School, Sugadabadi	Sri Parsuram Nayak
	Upper Primary School, Banangia	Sri Rabindra Rath
	Govt. Girls High School, Kudutuli	Sri Ganesh Pradhan
	Sitagudri VSS	Sri Samsen Mallick
	Patharkandi VSS	Dr. Akshya Ku.Pandha
2016	Govt. High School, Tikabali	Sri Ramesh Chandra Kanhar, Benabali
	Sevashram Sanskrit Vidyapith, Phulbani	Ms. Susmita Jena, Paburia
2017	Govt. Girls High School, Dutipada	Sri Sradharinda Pattnaik
	Dist. Disability Rehabilitation, Phulbani	Sri Ajit Ku. Mahapatra

		Sri Gadadhar Nishank
2018	Govt. UP Grade High School, Nediguda	Sri Bhikari Mallick, Ranaba GP
2019	B.G.T High Schoo, Rudangia, Tikabali	Sri Bidyadhar Khatua, Phulbani
	PAHAD (NGO), Sudrukumpa, Khajuripada	Sri Bhimsen Mallick, Phiringia
	Santinagar VSS, Phiringia	Sri Suraprasad Nayak, Khajuripada
	Govt. UP School, Lujuramunda	
	Govt. UG High School, Sasimaha, K.Nuagaon	
	Jagruti(NGO), Daringibadi	
2020	Samaita Janakalyan Yubak Sangh, K.Nuagaon	Sri Situprakash Rath, K.Nuagaon
		Sri Bidyadhar Kanhar, Khajuripada

9.9.2 Eco-Clubs

To create environmental awareness among students, more than350 Nos. of Eco-clubs have been constituted in the Education institutes. Rs.5000/- is granted annually to each institutes to conduct environmental awareness programmes.

9.10.Adequate manpower in Forest Division

The Sanctioned strength of Phulbani Forest Division under various posts, vacancy position for the year 2020-21.

Sanction strength of Phulbani Division for the year 2020-21.

Post Name	Sanction strength	Men in position	Vacancy	Remarks
DFO, Territorial	1	1	0	
ACF (Admin, Plan Prog. & Eco-Tourism)	1	1	0	The Cadre strength of ACF has been restructured vide resolution No. 6958 / F&E dated. 06.04.2017 of the Govt. of Odisha, F&E Deptt.
ACF(Affn, Farm Forestry & Communication)	1	1	0	
ACF (Enf. & Crime Control)	1	0	1	
FR(Range)	7	5	2	
Dy.Ranger for spl striking force	1	1	0	
Dy.Ranger for vulnerable Range as Second Officer	7	4	3	

Forester	40	40	0	
FG(Beat)	75	66	9	
FG(Ch)	16	2	14	
FG(Enf/Affn)	7	0	7	
FG (Total)	98	68	30	
Head Clerk	1	1	0	
Jr.Accountant	7	5	2	
Jr.Clerk	9	6	3	
Jr.Steno	1	1	0	
Driver(LV)	2	2	0	
Dak Runner	1	1	0	
Office Choukidar	1	1	0	
Chainman	1	1	0	
Amin	1	0	1	
TOTAL	**181**	**137**	**44**	

The Present staff strength is quite inadequate. It is suggested that the vacancy of the staff position should be filled up quickly with a view to smooth management of different schemes being implemented in Phulbani Forest Division and to strengthen the protection activities.

CHAPTER-X

FIVE YEAR PLANS

10.1 General Trends in Forestry investment.

Starting from the First Five Year Plan in 1951 right up to the Eighth Five Year Plan which ended in 1996-97, Rs.85 billion have been spent on plan activities of "Forestry development". During this period afforestation has been carried out over an area of 26.90 million hectares approximately. Financial allocation to the forestry sector has increased from Rs.76 million in the First Five Year Plan to Rs.40, 818 million in the Eight Five Year Plan. It has always been less than 1% of the total plan outlay of the country.

A provision of Rs.68 million has been made for the Ninth Five Year Plan. During 1997-98 of the Ninth Plan, afforestation of 1.48 million hectares has been done which includes the distribution of 10033 million seedlings (making 0.516 million hectares on the basis of 2000 seedlings per hectare). Thus up to 1997-98 total afforestation is 28.38 million hectares which includes a national target of 4.65 million hectares (equivalent of 9309 million seedlings distributed among the people).

Average Annual Plan Outlay for forestry sector during the 8^{th} Five Year Plan was about Rs.8.16 billion whereas during the same period the estimated annual withdrawals from the forests were worth Rs.300 billion which is about 36 times more than the planned investment.

The Five Year Plans/Annual Plans had specified objectives and programmes; the main activity under most of these plans was tree planting (afforestation).

The basic considerations for formulation of programmes for development of forests are outlined as follows:

1. Strengthening the forest administration, where large territories have been merged or private forests have been transferred to public ownership as a result of abolition of Zamindary and Jagirdary.
2. Renovation of areas, which were over-exploited to meet World War requirements.
3. Afforestation where large-scale soil erosion had occurred.
4. Development of forest communications.
5. Development of village plantations to ease the fuel supply position and,

6. Stepping up supplies of timber by increased use of non-conventional species after proper seasoning and treatment by chemical methods and therefore, increasing the number of seasoning kilns and treatment units.

A synopsis of the development programmes in different Five Year Plans is furnished as follows:-

10.1.1First and Second Five Year Plans:-

(a). Rehabilitation of Degraded Forests.
(b). Introduction of Economic Species.
(c). Survey and Demarcation of Forests.

10.1.2Third and Fourth Five Year Plans:

(a). Increasing productivity of forests through the plantation of fast (quick) growing species.
(b). Scientific assessment of Forest Resources and,
(c). Modern logging (with technical assistance of FAO)

10.1.3Fifth Five Year Plan:

(a). Large scale plantations.
(b). Social Forestry plantations with the assistance of SIDA(Swedish International Development Agency) and
(c). Forest Conservation.

10.1.4Sixth Five Year Plan:

(a). Social forestry project plantations and,
(b). Fuel wood reserves to protect natural forests.

10.1.5Seventh Five Year Plan:

(a). Forest Conservation.
(b). Massive afforestation.
(c). Wasteland development.

10.1.6Eighth and Ninth Five Year Plan:

(a). Preservation of Biological & Genetic diversity.
(b). Protection of forests against biotic interference.
(c). Utilization of waste lands and ,
(d). Promotion of people's participation through J.F.M.

10.1.7Tenth Five year plan:

(a). To bring one third of the geographical area under forest cover.

(b). Adoption of watershed approach.

(c). Considering needs of the people for successful conservation of forest eco-system.

(d). Regeneration of the degraded forests through J.F.M approach.

(e). Reduction of import of round timber for paper and pulp.

(f). "Greening" programmes through "Food for Work" scheme.

(g). Conservation and management of natural forests to reduce "Green house gas emissions".

(h). Culture, conservation and protection of medicinal plants.

(i). Plantation of Jatropha&Karanj (*Pongamiapinnata*) as "Bio-Diesel" to boost up livelihood opportunities of the rural people and,

(j). Merger of all afforestation programmes under the banner of "National Afforestation Programme".

Based on the priorities mentioned, the state plans provided for the following expenditure in addition to Rs.2crore for central schemes.

Heads of Development	Rupees in Lakh
1. Forest development	621.3
2. Administration	249.4
3. Forest based Industries	49.5
4. Education and Training	39.3
5. Research	10.0
Total	**969.5**

Forest development schemes include provision for the management and development of private forests and the wastelands vesting in State Governments, besides Rs.39.0lakh for soil conservation, Rs.29.0lakh for village plantations and Rs.104.0lakh for development of communications.

A further lump sum provision of Rs.2crore has been made in the plan for soil conservation. The agriculture programme also includes some schemes of soil conservation to implement the Five Year Plan.

First Five Year Plan for Orissa was formulated in the year 1955-56 with allocation of 35crore. National Development Council sanctioned only 17.84crore in the month of November-1952. Revised Five Year Plan for Orissa stipulated Rs.19.106crore.

10.21st Five Year Plan in Forestry Sector (1951-52 to 1955-56)-Rs.17.23lakh.

1. Education and training.
2. Forest development.
   (a). Forest roads- 457miles, Rs. 5.90lakh. Achievement -453miles.
   (b). Construction of 144nos. of buildings. Digging of 026nos.of wells.
   (c). Forest conservation & boundary maintenance -5306miles-Rs.1.46
   (d). Raising of plantation-1301 acres–Rs.1.05lakh.
   (e). Soil conservation measures in Sambalpur, Sundargarh, Kalahandi&Kheonjhar.
   (f). Plantation in New Capital. Casuarina, Mahogany, Poolang&Putranjiba (Chiraunjee).

10.3.2nd Five Year Plan in Forestry Sector (1956-57 to 1960-61)

1. Softwood plantation. --------Rs. 1.60lakh.
2. Creation of National Park---Rs. 6.00lakh.
   Creation of sanctuary----------Rs.1.00lakh.
3. Construction of building-----Rs.4.75lakh.
4. Training of ACFs, FRs, Foresters& FGs---Rs.10.93lakh.
5. Communication (Roads) -----Rs. 17.56lakh.
6. Teak plantation ---------- Rs.05.71lakh.
7. Sabai grass &khair plantation-Rs.01.15lakh.
8. Demarcation of forests----------Rs.02.36lakh.
9. Development of Ex-Zamidary forestry—Rs.11.54lakh.

Soil conservation measures --------Rs. 57.04lakh.

Total of forestry and soil conservation = **106.805lakh**.

10.4 3rd Five Year Plan in Forestry Sector (1961-62 to 1965-66):

Objectives: - To achieve high potential, laying emphasis on

1. Survey of forest resources.
2. Demarcation of more forest areas.

3. Plantation of fast growing species.
4. Development of commercially important forestry.
5. Improved methods of logging.
6. Farm forestry.
7. Afforestation & enrichment of depleted forestry.
8. Provision of better communication facility.
9. Protection of Wild Life.
10. Scientific exploitation of forest resources through improved logging systems.
11. Formation of forest labour co-operative societies to produce skilled labourers for improved logging.

Abstract of outlay during the 3rd Five Year Plan (1961-62 to 1965-66)

Table No.-10.1		
Sl.No.	**Particulars of the Scheme**	**Total outlay**
1.	Economic Plantation	69.79
2.	Rehabilitation of Degraded forests	18.09
3.	Forest survey	0.44
4.	Consolidation	4.48
5.	Forest publicity	0.98
6.	Forest resources survey	0.81
7.	Forest protection	0.81
8.	M.F.P (NTFP)	1.03
9.	Communication	24.40
10.	Building	18.76
11.	Preservation of wild life	13.00
12.	Training of staff	8.34
13.	Departmental working of coupe	__
14.	Creation of afforestation circle	1.07
15.	Forest Development Corporation	72.31
Total forest state plan		**234.31(State Plan)**
	CENTRAL SECTOR	
1.	Plantation of fast (quick) growing species	26.29(Centrally sponsored scheme)
GRAND TOTAL OF FORESTRY SECTOR		**260.60Lakh.**

10.5Annual Plan Period: (1966-67 to 1968-69)

There were deviations in the schedule due to Chinese aggression and Indo-Pak war, which took place in 1962 and 1965 respectively. These two war fares shatterred the economy of the country. This lead to the formulation of annual plans for 3 years i.e. from 1996-67 to 1968-69.

During these three annual plan years, importance was given to raise.

i. Plantations of fast growing species.
ii. Mechanised plantations as in the case of Tarai&Bhabar areas of Uttar Pradesh (now in Uttaranchal) and,
iii. Improved logging techniques with the assistance of F.A.O (Food and Agriculture Organization)-United Nation's Special Fund.

10.6 <u>The 4th Five Year Plan (1969-74)</u>:

It was proposed to make an investment of Rs.3.25crore for Orissa during the 4th Plan.

(a). The main objective of this plan was to create forests of economic value in order to increase the potential productivity of those forests, which were covered with miscellaneous species. The species raised were Teak, Semul, Sissoo, Khair, Gamhar, Kurum, Eucalyptus, Bamboo, Casuarina& Pines over an area of 4192 acres.

(b). To increase the production of forest wealth and enable the state in achieving higher returns on investment in forestry sector.

The target was 75,000 acres for economic plantations and fast growing species. The total area under the fast growing species and economic plantations taken together was about 19,957 acres.

(c). To boost rural economy through the implementation of

i. Farm forestry. (Plantation of fuel wood & small timber)
ii. Development of pasture and grazing lands.
iii. Cultivation of Coffee, Cardamom, Pepper and Cocoa through forest research.
iv. Planting of medicinal plants.
v. Development of Lac cultivation.
vi. Raising of Tussar plantations.

(d). Other activities undertaken during the 4th Five Year Plan are:

i. Rehabilitation of degraded forests.
ii. Preparation of Working Plan (4 nos.) & Working Scheme (4 nos.).
iii. Nature Conservation: National Park at Similipal, BotanicalPark at Nandankanan and Sanctuaries in different Forest divisions.
iv. Conducting Forest research: Establishment of soil laboratory at Angul.
v. Communication: Construction & improvement of Forest roads.

vi. Prevention of Podu cultivation (Shifting cultivation).

vii. Training of ACFs, FRs, Foresters, & FGs.

viii. To conduct Forest Resources Survey through centrally sponsored schemes during the year 1969-70- to survey 400sq-miles of forest areas during the 4th plan.

ix. Extension work of package programme for Lac under Centrally sponsored scheme.

Table No.-10.2 SCHEME WISE EXPENDITURE INCURRED ON DIFFERENT FORESTRY SCHEME IN INDIA

Sl. No.	Scheme	1st Plan 1951-56	2nd Plan 1956-61	3rd Plan 1961-66	Annual Plan 1966-69	Total 1951-69	Fourth Plan 1969-74
I	**State Scheme & Centrally sponsored scheme-**						
1.	Economic Plantation for industrial & commercial uses	111.91	486.88	1163.16	934.01	2695.96	2014.99
2.	Rehabilitation of degraded forests	16.42	199.23	380.58	229.84	826.07	322.17
3.	Farm forestry-cum-fuel wood plantations			109.54	151.93	261.47	361.25
4.	Development of minor forest products			151.74	148.09	299.83	107.44
5.	Communications	42.27	247.65	555.98	335.50	1181.40	553.01
6.	Consolidation of forests (including survey and demarcation)	14.63	61.83	199.30	194.19	469.95	367.75
7.	Development of pastures and grazing			52.93	47.13	100.06	77.82
8.	Nature of conservation		99.52	175.07	125.32	399.91	445.32
9.	Training of staff	41.75	74.00	178.43	136.49	430.67	147.83
10.	Timber operations			285.77	246.97	532.74	554.19

11.	Forest protection			107.03	62.79	169.82	115.25
12.	Working Plan organization			121.55	100.90	222.45	132.91
13.	Forest Research			25.61	46.64	72.25	156.27
14.	Publicity			14.03	13.44	27.47	47.41
15.	Establishment of statistical cell and planning cell				13.55	13.55	38.63
16.	Construction of building	43.97	115.27	247.40	149.94	556.58	4.5.99
17.	Amenities to staff and labour			48.05	14.63	62.68	31.10
18.	Intensification of management				20.57	20.57	29.43
19.	Cultural operation				42.89	42.89	71.33
20.	Plantation of quick growing species			406.48	939.45	1345.93	1685.59
21.	Forest resources survey			32.11	34.47	66.58	101.92
22.	Miscellaneous schemes	478.83	738.28	248.54	95.47	1561.12	821.79
II	**Central Schemes-**						
1.	Forest Research Institude& Collages		41.85	17.39	27.45	86.69	101.29
2.	Delhi zoological park		56.20	34.67	6.43	97.30	22.75
3.	Pre investment survey of forest resources			8.17	71.54	79.71	143.14
4.	Logging training project			3.06	16.19	19.25	35.44
5.	Scheme-wise details not	100.00				100.00	6.85

	available						
	Total	**849.78**	**2120.71**	**4566.59**	**4205.82**	**11742.90**	**8898.86**
Source: Report of the National Commission on Agriculture, 1976, part IX, Forestry							

10.6.1 Review of progress up to the end of the 4th Five Year Plan:

The original ceiling on expenditure in the 4th Plan was Rs.3.25crore while the final figure was about 4.0crore.

By the end of the 4th Plan, the total area likely to be covered by plantation under all schemes was about 2,57000acres or about 400sq.miles.

About 14,500sq.miles of forests were to be completely demarcated and surveyed by way of "Forest Consolidation".

At the end of the 4th plan, about 5500sq.miles of forests were to be demarcated and surveyed and brought under scientific management. Taking the unit of 1 Mile of forest road for each sq.mile of forest is to be assumed by the end of the 4th Plan there would be about 7000Kms.of the forest roads with a balance of 9000Kms. of the forest roads yet to be constructed.

Under "Nature Conservation" the activities were almost confined to the development of zoological park at Nandankanan..

Thus, there were 8 Sanctuaries, a proposed National Park in Similipal and one Biological park.

Table No.-10.3 Plan out lay (Scheme wise) Rupees in Lakh (for 4th Five Year Plan) (Orissa figure)

Sl.No.	Name of the Scheme	4th Plan outlay 1969 to 1974
1.	Training of F.Gs in M.F.GSchool	14.88
2.	Training of ACFs & F.Rs	
3.	Creation of second forester school	
4.	Communication (Staff)	05.00
5.	Forest development- Consolidation	10.22

6.	Working Plans	16.10
7.	Intensification & Forest management	15.77
8.	Nature conservation	21.58
9.	Establishment of planning cell	02.77
10.	Rehabilitation of degraded forests	24.99
11.	Development of MinorForest Produce	07.71
12.	Forest Publicity	01.15
13.	Forest Protection	11.22
14.	Plantation of Quick Growing Species.	76.25
15.	Forest Research	05.36
16.	Farm Forestry	07.25
17.	Purchase of Shares in O.F.C. Ltd.	10.00 (Not originally included in plantation)
18.	Podu prevention (Shifting cultivation)	01.00 (Not originally included in plantation)
18(A).	Training in Silviculture	00.20 (Not originally included in plantation)
19.	Communication (Works)	13.56
20.	Construction of building	09.30
21.	Economic plantation	74.29
CENTRALLY SPONSORED SCHEME		
40.	Forest Resource Survey	04.45 in First 3 years
41.	Extension Work and package Programme of Lac.	00.27 in First 3 years

Despite all sincere efforts at the National level, implementation of the plan activities were impeded due to 2nd Indo-Pak War in 1971. Similarly, on 29th October, 1971 there was a devastating cyclone in Orissa. This can be ascertained

from the following: National growth rate was 5.60% in 1969-70; 5.10% in 1970-71 and only 0.6% in 1971-72.

In spite of the aboveset backs, there had been some achievements in forestry sector during the 4th Five Year Plan (1969 to 1974) viz: Enactment of Wild Life (protection) Act 1972, and implementation of Project Tiger in 1973. The above two achievements are based on the relentless and untiring efforts of **PadmashreeSaroj Raj Chowdhury I.F.S (Orissa Cadre) who bid adieu to this world in May 1982 as Field Director, STR, Baripada**.

10.7 Target & Strategy for the 5th Five Year Plan (1974-79):

The main areas of development in the field of Forestry are depicted below:-

(i). Consolidation and scientific management.

(ii). Afforestation on barren lands & enrichment of existing forests of low value with the help of economic and valuable species, wherever necessary.

(iii). Intensification of management.

(iv). Development of communication in the forests.

(v). Conservation of nature and wild life for scientific study of the Flora & Fauna.

(vi). Implementation of social forestry program at National level with the help of external assistance in forestry sector.

(vii). Plantation of Fuel wood and small timber through farm forestry measures to boost rural economy and cater to the needs of rural populace.

(viii). Establishment of state owned Forest Corporations/Forest Development Corporations to ensure scientific and improved logging techniques by imparting training to the forest labourers for attaining utmost out-turn from matured forest crop and thus, promote forest based industries.

(ix). Creation of coastal afforestation circle, as well as planning and evaluation circle in the state of Orissa to monitor the progress of economically viable spp. along with other categories of plantations.

(x). Creation of forest genetics division in the state of Orissa, under forest research and compilation of "The Flora of Orissa" keeping in view the useful medicinal plants available in the state.

10.8 Annual Plan 1979-80:

This was oriented to implement the continuance of the planning programme through annual action plan in forestry sector under the category of forest & wild life plan.

10.9 Sixth Five Year Plan (1980 to 1985):

Target & strategies of the sixth Five Year Plan are as follows.

(i). Rational land use survey.
(ii). Creation of Water and Land Management Institute (WALMI) at the State level in Orissa.
(iii). Preservation of Bio-diversity for scientific management of Eco-Systems and for sustainable utilisation of the resources (especially Forest Resources in forestry sector). E.g. Similipal Biosphere Reserve/ creation of Chilika Wild Life Division in March 1984.
(iv). Maintenance of balance of the Eco-System for healthy survival and economic development of the people.
(v). Constitution of Biosphere Reserve as a national consensus.

10.10 Seventh Five Year Plan (1985 to 1990):

The objectives of the 7^{th} Five Year Plan are as follows:

(i). Environmental management to combat environmental degradation.
(ii). Implementation of Eco-Development programme through land reclamation, afforestation and improvement of the water bodies for healthy living of aquatic Flora & Fauna.
(iii). Implementation of research & training through Botanical survey of India and Zoological survey of India on Micro-organisms, e.g. Fungi, Bacteria, and Invertebrates (Special case of leech in treatment of animal and human diseases and so on and so forth).

(iv). Convening seminars on Man & Biosphere programmes and constitution of Biosphere reserves all over the country under the guidance of Department of Environment, Government of India.

(v). Restoration of degraded Eco-System through Eco-Development Programme (A special reference to Chilka Lagoon, a Ramsar site)

10.10.1 Review of the 7th Five Year Plan (1985-1990):

(i). Constitution of seven Biosphere reserves for preservation of Bio- diversity in the country.

(ii). Execution of Eco-Restoration programmes in fragile Eco-systems.

(iii). Breeding of plants and commercial utility of medicinal plants through Department/N.G.O, Nurseries and Regional plant resource centers through the process of Tissue Culture.

(iv). Convening the Environment awareness programme through the district environment society and the concerned territorial, social forestry and afforestation divisions having jurisdiction over their respective areas. All over the country, more than 200 N.G.Os have started functioning to augment the Environment awareness programme.

Table No.- 10.4 Progress of Afforestation through successive Plan periods

Sl. No.	Five Year Plan Period	Area afforested in plan period (lakh Ha.)	Cumulative (in lakh)
1.	First	0.52	0.52
2.	Second	3.11	3.63
3.	Third	5.83	9.46
4.	1966-69	4.53	13.99
5.	Fourth	7.14	21.13
6.	Fifth	12.21	33.34
7.	1979-80	2.22	35.56
8.	Sixth	46.50	82.06
9.	Seventh	88.70	170.76

10.10.2 Enunciation of Forest & Wild Life Policy:

(i). An amendment was made during 1988 on " The Forest Conservation Act 1980" in order to promote appropriate and strict implementation of the Act.

(ii). To ensure "Environmental stability" and "Maintenance of Ecological balance". A "National Forest Policy" was formulated in December 1988.

