

## **CHAPTER – 6**

### **THE STRATEGIES**

#### **6.1. Boundaries.**

As it has been discussed in Chapter 2, the boundary condition of the sanctuary is very poor. There is no maintenance for long since. Maintenance of external and internal boundaries has to be taken up on top most priority. Action has already been taken for pillar posting along the sanctuary boundary after due survey.

##### **6.1.1 External Boundaries**

Around 110 kms. of external boundary run through the boundaries forest and revenue village limits. Clearance of under growth shrubs and poles are to be done on a width of 30 meters keeping the boundary pillars on the middle of the cleared line.

Around 105 kms. of external boundary run along the road, river, revenue villages. So clearance of under growth is not required. The RCC pillars are to be posted at proper places where the old ones are found or have been damaged or absent. RCC pillars need to be posted at every turning of the boundary line.

Besides these, intermediate pillars of different dimension are to be posted at every 100 mtr. interval.

RCC pillars will be posted at suitable places where materials can be easily transported and water is available for proper curing. In the extreme cases where the boundary line passes on hill top or remote places, stone cairns may be erected in place of RCC pillars.

### 6.1.2. The Size of RCC Pillar

9" x 9" x 2' 6" with 3" footing on either wings on bottom side. 1'.6" of the pillar is to be seen above the ground level after erection.

### Size of Cairns

Cairn height	..	0.75 mtr.
Base diameter	..	1.20 mtr.
Top diameter	..	0.75 mtr.
Length of Central Pole:		
Below ground	..	0.50 mtr.
Inside stone	..	0.75 mtr.
Above cairn	..	<u>0.50 mtr.</u>
Total height		1.75 mtr.

The cairns are to be made of loose boulder packed with filling of earth in void space. First layer of the boulder will be given in a ring shaped foundation in trench of 1 ft. depth. The central pole is to be preferably a sal pole whose girth will be 1'.6" to 2'.0" .

### **6.1.3. Colouring and numbering.**

Both the RCC pillars and top of the pole of the cairns are to be painted with 'Corbet Brown' colour oil painting to make it water proof and camouflaging with the surroundings.

Pillar serial number, starting with SE corner as pillar no 1 and moving in anti clock wise direction, and longitude / latitude of the place are to be written on the pillar / post with white colour paint.

### **6.1.4. Quantum of work.**

1. Boundary clearance on a width of 30mtr, for 110 Kms.
2. Pillar posting at every 100 mtr. interval on 215 Kms length. Number of pillars are to be 2150 no (approximately). They are to be posted after proper survey.

The work is to be completed within first 2 years of execution of this plan..

### **6.1.5.GPS reading.**

After completion of survey, pillar posting and numbering a field book will be prepared where GPS location of each pillar, number chainage and bearing will be recorded.

### **6.1.6. Internal Boundary Maintenance.**

RF and its compartments shall be demarcated clearly with pillars. Rather it is much more essential to mark the boundary lines of cluster of villages found inside the sanctuary. There are 99 revenue villages and 3 forest villages inside the sanctuary. The boundary length of cluster of some villages come to 322 kms. Those can be treated as internal boundaries.

Though clearance of internal boundary is not that much important, posting of pillars on the line is highly required to avoid encroachment of habitation.

Similar steps are to be followed as has been done in case of maintenance of external boundary lines.

### **6.1.7. Quantum of work.**

No. of pillars	3200 Nos.
Survey demarcation of (Pillar construction, carriage, posting, colouring, numbering of pillars)	322 Kms.

The work will be executed within 3 years of execution of this plan.

### **6.1.8. Ecological Boundary.**

The flagship species like Tiger and Elephant never restrict themselves within the territorial boundary of Satkosia Gorge Sanctuary. They cross the boundary in search of food and mates. It is also reported that the elephants of Satkosia Range move to adjoining Forest Divisions like Athgarh, Athmallik, Angul, Dhenkanal, Boudh and Nayagarh. Where as, the ecological boundary of all other species is confined to that of Buffer zone.

**6.1.9. The description of Buffer zone is given below:**

**BOUNDARY DESCRIPTION**

The outer boundary of the buffer zone starts from the meeting point of Suhagi nalla in the river Mahanadi in Cutack District, moves in north ward direction till it meets Maradamukha village boundary. Then it runs along the southern & eastern boundary of that village till it reaches the boundary of Sisupathar P.F. Then it follows the southern boundary of Sisupathar P.F. on north-east direction till it meets Balikiary RF. Then it follows the southern boundary of Balikiary RF, Nuagarh R.F. till it meets the inter-district boundary of Cuttack and Dhenkanal. Then it runs northwesterly direction along the Northern boundary of Nandinia R.F. of Dhenkanal District, northern boundary of Nuakheta R.F. of Angul District till it meets Nukheta Revenue Village. Then it follows the northern boundary of Nuakheta Revenue village, Northern boundary of Balong R.F. on westward direction. Then follows northern boundary of Bhogapal R.F., northern boundary of Hidisinga Revenue village, then follows northern boundary of Krushnachakra R.F. Then follows the northern boundary of Kulsar Revenue village, then northern boundary of Krushnachakra R.F. till it meets eastern boundary of Tabada R.F. Then it follows the southern boundary of Tabada R.F. northwesterly direction till it meets the sub-division boundary of Athamallik Sub-Division. Then it runs along the sub-Division boundary on southwesterly direction till it meets Hatidhara R.F. boundary of Athamallik Division. Then it follows the northern, western and southern boundary of Hatidhara R.F. till it meets the Chanagudi nalla.