(iii). Implementation of the 10 point National Wild Life Action Plan:
This was based on the Bio-geographic classification system prepared by the Wild-life institute of India, Dehra Dun.

10.10.3 Execution of Afforestation Programme:

(i). During the 7th Five Year Plan, a large tract of land was brought under afforestation programme viz, Block Plantations, Strip Plantations along canal banks, Railway lines and Avenue Plantations along the roads (National highways, Main District roads.).

(ii). Farm forestry programmes in the village limits.

(iii). Plantation with external assistance viz. SIDA, World Bank, OECF, Japan D.F.ID, EEC, UNDP, &Germany.

(iv). Social forestry project plantations were taken up from the year 1981-82. The scheme was design to be executed with the participation of the people with the following objectives

(a). Establishment of decentralised people's nurseries and school nurseries.

(b). Block plantations (in small patches) on community lands and lands of the members of SCs/STs as well as of the people living below the poverty line.

(c). Silvo-pastoral plantations through people's institution and involvement.

(d). Rendering assistance in the implementation of the "Tree patta scheme".

Execution of N.R.E.P & R.LE.G.P schemes carried out with the financial assistance of the Department of Rural Development, Government of India.

10.11.Annual Plan 1990-91 and 1991-92:

During the intervening period, two annual plans i.e. 1990-91and 1991-92 were implemented.

Financial and Physical progresses made are as follows: -

Year	***Outlay***	***Expenditure***
1990-91	2623.40	2357.59
1991-92	2646.00	2646.00

Table No.-10.5						
Target				**Achievement**		
Year	**Plantation**	**RDF**	**Seedling distribution**	**Plantation**	**RDF**	**Seedling distribution**
1990-91	28915Ha	1300Ha	210.05Lakh Nos.	30,986.7Ha	1300Ha	194.121Lakh Nos.
1991-92	20595Ha	07255 Ha.	284.05Lakh Nos.	20595Ha	07255 Ha.	284.05Lakh Nos.

10.12 Eighth Five Year Plan

10.12.1 Environment and Forests:

10.12.1.1 General Enunciation:

Destruction and degradation of forests take a heavy toll of our soil and water resources. Top soil with essential plant nutrients flow into the sea every year and over all degradation of nature makes our resources less productive and vulnerable. This leads to impoverishment of the rural population.

Water resources and the air in our country continue to be polluted. The polluted water and air affect human and animal health. Unplanned urban civilisation and industrialisation further add to the levels of pollution.

Environmental degradation threatens socio-economic progress of the country. This leads to the damage of "Life-Support System" beyond repair. The poverty and under development of the people force them to live in squalor. This brings in further degradation of their environment. Removal of poverty, generation of employment, raising the levels of education and increasing the awareness of the people are crucial parameters for protecting environment and need judicious management.

10.12.1.2The major thrust of the Eighth Plan (1992-97) are as follows*:-*

1). To protect the natural environment.
2). To regenerate and restore degraded ecosystems and increase their productivity and to generate employment through these activities.

3). To decentralize control over nature and natural resources.
4). To develop and share an understanding of nature and natural processes.
5). To formulate a national policy for environment and an appropriate institutional and legal frame work in support of the policy.
6). To ensure coordinated and integrated Governmental action aimed at conserving nature and sustainable use of natural resources.
7). To make individuals and institutions more accountable to the people for their actions with impact on environment and ecosystem, and
8). To monitor the state of environment.

The above-mentioned objectives are not independent of each other. They are complementary and sometimes inter-dependent on each other. Greater effort is essential to reverse the trend of degradation of environment.

10.12.1.3The Eighth Five Year Plan (1992-97):

The objectives of the Eighth Five Year Plan are depicted as follows:-

(i) To preserve natural forests through intensified protection measures as well as people's participation under suitable model of "Usufructs-distribution".
(ii) To lunch a massive farm forestry programme for promoting private forests capitalizing on the enthusiasm already generated among the public through "Extension-measures".
(iii) To rejuvenate the degraded forests through "Social Fencing".
(iv) To bring about a qualitative change in the plantations by the use of "certified quality seeds".
(v) To develop a strong research base to support the various forestry programmes.
(vi) To upgrade the capacity of the forest department in the field of evaluation, monitoring and remote sensing applications for a quick inventory preparation.
(vii) To involve the "village communities" and the "Voluntary agencies" for regeneration of degraded forest lands.
(viii) Protection and conservation of Wild Life.

Table No.-10.6 Financial outlay (State sector) for the Eighth plan and the annual plan for 1992-93 is furnished as follows			
Sl.No.	**Minor Head of Department**	**Outlay proposed for 1992-1997 (Rs in Lakhs)**	**Outlay proposed for 1992-1993 (Rs in Lakhs)**
1.	Direction and Administration	11,53.00	166.20
2.	Survey and Utilisation of Forest	5.0	1.0
3.	Statistics	76.00	12.30
4.	Communication and Building	290.00	50.00
5.	Assistance to public sector & other undertakings	442.00	75.00
6.	Forest Conservation and Development.	796.00	141.50
7.	Social and Farm Forestry.	1,32,19.00	2,348.00
8.	Extension and training	260.00	55.00
9.	Wild-life preservation.	542.00	94.00
10.	Zoological parks.	323.00	58.00
11.	Agricultural research and education, Forest research	226.00	42.00
	Total	**1,73,32.00**	**3,043.00**

10.12.1.4 Outlay for Central Sector Scheme:

An outlay of Rs. 8689.79 lakh and Rs. 1741.25 lakh are also proposed under central sector for execution of central and centrally sponsored plan schemes during the eighth plan (1992-97) and annual plan 1992-93 respecively. Scheme wise break-up is given in the table below:

TABLE

Outlay proposed under Central/Centrally Sponsored Plan Scheme during 8th plan (1992-97 and Annual Plan (1992-93)

I.CENTRAL PLAN-(100%)

(Rupees in Lakhs)

S.No.	Name of the Scheme	Proposed outlay8th Plan-1992-97	Proposed OutlayAnnual Plan-1992-93
1.	Afforestation & Soil Conservation in the Catchment Areas of Rengali, Mandira&Machkund projects (RVP)	600.00	120.00
2.	Decetralised People's Nursery	500.00	100.00
3.	NTFP Plantations including Medicinal Plants	500.00	100.00
4.	Seed Development Programme	134.43	22.62
5.	Integrated Wasteland Development Programme	1,370.00	300.00

6.	Creation of Protection Force & Reorganization of State Forest Department	832.66	126.25
7.	Aerial Seeding	40.00	10.00
8.	Zoo Authority, India	50.00	10.00
9.	Elephant Management	2,411.58	503.39
10.	Control of Poaching & Illegal trade in Tiger Reserve	71.12	17.99
11.	Eco-Development Project	308.00	92.00
	Total	**6,817.79**	**1,402.25**

II. CENTRALLY SPONSORED PLAN (50:50 BASIS)

Sl.No.	Scheme	Proposed Outlay Central Share 8th Plan 1992-97	Proposed Outlay Central Share Annual Plan 1992-93
1.	Protection against Biotic Interference	100.00	20.00
2.	Area Oriented Fuel wood & Fodder project (Rural Fuel Wood)	1,274.00	225.00
3.	Control of Poaching	73.00	13.00
4.	Nature Conservation	50.00	10.00
5.	Similipal Tiger Reserve	150.00	26.00
6.	ModernForest Fire Control Method	225.00	45.00
7.	Total Central Sponsored Programme→	1,872.00	339.00

GRAND TOTAL OF I &II → **8,689.79** **1,741.25**

PHYSICAL TARGET:

With the investment of the above outlays, it was proposed to achieve the physical targets under various Plan Schemes as indicated below:

Table No.10.7

S.No.	ITEMS/UNITS	Target for 8th Plan (1992-97)	Target for Annual Plan (1992-93)
1.	Plantations (Hectares)	131,150	25,850
2.	Rehabilitation of Degraded Forests (Hectares)	30,000	5,000
3.	Seedlings Distribution (Lakh Nos.)	20,00.25	3,00.05

10.12.1.5Review of the 8th Five Year Plan:

It is ascertained from the average annual plan outlay in forestry sector during the Eighth Five Year Plan that the estimated annual withdrawals from the forests were 36 times more than the planned investment.

Other assessments reveal that forestry in India had continuously suffered losses due to deforestation and degradation of forests being in excess of the investment in resources-creation and enhancement.

To obtain positive net investment and to turn towards sustainable development, it is imperative that the gross investment is made higher than the disinvestment. This calls for intensive efforts along with innovative and efficient measures for mobilisation of funds from all potential sources, viz; public, private, domestic and external.

10.12.1.6Preservation of Biological and Genetic Diversity (Bio-diversity):

The scheme on conservation of Bio-diversity was initiated in the year 1991-92. This was designed to ensure co-ordination amongst the executing agencies working on the conservation of biological diversity.

The scheme provided stipulations on review, monitoring and evolution of adequate policy instruments for the same. 168 countries including India signed the convention on biological diversity. India had ratified the convention held at Rio-de-Janeiro.

10.12.1.7Implementation of Laws on Pollution control regarding Water & Air:

Central & State pollution control boards are implementing laws on pollution control, for rendering effective protection of the environment. The water (prevention and control of pollution) Act 1974 amended in 1988 and the Air (prevention and control of pollution) Act 1981 has been amended in 1987 for effective implementation of certain provisions of Acts along with the provisions of the environment (protection) Act 1986.

10.12.1.7Modern Forest Fire control Methods:

With financial assistance from the United Nations Development Programme (UNDP), the scheme was launched during the 7th Five Year Plan so as to effectively combat forest fires that takes a heavy toll of our forests, including the flora & the fauna. This was first launched in Uttar Pradesh and Maharastra. Subsequently, it was extended to over 13 states of our country during the 8th Five Year Plan. In total, 26 divisions of the state of Orissa shall be covered with an estimated cost of Rs.450.0lakh during the 8th Five Year Plan. The state share is Rs.225.0lakh. and Rs.45.0lakh has been proposed for the annual plan, 1992-93.

10.13 NINETH FIVE YEAR PLAN

10.13.1 STRATEGY OF THE 9TH FIVE YEAR PLAN

10.13.1.1The objectives of the 9th plan are depicted below:

1. Empowering the people through information generation, dissemination and access.
2. Involving the industry, in both private and public sectors.
3. Integrating environment with decision making through valuation of environmental impacts; evolving market based economic instruments as an alternative to the command and control form of environmental regulation; appropriate pricing of term marginal cost of supply; appropriate fiscal reforms and natural resource accounting.
4. Evolving the rights for common property resources.
5. Inter-sectoral coordination and cooperation.
6. Ensuring scientific and technological inputs.
7. Participation of people (particularly women) in the management and sharing of usufructs through joint forest management (JFM).
8. Involvement of N.G.O.s for awareness building and as an interface between forest department and the people. This process would be encouraged during the Ninth Five Year Plan.
9. Integrated development of villages in and around forests.

10.13.1.2Review of the Ninth Five Year Plan:

Emphasis has been given for the implementation of the following programmes during the 9th Five Year Plan.

(i). Integrated Afforestation and Eco-development Projects Scheme (IAEPS).

(ii). Fuel wood and fodder project scheme.

(iii). Non-Timber forest produce scheme (NTFP).

(iv). Grant-in-Aid scheme.

(v). Seed development scheme and

(vi). Scheme of Aerial Seeding.

Table No.-10.8 INVESTMENT OF FORESTRY SECTOR

Plan/Year	Total Plan		Agriculture Plan		Forest and Wildlife Plan		Forest Outlay
	Outlay	Actual	Outlay	Actual	Outlay	Actual	(% of total)
First Plan (1951-1956)	23780	19600	3540	2900	76	85	0.32
Second Plan (1956-1961)	45000	46720	5100	5490	212	212	0.47
Third Plan (1961-1966)	75000	8577	10860	10890	458	459	0.61
Annual Plan (1966-1969)	66250	66225	10370	11070	419	421	0.63
Fourth Plan (1969-1974)	159020	157790	27280	23200	894	938	0.56
Fifth Plan (1974-1979)	393220	394260	47660	48650	2088	2088	0.53
Annual Plan (1979-1980)	126010	121760	18150	19960	683	683	0.54
Sixth Plan (1980-1985)	975000	1092920	125390	152010	6924	NA	0.71
Seventh Plan (1985-1990)	1800000	2187300	222330	315090	18519	19759	1.09
Annual Plan (1990-1991)	647170	583690	91420	85420	6299	5764	0.97
Annual Plan (1991-1992)	723170	647500	100580	90600	7831	7153	1.08
Eighth Plan (1992-1997)	4341000	-	636420	-	40820	39930	0.94
Ninth Plan (1997-2002)	-	-	-	-	68228		
Total up to 8th FYP	**9374620**		**1299100**		**85295**		**0. 90**

Source: Developing Wastelands, Ministry of Environment and forests.

10.14 TENTH FIVE-YEAR PLAN (National Plan)

10.14.1 FORESTS AND ENVIRONMENT

10.14.1.1 General Enunciation:-

Forests play an important role in environmental and economic sustainability. Forests promote the "Life-Support Systems" essential for life on the earth.

The important features of "Life Support Systems" bearing influence on economy and environment are mentioned as follows:-

(i). Supply of timber, fuel wood, fodder and a wide range of non-timber forest produce (NTFP).

(ii). Natural habitat for Bio-Diversity and repository of "Genetic wealth".

(iii). Provision of recreation and opportunity for "Eco-Tourism".

(iv). Playing an integral part of the watershed to regulate the water regime, conserve soil and control floods and

(v). Carbon-Sequestration and carbon sink.

TENTH PLAN-2002-07 ORISSA AT A GLANCE	
Major Heads/Minor Heads of Development	**Projected outlay (Rs. Lakhs)**
Forestry & Wild Life	69446
Plantations	0

10.14.1.2 The main objectives of the 10th Five Year Plan are depicted below:

1. The national forest policy stipulates that the one-third geographical area of the country should be brought under forest tree cover.
2. Adoption of watershed approach for the maintenance and development of forests.
3. The compelling needs of the community living adjacent to the forests should be taken into account for successful conservation of the forest Eco-system.
4. To bring in successful regeneration of degraded forests, adequate thrust should be given on effective joint forest management (JFM).
5. Efforts should be made to reduce bulk import of round timber and other produce for large forest based industries, such as paper and pulp. These bulk requirements would be met from community land, degraded forests or private farmlands.
6. "Greening" programmes under the "Food for Work" scheme should be extensively implemented to ensure productive employment and food security.

7. The effective conservation and management of existing natural forests and forest soils (which are the store houses of carbon) will significantly reduce "Greenhouse" emissions. This will provide new market avenues for "Forest Protection and Management".
8. Priority should be given on the culture conservation and protection of the medicinal plants to ensure health care, employment generation and boost exports.
9. Plantation of Jatrophacurcas and Pongamiapinnata are to be promoted for large-scale extraction of Bio-diesel and encourage enhancement of livelihood opportunities and income generation facilities for the rural people.
10. It has been proposed to merge all afforestation programmes of the National Afforestation & Eco-Development Board (NAEB) into a single scheme called "National Afforestation Programme" (NAP). This would be operated through the Forest Development Agency (FDA).
    (It has components like natural regeneration management intervention; pasture development and bamboo development etc.)

The salient features of the FDA are as follows: -

(a). Micro-planning exercise would be the core element of the strategy.
(b). Watershed approach will be universalized in all afforestation programmes.
(c). Decision-making at the community level in respect of choice of species and
(d). Entry point activities to mobilise community participation.

10.15 ELEVENTH FIVE-YEAR PLAN (2007-12)

Ministry of Environment and Forests had an approved out lay of 10,000 crores for the 11th 5 year plan, 2007-12 with the following objectives.

(1) In increase forest and tree cover by 5 percentage points.
(2) To attain WTO standards of air quality in all major cities by 2011-12.
(3) To treat all urban waste water by 2011-12 to clean the river waters.
(4) To increase energy efficiency by 20 percentage points.

The Ministry is currently operating thematic schemes in 22 thematic areas. These schemes cover the main budgetary requirements for the ministry. The name of the schemes and their out lays in the 11^{th} 5 year plan and the projected

budget out lays (with 20% increase) for the 12th 5 year plan are given in the table below

Table No. 10.9			
Sl. No.	**Name of the scheme**	**11th Plan (Rs in Crores)**	**12th Plan (Rs in Crores)**
	Environment & Ecology		
1.	Environmental monitoring and Governance	216.00	259.20
2	Pollution abatement	235.00	282.00
3	Research Development for conservation & Development	250.00	300.00
4	Conservation of Natural Resources & Eco-system	600.00	720.00
5	Environment Information, Education & Awareness	295.00	354.00
6	Environmental management in Heritage, Pilgrimage& Tourist centres Taj	0.01	0.012
7	International Co-operation Activities	80.00	96.00
8	National Coastal Management Programme	10.00	12.00
9	National River conservation Plan (NRCP)	2100.00	2520.00
	Total Environment & Ecology	3786.01	4543.212
	Forestry & Wildlife		
10	Grants in aid to F & WL institution	450.00	540.00
11	Capacity Building in Forestry sector	110.00	132.00
12	Gregarious flowering of muli (melacannabaccifera) Bamboos	37.00	44.00
13	Intensification of forest management	600.00	720.00
14	Strengthening Forestry Divisions	100.00	120.00
15	Strengthening of Wild Life Division	150.00	180.00
16	Integrated development of wildlife habitats	800.00	960.00
17	Project Tiger	615.00	738.00
18	Project Elephant	81.99	98.388
19	National Afforestation programme	2000.00	2400.00
20	National Afforestation Programme	2000.00	2400.00
21	Social Forestry with communities (Panchayat Van Yojana)	900.00	1080.00
21	Animal Welfare	120.00	144.00
	Total Forestry &Wildife	**6213.99**	**7456.788**
	Grand Total Enviornment, Forest & Wildlife	**10000.00**	**12000.00**

10.16 Twelfth Five year Plan (2012-17)

The twelfth plan document, approved by the National Development Counsil on 27th December, 2012 has the basic theme of "Faster, Sustainable and more inclusive growth" and lays out major target, key challenges to meet them and the broad strategy that may be followed to achieve the stated objectives . Ministry of Environment & Forests has been allocated an out lay of 17,874 crores which works out to 0.41% of the plan allocation across various Ministries/Departments as against share of 0.42% or Rs.9231 crores in the Eleventh Plan. At current prices, the enhancement in this Ministry's twelfth plan out lay over the Eleventh Plan out lay, however, works out to 109%.

Twelfth plan has identified 13 monitorable socio-economic targets for this Ministry. These targets are as follows:

10.16.1 Environment & Climate Change

- Assess and remediate and 12 identified contaminated sites with potential from ground water contamination by 2017.
- Clean 80% of critically polluted stretches in rivers by 2017 and 100% by 2020.
- States to meet National ambient air quality standards in urban areas by 2017.
- To reduce emission intensity of GDP in line with the target of 20 to 25% reduction over 2005 levels by 2020.

10.16.2 Forest and livelihood

- Greening 5 million hectare under GIM including 1.5 million hectare of degraded lands, afforestation & Eco-restoration of 0.9 million hectare of ecologically sensitive areas.
- Technology based monitoring of forest cover, bio-diversity and growing stock including change- monitoring on periodical basis through dedicated satellite by 2017 and establishment of open web-bases national forestry and environmental information system for research public accessibility by 2015.
- Engagement of village green guards/community foresters for every JFM village 2016.
- Establish forestry seed bank in forest circles and model nursery in every district with information on public portal by 2014.
- Improve forest productivity and sustainable management of biodiversity.

- ❖ Restore and intensify forest range lands/grazing land management and establish community grazing land around forest fringe villages.
- ❖ Build capacity of JFMCs for management of forest resources including eco-tourism.
- ❖ Revive seed orchards and silviculture plots for various forest types of the country as well as for enlisted species under MFPs/NTFPs including genetic improvement and establishment of clonal orchards.

10.16.3 Wild life, Eco-tourism & Animal Welfare

- ❖ 20% of veterinary professionals in the country will be trained in treating wildlife.
- ❖ Integrated Eco- tourism district plans covering 10% of all potential protected areas by 2017.
- ❖ Promoting participation of private sector, civil societies, NGOs and Philanthropists in animal welfare.
- ❖ Reducing and managing human-wildlife conflict.
- ❖ Commercialisation of permissible marine products rich in poly unsaturated fatty acids, vitamins and so on.
- ❖ Promotion of eco-tourism and participatory eco-development support livelihood of local population.

10.16.4 Eco-system & Bio-diversity

- ❖ Restore 0.1 million hectare of wet lands/ inland slakes/water bodies by 2017.
- ❖ Mapping and preparation of bio-diversity management plans for deserts, coastal areas, important coral zones, wet lands, mangroves and show on to be completed by 2017.
- ❖ Develop national targets and indicators related to bio-diversity and support actions to strengthen implementation of biological diversity act , 2002 and ensure bio-safety for economic and social development of local communities.
- ❖ Assess coastal biodiversity resources, ensure sustainable management, restoration of mangroves, coral reefs and wet lands and support livelihood.

10.17 Thirteenth Five year Plan (2017-22)

Table No. 10.10

FORESTRY & WILDLIFE

Management of Natural Forests

Sl. No.	Scheme Code	Sector/Subsector/ Scheme	Head of Account	State Plan	Central Assistance	Aggregate Plan	Name of department/ Agency	Responsible Officer	Drawing Disbursing Officer(Designated Officer)	New/Continuting scheme
1	FOR 002	i)Forest protection	2406-01-101-81	2650.00		2650.00	Kerala Forest Department	APCCF (F,B&A)	APCCF Northern &Southern region	C
			4406-01-101-99 (01)	2800.00		2800.00	Kerala Forest Department	APCCF (F,B&A)		C
2	FOR 003	ii)Regeneration of denuded forests	2406-01-101-94	100.00		100.00	Kerala Forest Department	APCCF (F,B&A)	APCCF Northern &Southern region	C
3	FOR 073	iii) NWFP including promotion of medicinal plants	2406-01-101-80	195.00		195.00	Kerala Forest Department	APCCF (F,B&A)	APCCF Northern &Southern region	C
Improving Productivity of Plantations (Hardwood & Industrial)										
4	FOR 004	i)Hardwood Species	4406-01-105-87-01	650.00		650.00	Kerala Forest Department	APCCF (F,B&A)	APCCF Northern &Southern region	C
5	FOR 005	ii)Industrial Raw material	4406-01-105-87 (02)	800.00		800.00	Kerala Forest Department	APCCF (F,B&A)	APCCF Northern &Southern region	C

Infrastructure										
6	FOR 009	Roads	4406-01-070-99	500.00		500.00	Kerala Forest Department	APCCF (F,B&A)	APCCF Northern &Southern region	C
7	FOR 010	Buildings	4406-01-070-97	700.00		700.00	Kerala Forest Department	APCCF (F,B&A)	APCCF Northern &Southern region	C
Bio diversity Conservation and PA Management										
8	FOR 011	Conservation of Bio diversity	2406-02-110-68	700.00		700.00	Kerala Forest Department	PCCF(Wildlife) & CWW)	CCF (SF)	C
9	FOR 015	Eco development Programme	2406-02-110-56	350.00		350.00	Kerala Forest Department	PCCF(Wildlife) & CWW)	PCCF (Wildlife)&CWW)	C
Integrated Development of Wild life Habitats										
10	FOR 087	Management of Wildlife Sanctuaries (60% CSS)	2406-02-110-39 (01 to 15)	340.00	510.00	850.00	Kerala Forest Department	PCCF(Wildlife) & CWW)	CCF Wildlife	C
11	FOR 088	Management of National Parks (60% CSS)	2406-02-110-38 (01) to (05)	100.00	150.00	250.00	Kerala Forest Department	PCCF(Wildlife) & CWW)	CCF Wildlife	C
12	FOR 089	Management of Community Reserve (60% CSS)	2406-02-110-37 (01)	2.00	3.00	5.00	Kerala Forest Department	PCCF(Wildlife) & CWW)	CCF Wildlife	C
13	FOR 090	Project Tiger (60% CSS)	2406-02-110-36(01),(02)	550.00	825.00	1375.00	Kerala Forest Department	PCCF(Wildlife) & CWW)	FD, PT, Kottayam	C
14	FOR 094	Project Elephant (60% CSS)	2406-02-110-35	251.00	376.50	627.50	Kerala Forest Department	PCCF(Wildlife) & CWW)	CCF	C
National Mission for Green India										
15	FOR 091	National Afforestation	2406-01-102-86	1470.00	2205.00	3675.00	Kerala Forest	APCCF (E &TW)	Additional PCCF	C

		Programme (60% CSS)					Department		(Administration)	
16	FOR 095	Integrated Forest Protection Scheme (60% CSS)	2406-01-800-54	175.00	262.50	437.50	Kerala Forest Department	APCCF (F,B&A)	CCF Northern Circle	C
Conservation of Natural Resources and Ecosystems										
17	FOR 096	Nilgiri Biosphere Reserve (60% CSS)	2406-02-110-34	142.00	213.25	355.25	Kerala Forest Department	PCCF(Wildlife) & CWW)	CCF Wildlife	C
18	FOR 097	Agasthyamala Biosphere Reserve (60% CSS)	2406-02-110-33	142.00	213.25	355.25	Kerala Forest Department	PCCF(Wildlife) & CWW)	CF ABP, Tvpm	C
19	FOR 098	Wetland conservation (60% CSS)	2406-02-110-32	35.00	52.50	87.50	Kerala Forest Department	PCCF(SF)	CCF (SF)	C
20	FOR 099	Integrated development of Wildlife Habitat to Wayanad Wildlife sanctuary for voluntary relocation of settlements from protected areas (60% CSS)	2406-02- 110-31	540.00	810.00	1350.00	Kerala Forest Department	PCCF(Wildlife) & CWW)	PCCF (Wildlife) & CWW)	C
21	FOR 016	Eco-Tourism	4406-01-800-91	935.00		935.00	Kerala Forest Department	APCCF (F,B&A)	CCF Wildlife	C
22	FOR 075	Human Resource Development	2406-01-003-97	395.00		395.00	Kerala Forest Department	APCCF (IHRD)	APCCF (IHRD)	C
23	FOR 076	Resource Planning and Research	2406-01-004-92	250.00		250.00	Kerala Forest Department	CCF(WP &R)	CCF Working Plant Research	C
24	FOR 051	Forest Management Information System and GIS	2406-01-800-57	150.00		150.00	Kerala Forest Department	APCCF (FMIS)	APCCF (FMIS)	C
25	FOR 070	Extension Forestry	2406-01-800-55 (01)	1400.00		1400.00	Kerala Forest Department	PCCF(SF)	CCF SF	C

26	FOR 026	Rural Infrastructure Development Fund	4406-01-800-90	5000.00		5000.00	Kerala Forest Department	APCCF (F,B&A)	APCCF (F,B&A)	C
27	FOR 064	Measures to reduce man-animal conflict	2406-01-800-56	2000.00		2000.00	Kerala Forest Department	PCCF(Wildlife) & CWW)	PCCF (Wildlife)&CWW)	C
28	FOR 067	Zoological Park at Puthur, Thrissur	2406-02-110- 48	500.00		500.00	Kerala Forest Department	Special officer, Puthur Zoological Park	Special officer, Puthur Zoological Park	C
		Zoological Park atPuthur, Thrissur(RIDF)	4406-02-110-97	500.00		500.00	Kerala Forest Department	Special officer, Puthur Zoological Park	Special officer, Puthur Zoological Park	C
29	FOR 100	Assistance to Kerala Agricultural University to support the training and Extension needs of KFD	2415-01-277-86	50.00		50.00	Kerala Forest Department	APCCF (F,B&A)	APCCF (F,B&A)	N
		Total (1.6)		**24372.00**	**5621.00**	**29993.00**				

CHAPTER-XI

PAST SYSTEM OF MANAGEMENT

11.1 General History of the forest.

The Kondhas are the primitive tribal inhabitants of Kondhamal District. Southern hill tracts of Boudh estate were named Khondhamal in the Boudh settlement of 1907. Since 1907 the Rulers of Boudh state continued to rule Khondmal areas till the merger of Feudatory States with the state of Orissa.

Prior to Independence, Late D.N Chowdhury the then Divisional Forest Officer, Phulbani Division wrote the scheme for Ranipathar, Donga-Billabadi Forest Blocks covering 28956.0 Acres in the year 1941. Thus he made an attempt to introduce systematic management practices in Phulbani Division.

From the year 1942-43 till 1945-46 the coupes were sold systematically.

By that time only one Timber Felling Series and five Bamboo Felling Series were constituted. Subsequently, F.A.B Hart, Conservator of Forests, during his inspection of Forests in Phulbani Division (Erstwhile G.Udaygiri Division) in May-June 1946 suggested two more Felling Series such as

1. Katringia F.S comprising Palchi, Kalabagh, Sudrukumpa & Katringia Forest Blocks and
2. Balandapara Felling Series comprising Baghnadi, Balandapara, Kerandibali, Paijeru and Sadingia Forest Blocks.

The past systems of management in a systematic manner are enumerated below: -

11.1(i)Coppice Working Circle: -

Only one Coppice Felling Series was constituted during the year 1942-43 comprising 4 nos. of forest blocks around G.Udaygiri. Working of coupes was not systematic. High stumps were observed after working of the coppice coupes.

11.1(ii)Bamboo Working Circle :-

Out of five only one bamboo Felling Series was worked out in Ranipathar north by Heilgers & Co. subsequently Ranipathar south was worked out. All the three felling series of Donga forest block were left unworked due to inaccessibility of the area.

11.1.1Scheme prepared by Sri H.K Mishra: -

Working scheme for Phulbani was compiled by Sri H.K Mishra (from 1963-64 to 1982-83) in which he suggested 5 working circles such as

1. The Selection Working Circle
2. The Coppice Working Circle
3. The Bamboo Working Circle
4. The Protection cum Plantation Working Circle
5. The Podu Prevention Working Circle

Mr Mishra categorized the growing stock as (a) Sal forests (b) Miscellaneous forests (c) Bamboo forests.

11.1.2 The Selection Working Circle :-

It was confined to hilly forest areas. It covered 87,832.0 acres comprising Sudurukumpa, Kalabagh Palchi, Baghnadi, Ranipathar as well as Donga Forest Blocks. It was oriented to achieve the objective of maintenance of good forest cover on gentle and steep slopes and obtain maximum out turn on sustainable basis. Felling cycle was 20 years. Selection-cum-Improvement marking was adopted. Sal, Piasal, Bandhan, Sissoo and Gahmar were classified as principal species. Asan, Haldu and Mitkunia and Jamun were considered as secondary species. Exploitable diameter for Sal was 20" for Ranipathar and Kalabagh F.S. It was 18" for Baghnadi F.S Exploitable diameter for other species were:Piasal-18", Sissoo & Dhaura=16", Bandhan =14", Asan & Haland=20", Semal=20" & for rest of the species, it was 16". The felling cycle was 20 years for Kalabagh and Ranipathar F.S. Baghnadi had 10 years felling cycle. 20% trees of exploitable girth were retained as future trees. The Forest Blocks allotted to different selection felling series are as follows:

Name of the F.S	R.F Blocks	Area in Hectare	Total area ofthe Felling Seriesin Ha.
1. Ranipathar	Ranipathar Donga	4,747.77 6,972.48	11,720.25
2. Kalabagh	Kalabagh Sudurukumpa	7,698.90 4,710.64	12,409.54
3. Baghnadi	Baghnadi Palchi	7,224.60 1,845.40	9,070.00

In Ranipathar felling series, the coupe No.III to IV and coupe No.IX were not worked out. Timber and fuel wood exploited were in excess in comparison with the prescribed yield. This is indicative of marked deviations in the past in respect of working of coupes. In Kalabagh F.S. 1,000 trees were fixed as annual yield with 20 years felling cycle. But in actual practice, outturn was much excess in comparison with the prescribed yield of sal trees of exploitable size.

Similarly, out of 20 coupes coupe No. V, VI, VII, IX, X, XIV, XIX &XX (eight coupes) have not been worked out in Baghnadi felling series. Such deviations were indication of improper management of the forests.

11.1.3 Coppice Working Circle : -

This working circle was constituted with seven nos. of forest blocks.

(i) Khajuripada (ii) Phulbani (iii) Sudreju (iv) Khaumunda (v) Darki (vi) Bandhagarh 'A' and (vii) Bandhagarh 'B' covering an area of 11,031.97 hectares. Salient features of this working circle were

I. Poor growth of Sal Crops
II. Incidence of repeated felling by the local people for their bonafide use
III. Non-availability of large sized trees.
IV. Ravage by Podu cultivation and
V. Local demands for poles and fuel wood in sizeable magnitude as well as the availability of large nos. of root stocks as source of coppice regeneration.

Such forests were managed under coppice with standard system. Sal, Piasal, Bandhan, & Gahmar were treated as principal species. Asan, Kurum, Mitkunia, Jamun, and Sidha, were treated as secondary spices. This practice of coppice system imbibed detrimental effect on the status of the forests.

11.1.4 Bamboo Working Circle: -

This working circle practically overlaps the selection working circle. Total area covers 20,457.59 Hectares. This working circle comprises Burtang, Sudurukumpa, Ranipather, Donga, Billabadi, Kalabagh and Baghnadi Forest Blocks. In this working circle nine felling series were constituted. Matured culms were removed from the clumps through the process of "selection felling". The coupes were leased out to M/s T.P. Mills & M/s O.P. Mills. Subsidiary silvicultural operations were prescribed to be taken on the years following years of working of the coupes.

11.1.5 Protection cum Plantation Working circle: -

Sixteen nos. of Podu ravaged forest blocks were included in this working circle. During site clearance for Podu cultivation, fellings were done in an erratic manner. At places, good Sal-patches were left here and there. Such patches of forests were retained without any felling.

These sixteen nos. of forest blocks covered an area of 25,977.27 hectares and constituted 12 (twelve) nos. of felling series tabulated as follows.

Name of F.S	**Name of Forest Block**	**Area in hectares**
Gumagarh	Gumagarh----------	2,355.35
Dakpalla 'B'	Dakpalla 'B'----------	981.67
Kalamuri	Kalamuri	
	Dakpalla 'A'----------	509.92
Balaskumpa	Balaskumpa----------	1,618.80
Dutimendi	Dutimendi ----------	809.40
Ghugulasahi	Ghugulasahi	
	Muskuli	
	Pandrisuga----------	1,145.30
	Burtang Extension	
Bhaliapada	Bhaliapada ----------	809.40
Bamandei	Bamandei ----------	194.26
Gochhapada	Gochhapada ----------	6,863.71
Kerandibali West	Kerandibali West ----------	3,909.40
Sadingia	Sadingia ----------	910.58
Kerandi East	Kerandi East ----------	5,869.48
		25,977.27 Hectares.

Silvicultural operations, prescribed to be carried out were climber cutting and singling out of Sal shoots, removal of silviculturally available matured trees which would not survive for another 20 years.

AND

Plantation was scheduled to be taken up after clear felling in strips. In hilly terrain 40 ft width of forests were prescribed to be retained and the next 20ft width of forest growth would have to be removed. The species prescribed to have been raised were mainly Teak, Chakunda and Bamboos. At places Sissoo, Gambhar, Mango, Tamarind, Mahul, Cashew and Kurum would have been planted as per suitability of the sites.

Plantations raised in Gumagarh, Dakpalla'B', Dutimendi, Ghugulasahi, Balaskumpa, and Gochhapada were not appreciable probably due to lack of requisite post planting care or some other inhibiting factors.

11.1.6 Podu Prevention-cum-Rehabilitation of Podu Cultivation Working Circle: -

This working circle comprised Gerupada east, Gerupada west, Dahisara and Nuapadar Forest B Blocks covering an area 2,280.49 hectares.

The operations were designed to check Podu cultivation in the aforesaid Forest Blocks and adjoining areas. For the sake of convenience three felling series were constituted with a felling cycle of 20 years.

11.2 (C) Schemes Prepared by Sri S.C Padhi, I.F.S: -

The scheme was prepared for the forests of G.Udaygiri Range for the period 1971 to 1990. By that time G.Udaygiri was under Balliguda Forest Division.

Previously a portion of G.Udaygiri Range, especially Chakapada Forest Block was under Ghumsur North Forest Division. This Forest Block was taken up under Mr. Hinchin's working plan for the year 1919 to 1930. Then it was covered under the working plan prepared by Dr. Nair (1930-1940). Subsequently Mr. D.H. Khan, I.F.S. revised the working plan for the period from 1940 to 1950. This plan was extended up to 1968. Two adhoc coupes 1969-70 & 1970-71 were worked under Mr. Khan's plan. This working plan was revised by the W.P.O.II Berhampur circle. Mr. S.C Padhi, prepared the scheme for G.Udaygiri range which comprised eight Forest Blocks covering 18, 725.90 hectares. He suggested four working circle viz.

1. The Selection Working Circle.
2. The Improvement Working Circle.
3. The Rehabilitation Working Circle and
4. The Bamboo (overlapping) Working Circle.

11.2.1 The selection Working Circle: -

Chakapada Forest Block was allotted to this Working Circle covering 13,137.31 hectares. This constituted 2 nos. of felling series.

(a) Chakapada Felling Series.

(b) Chahali Felling Series.

Exploitation was based on Silvicultural considerations. Felling cycle was fixed at 20 years. Sal, Teak, Bija, Gahmar Kangada, Sissoo and Bandhan were categorized as principal species.

Asan, Mundi, Tentara, Siris, Kasi, Simul, Mango and Haldu were termed as secondary species.

Sri Padhi suggested exploitable diameter for different species as follows:-

Sal and Teak ---------- 30″

Bija, Asan, Haldu, Mundi, Mango & Siris ---------- 20″

Gamhar, Sissoo & Kasi ----------18″

Bandhan & Kangada ---------- 16″

Other Species ---------- 12"

He suggested to mark all dead, dry, uprooted or fallen trees for exploitation down to 3" diameter and retention of 50% of healthy, well grown and sound trees of Sal, Bija, and Asan from the "approach-class" as future yield. He also stipulated the retention of trees on Nala banks, Steep slopes, river banks and on blank areas.

He further suggested marking all inferior species for felling which interfered with the growth of superior grade of species. Teak and other plantations falling within the coupe areas were excluded from marking and felling.

Subsidiary Silvicultural operations suggested the felling of:

Marked and unfelled trees.

Damaged ones.

Defective trees.

Diseased trees.

High stumps.

Inferior species below 3" girth(G) at breast(B) height(H).Bamboo clumps interfering with the growth of principal and secondary species or their established regeneration.

Secondary species below 6" G.B.H. interfering or likely to interfere with the growth or establishment of the principal spices.

He suggested cutting of climbers at the time of silvicultural operations. Yield was prescribed on area basis. Annual coupes were marked basing on the stock maps prepared on the basis of ocular estimation. Compartment Histories have not been maintained. Such files are not available in Range or Divisional Office.

11.2.2 Improvement Working Circle: -

This working circle covered only 2482.2 hectares cut of 4747.13 hectares of Burtang South Block.

This was oriented to bring in

(i) Improvement in quality and composition of the crop and

(ii) Restock the areas bearing scanty proportion of the crop. Working was restricted on: (a) hill tops (b) Precipitous slopes and (c) eroded areas.

Working was limited with gentle slopes and flat terrain. Tending operation viz. improvement felling, thinning and cleanings were done to promote the status of the principal species like Sal, Piasal, Sissoo, Asan, Bandhan, Gahmar, Kangada, Kasi, Haldu and Mundi etc. The rest were treated as inferior species.

Exploitable diameter for Bandhan was 12"and for the rest 20".

There were 2 felling series such as (1) Archangi F.S and (2) Pasara F.S Felling cycle was 20 years.

Rules for Improvement fellings and subsidiary silvicultural operation were meticulously followed.

11.2.3 Rehabilitation Working Circle: -

It comprised 816.68 hectares. It covered Kurumingia, Sujeli, Puklingia, Gudingia, Jobedi and Rotingia Forest Blocks.

The objectives were as follows: -

(i). Rehabilitation of degrade sites affected by fire, repeated felling and heavy incidence of grazing.

The felling cycle was 5 (five) years.

No felling series were formed.

Sal, Piasal, Sissoo, Asan, Bandhan, Ghamar, Haland, Kangada, Kasi and Mundi were considered as economically valuable species. Protection measures like, Fire protection, cattle proof trenches, and regeneration cleaning were prescribed, to promote regeneration, climber cutting and singling out operation were suggested along with gap planting in the blank spaces. The results have not been observed.

11.2.4 Bamboo Working Circle: -

This working circle overlapped the areas of selection working circle and improvement working circle falling within Chakapad and Burtang south Forest Blocks.

It covered 17896.97 hectares.

It was formed to promote the regeneration of salia bamboos, through two felling series such as Chakapad F.S and Burtang south F.S. The cutting cycle was 04 years. Culm selection system was adopted for salia bamboos. CleaRFelling system was adopted for daba bamboo.

Within the bamboo working circle-areas the plantations of Teak, Gahmar, Sissoo, Ailanthus, Chakunda and Eucalyptus alongwith the bamboos were raised by the Afforestation Division. The local people caused immense damage to the plantation. Sri Padhy suggested reviving the plantation programme as before with adequate protection and maintenance operations.

11.3 Working Scheme Prepared by Sri Parmatam Singh, I.F.S: -

There were three different phases of management of the forests in Phulbani Division.

i. Under Muttada prior to 1954.

ii. Under Revenue Administration from 1954-1959.

iii. Under the control of Forest Department from 1959 onwards.

During Revenue Administration no scientific and protective measures were taken up. A scheme was written by Mr. M.F. Ahmed, IFS for the period 1964-65 to 1983-84. He suggested two working circles. viz. (1) Selection cum Improvement Working Circle and (2) Bamboo overlapping Working Circle. Only the former one was worked out.

The working scheme written by Sri Paramatam Singh, I.F.S was for the period from 1971-72 to 1990-91. Which was meant for management of the PRF blocks as follows:-

1.	Karada PRF 6726.11 hectares	9 compartments.
2.	Sikabadi PRF 2306.79 hectares	4 compartments.
3.	Nandabali PRF 3806.61 hectares	6 compartments.
4.	Baraba PRF 1325.37 hectares	5 compartments.
5.	Ranaba PRF 2624.44 hectares	5 compartments.
6.	Machhaghat PRF 1235.65 hectares	4 compartments.
7.	Badagada PRF 2274.41 hectares	4 compartments.

The following working circles were constituted

1. The Improvement working circle.
2. The Miscellaneous working circle.
3. The Bamboo working circle.
4. The M.F.P. (Overlapping) working circle.

11.3.1 Improvement working circle:-

This working circle comprised five nos. of Sal bearing Forest Blocks in part such as: -

i. Machhaghat

ii. Ranaba

iii. Baraba

iv. Baduguda and

v. Nandavalli

This working circle covered an area of 2468.6 hectares, which was allotted to

a) Baraba Felling Series and

b) Ranaba Felling Series with 20 years of Felling cycle coinciding with the working period of the scheme.

This system of management was oriented to (i) Improve the quality of the crop and (ii) Value Addition processes through scientific silvicultural methods.

From the point of view of economic utility Sal, Piasal, Asan, Bandhan, Gahmar, Halanda, Jamun, Kangada, Kasi, Mango, Mundi, Semul, Sissoo, Siris and Tentara, were categorised as valuable species. The rest of the crops were treated as inferior species.

Exploitable diameter of Bandhan was 14" and the rest of the valuable species bore exploitable diameter of 20".

The working period of the scheme commence from 1971-72. Actually it became operative from 1979-80. The rest of the coupes were worked out in chronological order.

11.3.2 Miscellaneous Working Circle: -

This working circle extends over the parts of seven Forest Blocks of Karada Range excluding the areas of Improvement Working Circle. It is confined to the tops of the hills and upper hill slopes bearing the crops of miscellaneous species.

This system of management was designed to achieve:

(a) Effective protection of hill slopes from soil erosion through maintenance of thick vegetal cover.

(b) To improve the site quality of the crop.

(c) Value addition of the existing crop and

(d) Cater the needs of the right holders for their bonafide use.

One felling series was formulated Specific and exploitable diameter was not fixed. Method of execution of felling and subsidiary silvicultural operation was prescribed. The said working circle was not operative.

11.3.3 The Bamboo Working Circle: -

This working circle comprises of 7 forest blocks of Karada Range. Five Felling Series were formed in this working circle. Viz.

1. Karada
2. Nandapalli
3. Machhaghat

4. Ranaba
5. Baraba

The management objectives were as follows:-

a) Upliftment in nutritional status of the bamboo forests by way of timely and systematic management.
b) Out turn of maximum sustained yield.
c) To cater bonafide requirement of bamboos for the local people and
d) To promote establishment of bamboo based industries like paper mills etc.

The cutting cycle prescribed was 4 years. Each Felling Series comprises of four annual coupes. It was suggested for retention of 10 culms per clump. Clear felling system was prescribed for Daba bamboo (*Bambusa arundinancea*). All the bamboo coupes were leased out to M/s. Straw Products Ltd. No deviation have been observed nor recorded.

11.3.4 Minor forest produce (Overlapping) Working Circle: -

This working circle covers all the seven Forest Blocks. Basing on the economic utility of the Non Timber Forest produce the following categories of MFP are given prime importance. Viz. Kendu leaves, Sal seeds, Sabaigrass, Siali leaves, Siali fibres, Arrowroot, Hill brooms, Tamarind and Myrobalans.

Objectives of the management are:-

(i) To obtain maximum sustained yield on adoption of scientific management practice.
(ii) To provides employment to rural youth especially the tribal people.

Period of collection was annual. Out of 7 PRFs of Karada Range, three Forest Blocks viz. Baraba, Machhaghat and Ranaba have been notified as Reserve Forests.

11.4 Working plan of Sri S.N. Bohidar, IFS (1990-91 to 2000-01):-

Working plan of Phulbani Forest Division was prepared by Sri S.N. Bohidar, I.F.S for the period from 1990-91 to 2000-2001. It was amended for incorporating working of Bamboo coupes for the period from 1990-91 to 2000-2001 as per the approval of the Chief Conservator of Forests (Central), Government of India, Eastern Region, Bhubaneswar in his letter No. 13FCWP/OS/P.L.B. dt.15/11/1993.

Moratorium on tree felling in Phulbani Division was imposed by Government of Orissa as per their letter no. F.F.C. 5/88(Part) 23614/F.F.A3/4H.dt.13.10.1988.