Then it follows the western boundary of the sanctuary. Then it follows the southern boundary of sanctuary till it meets the inter-district between Boudh and Nayagarh District. Then it follows the northern and eastern boundary of Baisipalli R.F. till it touches the road between Badasilinga to Makarprasad where it runs easternly along the southern boundary of Makarprasad R.F. up to Champadali village. Then it follows the Brutang nalla on easternly direction till it meets river Mahanadi where it crosses the river Mahanadi and reaches the starting point at Odasinga nalla.

**The following villages are coming under the Buffer Zone:**

Name of the village	District	Division	Area ( in Ha.)	Population	Year of settlement
Barabhaya	Cuttack	Athagarh	199	414	1995
Kusal	Cuttack	Athagarh	92	09	1995
Balikiary	Cuttack	Athagarh	188	291	1995
Chakamunda	Cuttack	Athagarh	314	1269	1995
Sisupathar	Cuttack	Athagarh	398	546	1995
Maradamukha	Cuttack	Athagarh	198	558	1995
Kharuani	Cuttack	Athagarh	26	108	1995
Marudiha	Cuttack	Athagarh	25	72	1995
Nuakheta	Angul	Angul	1045	1417	1962
Balanga	Angul	Angul	227	1149	1962
Talasira	Angul	Angul	186	458	1962
Labangi	Angul	Angul	230	70	1962
Pampasar	Angul	Angul	172	171	1962
Hidsing	Angul	Angul	270	296	1962
Hinsrida	Angul	Angul	156	269	1962
Burti	Angul	Angul	247	366	1962
Jagannathpur	Angul	Angul	689	1171	1962
Tainsi	Angul	Angul	1071	1724	1962
Kamarsahi	Angul	Angul			1962
Kumuri	Angul	Angul	174	412	1962

Tendulipada	Angul	Angul	128	76	1962
Hinjagola	Angul	Angul	207	281	1962
Kulsar	Angul	Angul	155	264	1962
Krushnachakra	Angul	Angul	235	242	1962
Laimunda	Angul	Angul	76	124	1962
Baghmunda	Angul	Angul	417	236	1962
Hinjadoli	Angul	Angul	131	188	1962
Nuapada	Angul	Angul	326	580	1962
Olaberi	Angul	Angul	91	132	1962
Kantabeda	Angul	Angul	390	527	1962
Baragotha	Angul	Angul	281	198	1962
Badataila	Angul	Angul	75	235	1962
Bhagatpur	Angul	Angul	186	557	1962
Dandasinga	Angul	Angul	98	281	1962
Lakshmanpur	Angul	Angul	133	458	1962
Bhalumunda	Angul	Angul	78	127	1962
Ganjada	Angul	Angul	760	1146	1962
Kadaliberini	Angul	Angul	97	401	1962
Kothabhuin	Angul	Angul	565	902	1962
Sankrida	Angul	Angul	204	124	1962
Dalaki	Angul	Angul	155	219	1962
Dalasinga	Angul	Angul	224	583	1962
Thukuli	Angul	Angul	89	0	1962
Hinsaloi	Angul	Angul	70	59	1962
Sorispala	Angul	Angul	68	150	1962
Khalisahi	Nayagarh	Nayagarh	173	138	1985
Khajuridiha	Nayagarh	Nayagarh	89	125	1985
Champadali	Nayagarh	Nayagarh	139	167	1985
Siligadi	Nayagarh	Nayagarh	167	117	1985
Raimara	Nayagarh	Nayagarh	276	285	1985
Tulikutapia	Nayagarh	Nayagarh	83	62	1985

Sakin	Nayagarh	Nayagarh	114	43	1985
Dhipasahi	Nayagarh	Nayagarh	101	185	1985
Kendudhipi	Nayagarh	Nayagarh	42	0	1985
Gergedi	Nayagarh	Nayagarh	59	57	1985
Purunapani	Nayagarh	Nayagarh	59	89	1985
Gochhabari	Nayagarh	Nayagarh	163	244	1985
Dhupaju	Nayagarh	Nayagarh	106	133	1985
Badasilinga	Nayagarh	Nayagarh	328	481	1985
Sikhargochha	Nayagarh	Nayagarh	134	177	1985
Janakjhola	Nayagarh	Nayagarh	22	12	1985
Khalighati	Nayagarh	Nayagarh	348	134	1985
Janisahi	Nayagarh	Nayagarh	69	79	1985
Sansilinga	Nayagarh	Nayagarh	44	8	1985
Dumduma	Nayagarh	Nayagarh			1985
Tailasahi	Nayagarh	Nayagarh			1985
Parhasahi			7929	11038	
Total			7927		