The outgoing plan covers 59 (Fifty nine) R.F. blocks covering an area of 98281.87 hectares. The plan period was 10 years.

General objects of management of the plan

(1). Maintenance of ecological balance through conservation of vegetation, soil moisture and soil.

(2). Upliftment of economic value of forests.

(3). Adoption of skillful management to improve crop condition.

(4). Catering the needs of the local people for bonafide use of timber, fuel wood, bamboos and grazing benefit.

(5). To meet the demands of pulpwood, Match Industries and ply wood industries.

(6). Preservation and management of wild life.

The following working circles were formulated during the outgoing plan.

Table No. 11.1

Sl. No.	Name of the Working Circle	Area in Hectares
1.	Improvement Working Circle	56,448.93
2.	Rehabilitation cum Soil Conservation Working Circle	41,751.82
3.	Plantation Working Circle	490.00
4.	Bamboo (Overlapping) Working Circle	76,136.95
5.	M.F.P. (Overlapping) Working Circle	
6.	Wild Life (Overlapping) Working Circle	

11.4.1 Improvement Working Circle:-

This working circle covers an area of 56448.93 hectares. This working circle comprises Sal and Miscellaneous forests. It belongs to the forest type sub-group 3C (Northern Tropical Moist Deciduous Forests) and 5B (Northern Indian Tropical Dry Deciduous Forests).

Sal is the principal species in these tracts of forests. It remained confined to plains and gentle slopes of the hills and the valleys bearing deep soil and organic nutrients. The site quality of Sal was III to V having crop density 0.4 to 0.5. Bamboos occurred along with other associates of Sal in most of the Forest Blocks.

It comprises of seven Felling Series. The period of improvement was 10 years. The dead and fallen trees were prescribed as yield from this Working Circle.

Result:-

A large tract of forests fell within the zone of cyclonic wind. These up rooted trees and the trees removed by illicit felling presented appearance of over exploitation. Unregulated grazing and fire have adversely affected the regeneration. Special attention was needed for the Sal bearing areas which could not be afforeded during this plan. Due to over exploitation in the past, the coupes could not worked out in time. The subsidiary silvicultural operations could not be carried out due to financial stringency faced by the Government. The imposition of moratorium also vitiated the process of regular and systematic working of the coupes and subsidiary silvicultural operations.

11.4.2 Rehabilitation cum Soil Conservation Working Circle: -

This working circle covered mostly the degraded forest areas to a tune of 41751.82 hectares in the outgoing plan.

This was the outcome of continuous hacking, unregulated grazing and annual fire. Consequent upon heavy pressure on the forests, the vegetation was virtually reduced to bushy form in shape of scrub forests.

The management objectives of formulation of this working circle are mentioned as follows: -

1. Adoption of site specific soil and moisture conservation measures to reduce surface run off and there by bringing in amelioration of the Micro-Climate.
2. Enrichment of the forests by gap planting.
3. Restoration of the area with close vegetative cover.
4. Improvement of the status of the forests and upliftment of the bearing capacity of vegetation to cater the needs of the local people for their banafide use of timber, fuel wood and bamboos.

Fast growing indigenous as well as exotic species were recommended for planting viz.*Acacia catechu, Acacia nilotica, Artocarpus heterophyllus, Cassia siamea, Dalbegia Sissoo, Mangifera indica, Tamarindus indica* and Bamboos.

Four nos. of Rehabilitation cum Conservation series were constituted for four ranges with 10 years' work programme. No yield was prescribed.

Result:-

The prescriptions of the working plan could not achieve the target. Over exploitation in the past did not permit regular and continuous working operations. Due to paucity of funds, the soil conservation measures, plantations, tending and cleaning

operation as prescribed in the working plan could not be executed. Unregulated over grazing of the cattle and frequent incidence of fire vitiated the condition of the crop. Consequently, soil erosion is continuing since then without any remarkable effort.

11.4.3 Plantation Working Circle: -

This working circle covered 490.0 hectares. This included existing Teak and fuel wood plantations along with one planting series in Kalabagh R.F of Phiringia range extending over 125 hectares. The species prescribed were Teak, Gahmar, Piasal, Acacia, Cashew, Chakunda, Eucalyptus and some fruit bearing species to restrict soil erosion. It was prescribed to carry out tending operations in the existing plantation.

Result:-

Paucity of funds did not permit to achieve the management objectives.

It became feasible to raise plantations over 125 hectares only against the target of 49.0 hectares.

11.4.4 Bamboo (Overlapping) Working Circle: -

This working circle covered an area of 76136.95 hectares. It overlaps the Improvement and Rehabilitation Working Circles and includes all the commercially viable bamboo exploitable areas. Distribution of Salia bamboo is profuse whereas Daba bamboo is sporadically distributed in some places.

Objectives of management are:

(i). Out turn of maximum sustained yield.
(ii). Improvement of the quality of the growing stock through scientific methods of management.
(iii). To cater the demands of the local people and
(iv). To fulfill the requirement of paper pulp needed by the paper mills.

11.4.5 Silvicultural system adopted: -

The Silvicultural system adopted was "the culm-selection cum clump improvement". A felling cycle of 4 years was adopted both for Salia and Daba bamboos. 17 nos. of Felling Series have been constituted in this working circle. For bamboo working, the uniform set up of rules prescribed by the Government of Orissa, meant for all the bamboo forests of the state is now being followed scrupulously in cutting up of the bamboos in this Division.

Result: -

Due to paucity of funds, Subsidiary Silvicular Operations have not been carried out systematically as prescribed in the outgoing plan.

Bamboo bearing areas could not be protected from fire, grazing and illicit cutting. It has resulted in degradation of Bamboo Forests. Gregarious flowering of bamboo have not occurred in the salia bamboo areas. However sporadic flowering has occurred in some patches. The natural regeneration of bamboo caused due to sporadic flowering could not be protected from fire and grazing. Thus natural regeneration from seedling origin is totally absent. Bamboo operations were stopped since the crop year of 2001 as per the decision taken by the "Bamboo Empowered Committee".

11.4.6 Minor Forest Produce (Overlapping) Working Circle: -

This working circle covers large tract of forests extending over the entire Phulbani Forest Division. The M.F.P plays an important role in rural economy of the Division. Due to want of purchasers and marketing agencies the tribal people are not interested in collection of the M.F.P items.

The objectives of management are follows:

(i). To obtain maximum collection of M.F.P. which goes waste in the forests due to non collection.

(ii). To supplement rural economy through collection of M.F.P.

(iii). To prevent deterioration of the M.F.P species and the host species.

(iv). To cater to the needs of M.F.P based industries.

The items of M.F.P available are Sal seeds, Kendu leaves, Mahua flower, Mahua seeds, Genduli gum, Siali leaves, Siali fibres, Hill brooms, Myrabolans, Medha bark/Sunari bark, Horns, Tassar, Cocoons etc. AMCS, Tikabali and TDCC Ltd. Baliguda were entrusted for collection of MFP items during the outgoing plan period TDCC Ltd., Baliguda and the AMCS, Tikabali, engaged local people for collection of Minor Forest Produce from the forests and processed them for disposal by the aforesaid organisations.

Result:-

The trade of kendu leaves has been nationalised since 13/12/1972. Collection and disposal has been done departmentally through kendu leaves wing of the Forest Department.

The collection and trade of sal seeds was carried out through the T.D.C.C Ltd. 18 MFP items viz.1.Tamarind 2.Marking Nut 3.Myrabolan 4.Semul cotton 5.Siali leaf plates

6.Hill Brooms 7.Matred 8.Arrowroot 9.Lac 10.Honey 11.Genduligum 12.Patalgaruda 13.Cane 14.Siali Fibre 15.Babulgum 16.Sabai grass 17.Thatch grass 18.Clearing Nut were leased out to the AMCS, Tikabali till notification of new N.T.F.P policy.

The new N.T.F.P policy was notified as per Resolution No.5503/F&E dt.31/03/2000 and in Memo No.13285/F&E dt.23/08/2000 has transferred the procurement and trade of 67 MFP items to the Gram Panchayats.

Collection of 9 M.F.P items covered under para-4(6) of M.F.P policy resolution dt.31/03/2000 i.e. 1.Sal leaf, 2.Sal resin, 3.Gum 4.Khaira (Catechu), 5.Barks of trees and Climber, 6.Roots of Patalagaruda, 7.Sandal Wood, 8.Tassar Cocoon & 9.Cane have been banned.

In view of the above mentioned New N.T.F.P policy the MFP items available in this Division which was leased out to AMCS Ltd., Tikabali are now being transferred to Gram Panchayats.

11.4.7 Wild Life (Overlapping) Working Circle:-

Wild life is the integral part of the Forest wealth. For the purpose of illegal collection of forest materials the people living around the dense forests regard the wild animals as their enemies. That is why they have developed a "Public apathy" towards the innocent wild animals living in the forests.

Some of them have already been extinct and some are on the verge of extinction.

At a very late stage some people have developed soft corner for the protection and preservation of Wild Fauna.

The special management objectives are depicted below:-

1. To improve the forest cover and food value inside the forest area and also to provide favourable habitat for wild life.
2. To inculcate a spirit of the nearby villagers, for developing wide sense of belonging and love for nature as well as wild life.
3. To develop a mass of green Forest Development of Forest Blocks near township of Phulbani, Tikabali and Patangi etc. The same can be achieved through Rehabilitation and Afforestation measures to credit recreational opportunities for the people of the township (eg.Dakpalla 'A').

Most of the Forest Blocks do not bear perennial nalas inside. This became an adverse factor, by which such forests do not bear adequate forest cover to serve as a suitable habitat for wild life.

In the out going plan, the author Sri S.N. Bohidar, IFS made the following classification viz-

'A' – Habitat deteriorated to a lesser degree.

'B' – Habitat deteriorated to a maximum degree.

'C' – Barren Forest Blocks near the township.

Result: -

No works could be taken up during the outgoing plan period due to the paucity of funds.

11.5 Working Plan of Sri Ajay Raizada, IFS (2007-08 to 2016-17)

The current working plan in operation was prepared by Sri Ajay Raizada, IFS for the period from 2007-08 to 2016-17. The plan at this juncture has completed eight years of implementation. The plan was approved by MoEF, Govt. of India through their letter No.13/FCWP/OS-FLB dt. 14.03.2008. In the approval letter detailed conditions were laid out regarding implementation of each working circle as well as general conditions. However, in the said approval the bamboo overlapping working circle operations with respect to bamboo felling were not approved. From the year 2007-08 to 2010-11 bamboo felling were carried out through approved working schemes that were submitted annually. For the year 2011-12 a one year approval was given from bamboo coupe working through MoEF letter No. 13/FCWP/OS-FLB dt. 13.10.2011 for the period from 2012-13 to 2016-17 the bamboo overlapping working circle was approved through MoEF letter No. 13/FCWP/OS-FLB dt. 04.09.2012.

The current working plan covered 61 RFs, 35 PRFs & 111 VFs with a total area coverage of 1,46,634.56 ha. The current working plan outline the general objects of management as follows:

1. The primary objective of Forest Management would be environmental and ecological improvement. Production of Timber, NTFP products and the like would be incidental. This means that what was the main objective in the past would be secondary and what was secondary would become the main objective. These objectives have a direct bearing on human health and welfare.
2. A standing tree in more valuable than the one harvested for the purpose of obtaining timber of the required sizes that also gives the highest revenue. The

accumulated benefits of a standing tree – direct as well as indirect – far outweigh its timber value. The diversified benefits accruing from a living tree cannot be bestowed by any man-made machine as economically, efficiently and effectively. It would therefore, be necessary to determine the biological maturity of each species. This means, the objective of 'Change Nature' to produce sustained yield of selected timbers will be replaced by "Follow Nature"; the objective of Regular Crops will be replaced by Irregular Crops.

3. Nothing that Mother Nature has created is a weed to be removed ruthlessly. Every species has an ecological and environmental role to play. The normal practice of classifying various tree species as Superior/Inferior and Timber/Miscellaneous would be abandoned.
4. Sustainability of parts alone would ensure the sustainability of the whole. Sustainability of all the sub-systems comprising a given Forest Ecosystem will, therefore, be imperative.
5. There would be minimal intervention in the natural character and composition of forest crops. Since the culture and lifestyle of the dependent community are directly linked to the kind of forest crops, such a measure alone would support and sustain cultural diversity. Since most of the Forest Ecosystems have been converted under Management Plans into Uniform Crops of one or two important timber species, they will need to be reconverted to multi-species, multi-ages and multi-canopied crops.
6. Usage within self-renewal limits. The use of forests will be within the capability of the concerned forests for self-renewal.
7. Sustainable usage. The wisdom of how to use forests and at the same time ensure their sustainability is with the local community which has co-existed with these forests for generations.
8. The positive link between trees and soil fertility as well as water conservation will be expressly recognized. The Management of Forests for conserving and regulating water will be expressly guided by this consideration.
9. Because of health hazards and environmental degradation, the twenty first century will be a century of organic farming in which trees and forests will play a significant role.
10. Urban forestry will be needed more than ever before. Selection of suitable species and the management of trees planted in urban areas will warrant

development of special skills. Trees which have the potential of containing air and noise pollution will have to be identified and popularized.

11. Agro-forestry would occupy a place of pride in the twenty-first century and beyond. Actually, this should have happened a long time ago. The Twenty-first Century will witness the integration of Agriculture, Animal Husbandry and Forestry for optimum production and minimal land degradation. Identification of suitable species that can co-exist with agriculture and at the same time, conserve soil and water, improve soil fertility, and help control insect pests, will need to be identified and their silviculture and management practices developed. This will be very welcome because it will enable foresters to move in the direction of sustainable forest management without the fear of loss of production of timber and fuel wood.

12. Bamboos will be perceived as one of the greatest gifts of God to the Division; their multiple uses and the rate of growth are matched by no other plant. They will be extensively used for ameliorating rural poverty and solving the problem of rural housing. As such, one of the objectives would be the rehabilitation of bamboos as expeditiously as possible. Necessary technology for this purpose will need to be developed.

13. The planning, the management and the distribution of benefits will be done in active partnership with the stakeholders concerned – the local community, the professional graziers, the farmers, industry and the like.

14. Forestry will be increasingly treated as a multidisciplinary applied science; it would also become a multi-agency activity.

15. The measure of success of Forest Management will be judged by its impact on Man and Environment and not on the quantity of timber produced and the revenue earned as is the common practice now.

The current working plan constituted eight working circles with the following objectives:

1. To maintain closed canopy on the hill slopes and catchments of rivers to check soil erosion, to maintain hydrological balance and regulate water yield.

2. To prevent further degradation of eco-systems by regulating the fellings of trees and taking adequate steps in conserving flora and fauna of the forests.

3. To improve composition and productivity of these forests by increasing investment and improved inputs.

4. To restock the barren, degraded and depleted forests by using appropriate techniques and prescriptions.
5. To encourage peoples' participation in forestry in achieving the aforesaid objectives.
6. To protect and manage wildlife resources with a view to conserve and help enrich biodiversity.
7. To meet the firewood and small timber etc. requirement of local people in an optimal manner, subject to the aforesaid environmental imperatives.
8. To provide increased opportunities for sustainable livelihood security to the local people dependent on forests through scientific harvesting, value addition and marketing of NTFPs.
9. To identify rare and endangered species of flora and take adequate steps for its conservation.

To achieve the above objectives and in consistence with the provisions of the National Working Plan Code, 2004 as well as approval of the Working Plans' Committee, the following Working Circles have been constituted for the management of the forest area covered under the current plan:

1. The Selection Working Circle.
2. The Rehabilitation Working Circle.
3. The Plantation (Overlapping) Working Circle.
4. The J.F.M. (Overlapping) Working Circle.
5. The Forest Protection (Overlapping) Working Circle.
6. The Bamboo (Overlapping) Working Circle.
7. The NTFP (Overlapping) Working Circle.
8. The Wildlife (Overlapping) Working Circle.

11.5.1 Selection working Circle

The total area allotted to this working circle is 47495.35 ha. comprising of 15 RFs & 6PRFs.

11.5.1.1 Silvicultural System

The Selection system will be adopted with emphasis on sustainable production and stability of the ecosystem. The crop and soil condition will be improved by selective opening up of the canopy. No felling has been prescribed in eroded and steep hill slopes, blank areas and along nallah banks. Marking is a very important

exercise, requiring judicious application of skill. It should therefore, be carried out by a Range Officer under proper supervision of the Assistant Conservator of Forests and concerned DFO of the Division.

11.5.1.2 Choice of Species:

No species will be preferred at the cost of any other species. All species are to be given equal importance for conservation of species biodiversity and development of the forest. The emphasis of management is on conservation of biodiversity and development of balanced forest in which the natural selection of the species will be encouraged. The fruit bearing and important NTFP species such as Mahula, Amla, Chara, Kendu, Bahada, Harida and Bela will not be felled.

11.5.1.3 Exploitable Girth Class:

The exploitable girth class fixed for various species is based on the silvicultural rotation. The other factors such as site quality, production capacity, growth, yield and market demands etc. have also been taken into account. The exploitable girth of different species are reflected below:

LIST OF EXPLOITABLE GIRTH CLASS OF PRINCIPAL SPECIES IN ELECTION WORKING CIRCLE OF PHULBANI FOREST DIVISION.

Table No: 11.2

Sl. No.	Local Name	Botanical Name	Exploitable girth in cms.
1	2	3	4
01	Sal	Shorea robusta	150
02	Piasal	Pterocarpus marsupium	150
03	Bandhan	Ougeinia oojeinensis	120
04	Asan	Terminalia tomentosa	140
05	Dhaura	Anogeissus latifolia	145
06	Kurum	Haldina cordifolia	150
07	Mitkunia	Mitragyna parviflora	135
08	Mai	Lannea caromandelica	135
09	Sidha	Lagerstroemia parviflora	135
10	Kasi	Bridelia retusa	135

11.5.1.4 Felling Cycle:

The felling cycle has been fixed at 10 years, which synchronizes with the Plan period. In case of a longer felling cycle, the crop will remain unattended for over a long period of time. With a shorter felling cycle silvicultural operations can be taken up at shorter intervals to maintain the forests in a healthy condition.

11.5.1.5 Calculation of the yield

The yield was regulated by area with a percentage check on the removal of exploitable trees as calculated by Smythies' safeguarding formula. The average number of trees that can be removed for sal was calculated 0.4 per ha. and 0.6 per ha. for non sal. Further, fifty percent of the exploitable trees would be retained as a safeguarding measure against biotic pressure and for conservation purpose. In the approval letter of MoEF the following condition was laid out: the selection felling shall be restricted to those coupes were harvestable tree limit is 0.2 ha. and above for sal and non sal category.

The selection working circle also had subsidiary silvicultural operation. The selection working circle recommended that SSO shall be carried out in the year following the main felling. This shall be departmental operation done over the entire coupe area except in much degraded areas and steep slopes.

11.5.1.6 Analysis of selection working circle operations from 2007-08 to 2014-15

The working of timber coupes under selection working circle started from April 2008 after the approval of MoEF. Since the approval had come in March 2008 the coupes of 2007-08 were taken up as arrear coupes. Out of 10 coupes due in 2007-08 only 5 coupes were worked as arrear coupes in 2008-09 & 2009-10. The felling series wise analysis is as follows:

A. Barba felling series.

This series consisted of Barba RF & Badagada RF. The series has not been worked in 2007-08 which consisted of compartment-I part of Baraba RF & also not worked in 2009-10 for Baraba compartment-I & II part and Compartment-III. Based on the prescription of the working plan this series should have been felled about 1213 trees by 2014-15 but only 698 trees were felled. There is a deficit of 515 trees in

total600 cum of timber was produced. However, in coupe II, V & VI there was excess production owing mainly to the salvage of dead and uprooted trees.

This coupe was severely affected by Phyaline cyclone during October of 2013. 1464 nos of trees were uprooted due to phyaline in 2013-14. The total trees that are due for removal in all the 10 coupes comes to about 1577 trees. Whereas as of 13-14, 631 trees were removed in regular coupe working and 1464 trees were uprooted in Phyaline cyclone. In total 2095 trees were removed which is 518 trees excess.

B. Nandabali felling Series

This series consist entirely of Nandabali RF compartment I & II. This series was not worked in 2007-08, 2008-09 and 2009-10 mainly because of Naxal activities. This series should has actually fell 1489 trees by 2014-15 but only 1056 trees were felled and there is a deficit of 433 trees. However, there was excess production in coupe V, VI & VII owing to salvage of uprooted trees.

This coupe was severely affected by Phyaline cyclone during October of 2013. 2490 nos of trees were uprooted due to phyaline in 2013-14. That as per working plan the total trees that are due for removal in all the 10 coupes comes to about 1776 trees. Whereas as of 14-15, 838 trees were removed in regular coupe working and 2490 trees were uprooted in Phyaline cyclone. In total 3328 trees were removed which is 1552 trees excess.

This series consist of Ranaba RF compartment I to V and Machhaghat RF compartment I to IV. The series was not worked in 2007-08 to 2009-10 because of Naxalite problem. This series should have actually felled 1811 trees by 2014-15 but only 587 trees were felled. There being a deficit of 1224 trees. There is however excess production of 129 trees in coupe VII due to salvage of trees. This coupe in general has a deficit of exploitable girth trees.

This coupe was affected by Phyaline cyclone during October of 2013. 1052 nos of trees were uprooted due to phyaline in 2013-14. The total trees that are due for removal in all the 10 coupes comes to about 2363 trees. Whereas as of 14-15, 281 trees were removed in regular coupe working and 1052 trees were uprooted in Phyaline cyclone. In total 1333 trees were removed which is still less by 1030 trees. Since this coupe was not much affected by cyclone and the total tree removal has not exceeded the limit of extraction this series can remain in selection working circle.

D. Burtang North felling Series

This series consist of Archangi A RF, Archangi B RF, Burtang North RF (Compartment I, II & III), Khajuripada RF compartment III & Kalabagh RF (compartment IV & V, compartment XIII & XIV). The coupe was worked in all years. However, in coupe IV V & VI no felling was carried out because of non-availability of trees in exploitable girth. This series should have felled 1679 trees by 2014-15 but only 1243 trees were felled. There being a deficit of 436 trees. However, there was excess production in coupe II & III because of salvage of trees.

There was no affect of the cyclone in this felling series.

E.Chakapad-I felling Series

This series consist of Chakapad RF compartment I &Iv to VIII and Burtang South RF compartment V. This series was worked in all years except in 2014-15. Because of the phyline cyclone this coupe was severely affected in 2013 October. Therefore coupe felling was suspended from 2013-14 onwards. In 2013-14 however salvage of uprooted trees was done. This series should have felled 1715 trees by 2014-15 but in total 3441 trees were extracted thereby an excess of 1726 trees were extracted. This is mainly because of excess production from uprooted trees during salvage after phyline cyclone and also salvage of dead trees in coupe I to V.

This coupe was severely affected by Phyaline cyclone during October of 2013. 2323 nos of trees were uprooted due to phyaline in 2013-14. The total trees that are due for removal in all the 10 coupes comes to about 1892 trees. Whereas as of 12-13, 2992 trees were removed in regular coupe working and 2323 trees were uprooted in Phyaline cuclone. In total 5315 trees were removed which is 3423 trees excess.