**The following Forest Blocks are coming under the Buffer Zone:**

Name of the Forest Blocks	District	Division	Area ( in Ha.)
Balikiary RF	Cuttack	Athagarh	5460
Sisupathar PF	Cuttack	Athagarh	
Nuagarh RF	Cuttack	Athagarh	4220
Nandinia RF	Dhenkanal	Dhenkanal	641.85
Nuakheta RF	Angul	Angul	3000.8
Balonga RF	Angul	Angul	3040.23
Cpt.No.1 to 10 ,13			
Kumuri RF	Angul	Satkosia (WL)	337.52
Kumuri R.F.	Angul	Satkosia Wildlife	337.52

Bhogapal RF	Angul	Angul	184.72
Labangi DPF	Angul	Angul	69.78
Krushnachakra RF	Angul	Angul	2515.8
Hatidhara RF Cpt.No.1 to 22	Angul	Athamallik	5938.81
Makarprasad DPF	Nayagarh	Nayagarh	1152.5
Total			10014.41
Total buffer area			17941.41 Ha. 179.41 Sq. Kms.

Therefore it is suggested to extend all the treatments of this Management Plan to the Buffer zone of the sanctuary area is for long term conservation of the flagship species.

Linking habitats through Corridor, habitat improvement, protection measures, water availability and eco-development work can be taken up outside the sanctuary boundary in Buffer zone in addition to the Core zone. The quantum of work is being dealt with in the thematic plan.

#### **6.1.10. Ecological Boundary:-**

The ecological boundary of most of the wild animals of the sanctuary is beyond its notified boundary. The forest areas in buffer zone so described in the Chapter-6 is mostly used by the wild animals. Therefore, it is suggested to extend the existing sanctuary boundary to the adjoining Reserved Forests of Athagarh, Dhenkanal and Angul Forest divisions. Similarly source of the peripheral villagers now existing within the boundary of the sanctuary need to be carved out from the

sanctuary. Therefore, the sanctuary boundary require rationalization by a fresh notification of the Govt. of Orissa. The draft notification for boundary rationalization for boundary rationalization is given below. The map is also enclosed in the plan.

### **Rationalization of sanctuary boundary**

#### **CUTTACK DISTRICT.**

The boundary line of the sanctuary in the south east starts from the middle of the river Mahanadi near Baliput ferry ghat of Cuttack district which runs towards north along the eastern boundary of the Judum RF block II & then that of Judum RF block-I till it meets the inter dist. boundary between Angul & Cuttack dist. Then it follows the same inter district boundary till it touches northern boundary of Barabhaya revenue village. Then it runs along the eastern boundary of Barabhaya revenue village excluding the revenue villages like Barabhaya, Kushal and Balikiari, it runs along southern boundary of Balikiari village and then follows the forest road from Balikiari to Sissupather till it touches Balikiari R.F. boundary. Then it runs towards south, then eastward along Balikiari RF of Athagarh Forest Division till it meets Nuagarh RF line near village Khola. Then it follows the eastern boundary of Nuagarh R.F. till reaches boundary of Kharuani village. Then it follows southern, western and northern boundary of Kharuani village to exclude the village from sanctuary till it reaches again the Nuagarh R.F. boundary. Then it follows the southern boundary line of Nuagarh RF till it meets the inter dist boundary of Dhenkanal & Cuttack dist. Then it turns westerly and runs along the said inter-district boundary till it reaches the trijunction point of three district namely Angul, Dhenkanal, and Cuttack.

## ANGUL DISTRICT

The North-Eastern boundary of the sanctuary follows through the trijunction point of three districts namely Dhenkanal, Angul & Cuttack towards north along the Nuakheta R.F. boundary including the R.F. till it meets Bolang RF boundary. Then it runs the northern and western boundary of Bolong R.F. ( including it) till it reaches Jocub R.F. Then it follows the eastern boundary of Jocub RF till it touches Takarsinga RF boundary near Pampasar village. The northern boundary of the sanctuary follows the boundary of Takarsinga RF till it touches Chhotamunda RF near Satbhenia nala. Then it runs along the north-eastern boundary of Chhotamunda RF, eastern boundary of Tainsi RF, northern boundary of Tainsi RF & Kumuri PF, western boundary of Tainsi RF till it reaches Baghamunda RF near Baghamunda village. Then it follows eastern & western boundary line of Baghamunda RF till it reaches Majhipada RF boundary. Then it follows the Chanagudi nala (within Hatidhara RF) in southward direction till its meets southern boundary of Hatidhara RF near village Nilamara. Then it continues with the southern boundary of Hatidhara RF till it meets the bank of river Mahanadi. Then it runs westward along the bank of river up to Olatha ferry ghat where it crosses the river Mahanadi & reaches at Harabhanga ferry ghat of Boudh district. 11 revenue villages, as follows, have been ringed out to form Buffer area of the sanctuary.

Sl. No.	Name of village	Area in Ha.	House hold	Population
1.	Purunakote	358	171	766
2.	Gopalpur	141	83	316
3.	Chhotkei	235	93	434
4.	Tulka	204	94	455

5.	Majhipada	386	37	170
6.	Behera sahi	238	37	177
7.	Gaindi	83	66	308
8.	Karadapada	149	98	415
9.	Hatibari	282	92	443
10.	Tikarpada	152	180	684
11.	Katrang	317	69	276

Also 3 Forest villages viz. Tarava, Asanbahali and Bhurkundi will be inside the sanctuary as Buffer, as they are inside the R.F. areas. Further more, 3 Revenue villages namely Raigoda, Badakheta & Salor will be ringed out, to be relocated later on.

Sl. No.	Name of village	Area in Ha.	House hold	Population
1	Badakaheta	90	24	100
2	Salor	124	19	90
3	Raigoda	172	31	185

### BOUDH DISTRICT

The western boundary of the sanctuary runs from Harabhanga ferry ghat along the Mahanadi river bank eastward till it reaches Padmatola RF near Kankei temple. Then it runs along the western boundary of Padmatola RF, northern boundary of Arakhapadar RF till it reaches Badajore nala. It goes along the Badjore nala till it crosses the southern boundary of Arakhapadar RF near Nandagadu village. Then it follows the southern boundary of Arkhapadar RF towards east till it meets the inter-district boundary of Boudh & Nayagarh district and follows the same till it meets Mahanadi R.F. One revenue village i.e. Marada which is included within the sanctuary will be ringed out, to be relocated later on.

Name of village	Area in Ha.	Total house hold	Total Population
1. Marada	29.94	14	57

### NAYAGARH DISTRICT

The southern boundary of the sanctuary starts from the inter district boundary between Boudh & Nayagarh, place in between Padmatola dam & Bankajhari village and runs along the southern boundary and then eastern boundary of Mahanadi RF till it meets Chhamundia PRF excluding revenue villages namely Sagadabhanga and Malasapadar. Then it runs along the eastern, northern and western boundary of Chhamundia PRF and then westward along the eastern & northern boundary of Mahanadi R.F. up to end of Bethiasahi village, where it crosses the river Mahanadi along the Bethiasahi- Baliput (Cuttack district) ferry route and joins the Baliput ferry ghat. Following 6 revenue villages are included in sanctuary and will be ringed out to be relocated in future.

Name of village	Area in Ha.	Total house hold	Total Population
1. Kuturi	119	20	89
2. Bahali	37	-	-
3. Badmul	288	13	53
4. Salapaganda	11	7	41
5. Musugurha	13	5	25
6. Malisahi	-	-	-

Areas on both sides of Pampasar –Tikarpada P.W.D. road coming within the limits of the sanctuary up to 1 chain width on either side of middle of the road.

**6.2. Zonation and Zone Plan.**

**CORE ZONE**

The total geographic area of the Satkosia Gorge Sanctuary, 795.52 Sq. Km, has been taken as the core zone out of which Mahanadi Gorge occupies 30.1 Sq. Km. and villages occupy 137.622 Sq. Km.

It is proposed to divide the Satkosia Gorge Sanctuary (Core Zone) in to 4 distinct zones without any overlapping, so as to treat the zones with specific strategies. The name of zones, their areas are given below.

	Sl. No.	Name of Zone	Extent of area in Sq.Km.
CORE ZONE	1.	Wilderness Zone	565.078
	2.	Eco Development Zone	183.746
	3.	Eco Tourism Zone	44.972
	4.	Restoration Zone	<u>1.724</u>
		Total	795.52
BUFFER ZONE	1.	Wilderness Zone	100.14
	2.	Ecodevelopment Zone	<u>79.27</u>
		Total	179.41

**6.2.1. Sub-Plan for Wilderness Zone.**

**6.2.1.1. Constitution of the Zone.**

The Wilderness Zone of the Satkosia Gorge Sanctuary will include entire core area including Mahanadi River portion excluding the areas earmarked for Revenue villages, Forest villages, Eco tourism Zone, Eco Development Zone and Restoration Zone and forested areas in buffer zone. Total area of wilderness zone is 565.078 Sq. Kms. in core + 100.14 Sq. Km. in Buffer zone = 665.22 Sq. Kms.

The Zone is shown in the Zone Map annexed in the Plan.

#### **6.2.1.2. Past Management in the Zone.**

In A.K.Mishra's Management Plan, the Zonation was not clearly defined though there was a zone namely Wilderness Zone. The prescriptions given under this zone and their extent of implementation is as follows:

1. Water Resource Development activities like construction of water storage structures, WHS, check dams and percolation tanks .
2. 2 Monitoring of animals- Conducted during monitoring of Tiger, copredators, herbivores etc. during Jan 06 last.
3. Animal health surveillance - Vaccination work to all domestic cattle in the villages inside the sanctuary are being taken up regularly.

#### **6.2.1.3. Specific Objectives under broad objectives.**

### **Broad objectives.**

1. To restore and conserve a viable population of endangered Gharial and Mugger in Mahanadi Gorge Eco system.
2. To maintain representative biodiversity with special emphasis on maintaining the viable population of Tiger and Elephant.
3. To enhance the catchment capability to increase water availability.