F. Chakapad II felling Series

This series consist of entirely Chakapad RF compartment II, III, IX and XIV to XXI. This series was worked all the years. This series should have felled 3054 trees by 2014-15 but in total 5054 trees were felled. There has been excess extraction of 2000 trees. This was mainly because of salvage of dead trees and salvage of uprooted trees due to phyline cyclone.

This coupe was severely affected by Phyaline cyclone during October of 2013. 2645 nos of trees were uprooted due to phyaline in 2013-14. The total trees that are due for removal in all the 10 coupes comes to about 3376 trees. Whereas as of 13-14, 4947 trees were removed in regular coupe working and 2645 trees were uprooted in Phyaline cyclone. In total 7592 trees were removed which is 4216 trees excess.

G. Ranipathar felling Series

This series consist of Ranipathar RF compartment VII to XII, Sudrukumpa RF compartment I, III, IV, V and VII & Donga RF compartment III. This coupe was also worked in all the years. There was however no extraction in coupe IV because of non availability of exploitable trees. There was excess production in compartment II because of salvage. This series should have felled 2603 trees by 2014-15 but only 1773 trees were felled. There is a deficit of 830 trees. The coupe was not affected by Phyaline cyclone.

H. Donga felling Series

This series consist of Donga RF compartment I, IV, VII & XI to XVI and Ranipathar RF compartment I to VI. This series was worked in all the years. The series should have felled 2719 trees by 2014-15 but only 1379 trees were felled thereby leaving a deficit of 1340 trees. The coupe was not affected by Phyaline cyclone.

I. Kiamunda felling Series

This series consist of Kiamunda PRF compartment II & Krandibali East RF compartment II & VII. This series was not worked in any of the year except compartment VII. As per the MoEF condition this series was not marked for felling because the harvestable trees are less than 0.2 per ha. In compartment VII salvage of 73 numbers of trees was done in 2013-14. This coupe has no scope of extraction of exploitable girth trees. Therefore it is suggested that this coupe shall be removed from selection working circle and placed under Protection working circle.

J. Karada felling Series

This series consist of Karada PRF compartment II & III and Sikabadi PRF compartment II. This series was not worked from 2007-08 to 2010-11 because of Naxal activities. This series should have felled 1865 trees by 2014-15 but only 490 trees were felled leaving a deficit of 1375 trees. This deficit is because of steep slopes in Karada PRF and Sikabadi PRF.

11.5.1.7 Achievements in timber subsidiary silvicultural operations

As per the working plan recommendation and the conditions of MoEF all the timber coupes worked every year are to be treated with silvicultural operations in the succeeding year. Therefore by 2014-15 all felling series until coupe No.-7 should have been treated silvicultural operations. The total area in all felling series from Coupe -1

to 7 which were due for SSO work between 2008-09 to 2014-15 comes to 35583.54 ha. however between 2008-09 to 2014-15 only 17455 ha. was treated with SSO work. This is about 49% of achievement. There is therefore an urgent need to treat the arear coupes if not the regeneration potential of the selection working circle will be severely affected.

11.5.2 Rehabilitation working circle:

In the current working plan rehabilitation working circle is constituted with a total area of 99139.82ha. of forest area to facilitate proper and systematic to the degraded forest. A total of 45 numbers of treatment series were found for the management with the following objectives.

(i) To rehabilitate and restock the degraded forests for environmental stability in the locality.

(ii) To provide protection to the degraded forests with participation of villagers of the adjoining villages through Joint Forest Management. (J.F.M.).

(iii) To improve site quality through soil and moisture conservation measures.

(iv) To improve/restore the micro-climate and micro-edaphic conditions.

(v) To increase the biodiversity in the forest crop by encouraging natural regeneration.

(vi) To tend and improve the existing growing stock through suitable silvicultural measures in order to get better growth.

(vii) To meet the need of local people with regard to firewood and small timber to the extent possible, depending on the productivity, to ensure people's participation in protection of forests.

The treatment series included forest blocks in all the Ranges except Karada Range. Each treatment series was divided into 10 coupes. The working plan prescribed 6 treatment types designated A to F for forest with various stages of degradation. This working circle was in operation since the year 2007-08 and had completed eight years of working by the end of March 2015. The working of RWC was done mainly through two programmes: (a) ANR with gap plantation & (b) ANR without gap plantation. In ANR with gap plantation gaps were planted with seedlings at the rate of 200 plants per ha. minimum gaps of 0.4 ha. were selected for plantation. In case of ANR without gap plantation, no plantation was taken. In both the methods soil moisture conservation and silviculture tending operations were carried out in the selected areas. A major part of rehabilitation working circle was worked through

funding of CAMPA APOs 2009-10, 2010-11 & 2011-12 and a small portion through state plan scheme and MGNREGS. The CAMPA Scheme was completely ANR without gap plantation.

From 2007-08 to 2014-15 only 5392 ha. of forest area was treated out of a total target of 79498.63 ha. until 2014-15. Therefore the achievement in this working circle is only 6.8%. Of the 5392 ha, 4822 ha.were treated by ANR without gap plantation and 570 ha. was treated with ANR gap plantation. In Phulbani Division OFSDP programme was in operation in 240 VSS between 2006-07 to 2014-15 for a period of 9 years. Through JFM mode of implementation degraded forest area falling in VSS assigned area was treated. The 240 VSS covers 7999 ha. of reserved Forest area and 1652 ha. of PRF area. This forest area also overlaps the rehabilitation working circle. Therefore in affect this area was also treated by ANR without gap treatment. Total of this area is 9649 ha. the net achievement in RWC therefore is9649 ha. plus 5392ha. which is 15041 ha. the achievement in RWC is therefore 18.9% of target.

With respect to silviculture treatment adopted all the recommendations meticulously adopted by the implementing Officers. However no thinning prescription was implemented as no suitable site was identified.

It is to be noted that the division has implemented 600ha in 2012-13, 1900 ha.in 2013-14 and 500 ha. in 2014-15 of ANR with gap plantation. This area was implemented through MGNREGS Scheme. Most of this area is falling outside the working plan area in revenue forest land.

11.5.3 Bamboo overlapping working circle

In the current working plan the bamboo overlapping working circle covered all the bamboo bearing forest areas and overlapped the selection and rehabilitation working circles except the areas under protection working circle. A total of 10109.04 ha. was allotted to this working circle with the following objectives.

1. To improve the growing stock of Bamboo by appropriate silvicultural operations.
2. To obtain maximum possible yield of Bamboo to meet the bonafide requirement of both the local community including artisans as well as pulp industries in perpetuity.
3. To enforce scientific cutting rules to ensure maximum yield on sustainable basis so as not to effect the future yield.
4. To rehabilitate the exhausted bamboo bearing areas through appropriate measures like tending, soil working, plantation etc.

5. To generate employment for the local poor people.

The forest block wise distribution of area to this working circle is provided in the following table.

Table No.: 11.3 - Range wise and compartment wise area allotted to BoWC

Sl. No.	Name of Forest Block	Compartment		Total area of the Block allotted in BoWC Ha.
		Comptt. No.	Area in Ha.	
1	2	3	4	5
I. Sudurukumpa Range				
1	Donga R.F.	01 to 17	6792.96	6792.96
2	Ranipathar	01 to 12	5191.92	5191.92
3	Sudurukumpa R.F.	01 to 09	4457.23	4457.23
II. Phulbani Range				
04	Burtanga 'N' R.F.	01 to 04	1805.30	1805.30
05	Khajuripada R.F.	01 to 04	2637.72	2637.72
06	Kalabagh R.F.	01 to 14	5055.01	5055.01
07	Palchi R.F.	01 to 04	1886.92	1886.92
III. Phiringia Range				
08	Baghanadi R.F.	01 to 14	9776.09	9776.09
09	Ladapadar R.F.	01 to 05	1530.57	1530.57
10	Kerandibali 'W' R.F.	01 to 07	4967.57	4967.57
11	Gochhapada R.F.	01 to 10	5038.33	5038.33
12	Kerandibali 'E' R.F.	01 to 07	3349.77	3349.77
IV. Tikabali Range				
13	Chakapad R.F.	01 to 21	12775.52	12775.52
14	Ghudukapadar R.F.		199.81	199.81
15	Archangi 'A' R.F.		225.84	225.84
16	Archangi 'B' R.F.		210.39	210.39
17	Burtang 'S' R.F.	01 to 06	5167.59	5167.59
V. Karada Range				
18	Baraba R.F.	01 to 05	1551.43	1551.43
19	Machhaghat R.F.	01 to 04	1909.16	1909.16
20	Ranaba R.F.	01 to 05	2815.40	2815.40
		Total R.F.		**77,344.53**
P.R.Fs				
I. Phulbani Range				
01	Ganjuguda 'B' PRF	01 to 02	1055.74	1055.74
II. Phiringia Range				
01	Balandapada 'N' PRF	01 to 02	1321.55	1321.55
02	Balandapada 'S' PRF	01to 04	5872.23	5872.23
III. Tikabali Range				
03	Baradikia		56.09	56.09
04	Budukakhole PRF		59.73	59.73
05	Nandini 'A' PRF		151.71	151.71
06	Nandini 'B' PRF		46.94	46.94

07	Mundula PRF	01 to 02	275.36	275.36
IV. Karada Range				
08	Nandabali PRF	01 to 02	3553.04	3553.04
09	Badegarh PRF	01 to 02	1601.40	1601.40
V. Raikia Range				
10	Sikabadi PRF	01 to 02	2640.27	2640.27
11	Karada PRF	01 to 04	7112.47	7112.47
		Total PRF		**23,746.53**
		Grand Total		**1,01,091.06 Ha.**

The silvicultural system prescribed was culm selection clump improvement with simultaneous cleaning and cultural operation for salia and daba bamboo. The felling cycle of 4 years was adopted for both salia and daba. Each cutting series was divided into 4 annual coupes named A,B,C,D.

The bamboo overlapping working circle was operated from 2007-08 to 2010-11 by means of approved bamboo working schemes. The working of bamboo working circle as per the current working plan started from 2011-12 onwards. The number of cutting series and area of each series in working scheme is not same as in working plan. The working scheme had 23 cutting series with a total area of 99888.23 ha. Whereas the working plan had 22 cutting series with a total area of 101091.4 ha.

Since the starting of working of bamboo coupes from 2007-08 two cutting cycles have been completed by 2014-15. In case of RF blocks the coupe sequence started with C coupes and in case of PRFs it started with D coupes. The following table No. 11.4 gives the abstract of bamboo production in different years since 2007-08 in Phulbani Forest Division.

Table No.11.4
Annual Bamboo Production in Phulbani Forest Division

Year	No. of coupes due for working	No. of coupes worked out	Outturn of coupes		Working Agency
			IB (in SU)	CB (in Nos)	
2007-08	23	16	16025.51	26301	JK Paper (RMP)
2008-09	23	17	7012.79	21500	JK Paper (RMP)
2009-10	23	17	5082.35	6535	JK Paper (RMP)
2010-11	23	17	8067.45	9270	JK Paper (RMP)
2011-12	22	12	11738.35	7584	JK Paper (RMP)
2012-13	22	1	--	3000	OFDC
2013-14	22	5	445.16	8500	OFDC

2014-15	22	2	60.38	2500	OFDC

From the above table it can be seen the production of industrial bamboo was highest in 2007-08, about 16,000 su. During the time from 2007-08 to 2011-12 bamboo was worked through raw material procurer i.e. JK Paper Mill. Since 2012-13 from the time OFDC has taken up bamboo felling the production is almost nil. The OFDC although has taken delivery of all the coupes had surrendered most of the coupes in the respective years. This was because of managerial problems within OFDC and not related to non-productivity of the coupes. The coupes that showed excess production than estimated in the first cutting cycle are Donga West C & B, Bilabadi C&A, Burtang North D&B, Sudrukumpa C,D&B, Gochapada D, Burtanga South C, Baraba C&B, Ranaba C&B, Machhaghat C&A, Balandapada A,B,C,D, Chakapad B, Badagada D and Karada D&C. The coupes which showed excess production than estimated in the 2nd felling cycle as per the current working plan are Sudrukumpa D, Kalabagh B, Baghanadi C, Burtang South C, Baraba C, Ranaba C, Machhaghat C, Badagada D&B. The cutting series Ranipathar South, Donga East and Khajuripada were never worked from 2007-08. The series had spars and degraded bamboos and are completely of C treatment type.

The bamboo overlapping working circle recommended for simultaneous silvicultural operation in all the coupes worked for bamboo felling and in all the bamboo areas were B & C treatment type is required. It also recommended for plantation in C type areas of Bamboo working circle. There has been no gregarious flowering of bamboo in Phulbani Forest Division between 2007-08 to 2014-15 whereas sporadic flowering is noticed in some of the forest blocks.

11.5.4 Plantation overlapping working circle

This working circle includes all those blocks that have permanent blanks and barren land, which are devoid of root stock and natural regeneration. Also included under this Overlapping Working Circle are the old existing plantations raised during and/or prior to the outgoing plan period. In Phulbani Forest Division the plantation working circle mainly overlaps the Rehabilitation Working Circle and a small portion of Selection Working Circle. The working circle was constituted with the following objectives :

1. Regeneration and eco-development of degraded forests and adjoining areas on watershed basis.

2. Augmentation of availability of fuelwood, fodder and grasses from the regenerated areas.
3. To restock the barren and permanent blanks, besides enclosed areas by raising plantation of suitable species through artificial regeneration.
4. To maintain existing old plantations by appropriate tending operations.
5. To harvest mature plantations to meet the requirement of both the industry and the local people by following necessary replanting as per the silvicultural requirements.
6. To concentrate more on such choice of species which have proved successful for their locality.
7. To implement measures to conserve soil and moisture thereby enhancing the land productivity.
8. Securing people's participation in planning and regeneration efforts to ensure sustainability and equitable distribution of forest products from the regenerated lands and to promote partnership concept in the management and administration of forests and common property resources.
9. Promote agro-forestry and development of common property resources.
10. Promotion of fuel saving devices to encourage efficient use of fuelwood and to reduce the drudgery of rural/tribal women involved in collection of wood as also to improve environment.
11. To encourage and improve the plantation of NTFP species like bamboo, cane and medicinal plants.
12. To develop water resources through plantation and water harvesting programme.
13. Development and extension of improved technologies such as clonal propagation and use of root trainers for raising seedlings, mycorrhizal inoculation etc.
14. Rehabilitation of special problem lands like saline/alkaline soil, ravines, etc. Employment generation for the disadvantages sections of society, particularly women, scheduled castes/scheduled tribes and landless rural labourers, inhabiting the forests and adjoining areas.

Broadly three categories of lands are covered under this Working Circle as detailed below:

1. The first is that of blank areas which require artificial regeneration/plantation.

2. The second covers old plantation areas which need only protection and tending/thinning operations exclusively available pure teak plantations.

Both the above categories constitute a total area of 2165 Ha.

The total area allotted to the working circle is therefore 2165.0 ha. and it comprises both the plantable area as well as existing plantation. The block wise and Range wise distingution of area in this working circle is provided in the following table No.11.5

Table No. 11.5 Area allotted to Plantation (Overlapping) W.C.

Sl.No.	Name of Forest block	Status	Area of the block	Area under Plantation in Ha.	Area now allotted in Ha.	Total allotted area to Plt. WC in Ha.
I. Sudurukumpa Range						
1	Ranipathar	RF	5191.9147	432	--	432.00
				432		**432.00**
II. Phulbani Range						
2	Muskuli	RF	1161.3809	100.0	--	100.00
3	Ghugulasahi	RF	116.7626	118.0	--	118.00
4	Bhaliapada	RF	250.6065	40.00	--	40.00
5	Balaskumpa	RF	342.8661	30.00	--	30.00
6	Dakapalla 'B'	RF	318.1689	20.00	--	20.00
7	Khaumunda	RF		20.00	--	20.00
				328.00		**328.00**
III. Tikabali Range						
8	Chakapad	RF	12,775.5269	120.00	--	120.00
9	Burtang 'S'	RF	5167.5846	35.00	--	35.00
10	Lianpada	RF	3044.961	10.00	--	10.00
				165.00		**165.00**
IV. Raikia Range						
11	Lendrikia	RF	947.1978	10.00	50.00	60.00
12	Dibari	RF	203.7817	20.00	--	20.00
13	Raikia	RF	594.3900	--	50.00	50.00
14	Sikabadi	PRF	2640.2627	90.00	65.00	155.00
15	Karada	PRF	7112.4657	--	100.00	100.00
				120.00	**265.00**	**385.00**
V. Karada Range						
16	Baraba	RF	1551.4248	200.00	--	200.00
17	Badegarh	PRF	1601.3978	20.00	--	20.00
18	Nandabali	PRF	3553.0308	80.00	--	80.00
				300.00		**300.00**
VI. G. Udayagiri Range						
19	Rotingia	RF	116.306	50.00	NIL	50.00
20	Pukulingia	RF	169.471		20.00	20.00
21	Kanabagedi	RF	192.530	10.00	NIL	10.00

22	Podangi	RF	1842.462	15.00	NIL	15.00
23	Bakingia	PRF	1856.9459	NIL	80.00	80.00
24	Paburia	PRF	1456.204	25.00	NIL	25.00
				100.00	**100.00**	**252.40**
VII. Phiringia Range						
25	Dahisar	RF	214.787	15.00	NIL	15.00
26	Gerupada 'E'	RF	236.194	50.00	NIL	50.00
27	Gochhapada	RF	5038.343	10.00	NIL	10.00
28	Bandhagarh 'A'	PRF	3592.921	120.00	80.00	200.00
29	Kelapada 'B'	PRF	224.64	10.00	NIL	10.00
30	Mallikpada	PRF	660.169	50.00	NIL	50.00
31	Nuapadar	RF	705.721	NIL	20.00	20.00
				255.00	**100.00**	**355.00**
			Grand Total	**1700**	**465**	**2165.00**

Out of the total area 2165 ha. allotted to this working circle only 465 ha. was recommended for new plantation. The 465 ha. was distributed in 4 planting series. Each planting series was divided into 10 annual coupes. Each coupe therefore had an average 10ha. area to 20ha. area. The series wise distribution is provided in the following table:

Table No.: 11.6 Allotment of Blocks and Compartments into different planting series (P.S)

Sl. No.	Planting series	Range	Name of the block	Status	Comptt. No.	Area in Ha.	Area of P.S. in Ha.
1	2	3	4	5	6	7	8
I	Raikia	Raikia	1. Raikia	RF	--	50	
		-do-	2. Lendrikia	RF	--	50	
						100	100
II	Karada	Raikia	1. Sikabadi	PRF	C/2	65	
		-do-	2. Karada	PRF	C/3	100	
						165	165
III	G. Udayagiri	G. Udayagiri	1. Pukulingia (G. Udayagiri 'A')	RF	--	20	
			2. Bakingia	PRF	C/1,2	80	
						100	100
IV	Bandhagada	Phiringia	1. Bandhagada 'A'	PRF	C/1,2	80	
			2. Nuapadar	RF	--	20	
						100	100
Grand Total				4 nos. of Planting Series			465

The major difficulty in allotment of planting coupes has been small size of the plantation coupe. In most of the plantation schemes the norm for watch and ward is

such that a minimum of 20 to 25 ha. is required for providing round the year watch and ward. Therefore the 10ha.coupe area is not affective.

The current working plan also provided for teak tending treatment. The existing teak plantation have been constituted into 26 tending series constituting 1700 ha.

Achievements :

Since 2007-08 the plantation undertaken in Phulbani Forest Division cumulatively amounted to 1380 ha. and bamboo plantations amounted to 315 ha. Table No.11.06 & 11.07 gives an abstract of plantations scheme wise and year wise achieved in Phulbani Forest Division between 2007-08 and 2014-15.

Table No. 11.7 Achievement of Block Plantation under different schemes

Scheme	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
B. Econ plntn.	50							50	100
CAMPA 09-10				250					250
OFSDP (Non-JFM)		100	130	410					640
13TH FC									
inside W.P.					100	100	0		200
Outside W.P.					30	80	30	50	190
Total	**50**	**100**	**130**	**660**	**130**	**180**	**30**	**100**	**1380**

Table No. 11.8 Achievement of Bamboo Plantation under different schemes

Scheme	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
State Plan - OBDP	0	0	0	0	30	30	30	30	120
NBM - CP	0	20	0	0	0	50	20	105	195
Total	**0**	**20**	**0**	**0**	**30**	**80**	**50**	**135**	**315**

It is seen that out of 465 ha. of plantation working circle area 415 ha. was achieved. In most of the plantation series the achievement has exceeded the target but in Karada out of a target of 100 ha. only 10ha. was achieved. Plantation was done in 960 ha. of area lying inside the working plan and 320 ha. in revenue forest land

lying outside working plan area therefore the net planted area in 8 years of plantations has come to 1695 ha including bamboo plantation.

Regarding the achievement of teak tending series out of the total target of 1700 ha.200 ha.was achieved in the year 2014-15 under CAMPA 2013-14.

11.5.5 Wildlife Overlapping working Circle

The wildlife overlapping working circle covers the entire working plan area. This working circle was constituted with the following objectives:

1) To conserve, protect and improve wild life habitat with special emphasis on unique, special, macro habitat and riparian Zones of the Division.

2) To promote wild life in general and endangered species in particular by appropriate site specific and realistic management techniques.

3) To create awareness among the local people to have compassion for wild life with required justification for their important role and conservation of their habitat.

4) To conserve and develop ecotourism sites.

5) Eco-development planning for biodiversity conservation and increase in population of wild life by providing enabling (conducive) environment in respective forest blocks.

6) Eco-Administrative unit approach for management of wild life.

7) Prevention of wild life related crimes and enforcement of existing laws by following systematic procedure in accordance with the provisions of law.

8) Study and analysis of Conservation-Development linkages.

9) Feasibility analysis of livelihood strategies of village communities living in and around the forest areas.

10) Conflict management, problem analysis and objective setting to achieve desired output in a sustainable manner.

The circle in fact covered the entire geographic area of the division as far as protection of wildlife is concerned. Regarding the implementation of the working circle the following activities were taken up during the working plan period between 2007-08 to 2014-15:

a. Creation of water bodies for management of habitats

In the current working plan period a total of 51 numbers of Water bodies of the dimension 30mtr x 40 mtr x 3mtr were opened in different forest blocks of the division. **The list of water bodies created is furnished in Table No.5.3 of**

Chapter-5 of Part-I. The location of the water bodies was selected such that the water body falls in the drainage line at the base of the foothills. Since most of the reserve forests boundary lines are running about 2 contours from the base of the hill, the water bodies were mostly located in Keshra Forest.

b. Prevention and control of forest fire.

The forest of Phulbani Division are highly prone to forest fire from the month of March to May. The most critical period is from March 20th to April 30th. The major reasons for forest fire has been NTFP collection such as Mahula, honey and Kenduleaf collection. Fire is also ignited in forest area for hunting of animals by poachers. Every year 500 kms of fire line under CAMPA scheme is being maintained by forest deptt. to prevent this spread of fire. Further, an additional 100 kms is being maintained under the scheme IFM. For control of forest fire fire squads have been deployed in all the Ranges. 6 fire squads consisting of 10 workers and a vehicle for movement were deployed under 13th FC grant between the year 2010-11 to 2014-15. Further, additional 4 squads were deployed under CAMPA scheme. The squads move to the forest fire occurrence places and control them round the clock.

c. Deployment of anti poaching squad.