### **Specific Objectives.**

- (i) To check gill net fishing and over fishing.
- (ii) To check illegal transit of timber in raft through river.
- (iii) To ensure complete protection against forest fire.
- (iv) To ensure complete check on illegal killing of elephants and poaching of other animals.
- (v) To stop unsustainable practices
- (vi) To regulate grazing.
- (vii) To take up minimum restorative management interventions.
- (viii) To take up soil and moisture conservation activities.
- (ix) To ensure water availability by artificial means.
- (x) To develop synergy between activities of different departments.

- (xi) To build up peoples' stake holding.
- (xii) To coordinate and converge different sectoral programmes in the area to achieve the goal of conservation.
- (xiii) To enhance Ecosystem services.

#### **6.2.1.4. Prescriptions of Activities.**

The Wilderness zone is really a red flag area which needs complete protection against grazing, fire, illicit felling, poaching, fishing etc. The management intervention will be minimum so as to achieve the objectives. Only restorative developmental activities will be done for the advantage of wild animals especially for Tiger and its prey base.

Following activities will be done to overcome the problems identified earlier to achieve the specific objectives.

#### **6.2.1.4. Mahanadi River Squad.**

The Mahanadi River Squad (MRS) is functioning properly as desired in controlling movement of illicit forest produce. Its activity needs to be further strengthened. Tikarpara, Baliput, Badamul, Chhamundia, Sitalapani are the strategic places where squads will be stationed. All the party will be provided with motor launches / boats. They will be provided with search lights, VHF hand sets and arms and ammunitions. Their main function is to check illegal

entry of boats into the gorge and checking illegal fishing, transport of timber, kendu leaf, bamboo from the sanctuary. The MRS will watch the nesting sites of the crocodiles on river bank during nesting season i.e. during May and June. The eggs will be prevented from predation by domestic dogs, pigs and human beings. All the squads stationed at different places will have better coordination among themselves to strengthen their work.

**Works:-**

1. Engagement of daily wage driver and assistant in all the 5 motor launches from July to November = 5 months.
2. Maintenance of 5 motor launches every year.
3. Purchase of VHF handsets, batteries, search light, guns and cartridges and supply of uniforms to daily wage staff.
4. Provision of POL for all the motor launches / boats to run round the year.

**6.2.1.4.2. Fishing Regulation.**

- (i) Limited fishing permit will be issued by the D.F.O. to the local traditional fishermen to catch scaly fish with hook and bait (Floating baits) or by angling only as per permission laid in Chapter V-A of the Wildlife (P) Orissa Rules 1974.

- (ii) In no case throw nets or gill nets will be allowed. Large baited hooks which are likely to endanger the Gharial and Mugger shall not be allowed.
- (iii) Fishing be closed during breeding and nesting period of crocodiles.

**6.2.1.4.3. Soil & Moisture Conservation measure.**

Rain water in Satkosia Gorge Sanctuary mostly drains in to the nalas of Mahanadi river basin and to a less quantity in to Brahmani River basin. It is proposed to conserve soil and moisture in only 27 major nalas within Satkosia Gorge sanctuary though nearly one hundred of small nalas are there. 27 nalas are selected because they are having significant role in conservation of flora and fauna. Such nalas are:

Sl No	Name of nala	River basin	District
1	Bauli nalla	Brahmani	Angul
2	Asanbahal	Mahanadi	Angul
3	Dimiri	Mahanadi	Angul
4	Khalkhala	Mahanadi	Angul
5	Purunapani	Mahanadi	Nayagarh
6	Nandini	Mahanadi	Angul
7	Baniajore	Brahmani	Angul
8	Duhanjore	Mahanadi	Angul
9	Satbhenia	Mahanadi	Angul
10	Sarimother	Mahanadi	Angul
11	Ghoda Pathar	Mahanadi	Angul
12	Kurut garh	Mahanadi	Angul
13	Chupu	Mahanadi	Angul
14	Ramagaon	Mahanadi	Angul
15	Ramkut	Mahanadi	Angul
16	Halua	Mahanadi	Angul
17	Bhimdhara	Mahanadi	Angul
18	Satidhara	Mahanadi	Angul

19	Burma	Mahanadi	Angul
20	Khali	Mahanadi	Angul
21	Marada	Mahanadi	Boudh
22	Udandai	Mahanadi	Boudh
23	Sitalpani	Mahanadi	Boudh
24	Nimandi	Mahanadi	Nayagarh
25	Mudligadia	Mahanadi	Nayagarh
26	Shankarjhuli	Mahanadi	Nayagarh
27	Rajing	Mahanadi	Nayagarh

Soil and moisture conservation treatment will be given from ridge to valley. On ridges, vegetative barriers will be provided. On upper slopes loose stone check dams will be constructed. On lower slopes “loose boulder check dams with brush wood covered with wire mesh” will be constructed. In the plains percolation tanks, inverted bandhara will be constructed.

Name of nalla	Brush wood with loose stone ( in nos.)	Gully plugging and loose boulder with wire mesh check dam ( in nos.)	Percolation tanks (in nos.)	Inverted bandhara (in nos.)
Bauli nalla	1000	0500	100	35
Asanbahal	1000	0500	100	20
Dimiri	1000	0500	75	20
Khalkhala	1000	0500	75	25
Purunapani	1000	0500	100	30
Nandini	1000	0500	100	30
Baniajore	1000	0500	100	30

Duhanjore	1000	0500	100	30
Satbhenia	1000	0500	100	30
Sarimother	1000	0500	100	30
GhodaPathar	1000	0500	100	30
Kurut garh	1000	0500	100	30
Chupu	1000	0500	100	30
Ramagaon	1000	0500	100	30
Ramkut	1000	0500	100	30
Halua	1000	0500	100	30
Bhimdhara	1000	0500	100	30
Satidhara	1000	0500	100	30
Burma	1000	0500	100	30
Khali	1000	0500	100	30
Marada	1000	0500	100	30
Udandai	1000	0500	100	30
Sitalpani	1000	0500	100	30
Nimandi	1000	0500	100	30
Mudligadia	1000	0500	100	30

Shankarjhuli	1000	0500	100	30
Rajing	1000	0500	100	30
<b>Total</b>	<b>27000</b>	<b>13500</b>	<b>2650</b>	<b>790</b>

Every year one catchment area will be treated as a whole.

All the above treatments will be given in nalas in catchment to conserve soil and moisture.

#### **At Higher (Steep) Slopes:.**

##### **a) Brush wood with loose stone check dam :**

Brush wood check dams will be made at suitable locations. Small stones will be collected locally and kept in between 2 brush wood barriers to check the run off.

##### **b) Gully Plugging :**

At the origin of the gully i.e. at the gully head, loose stone / boulders will be packed to avoid further erosion at head.

##### **c) Loose boulder with wire mesh check dam:**

On the bed of nalla and gully, loose boulders will be packed and covered with 4" x 4" size chain link mesh to form a stable check dam. A series of similar check dams will be constructed at 50 – 100 mtr. interval depending upon the steepness of the slopes.

### **At Mild Slopes.**

**Inverted bandharas :** Where soft rocks are there on both the nalla banks and maximum nalla width is 15 mtr, inverted bandharas can be taken up. The earth and stones are excavated to form a trench across the nalla at 3 ft wide, 4 – 5 ft depth till hard rock appear on bottom. The trench will be filled up with clay soil with compaction. These inverted bandheras will help in arresting ground water flow to downwards.

Where water is available near by, a wall of RR stones masonry in cement mortar may be constructed inside the trench instead of putting clay soil.

### **Percolation Tanks.**

A cement concrete check dam with RR stone masonry wing walls, abutment, apron for 20 – 30 ft width of nalla will be constructed on nalla bed. It will have weir to allow excess water to go out. A pit dug on upstream side of the percolation tank will allow water to stand for 5' – 6' height.

The design and diagram of the above structures are given in Annexure....

#### **6.2.1.4.4. Grazing control :**

It has already been discussed in Chapter-3 Para- 3.6.4 that there are 35,235 livestock in the villages located inside sanctuary. They all graze inside it and exert tremendous pressure on the forests. They can not be deprived of their rights

unless they are relocated. Therefore it is proposed to regulate the grazing than total denial . Rotational grazing is the only suitable method to reduce pressure.

1. Grazing and lopping to be confined within 1 km distance from the village boundary. The forest within that limit is to be divided in to 5 equal parts. The people will be asked to graze their cattle in one patch in a year and to rotate the grazing by shifting to next patch year after year.
2. Goatery to be discouraged.
3. Incentives to be provided for stall feeding, purchase of hybrid cattle and castration of penned cattle.
4. No livestock will be allowed to move free but to be guarded by a cow boy.
5. Three cattle pounds (Kanjia hoda) to be constructed to impound the cattle.

#### **6.2.1.4.5.**

Following activities will be undertaken in the wilderness zone. But the details are being discussed in theme plan as they are to be implemented in more than one zone.

1. Forest protection from illicit felling, transit, fire, grazing.
2. Plantation activities.
3. Animal health surveillance.
4. Weed eradication.
5. Maintenance of Water bodies
6. Maintenance of Salt licks

### **6.2.2. Sub Plan for Eco-Development Zone :**

Detail plan is being discussed in the Chapter 8 – ( Ecodevelopment plan)

### **6.2.3. Sub Plan for Eco Tourism Zone :**

Details is being discussed in Chapter – 7 (Tourism, Interpretation and Conservation Education).