One squad consisting of 10 workers and a vehicle has been deployed in Karada Range. The squad mainly worked in patrolling the elephant movement areas and prevent any poaching of elephants.

d. Construction of anti poaching shed.

One anti poaching shed was constructed in Karada Section of Raikia Range. The anti poaching shed was used by elephant trackers and squad deployed under state plan scheme elephant management.

e. Deployment of anti-depredation squad.

One squad consisting of 10 workers and a vehicle has been deployed in Tikaballi Range, Chakapad Section. The squad moved in elephant depredation areas for protecting the crops of people and also the elephants.

f. Improvement of communication infrastructure

VHF towers were erected in the remote areas of Karada Range, Raikia Range, Tikaballi Range & Sudrukumpa Range. The improvement in communication helped in quick movement of squad and staff thereby protecting the forest.

A total of 13 numbers of cases were booked in Phulbani Forest Division relating to wildlife offences. The list of such offences year and place of occurrence is provided in Table No.3.4 of Chapter-III of Part-I**.**From the table it is understood the Ranipathar RF and Donga RF are critical areas regarding wildlife offences.

With respect to implementation of corridor development the current working plan has proposed 6 corridors in Karada Range, Sudrukumpa Range and Phulbani Range. In the working plan period no such corridor activities were under taken. These routs although proposed as corridors are not recognised as elephant corridors perse. Instead these areas are now being treated as only elephant movement tracks. The detailed movement tracks in Raikia Range, Karada Range, Tikaballi Range, Sudrukumpa Range and Phulbani Range are available on GIS platform with the division. The elephant movement in Sudrukumpa and Phulbani Range is from Boudh Division. This movement is rare and happens once in 3 or 4 years. The movement in Tikaballi is from Nayagarh Division and occurs every year during crop maturing time. The movement in Raikia and Karada Range is quite frequent and occurs almost every time of the year. There is continuous movement in these Ranges from Ghumsur South and North divisions.

11.5.6 FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

The total area allotted to this working circle was 5025.19 ha. Majority of forest blocks included here are the ones which have been badly affected due to regular removal of biomass and some blocks are included which have valuable high forests, these are now becoming targets of timber smugglers in an organized way. Both these type of blocks need intensive protection measures so that pressure of biomass removal is reduced substantially so that silvicultural operation prescribed in the main working circle will yield the desired result. The main species in these forests are Sal and its associates like Piasal, Sisso, Asan, Dhaura, Kurum, Kasi, Kangada, Rai, Bandhan etc.The working circle was constituted the following objectives;

1. To protect these forests from fire and grazing and also to provide strict vigil against illicit felling, encroachment, poaching and shifting cultivation.
2. To keep delicate and eco-fragile areas ecologically intact by maintaining adequate vegetative cover.
3. To arrest further degradation and enhance the natural regeneration by adopting strong protection measures to minimize biotic inteRFerence.
4. To rehabilitate and restock the degrade forest.
5. To provide protection to the degraded forests with active participation of villagers of the adjoining villages through JFM.
6. To improve the site quality through soil and moisture conservation measures.
7. To improve/restore the micro-climate and micro-edaphic conditions.
8. To increase the biodiversity in the forest crop by encouraging natural regeneration.
9. To tend and improve the existing growing stock through suitable silvicultural measures in order to get better growth.
10. To meet the needs of local people with regard to firewood and small timber to the extent enjoyed depending on the productivity, to ensure peoples participation in protection of forests.

The allocation of forest blocks to this working circle is as follows;

Table No: 11.9 Details of Different Protection Units and their Constitution

Unit Name	Range Name	Name of the Forest Block	Block Status	Extent/ Comptt.	Block Area included in Ha.	Unit Area in Ha.
1	2	3	4	5	6	7
1. Khajuripada	Phulbani	1. Balaskumpa	RF	Full	342.86	
		2. Bhaliapada	RF	Full	250.60	
		3. Dutimendi	RF	Full	154.84	
		4. Pandrisuga	RF	Full	95.82	
Total					**844.12**	**844.12**
2. Phulbani	Phulbani	1. Dakpalla 'A'	RF	Full	275.15	
		2. Dakpalla 'B'	RF	Full	318.17	
		3. Khaumunda	RF	Full	213.84	
Total					**807.16**	**807.16**
3. Phiringia	Phiringia	1. Gerupada 'E'	RF	Full	236.19	
		2. Gerupada 'W'	RF	Full	199.47	
		3. Kelapada 'A'	PRF	Full	125.81	
		4. Kelapada 'B'	PRF	Full	224.65	

		5. Kelapada 'C'	PRF	Full	68.66	
Total					**854.78**	**854.78**
4. Tikabali	Tikabali	1. Tikabali	RF	Full	84.25	
		2. Beheragaon	PRF	Full	305.35	
	G. Udayagiri	1. Kalinga Sandal wood	RF	Full	31.39	
		2. Kanabagedi	RF	Full	192.53	
Total					**613.52**	**613.52**
5. Dibari	Raikia	1. Dibari	RF	Full	203.78	
		2. Kilundi	RF	Full	260.24	
Total					**464.02**	**464.02**
6. Raikia	Raikia	1. Lendrikia	RF	Part	897.20	
		2. Raikia	RF	Part	544.39	
Total					**1441.59**	**1441.59**
Grand Total of 6 numbers protection units					**5025.19**	**5025.19**

This working circle did not recommend any special silviculture method for the treatment of this working circle. Since this is overlapping working circle, the silviculture system to be followed will be as prescribed in the primary circle to which individual block of compartment was initially allotted. The treatment prescribed for this working circle was as follows;

1. The area should be rigidly protected from illegal biomass removal so as to keep it under nature's own care and nursing.
2. Areas of forest blocks on steep precipitous slopes and eco-fragile areas would be specially protected to ensure there is no loss of vegetation or soil cover.
3. Steps will be taken to prevent fire and grazing in the forests.
4. Boundary, compartment and blocks should be maintained.
5. Forest road network should be maintained.
6. Communication network-VHF sets should be used effectively to check smuggling of forest produce.
7. Special anti-smuggling squads and fire fighting squads should be created out of V.S.S. members for each protection unit.
8. There should be plan for inter-cultivation of suitable need based crops.
9. Provision for employment during lean period (November to March).

The protection cycle prescribed was five years for each of the six protection units, so that each protection unit shall be treated twice in the current working plan. In total twenty forest blocks have been included under this working circle. The protection problems in most of this forest blocks is related to removal of fire wood by

head loads and pole sized crop. All this forest blocks are sal, sal mixed, miscellaneous , vegetation with coppice shoots.

Achievements

The implementation of this working circle was not carried according to the annual coupes as laid out in the current working plan. Instead the whole forest block was taken as a unit and protection measures were implemented. The following measures were implemented:

1. VHF towers of 100" height were established in all Ranges and VHF handsets were supplied to all the foresters for effective communication. VHF base sets were also installed in all the Range vehicles of the Division. The infrastructure was developed through the funding from CAMPA scheme in the year 2013-14.
2. In order to involve people in protection of these forests 24 nos. Of VSS were constituted around these forest blocks.
3. No encroachments have been reported or booked in these forest blocks between 2007-08 to 2014-15.
4. In all the twenty forest blocks boundary maintenance was done at least once in the current working plan. During the process of boundary maintenance pillars were repaired and maintained.
5. There has been report of shifting cultivation in the above forest blocks.
6. The practise of fuel wood removal and pruning of sal saplings for turmeric cultivation is very much prevalent .Because of this most of the crop in these forest blocks is still open and consists of pole crops and coppice shoots. Therefore the forest cover has not changed much during the current working plan period.
7. The cattle grazing was also not restricted. Whereas the working plan prescribed the closing of these blocks from grazing for 5 years.

Therefore from the above achievements it is clear that the forest blocks under protection working circle didn't make much head way in increasing the Biomass and forest cover. It is therefore recommended that these forest blocks shall continue to remaining in protection working circle in the next working plan period also.

11.5.7 JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

The JFM (Overlapping) Working Circle includes the Working Plan area that is already under the protection of the V.S.S. constituted as per the joint forest management resolution of the State. In 2006-07 there were 483 Nos. Of VSS with an allotment of 30750 ha.of forest land. Therefore the total area allotted to this Working

Circle was 30750.77 ha. This is an Overlapping Working Circle which mainly overlaps the Rehabilitation Working Circle. The important forest blocks included in this Working Circle are:

1. Donga R.F.
2. Khaumunda R.F.
3. Kalamuri R.F.
4. Dakapalla R.F.
5. Sudrukumpa R.F.
6. Gumagarh R.F.
7. Ranaba R.F.
8. Machhaghat R.F.
9. Baraba R.F.
10. Karada P.R.F.
11. Sikabadi P.R.F.
12. Bandhagarh 'B' R.F.
13. Gochhapada R.F.
14. Baghanadi R.F.
15. Nuapadar R.F.
16. Bandhagarh 'A' P.R.F.
17. Gerupada R.F.
18. Lendrikia R.F.
19. Chakapad R.F.
20. Tudubali R.F.
21. Padangi R.F.
22. Tikabali R.F.
23. Burtang (S) R.F.
25. Palchi R.F.
24. Kerandibali R.F.

The working circle was formed with the following objectives;

1. To involve communities in forest and natural resources management and soliciting their active participation.
2. To bring the people and Forest department as equal partners in management practices.
3. To restock barren and blank areas through artificial regeneration or Assisted or Aided Natural Regeneration (ANR).
4. To enrich available growing stock by appropriate and site specific silvicultural practices.
5. To increase the productivity of the soil through suitable soil and moisture conservation measures.
6. To encourage people for rational utilization of their own community resources for the development of the community in a sustained manner.

7. To involve, guide and facilitate people in judicious and scientific NTFP collection, storage, value addition and trade.
8. To create multiple income generating activities in villages protecting the forests.
9. To study the scope of enhancing the network of VSS protection areas.

Achievements

The working circle was given maximum attention and effort in the current working plan period. This was achieved because of the implementation of OFSDP (Odisha Forestry Sector Development Project). The project was implemented since 2006-07 and was closed in 2014-15 for a period of 9 years. The project was implemented with following objective:

"To restore degraded forests and improve the income level of villages by promoting sustainable forest management including JFM plantation and community / tribal development, thereby improving environment and alleviating poverty."

In this project, a total of 240 VSS were adopted with a total assigned area of 26558.706 ha. Among these villages some of them are registered previously and a majority of them have been newly constituted in different phases. The previously registered VSS were once again re- surveyed and additional area was allotted such that every VSS participating in the project had assigned forest area ranging between 100 ha. to 200 ha. The implementation of the project was done in 5 phases the following table shows the year wise, phase wise VSS treatment.

Table No.11.10 Phase wise No. of VSS initiated in Phulbani Forest Division

Phase	Year	No. of VSS initiated
1st	2008-09	60
2nd	2009-10	86
3rd	2010-11	61
4th	2011-12	19
5th	2012-13	14
	Total	**240**

The project had undertaken rehabilitation of degrade forest area in these 240 VSS through Joint Forest Management mode. The abstract of total achievement in the current working plan period in terms of rehabilitation of degraded forest is

presented in the following table No.11.10. It is clear the project was able to achieve rehabilitation of degraded forest to the extent of 22708 ha. in the current working plan period.

Table No. 11.11 Restoration of Degraded Forest: (JFM Mode) under OFSDP of Phulbani Division

Name of the Component	Year wise Achivement (ha.)					Total Achievement (ha.)
	2008-09	2009-10	2010-11	2011-12	2012-13	
ANR without Gap Plantation	3868.5	5243	5844	1963	930	17848.5
ANR with Gap Plantation	989.5	1537	350	215	130	3221.5
Economic	89	147	121	77	174	608
Fuel & Fodder	82	210	82.5	21	78	473.5
Bamboo & Cane	24.5	27	67	28	31	177.5
NTFP	89	177	83	0	30	379
Grand Total	**5142.5**	**7341**	**6547.5**	**2304**	**1373**	**22708**

The working circle area has drastically increased in the current working plan because of registration of a number of new VSS. The difference between 2007-08 to 2014-15 in terms of the no. of VSS registered and total area of assignment is given in the following table. No.11.11 **No of VSS registered in Phulbani Forest Division and areas assigned**

Year ending	Total No. of VSS registered	Extent of forest area			Total (ha)
		RF (ha)	PRF (ha)	Rev. Forest (ha)	
March,2007	483	18670.96	3455	8624.81	30750.77
March,2015	613	*7997.068	*1652.36	*17334.69	50190.06

* The area compiled pertains to only 240 vss under OFSDP funding.

From the above table it is clear that in the current working plan period 130 new VSS registered and an additional area of 19439.29 ha. of forest area was added into this working circle. The management intervention was however taken up in only the 240 VSS under OFSDP project. In addition from 2013-14,10 Number of VSS were taken up under FDA funding for management. in the year 2015-16, 88 No. of VSS have been proposed for inclusion in Ama Jungle Yojana.

The VSS under OFSDP have been evaluated for Forest Cover Changes through GIS based analysis. For capturing the change, the image at the time of inception of the VSS on the image of 2013 were compared for Forest Cover density. The changes in terms of the classes viz shrub, open, modern and dense forest classes was analysed. From the analysis the overall trend has been a decrease in open forest and increasing moderate dense forest. However some of the VSS area have shown a decrease in dense forest cover marginally. There is however no loss in forest covers in any of the VSS.

In the current working plan the method of execution of VSS management such as General Body Meetings, Executive Body meetings, Survey demarcation, Micro plan preparation were described in detail. All these recommendation were scrupulously followed in the 240 VSS under the management through OFSDP funding. All the 240 VSS had a micro plan prepared during the initiation of VSS. Further, after completion of 5 years the micro plans were revisited and revised with involvement of a partner NGO.

With regard to capacity building a detail programme was implemented under OFSDP by involving an external capacity building agency. In Phulbani Division CBSA was employed for capacity building of 240 VSS. In the capacity building programme , the VSS members were trained in technical forestry matters and also account and book keeping practises. Most of the VSS members were also given exposure visits. A wide range of Entry Point Activities were also executed based on the area of treatment executed by each village.

The other interventions that were undertaken to improve the livelihood of the people of VSS are as follows; construction of link roads, causeways & culverts, non formal education through employment of teachers, health camps, IGA activities and development of cluster infrastructure.

This working circle has performed very well and achieved all its objectives.

11.5.8 THE NON TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

This working circle entirely an overlapping circle and covers the total working plan area. The circle was constituted to achieve the following objectives:

1. To assess the potentiality of the various NTFP produces of the Division.
2. To regulate the collection of various NTFPs and to develop the area for increased and sustainable production.
3. To meet the bonafide needs of the local people.
4. To create maximum rural employment in the interior and remote areas during the lean season.
5. To explore the scientific utility of many NTFPs, which are not collected at present by the primary collectors, even though abundant in the forests.
6. To regulate and optimize extraction and utilization of various NTFPs in conformity with Government policy with a view to promote sustainable management of forests.
7. To enhance the value of forests by way of developing new NTFPs, creating additional opportunities for further value addition in the existing NTFPs and strengthening the marketing network.
8. To develop and extend skills to the local people, including the tribal, for sustainable collection, extraction and utilization of various NTFPs so as to distract them from shifting cultivation.
9. To encourage small cottage industries, which can run on non-timber forest produces available in the nearby areas, instead of exporting them to outside.
10. Special emphasis on planting of species, which are known for their NTFP values during artificial regeneration in the forest areas.

Achievements

NTFP survey was conducted in all the seven ranges of the Division between 2011 to 2013

The main objectives of the study were as follows:

- Document the NTFP species available in all the ranges of Phulbani division along with its regeneration status.

- Prepare a NTFP species list in Range level.
- Document stem per hectare of NTFP tree species in the Range.
- Documentation of life form (Plant) distribution Pattern of the Range.
- Generate data on House hold consumption and sale of NTFP in the Range.

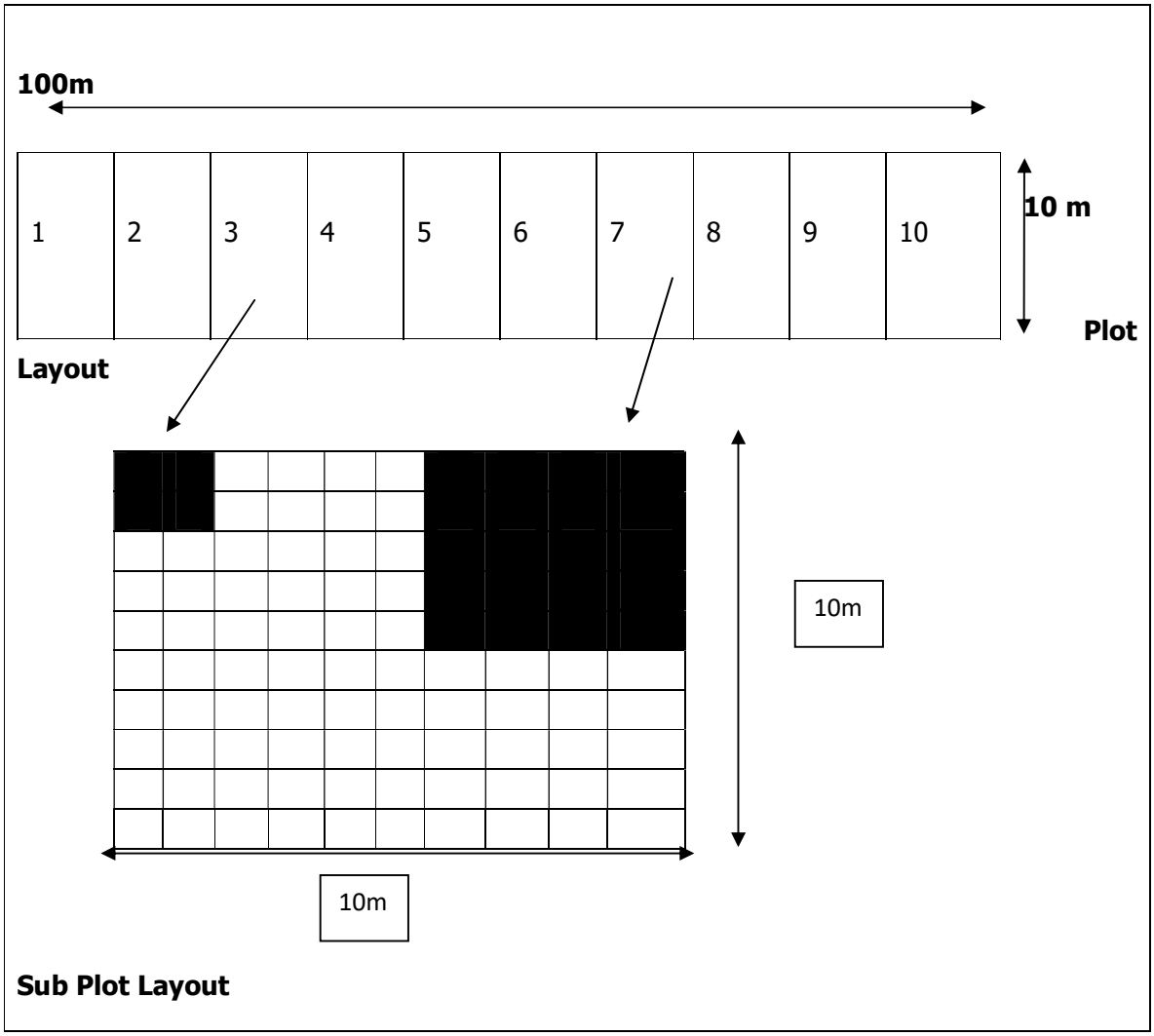
The sample points were supplied to the division by the PCCF office by overlaying maps of Forest cover, Forest boundary, Compartment boundary, Village location maps etc The layout of sample points in the GIS map was by Range, Section & Compartment including non-Reserve Forest areas, and at least 100 sample points in a Range were fixed.

The methodology is as follows:

Sample points (marked in the map) were located in the field with the help of GPS. Making this point as centre, 0.1ha plot (100mt x 10mt) is laid out. Thereafter, this 0.1ha.sample plot is divided into 10 equal sub-plots having an area of 0.01 ha each, as shown in figure below. The plot is always laid across the contour i.e. from bottom to top. All tree species that occur in the sample plot were enumerated and their details including girth inTree Enumeration Form. In sub-plot 3 & 7 (see fig) of the sample plot, tree occurring in the sub-plots (sub plots 3 & 7 only) are enumerated in detail and recorded in Sampling Tree Form, species and girth class wise. To study herbs and regeneration status, sub-plot No 3 & No 7 (see fig) are further sub-divided having an area of 2mt x 2mt herbs occurring therein are enumerated and recorded in Herb Form. Similarly, in the same sub plot (No 3 & 7) regeneration of species are studied and recorded separately in Regeneration Form. Regeneration study is generally done for trees & shrubs only. However, important NTFP species like Atundi, Gila (Entada), Siali etc were also recorded. An area of 5mt x 5mt is delineated in sub-plot No 3 & 7, as shown in Figure, for the study of Shrubs* & Climbers & Regeneration from coppice origin. Enumeration of shrub is done and observations are recorded meticulously in Shrub form. Climbers occurring in these particular sub-plots are also enumerated similarly but recorded separately in Climber Form. Likewise, regeneration from coppice origin are also studied in this sub-plot and separately recorded in Coppice Form.

The NTFP collection. Consumption and marketing by the local community are made through house hold survey and were recorded. For this study the village nearest to the forest/ comptt. was identified and at least 20% of the household in the

village is surveyed, keeping in mind that villagers from all walks of life are included in the sample. Types of forest produce collected and consumed, average quantity collected / yr, consumed quantity/ yr, sold / yr, volume and price of products sold



Sub Plot Layout

found a place in this study. Besides, types and names of markets, where the products are sold were recorded.

Analysis of the data:

The collected data on different aspects of NTFPs species as prescribed in Methodology have been analysed and presented which includes list of enumerated flora followed by data on enumeration of trees, shrubs, herbs, climbers and their regeneration vis-a vis their pictorial representation in bar diagrams. Nevertheless local household survey informations collected concerning to NTFP collection, consumption

and marketing have been analysed to assess the status of NTFP in broadening the livelihood basket of the poorest of the poor.

Apart from this, the Bio-diversity indices of sample areas have been calculated based on species richness and evenness using Simpson's Index and Shannon Index in order to justify the Bio-diversity richness of the surveyed Forest area of Phulbani Forest Division. The analysis of stem per ha of tree, shrubs, herbs and climbers was done. The NTFP species availability was analyzed by dividing the species as Potential, Traditional and Prioritized NTFP species. The data is also presented in graphical form range wise. Based on the results of the survey the availability, potentiality, extraction and marketing of all the NTFP produces have been documented and submitted to the PCCF Office.

As per as regulation of collection of NTFP produce is concerned only collection of sal leaves was being regulated by the Division. With respect to 68 Nos. Of NTFP items the charge of regulation has been placed on the Gram Panchayat concerned. As per the law the NTFP procures had to submit the monthly returns of NTFP trade to the Gram Panchayats which in turn should transmit the information to the forest department. However, no such returns were submitted in the current working plan period and therefore, no data on NTFP trade and extraction is available in the Division.

The sustainable harvesting, colleting programme through JFM approach involving VSS has been initiated in 240 VSS of the Division. In this regard the VSS members were given training on sustainable collection practices of NTFP. Further under National Medicine Plants Board project 5 VSS were included for development, sustainable harvest, processing and marketing of medicinal plants. In this project medicinal plants plantation, storage building, drying platform, processing machinery and training were initiated in the year 2013-14. The project was to be implemented in 3 years. In the same project the marketing arrangements for the VSS was done by a MOU with Dabur company. The procurement of medicinal plants produces mainly Harida, Bahada and Satabari has started from the year 2013-14. The Dabur company has also conducted the training of the villagers on sustainable harvest and processing of medicinal plantation.

11.5.9 MANAGEMENT AFTER EXPIRY OF WORKING PLAN OF SRI AJAYA RAIZADA, IFS

Working Plan of Phulbani Forest Division was expired during the year 2016-17. The new Working Plan was under preparation. To continue the management of forest, working scheme has been prepared.

11.5.9.1Working scheme-2017-18

This Working scheme has been prepared by Dr. G. Prakash Chand, IFS, DFO, Phulbani Forest Division and approved by Govt. of India MoEF vide Letter No13-FCWP-OS-FLB dt.30.03.2017 (for Scheme 2017-18). The following working circles were approved for management of the forest area under Phulbani Forest Division.

1. Selection Working Circle.
2. Rehabilitation Working Circle
3. Plantation Working Circle
4. J.F.M Working Circle
5. Forest Protection(Overlapping) Working Circle
6. Bamboo (Overlapping) Working Circle.
7. NTFP (Overlapping) Working Circle.
8. Wildlife (Overlapping) Working Circle.

In this Working schemes 61 RF and 35 PRFs blocks of total area 152745.446 ha. were covered.

11.5.9.2. Selection Working Circle

Total area allotted in this year 2017-18 under this circle was same as in outgoing plan prescribed in 2007-2008 i.e. 5189.21 hect. 10 nos. timber coupes under 10 felling series were marked in 6 Range and delivered to OFDC Ltd for working.

Result

Following number trees are selected for working of coupe

Sl no	Year	Felling series	Coupe name	Area	Trees marked
1	2017-18	Barba	BRB -I	219.64	126
2		Brutang (N)	BURT(N) -I	647.24	09
3		Chakapad-1	CHKP-1 -I	682.26	09
4		Chakapad-2	CHKP -2-I	659.23	238
5		Donga	Donga -I	465.68	64
6		Kiamunda	KMD-I	300.24	Exploitable Girth class treenot available
7		Karada	Karada-I	643.77	72
8		Nandabali	NDBL-I	304.07	45
9		Ranipathar	RANP-I	911.35	65
10		Ranaba	RNB-I	355.73	32

Out of 10 coupes, following No. of coupes are taken delivery by OFDC Ltd. for working

Year	Name of Range	Name of Coupe
2017-18	Karada	Baraba SWC-I
	Karada	Nandabali SWC-I
	Karada	Ranaba SWC-I
	Tikabali	Chakapada-1 SWC-I
	Tikabali	Chakapada-2 SWC-I
	Sudrukumpa	Ranipathar SWC-I
	Sudrukumpa	Donga SWC-I
	Phulbani	Burtanga (N) SWC-I
	Raikia	Karada SWC-I

Rest coupe could not worked out as the working of timber coupe could not be profitable and the production of timber coupe was 392.545 Cum timber & Firewood 93 stacks of 12'x3'3' size.

11.5.9.3 Rehabilitation Working Circle

Total area allotted in this Working circle is same as mentioned in the outgoing Working Plan prescribed for the year 2007-08. The total area allotted was 9964.86 ha.

Result

In this year 450 ha ANR including soil conservation measure has been taken up.

11.5.9.4Plantation Working Circle

No target of plantation inside Working Plan area has been allotted during this year.

Result

No AR(Block) plantation taken up inside Working Plan area i.e. RF/PRF area . However 70 hectare AR plantation has been taken up in outside Working Plan area.

11.5.9.5Bamboo(overlapping) Working Circle

Total area allotted in this year for this working circle is same as in outgoing plan prescribed for the year 2007-08. The total area of 22 nos. coupes was 21961.86 ha.

Result

All 22 Nos. Bamboo coupes were demarcated in the field and offered to OFDC Ltd. to take delivery for working. Out of 22 coupes, though coupes taken delivery by OFDC Ltd. but the coupes could not be worked.

Name of the Range	Bamboo Coupe	Area (in Ha.)	Production	
			Industrial Bamboo (in SU)	Commercial Bamboo (in Nos.)
Phulbani	Burtang (N) 'A'	593.51	--	--
	Khajuripada 'A'	546.26	--	--
	Kalabagh 'A'	1632.28	--	--
	Khajuripada Ganjuguda PRF 'B'	296.34	--	--
Sudrukumpa	Ranipathar (N) 'A'	768.74	--	--
	Ranipathar (S) 'A'	367.02	--	--
	Donga (W) 'A'	426.65	--	--
	Donga € 'A'	376.62	--	--
	Bilabadi 'A'	702.03	--	--
	Sudrukumpa 'A'	1073.68	--	--
Phiringia	Baghanadi 'A'	3413.33	--	--
	Ladapadar 'A'	735.06	--	--
	Gochhapada 'A'	1298.54	--	--
	Balandapada PRF 'B'	1013.55	--	--
Tikabali	Chakapada 'A'	2740.78	--	--
	Burtang (S) 'A'	1590.76	--	--
	Chakapada PRF 'B'	128.43	--	--
karada	Ranaba 'A'	703.54	--	--
	Machhaghat 'A'	291.28	--	3900
	Badagarh PRF 'B'	1939.5	--	--
	Baraba 'A'	388.83	--	--
Raikia	Karada PRF 'B'	935.13	--	--

11.5.9.6 Non timber Forest Produce (Overlapping) Working Circle

The working circle is covering entire forest area of this Division. The object of this working circle is to give suitable prescription for conservation, regulation, value addition and marketing of all NTFPs found in this Division. The total area under this overlapping working circle works out take 152745.446 hect.

Result

No over exploitation of NTFP was allowed. Sal leave was allowed to collect in the year 2017-18 is 5000 Qtl. The quantity of collection was regulated as per quantity allotted by Principal Chief Conservator of Odisha to this Division.

11.5.9.7The Wildlife (Overlapping) Working Circle

In this working circle covers almost the entire forest area of the Division. Special management prescriptions are to be provided for some of forest blocks where adequate concentration of wildlife is available. Steps to be taken to preserve wildlife crime and depredation by appropriate protection measure with people's participation in detection and disposal of cases.

Result

Following squads have been deployed for protection, depredation of wild animals.

Deployment of Squad

Name of the Division	Name of the squad	Place of deployment of the squad/jurisdiction of the squad	No. Of officers, staffs and temporary employees engaged in the squad
1	2	3	4
Phulbani Forest Division	(1) Para Forest Staff under CAMPA	Phulbani, Dubagada, Khajuripada & Bisipada Section of **Phulbani Range**	19 persons engaged for protection of forest and wildlife.
	(1) Protection Squad(IPCEA)Under 2406-F & WL - S P. (2) Para Forest staff under CAMPA	Ranipathar Section of **Sudrukumpa Range**	10 persons engaged for perform their duty for protection of forest and wildlife with the Range staff. 10 persons engaged for protection of forest and wildlife
	(1) Para Forest Staff under CAMPA	Phiringia Range	14 persons engaged for protection of forest and wildlife.
	(1) Wildlife Squad under CAMPA	Badagada, Indragada & Ranaba Section of **Karada Range**	10 persons engaged for protection of forest and wildlife.
	(1) Para Forest staff under CAMPA	G.Udayagiri Range	06 persons engaged for protection of forest and wildlife.
	(1) Wildlife Squad under CAMPA. (2) Para Forest Staff under CAMPA	Chahali Section of **Tikabali Range.** Tikabali, Chakapad & Chahali section of **Tikabali Range**.	10 persons engaged for protection of forest and wildlife. 08 persons engaged for protection of forest and wildlife.
	(1) Wildlife Squad under CAMPA.	Raikia & Karada Section of **Raikia Range**	02 persons engaged for protection of forest and wildlife.

	(2) Divisional elephant squad under 05 state plan. (3) Para Forest Staff under CAMPA		05 persons engaged in elephant tracking. 03 persons engaged for protection of forest and wildlife.

(87 number squad persons have been engaged forming eleven squads)

Rs 16,280/- as compensation to depredation was provided to the farmers.

Water bodies were not dug during this year.

01 No. Of Wildlife cases were decided and lodged cases in the Hon'ble SDJM, Phulbani Court.

11.5.9.8The Forest Protection (Overlapping) Working Circle

The total area allotted to this working circle was 2885.00 hect. 16 RF and 4 PRFs were taken under this working circle. These areas which are prone to human interference like illicit felling, encroachment, poaching, shifting cultivation and fire.

Result

In this year 1101 Nos. of fire points were detected and fire affected over 977.46 hect.

There is no illicit felling and encroachment recorded. Shifting cultivation found Nil.

11.5.9.9 Joint Forest Management (Overlapping) Working Circle

This overlapping working circle, overlaps with maintaining the rehabilitation working circle. All forest blocks which have been allowed to VSS for protection and management as per JFM resolution of the state have been included in this working circle.

Result

20 No. of VSS has been constituted.

160 No. of VSS have been included in AJY scheme for management of forest.

11.6Working scheme-2018-19

This Working scheme has been prepared by Sri Lakshmi Narayan Behera, OFS-I(SB), DFO, Phulbani Forest Division and approved by Govt. of India MoEF vide Letter , Letter No13-FCWP-OS-FLB dt.13.08.2018 (for Scheme 2018-19),

11.6.1 Selection Working Circle

Total area allotted in this year 2018-19 under this circle was same as in outgoing plan prescribed in 2008-2009 i.e. 4783.32 hect. 10 nos. timber coupes under 10 felling series were marked in 6 Ranges and delivered to OFDC Ltd for working.

Result

Trees selected for working of coupe

Sl.No.	Year	Felling series	Coupe name	Area	Trees marked
1	2018-19	Barba	BRB -II	258.42	73
2		Brutang (N)	BURT(N) -II	593.51	Non availability of exploitable girth class tree
3		Chakapad-1	CHKP-1 -II	426.38	119
4		Chakapad-2	CHKP -2-II	756.70	124
5		Donga	Donga -II	689.60	78
6		Kiamunda	KMD-II	280.21	Non-availability of exploitable girth class tree
7		Karada	Karada-II	366.67	Non-availability of exploitable girth class tree
8		Nandabali	NDBL-II	380.49	51
9		Ranipathar	RANP-II	669.73	Non-availability of exploitable girth class tree
10		Ranaba	RNB-II	361.61	36

Out of 10 coupes following No. of coupes taken deliveryby OFDC Ltd.

Year	Name of Range	Name of Coupe
2018-19	Karada	Baraba SWC-II
	Karada	Nandabali SWC-II
	Karada	Ranaba SWC-II
	Tikabali	Chakapada-1 SWC-II
	Tikabali	Chakapada-2 SWC-II
	Sudrukumpa	Donga SWC-II

Rest coupe could not workout as the working of timber coupe could not be profitable and the production of timber coupe was 325.8551 Cum timber & Firewood 50 stacks (12'x3'3') size.

11.6.2Rehabilitation Working Circle

Total area allotted in this working circle is same in outgoing plan prescribed for the year 2007-08. The total area allotted was 9964.86 ha.

Result

In this year 5800 Hectare ANR including soil conservation measure were taken up.

11.6.3 Plantation Working Circle

No target of plantation inside Working Plan area has been allotted during this year.

Result

No AR(Block) plantation taken up inside Working Plan area i.e. RF/PRF area . However 20.75 hectare AR plantation has been taken up in outside Working Plan area.

11.6.4 Bamboo(overlapping) Working Circle

Total area allotted in this year for this working circle is same as in outgoing plan prescribed for the year 2008-09. The total area of 22 nos. coupes was 27613.59 ha.

Result

All 22 Nos. Bamboo coupes were demarcated in the field and offered to OFDC Ltd. to take delivery for working. Out of 22 coupes, though coupes taken delivery by OFDC Ltd. but the coupes could not be worked.

Name of the Range	Bamboo Coupe	Area (in Ha.)	Production	
			Industrial Bamboo (in SU)	Commercial Bamboo (in Nos.)
Phulbani	Burtang (N) 'B'	560.07	--	--
	Khajuripada 'B'	527.67	--	--
	Kalabagh 'B'	2017.69	--	--
	Khajuripada Ganjuguda PRF 'C'	237.50	--	--
Sudrukumpa	Ranipathar (N) 'B'	832.88	--	--
	Ranipathar (S) 'B'	544.33	--	--
	Donga (W) 'B'	883.93	--	--
	Donga (E) 'B'	413.99	--	--
	Bilabadi 'B'	538.97	--	--
	Sudrukumpa 'B'	445.18	--	--
Phiringia	Baghanadi 'B'	2416.74	--	--
	Ladapadar 'B'	2719.45	--	--
	Gochhapada 'B'	2616.66	--	--
	Balandapada PRF 'C'	1149.35	--	--
Tikabali	Chakapada 'B'	4444.99	--	--
	Burtang (S) 'B'	1718.73	--	--
	Chakapada PRF 'C'	162.76	--	--
karada	Ranaba 'B'	566.54	--	--
	Machhaghat 'B'	442.18	--	--
	Badagarh PRF 'C'	593.03	--	--
	Baraba 'B'	399.90	--	--
Raikia	Karada PRF 'C'	3381.05	--	--

11.6.5 Non timber Forest Produce (Overlapping) Working Circle

The working circle is covering entire forest area of this Division. The object of this working circle is to give suitable prescription for conservation, regulation, value addition and marketing of all NTFPs found in this Division. The total area under this overlapping working circle works out take 152745.446 hect.

Result

No over exploitation of NTFP was allowed. Sal leave was allowed to collect in the year 2018-19 is 5000 Qtl. The quantity of collection was regulated as per quantity allotted by Principal Chief Conservator of Odisha to this Division.

11.6.6 The Wildlife (Overlapping) Working Circle

In this working circle covers almost the entire forest area of the Division. Special management prescriptions are to be provided for some of forest blocks where adequate concentration of wildlife is available. Steps to be taken to preserve wildlife crime and depredation by appropriate protection measure with people's participation in detection and disposal of cases.

Result

87 number squad persons have been engaged forming Eleven squads as detailed in the working scheme year 2017-18.

Rs 34,600/- as Compensation to depredation were provided to the farmers.

03 Nos. Of water bodies were dug during this year.

During this year there is no Wildlife case.

11.6.7 The Forest Protection (Overlapping) Working Circle

The total area allotted to this working circle was 2885.00 hect. 16 RF and 4 PRFs were taken under this working circle. These area which are prone to human interference like illicit felling, encroachment, poaching, shifting cultivation and forest fire.

Result

In this year 1665 Nos. Of fire point were detected and fire affected over 2464.58hect.There is no illicit felling and encroachment recorded. Shifting cultivation found Nil.

11.6.8 Joint Forest Management (Overlapping) Working Circle

The overlapping working circle, over laps with maintaining the rehabilitation working circle. All forest blocks which have been allowed to VSS for protection and management as per JFM resolution of the state have been included in this working circle.

Result

20 No. Of VSS has been consituted.

180 No. of VSS have been included in AJY scheme for management of forest.

11.7 Working scheme-2019-20

This Working scheme has been prepared by Sri Lakshmi Narayan Behera, OFS-I(SB), DFO, Phulbani Division and approved by Govt. of India MoEF vide Letter No.8-FCE- dt.14.11.2019 (for Scheme 2019-20).

The following working circles were approved for management of the forest area under Phulbani Forest Division.

1. Selection Working Circle.
2. Rehabilitation Working Circle
3. Plantation Working Circle
4. J.F.M Working Circle
5. Forest Protection(Overlapping) Working Circle
6. Bamboo (Overlapping) Working Circle.
7. NTFP (Overlapping) Working Circle.
8. Wildlife (Overlapping) Working Circle.

In this Working schemes covered 61 RF and 35 PRFs blocks of total area 152745.446 ha.

11.7.1 Selection Working Circle

Total area allotted in this year 2019-20 under this circle was same as in outgoing plan prescribed in 2009-10 i.e. 4408.03 hect. 10 nos. timber coupes under 10 felling series were marked in Range i.e. 6 Ranges and delivered to OFDC Ltd for working.

Result

Trees selected for working of coupe

Sl no	Year	Felling series	Coupe name	Area	Trees marked
1	2019-20	Barba	BRB -III	310.67	117
2		Brutang (N)	BURT(N) -III	560.07	Non availability of exploitable girth class tree
3		Chakapad-1	CHKP-1 -III	295.56	11 (not worked by OFDC)
4		Chakapad-2	CHKP -2-III	719.80	178
5		Donga	Donga -III	538.97	10 (not worked by OFDC)
6		Kiamunda	KMD-III	309.23	Non availability of exploitable girth class tree
7		Karada	Karada-III	469.11	17 (not worked by OFDC)

8		Nandabali	NDBL-III	426.23	27 (not worked by OFDC)
9		Ranipathar	RANP-III	529.68	109
10		Ranaba	RNB-III	248.71	91

Out of 10 coupes following No. of coupes were taken delivery by OFDC Ltd for working.

Year	Name of Range	Name of Coupe
2019-20	Karada	Baraba SWC-III
	Karada	Ranaba SWC-III
	Tikabali	Chakapada-2 SWC-III
	Sudrukumpa	Ranipathar SWC-III

Rest coupe could not workout as the working of timber coupe could not be profitable and the production of timber coupe was 442.0585 Cum timber and Firewood 50 stacks (12'x3'3') size.

11.7.2 Rehabilitation Working Circle

Total area allotted in this working circle is same in outgoing plan prescribed for the year 2007-08. The total area allotted was 9964.86 ha.

Result

In this year 855 hectare ANR including soil conservation measure were taken up.

11.7.3. Plantation Working Circle

No target of plantation inside Working Plan area has been allotted during this year.

Result

No AR(Block) plantation taken up inside Working Plan area i.e. RF/PRF area . However 90 hectare AR plantation has been taken up in outside Working Plan area.

11.7.4. Bamboo(overlapping) Working Circle

Total area allotted in this year for this working circle is same as in outgoing plan prescribed for the year 2009-10. The total area allotted was 22 coupes 27191.88 ha.

Result

All 22 Nos. Bamboo coupes were demarcated in the field and offered to OFDC Ltd. to take delivery for working. Out of 22 coupes, though coupes taken delivery by OFDC Ltd. but the coupes could not be worked.

Name of the Range	Bamboo Coupe	Area (in Ha.)	Production	
			Industrial Bamboo (in SU)	Commercial Bamboo (in Nos.)
Phulbani	Burtang (N) 'C'	440.71	--	--
	Khajuripada 'C'	536.26	--	--
	Kalabagh 'C'	1888.92	--	--
	Khajuripada Ganjuguda PRF 'D'	239.40	--	--
Sudrukumpa	Ranipathar (N) 'C'	415.43	--	--
	Ranipathar (S) 'C'	810.05	--	--
	Donga (W) 'C'	396.91	--	--
	Donga (E) 'C'	813.18	--	--
	Bilabadi 'C'	672.53	--	--
	Sudrukumpa 'C'	1578.60	--	--
Phiringia	Baghanadi 'C'	1683.47	--	--
	Ladapadar 'C'	2248.12	--	--
	Gochhapada 'C'	2421.67	--	--
	Balandapada PRF 'D'	1321.55	--	--
Tikabali	Chakapada 'C'	3188.42	--	--
	Burtang (S) 'C'	1487.37	--	--
	Chakapada PRF 'D'	151.71	--	--
karada	Ranaba 'C'	966.05	--	--
	Machhaghat 'C'	673.64	--	--
	Badagarh PRF 'D'	1008.37	--	--
	Baraba 'C'	518.10	--	--
Raikia	Karada PRF 'D'	3731.42	--	--

11.7.5. Non timber Forest Produce (Overlapping) Working Circle

The working circle is covering entire forest area of this Division. The object of this working circle is to give suitable prescription for conservation, regulation, value addition and marketing of all NTFPs found in this Division. The total area under this overlapping working circle works out take 152745.446 hect.

Result

No over exploitation of NTFP was allowed. Sal leave was allowed to collect in the year 2019-20 is 6000 Qtl. The quantity of collection was regulated as per quantity allotted by Principal Chief Conservator of Odisha to this Division.

11.7.6. The Wildlife (Overlapping) Working Circle

In this working circle covers almost the entire forest area of the Division. Special management prescriptions are to be provided for some of forest

blocks where adequate concentration of wildlife is available. Steps to be taken to preserve wildlife crime and depredation by appropriate protection measure with people's participation in detection and disposal of cases.

Result

87 number squad persons have been engaged forming Eleven squads as detailed in the working scheme year 2017-18.

Rs 1,64,974/- as compensation to depredation were provided to the farmers.

02 Nos. Of water bodies were dug during this year.

During this year there is no Wildlife case.

11.7.7. The Forest Protection (Overlapping) Working Circle

The total area allotted to this working circle was 2885.00 hect. 16 RF and 4 PRFs were taken under this working circle. These area which are prone to human interference like illicit felling, encroachment, poaching, shifting cultivation and forest fire.

Result

In this year 394 Nos. Of fire point were detected and fire affected over 348.49 hect.

There is no illicit felling and encroachment recorded. Shifting cultivation found Nil.

11.7.8. Joint Forest Management (Overlapping) Working Circle

The overlapping working circle, over laps with maintaining the rehabilitation working circle. All forest blocks which have been allowed to VSS for protection and management as per JFM resolution of the state have been included in this working circle.

Result

25 No. Of VSS has been consituted.

220 No. of VSS have been included in AJY scheme for management of forest.

11.8 Working scheme-2020-21

This Working scheme has been prepared by Sri Lakshmi Narayan Behera, OFS-I(SB), DFO, Phulbani Forest Division and approved by Govt. of India MoEF vide Letter No.8(31)7/2017-FCE- dt.19.08.2020 (for Scheme 2020-21).

The following working circles were approved for management of the forest area under Phulbani Forest Division.

1. Selection Working Circle.
2. Rehabilitation Working Circle
3. Plantation Working Circle
4. J.F.M Working Circle
5. Forest Protection(Overlapping) Working Circle
6. Bamboo (Overlapping) Working Circle.
7. NTFP (Overlapping) Working Circle.
8. Wildlife (Overlapping) Working Circle.

In this Working schemes covered 61 RF and 35 PRFs blocks of total area 152745.446 ha.

11.8.1 Selection Working Circle

Total area allotted in this year 2020-21 under this circle was same as in outgoing plan prescribed in 2010-11 i.e. 4408.03 hect. 10 nos. timber coupes under 10 felling series were marked in Range i.e. 6 Ranges and delivered to OFDC Ltd for working.