### **6.2.4. Sub Plan for Restoration Zone :**

#### **6.2.4.1 Justification of Relocation.**

There are certain villages like Raigoda in Satkosia Wildlife Division, Marada, Kuturi, Salapaganda, Musuguda of Mahanadi Wildlife Division, which are located in such a situation that they can not be ringed out from the sanctuary as they are in the heart of animal breeding zone. Due to their presence , the habitat of wildlife is fragmented and the people also suffer due to crop depredation and cattle depredation by the wild animals . They have no scope to avail the developmental activities of the Govt. They are deprived of education, health, electricity , communication and source of livelihood. So these, villages need to be relocated from the boundary of sanctuary for betterment of wild animals and as well as the villagers. During inquiry of the District Collector, Angul , villagers of Raigoda expressed their willingness to be relocated. There fore this plan includes Raigoda village as the restoration zone. But regarding other four villages of Mahanadi Wildlife Division , the people are not willing at present to evacuate the

area but so far as management of wildlife is concerned, they should be relocated in near future. This plan recommends organizing constant motivation camps in this four villages so that they volunteer to be relocated.

#### **6.2.4.2. Constitution of the Zone:-**

The Collector, Angul in his recommendation Dt. 24.07.1998 for issue of final notification of the sanctuary, has stated that only Raigoda village of this sanctuary is to be shifted to a new site with all applicable rehabilitation packages as per norms of Water Resources Department and Rehabilitation and Resettlement Policy of the State Govt. The villagers of Raigoda have also volunteered to shift leaving their 172.4 ha land to which necessary treatment are to be given to make them a suitable habitat for the wild animals.

#### **6.2.4.3. Past Management:**

Raigoda village was covered under buffer Zone where Eco Development activities were undertaken in the last Plan. One EDC has been formed. Plantations like Aided Natural Regeneration covering 3 ha of area and Pasture Land Development covering 2 ha of area, Jagannath Vana Prakalpa covering 20 ha have been taken up.

#### **6.2.4.4. Specific Objective.**

1. To identify a suitable site near to N H 42 / PWD road having culturable land for agriculture.
2. To make an alluring relocation package.

3. To make follow up action of rehabilitation in the new site for 5 years.
4. To develop grass land for wild animals in the evacuated area.
5. To create some new water bodies, water holes and to renovate the existing check dam and water bodies to provide water to wild animals.

#### **6.2.4.5. Prescription of Activities.**

##### **6.2.4.5.1. Identification of suitable relocation site:**

The villagers of Raigoda are depending on agriculture. So the new relocated area must have enough cultivable land. Some non-forest land close to the N.H.42 or PWD road or any existing developed village is to be selected so that developmental activities can be taken up quickly. If non-forest lands are not sufficiently available, then degraded revenue forest kism land may also be identified. A proposal for forest clearance may be submitted for permission under F.C. Act, 1980. If 172.4 ha of areas is not available in a single patch, cluster of small patches can also be identified within a radius of 3 to 4 km..

Collector ,Angul who is the Chairman of Task Force for Satkosia Gorge Sanctuary has already been approached time to time to identify such land and to alienate it following all Land acquisition Procedures.

##### **6.2.4.5.2. Alluring Relocation Package:**

a) The Government of India, through a scheme called “Beneficiary Oriented Scheme for tribal villages of Project Tiger Area, National Park and Wildlife Sanctuary (Central Sponsored)” provides Rupees 1.00 lakh per family for

effecting shifting of villages. In Raigoda, there are about 30 families. So, Rupees 30.00 lakh can be obtained from Central Government for their shifting.

b) Rehabilitation can be made as per the norms of Water Resources Rehabilitation and Resettlement Plan of the State Government which is enclosed in this plan as Appendix.

c) The Alluring Package for the people will include following minimum facilities for the villagers.

- (i) Permanent provision for drinking water,
- (ii) School with play ground for children,
- (iii) Community hall.
- (iv) Internal roads.
- (v) Approach roads to crop fields.
- (vi) Electricity supply.
- (vii) Financial assistance for construction of latrines.
- (viii) Construction of drainage and sewerage system.
- (ix) Land for cremation ground, common land, grazing land, and some reserve land for future development.

#### **6.2.4.5.3. Follow Up action:**

After settlement in new area, community based activities and other Development activities are to be taken up. Follow up action for 5 subsequent

years are to be taken up to make the relocation process successful. An extra fund @ Rupees 2.0 lakh per year, total Rupees 10.00 lakh is required for the same.

#### **6.2.4.5.4. Creation of grass land:**

Out of 172.4 ha of vacated land 60 ha area will be developed in to a meadow , 30 ha. for legumes by sowing seeds of legumes and transplanting slips of palatable grasses, 30 ha. of bamboo, 22 ha. of fodder tree will be raised , water body over 10 ha. of area will be created and development of infrastructure for facilitating animal sighting over 20 ha. will be made. A methodology is to be adopted for easy sighting of wild animals there.

#### **6.2.4.5.5, Motivation camps**

There will be a regular motivation camps in the villages like Kuturi, Marada, Salapaganda and Musuguda to motivate the villagers to evacuate the area for their economic development. Such type motivation will continue till they volunteer to be relocated.

### **6.3. THEME PLAN.**

The activities which are to be taken up in more than one zone are being kept in Theme Plan.

#### **6.3.1. Protection Plan.**

Under the theme plans some more emphasis will be given on the protection plan and research.

Protection plan prescribes.

⇒ New road alignments for surveillance and monitoring and to have a feel of the sanctuary biodiversity

Protection of forests against illicit felling and poaching is more important than any other interventions.