Result

Trees selected for working of coupe

Sl no	Year	Felling series	Coupe name	Area	Trees marked
1	2020-21	Barba	BRB -IV	100.6	58
2		Brutang (N)	BURT(N) -IV	260.8	5
3		Chakapad-1	CHKP-1 -IV	661.61	29
4		Chakapad-2	CHKP -2-IV	1085.65	156
5		Donga	Donga -IV	702.03	63
6		Kiamunda	KMD-IV	364.92	Non availability of exploitable girth class tree
7		Karada	Karada-IV	554.06	27
8		Nandabali	NDBL-IV	352.75	32
9		Ranipathar	RANP-IV	280.37	45
10		Ranaba	RNB-IV	471.81	88

Out of 10 coupes following No. of coupes taken delivery.

Year	Name of Range	Name of Coupe
2020-21	Karada	Baraba SWC-IV
	Karada	Ranaba SWC-IV
	karada	Nandabali SWC-IV
	Tikabali	Chakapada-1 SWC-IV
	Tikabali	Chakapada-2 SWC-IV
	Phulbani	Burtang (N) SWC-IV
	Sudrukumpa	Donga SWC-IV
	Sudrukumpa	Ranipathar SWC-IV
	Raikia	Karada PRF SWC-IV

Working of timber coupe is under progress.

11.8.2. Rehabilitation Working Circle

Total area allotted in this working circle is same in outgoing plan prescribed for the year 2010-11. The total area allotted was 9964.86 ha.

Result

In this year 2805 hectare ANR including soil conservation measure were taken up.

11.8.3. Plantation Working Circle

During this year target of plantation inside Working Plan area has been allotted 40 hectare.

Result

160 hectare AR plantation has been taken up in outside Working Plan area.

11.8.4. Bamboo(overlapping) Working Circle

Total area allotted in this year for this working circle is same as in outgoing plan prescribed for the year 2010-11. The total area allotted was 22 coupes 22625.51 ha.

Result

All 22 Nos. Bamboo coupes were demarcated in the field and offered to OFDC Ltd. to take delivery for working. Out of 22 coupes, though coupes taken delivery by OFDC Ltd. but the coupes could not be worked.

Name of the Range	Bamboo Coupe	Area (in Ha.)	Production	
			Industrial Bamboo (in SU)	Commercial Bamboo (in Nos.)
Phulbani	Burtang (N) 'D'	1349.66	--	--
	Khajuripada 'D'	896.51	--	--
	Kalabagh 'D'	1405.04	--	--
	Khajuripada Ganjuguda PRF 'A'	1270.7	--	--
Sudrukumpa	Ranipathar (N) 'D'	783.74	--	--
	Ranipathar (S) 'D'	1946.133	--	--
	Donga (W) 'D'	255.49	--	--
	Donga (E) 'D'	458.8	--	--
	Bilabadi 'D'	840.65	--	--
	Sudrukumpa 'D'	1486.92	--	--
Phiringia	Baghanadi 'D'	1172.9	--	--
	Ladapadar 'D'	795.51	--	--
	Gochhapada 'D'	1326.605	--	--
	Balandapada	1202.85	--	--

	PRF 'A'			
Tikabali	Chakapada 'D'	1768.52	--	--
	Burtang (S) 'D'	700.76	--	--
	Chakapada PRF 'A'	167.63	--	--
karada	Ranaba 'D'	371.81	--	--
	Machhaghat 'D'	528.41	--	--
	Badagarh PRF 'A'	1177.21	--	--
Raikia	Karada PRF 'D'	1267.632	--	--
	Sikabadi PRF 'A'	1452.03		

11.8.5. Non timber Forest Produce (Overlapping) Working Circle

The working circle is covering entire forest area of this Division. The object of this working circle is to give suitable prescription for conservation, regulation, value addition and marketing of all NTFPs found in this Division. The total area under this overlapping working circle works out take 152745.446 hect.

Result

No over exploitation of NTFP was allowed. Sal leave was allowed to collect in the year 2020-21 is 6000 Qtl. The quantity of collection was regulated as per quantity allowed by Principal Chief Conservator of Odisha to this Division.

11.8.6. The Wildlife (Overlapping) Working Circle

In this working circle covers almost the entire forest area of the Division. Special management prescriptions are to be provided for some of forest blocks where adequate concentration of wildlife is available. Steps to be taken to preserve wildlife crime and depredation by appropriate protection measure with people's participation in detection and disposal of cases.

Result

87 number squad persons have been engaged forming Eleven squads as detailed in the working scheme year 2017-18.

Rs 63,628/- as compensation to depredation were provided to the farmers.

No water bodies dug during this year.

02 Nos. Of Wildlife cases were decided and lodged cases in the Hon'ble SDJM, Phulbani Court.

11.8.7. The Forest Protection (Overlapping) Working Circle

The total area allotted to this working circle was 2885.00 hect. 16 RF and 4 PRFs were taken under this working circle. These area which are prone to

human interference like illicit felling, encroachment, poaching, shifting cultivation and forest fire.

Result

In this year 202 Nos. Of fire point were detected and fire affected over 204.45 hect.

There is no illicit felling and encroachment recorded. Shifting cultivation found Nil.

11.8.8. Joint Forest Management (Overlapping) Working Circle

The overlapping working circle, over laps with maintaining the rehabilitation working circle. All forest blocks which have been allowed to VSS for protection and management as per JFM resolution of the state have been included in this working circle.

Result

82 No. Of VSS has been constituted.

302 No. Of VSS have been included in AJY scheme for management of forest.

CHAPTER-XII

STATISTICS OF GROWTH AND YIELD

12.0.1 Past Statistics:-

In absence of adequate information on time series data at local level and for want of appropriate analytical tools, the past plans relied mainly on the following literatures:

12.0.1.1 Sal (*Shorearobusta*):

(a) Yield and stand tables for Sal (*Shorea robusta*) High forests, by A.L Griffth and Bakhsi Santram, Indian Forest Records (New series), Volume 4 (a), No. 4,1943.

(b) Yield tables for clear felled Sal (*Shorea robusta*) coppice by S.H Howard, Indian Forest Records (Silviculture Series) Volume XII, Part-IV, 1962.

(c) General volume tables for Sal (*Shorea robusta*) by S.H Howard, Indian Forest Records (Silviculture series), Volume X-Part-IV, 1924.

(d) Volume and outturn tables for Sal (*Shorea robusta*) by S.H. Howard, Indian Forest Records (Silviculture series) Volume XII, Part-1, 1925.

(e) The uneven aged Sal forests of Ramnagar Forest Division, Uttar Pradesh, their constitution, rate of growth etc. along with empirical yield and stands tables for selection type of Sal crop by G.S Mathanda, Indian Forester, Volume 84, 1958.

(f) Branch, Small wood tables for *Shorea robusta, Tectona grandis, Pinus excelsa* and *Pinuslongifolia*, Indian Forest Records (Silviculture series), Volume XVI, Part-VI, 1932.

12.0.1.2 Teak (*Tectonagrandis*)

Yield and stand tables for plantation Teak (*Tectona grandis*), Indian Forest Records (New Series), Silviculture, Volume IX, No.4, 1959.

12.0.1.3Asan (*Terminalia tomentosa*)

General standard and commercial volume tables for Asan (*Terminalia tomentosa*) by A.L Griffith and Bakshi Santram, Indian Forest Records (New series), Silviculture, Volume 4(A), No. 5, 1947.

12.0.1.4 Haland (*Adina cordifolia*):

An approximate volume table for Haldu (*Adina cordifolia*) by H.C Mobbs, Uttar Pradesh Forest Leaflet No. 6

12.0.1.5Khaira (*Acacia catechu*)

Commercial timber (Katha) and heart wood volume tables for Khaira (*Acacia catechu*) in North India by H.G Champion, I.D Mahendry and P.N Suri, Indian Forest Records (Silviculture Series), Volume XIII, Part-IX, 1929.

b)Standard commercial and heartwood volume tables (Factory working) for Khaira (Acacia catechu) in North India by H.G Champion and I.D Mahendru, Indian Forest Records (Silvilcuture Series), Volume XV, Part-III, 1931.

12.0.1.6Sissoo (*Dalbergia sisoo*):

(a) Preliminary yield table for *Dalgergia sisoo* by S.H. Howard, Forest Bulletin No. 52 (Silviculture), 1925.

(b) Provisional yield tables for *Dalbergia sissoo* in the irrigated plantation of the Punjab by Bakshi Santram, Indian Forest Records (New Series), Volume 4 (A), No. 2,1941.

(c) Standard and commercial volume tables for *Dalbergia sisoo* by M.A. Kazi, Indian Forest Records (Silviculture series), Volume II, No.2, 1936.

12.0.1.7Semal*(Bombaxceiba)*

(a) Volume tables and diameter growth for Semal (*Bombax ceiba*) by I.D Mahendru Indian Forest Records (Silviculture Series), Volume XV, Part-IV, 1932.

12.0.1.8 Dhaurang (*Holopteleaintegrifolia*) & panigambhar (*Trewianudiflora*):

Provisional volume tables and diameter growth for Holoptelea *integrofolia* &*Trewianudiflora* by I.D Mahendru, India Forest Records (Silvilculture Series), Volume XV, Part-VII, 1933.

12.0.1.9 Karada*(Cleistanthus collinus)*, Piasal*(Ptrocarpus marsupium)* & S.Mai*(Lannea coromandelica)*

(a) Standard and commercial volume tables for (*Cleistanthus collinus*) by S.N Dabral, P.K Bhattacharya, R.C Jain and Tarlok Singh.

(b) Standard and commercial volume tables for *Pterocarpus marsupium* by S.N Dabral, P.K Bhattacharya, Tarlok Singh and D.S Rawat.

(c) Standard volume tables for *Lannea coromandelica* by S.N Dabral and D.C Sharma, Indian Forest Records (New Series), Silviculture, Volume-II, No. 7.

The literaturesmentioned above are very old and generalized. These data has been collected from the localities that were different from the conditions prevalent in the Division. The local volume and yield table could not be developed because of the constraints in the available resources. Therefore the statistics provided in these literatures were not used for the present Working Plan.

In the Past working plan, the Mean Annual Increment (MAI) could not be calculated because of non-availability of complete past enumeration data. Compartment wise enumeration data was not available, and it is also difficult to get complete details of legal and illegal removal of timber from the forest for the last 20 years. Priors to previous plan growing stock assessment was not done. In the previous plan attempts has been made to assess the total volume of the growing stock by 1% systematic strip sampling method and by using the volume equations developed by forest survey of India (FSI) for Orissa. The data collected creates a bench mark and has helped the present revision of the working plan for comparing the future crop conditions and also helped in calculation of MAI in future provided the data on all kinds of removal will be made available.

12.0.1.10 Local Volume Equations

For the purpose of this plan, the volume equations of different species developed The local volume equation used in this working plan is presented in table No. 12.1. In the volume equation, V refers to under bark round timber volume in Cum, D is dbh, diameter over bark at breast height in meters. For tree species like Mango, Siris, Kusum, Gumhar, volume equations applicable for miscellaneous species has been used.

Table No.-12.1	
Species	**Local Volume Equations**
Asan	$V=0.103171-1.684599D+10.107586D^2$
Bahada	$V=0.035142-0.839708D+8.157614\ D^2$
Bandhan	$V=0.057424-1.153088D+8.542648\ D^2$
Dhaura	$V=0.015731-1.020606D+9.656667\ D^2$
Jamun	$\sqrt{V}=0.08444-1.26801D+8.75274\ D^2$
Kasi	$V=0.035142-0.839708D+8.157614D^2$
Kendu	$V=(-)0.009124-0.494103D+7.610416\ D^2$
Kurum	$\sqrt{V}=(-)0.009124-0.494103D+7.610416\ D^2$
Mahula	$V=0.030925-0.567037D+5.709471\ D^2$
Mai	$V=0.57424-1.53088D+8.542648D^2$
Mundi	$V=0.30925-0.567037D+5.709471\ D^2$
Piasal	$V=0.58424-1.233468D+9.433633\ D^2$
Sal	$V=0.109884-1.804754D+10.297714D^2$
Salai	$\sqrt{V}=(-)0.188655+3.021335\ D$
Simili	$V=0.136196-2.076740D+10.156600D^2$
Sisoo	$V=0.00965+0.58546D-2.5605D^2+24.34215D^2$
Other (Misc)	$V=0.88074-1.449236\ D+8.76053\ D^2$

The following quality classes for Sal as given in the All India Yield and Volume Table for Sal has been adopted in this Plan.

Quality-I Localities where the height of mature crop is over 33 m.

Quality-II Localities where the height of mature crop is 27 m to 33 m.

Quality-III Localities where the height of mature crop is 15 m to 27 m.

Quality-IV Localities where the height if mature crop is less than 15m.

12.0.1.11 Analysis of Enumeration

The intensity of sample enumeration in the 1% done by "Strip sampling" method during the previous working plan. In the present working plan, sample point enumeration is done over area of 0.1 ha (3.62mtX3.62mt).

12.0.1.12Comparison of enumeration results

Each enumeration strip was taken as a sample. The number of trees recorded in each enumeration strip was classified as per girth at breast height for twenty-six different species. All enumeration details of a particular compartment is summed up. In this way, the species wise number of trees per dia class was determined for each compartment.

The result obtained is used to estimate the number of trees present per hectare species wise in different dia classes. The number of trees per hectare of every compartment of forest block is added up. This gives the number of trees per hectare in each dia class of various species in different forest blocks. The percentage of various species, which constitute the forest crop and their dia wise contribution, is also calculated. In the ideal selection forests, the number of trees in successive diameter classes should be in a geometric series as per De Liocourt's Law. It follows that if the number of trees is plotted against diameter classes (or girth class), the resultant curve will be laterally inverted J Shape. Those forests, where the number of stems by diameter class (or girth class) decreases in a constant geometric progression, can be termed as balanced forest. The smooth inverted J curve will indicate the balanced stand structure of the forest block.

12.1Statistics of forest carbon stock:

12.1.1General concepts and approaches in forest carbon accounting

The 'Good Practices Guidance' (GPG) developed by Intergovernmental Panel on Climate Change (IPCC) is universally accepted source book for concepts, definitions, various pools, methods, default values, various required equations etc for preparing account of forest carbon stocks (FCS).The GPG uses the term "Categories" to refer specific sources of emissions/ removals of greenhouse gases. The 2003 revision of GPG for LULUCF has six categories of land viz Forest land, Cropland, Grassland, Wetlands, Settlements and Other lands. Each land-use category is further subdivided. The forest land is divided into three sub categories namely Forest land remaining Forest land, land converted to forest land and forest land converted to other land.

According to GPG, the calculation of GHG inventories require information on extent (in case of LULUCF, areal) of an emission/removal category termed as 'Activity data' and emission or removal of GHG per unit of area (removal of CO, per ha of added forest area) termed as 'Emission factors: The main aim is to estimate these factors for the reporting unit. Once these are estimated then the emission or removal, can be ascertained through the change in carbon stocks using stock difference method.

Three different approaches are given in the GPG to present the activity data (the change in area of different land categories). Approach 1 identifies the total area for each land category; it only provides "net" area. Approach 2 identifies the land conversions between categories by tracking and provides tabular information about

land-use conversion. Approach 3 involves, in addition, the spatial tracking of land-use conversion.

12.1.2 Methodology used by FSI in estimating carbon stock.

The calculation of carbon stock requires information on extent of area of an emission/removal category termed as 'Activity Data' and emission or removal of GHG per unit area termed as 'Emission Factor' as per the GPG developed by IPCC. The methodology used by FSI for activity data and emission factors has been described in the following paragraphs.

12.1.3 Methodology for estimating activity data

Three different methodologies are advocated in GPG and are being used by different countries to assess the extent of area (activity data) under 'Forest land remaining forest' and 'Non-forest land converted to forest: These methodologies are: Wall-to-wall mapping using remote sensing data; Mapping of sampled areas using remote sensing data and; Using field survey methods. For activity data, FSI used remotely sensed (RS) data and adhere to the guidelines of GPG with respect to RS data. A hybrid approach combining automated digital classification techniques with visual interpretation was used. This technique is generally used as it is simple, robust and cost effective.

12.1.4 Forest Type Mapping

Forest type wise extent of forest cover is useful information for characterizing forests in terms of floristic composition and ecological value. FSI mapped forest types of India, according to Champion & Seth classification (1968) on 1:50,000 scale. Using the forest type maps, distribution of forest cover in different forest types has been determined for the country. Canopy density wise spatial information was available from the 'forest cover mapping' This was supplemented with the forest type wise information generated under the national forest type mapping project carried out by FSI. This gave three canopy density classes and 17 type groups including plantation—thus yielding fifty one classes in all. Using this classification, area statistics (activity data) were generated through GIS technique.

12.1.5 Above Ground Biomass (AGB) of trees having dbh 10 cm and above and bamboo

Under the national forest inventory programme, FSI has been conducting a national forest inventory since 2002 following a multistage sampling approach. As per the design, data from about 21,000 sample plots (size 0.1 ha) had been collected

between years 2002-2008. At each sample plot, all trees of diameter 10 cm and above were measured. The woody volume of trees for each sample plot was calculated using volume equations developed by FSI for various species. The volume equation provides above ground woody volume i.e. above ground volume, which includes volume of main stem measured upto 10 cm diameter and volume of all branches having diameter 5 cm or more. Data of specific gravity and percentage carbon content of most of the tree species have been obtained from different published literature. For few species, percentage carbon content was ascertained by experimentation and for remaining an average of all other species was used. Standard formulae were used to calculate biomass and carbon content of each tree.

The estimates of bamboo biomass and carbon stocked in this resource has also been calculated from NFI data. For estimating volume of the bark, the double bark thickness of trees measured during forest inventory and volume equation of trees have been used. Using species-wise, dbh and bark thickness, bark volume equations were developed and were adjusted for 'bark void factor' which were utilized to estimate bark volume. With the help of the specific gravity of bark, the volume was converted into biomass. Using carbon content percent of wood, carbon stored in bark was estimated.

12.1.6Above ground biomass of trees having dbh less than 10 cm

This information was derived by FSI from a special study conducted during 2008-10 for SNC. On the basis of data collected between 2002-08, 20 important tree species were identified for each of 14 strata in NFI. For each of such species, 3 trees of diameters 1- 9 cm (at 1.37 m. height) were felled. From the felled trees, separate biomass was calculated and recorded for wood, twigs and leaves in the prescribed format. Taking the dry biomass of wood/foliage as dependent variable and dbh as independent variable biomass equations were developed for each species. Using the plot level regeneration data from NFl i.e. recruits, un-established, established and all trees having dbh between 5 to 10 cm, biomass and carbon content at plot level is calculated

12.1.7Above Ground Biomass of shrubs, herbs, climbers and biomass of Dead Organic Matter (DOM: dead wood and litter)

For this purpose, the data of forest inventory conducted during 2002-08 was analysed to ascertain the optimum number of plots required for each combination of forest type and forest density. It revealed that about 15 clusters of 2 sample plots for

each combination, would suffice for estimating the biomass/carbon factors for these components if 30% permissible error is considered. This survey was conducted in the districts on randomly selected points which were already inventoried during 2002-2008 and for which forest type and density were known.

For the desired combinations of forest type and forest density, the exact geographical locations (latitude and longitude) of the optimum number of randomly selected sample plots were visited. Using this information, at the centre of sample point, three concentric plots of size 5mx5m, 3mx3m and 1mx1m were laid out at a distance of 30m away from the centre of sample point in North and South direction. In 5mx5m plot, all dead wood above 5 cm diameter were collected, weighed and recorded. In 3mx3m plot, all woody litter i.e. all branches below 5 cm diameter were collected, weighed and recorded. All shrubs & climbers in 3mx3m plots were uprooted, weighed and recorded in the prescribed format. In 1m x 1m plot, all herbs were uprooted, weighed and recorded. Dry biomass was converted to carbon stock.

12.1.8 Organic matter in soil and forest floor

During forest inventory, data on forest floor (non-woody litter and humus) and soil carbon is also collected from each sample plot. For collecting data on humus and soil carbon, two sub-plots of size 1mx1m are laid out within the main plot. The forest floor from both the plots was first swept and material so collected was weighed and a portion of same was kept for carbon analysis. Further, at the centre of these two sub-plots, a pit of 30cm x 30cm x 30cm was dug and a composite sample of soil of 200gm was kept for organic carbon analysis. Samples of soil and humus were got analysed from the standard soil labs and were used for the calculation.

12.1.9Below ground biomass

This is the most difficult pool to measure and generally not measured in forest inventory. It is being included using a relationship (usually a root-to-shoot ratio) to aboveground biomass which have been established by various researchers. GPG also provide default ratios for six major global forest types. FSI has selectively used these defaults to arrive at the carbon number.

BGB (per hactre)=$0.489*AGB^{0.890}$

12.1.10Little layer mass:

Because a sample of the little layer is collected in a determined plot, the coefficient for converting the sampling area per hactre need to be determined. Where

150 gram of dry weight of litter layer is obtained in a 50mx50m square, little layer mass per hectare value is calculated is as follows.

Litter layer mass per hectare= litter layer mass in the plot(g)*(10000/sampling area in sqmt)

=150*(10000/25)=150*(40000)=6,000,000g=6,000kg.

12.1.11 Calculation of dead wood mass:

To estimate dead wood mass, the volume of each dead wood piece need to be calculated the, convert the volume to dry mass using wood densities based on decomposition class. Some literature values are useful to adopt estimation of dead wood mass.

12.1.12 Stump:

Volume of stump be calculated can be calculated using the Huiber's formula

V=A*L*100 where V is Volume (cm ^{3}), A is the sectional area at the middle (cm ^{2}), and L is the height of the stumps (m), if the cutting end is shaped like and ellipse, the sectional area is calculated using the following equation:

A=(D_1/2)8(D_2/2)*π, where d_1& d_2 are the two orthogonal diameters.

For example, for a stump that has 64 cm and 70cm as the orthogonal diameters and 0.47 m height, the volume is calculated as follows.

$$V = A * L * 100 = \left(\frac{64}{2}\right) * \left(\frac{70}{2}\right) * \pi * 0.7 * 100 = 246.301cm3$$

If the stump has "class 2"decomposition class, the mass will be calculated as follows, Mass= Volume* wood density (decomposition class 2)

12.1.13 Standing dead trees:

Volume of standing dead trees be calculated can be calculated using the Huber's formula. V=A*L*100 where V is Volume (cm ^{3}), A is the sectional area at the middle (cm ^{2}), and L is the height of the stumps (m). The area of breast height of standing dead trees is a substitute for the sectional area of middle (A) in some cases. For example, for a dead tree that has a DBH of 25.6 cm and a height of 6.5 mt, the Volume is calculated as follows.

$$V=A*L*100=(25.6/2)^2*6.5*100=334.567cm^3$$

If the stump has "class 2"decomposition class, the mass will be calculated as follows.

Mass= Volume* wood density (decomposition class 2).

12.1.14 Calculation of dead wood mass:

Similar to AGB, dead wood mass also needs to be reported as per hectare estimate, if the total amount of dead wood is 800 kg in a0.16 ha plot, the per hectare estimate of dead wood mass is calculated as follows.

Dead Wood Mass=800*(1/0.16)=5000kg=5.00Mg ha^{-1}

12.1.15 Conversion from biomass to carbon stock:

To estimate carbon stock of biomass and dead wood mass, "carbon fraction of drymatter" defined by IPCC 2006 GPG will be used

If AGB is 125 Mg ha^{-1} in a sample plot, carbon stock can calculated as follows.

Carbon stock= AGB*CF=125*0.47=58.75 Mg C ha^{-1}