#### **6.3.1.1. Specific Objectives.**

- a. To protect the forest from illicit felling of Teak and Sal.
- b. To check poaching of wild animals with emphasis on elephants.
- c. To strengthen the intelligence collection system and communication system.
- d. To strengthen the protection squads.
- e. To improve mobility.

#### **6.3.1.2. Activities.**

##### **6.3.1.2.1. District Task Force.**

It has already been decided by the Chief Secretary, Government of Orissa to constitute District Task Forces for Satkosia Gorge Sanctuary. The sanctuary covers part of 4 Revenue Districts like Angul, Cuttack, Boudh and Nayagarh and 2 Wildlife Divisions namely Satkosia Wildlife Division and Mahanadi Wildlife Division. Three D.T.F. are functioning in Angul, Cuttack and Nayagarh Districts. Four District task forces for Satkosia Gorge Sanctuary are required as detailed below.

#### **Constitution :**

District Magistrate cum Collector .....Chairman

DFO Satkosia Wildlife Division.....Member Secretary (for Angul & Cuttack)

DFO Mahanadi Wildlife Division .....Member Secretary (for Nayagarh & Boudh)

DFO (Territorial) of concerned District.....Member

Superintendent of Police of concerned district.....Member

DFO Satkosia Wildlife Division and Mahanadi Wildlife Division will convene the District Task Force meeting in their allotted districts after consultation with the respective Collectors. The District Task Force will see that the sanctuary is well protected. They will also make the strategies like deployment of Police Force and Executive Magistrates at the vulnerable / strategic places and assist the forest staff in conducting village raids, house searches and apprehension of offenders. They will also move to Chief Secretary, Home Secretary, Forest Secretary and to the Principal Chief Conservator of Forests, General and Wildlife for rendering necessary help for protection of the sanctuary.

The District Task Force meeting is to be convened once in a year at the minimum.

#### **6.3.1.2.2. Special Protection Force.**

Satkosia Gorge Sanctuary is coming under the jurisdiction of 2 Territorial Conservators i.e. Conservator of Forests, Angul Circle and Conservator of Forests, Bhubaneswar Circle. Since the sanctuary is looted by the smugglers of adjoining Territorial Divisions, a collective protection measure will be very much effective. For better coordination among all the divisions, the respective Conservator of

Forests will constitute a Circle Level Special Protection Force for the sanctuary taking staffs of different divisions and monitor their activities.

One Special Protection Force of the division is proposed to be stationed at Balikiari of Athgarh division which is just at the border of the sanctuary strategically located. A Jeep will be at their disposal.

Another Special Protection Force is proposed to be stationed at Badamul under Mahanadi Wildlife Division. A jeep will be at their disposal.

The duty of the Special Protection Force is to check entry of smugglers into the sanctuary through all possible routes. They will check such routes regularly and help in seizure of forest material and vehicles by the local staff and give intelligence regarding the illicit felling and poaching of wild animals in general and elephant in particular.

They will pass on message to the concerned V.H.F. stations where the smugglers are expected to have entered. They may seek help from staff stationed at different strategic locations.

#### **6.3.1.2.3. Deployment of OSAP (Orissa State Armed Police) Force.**

Tulka under Purunakote range is a hyper sensitive area. Encounters with timber smugglers in groups of 100 – 150 coming from Narsinghpur side are very common. Exchange of fire between forest staff and smuggler group is a common occurrence. Injury and causality are also recorded. All strategies on deployment have proved futile. Only OSAP could be able to protect the forest during their stay at Tulka for 8 months i.e. from 28.10.2000 to 19.6.2001. After their departure

also effect was felt up to further one year. One to two sections of OSAP are required to be deployed in this sanctuary at Tulka and Badamul.

#### **6.3.1.2.4. Elephant Tracker.**

Local people are more conversant with the movement of elephants in their area. They also know all the foot paths, water body, places where elephants take rest and spend more time. Persons knowing these information are to be engaged as elephant trackers, who will gather information on elephant (herd or tusker), movement and their health and transmit the same to the respective Range Officers in the evening through nearest VHF station. While tracking the elephants they will be watching the movement of poachers also , if any. They will also provide intelligence on the entry of any poacher in to the forest area of both core and buffer zones. They will be provided with Khaki uniform, I.D. Card, water bottles and registers.

There will be 6 elephant trackers in each range round the year. There are 5 ranges in the sanctuary.

So 30 persons x 12 months x Rs.2100 x 10 years is required to meet this expenses for conservation of Asiatic elephants in this sanctuary.

The vulnerable region where the elephant trackes will be engaged are Raigoda, Kadalikhola, Kandhaida, Kantarasingha, Jhirpani, Tersingh, Siaribhundi, Katrang, Chunabhati, Bhurkundi, Kuadoli, Chuanri, Ranibandha, Baghamunda and

Majhipada within core zone and at Barasingha, Jayapur, Bhusuka, Nuagarh, Bipradihi, Taleipathar, Nuakheta in Buffer zone.

#### **6.3.1.2.5. Foot patrolling Squad.**

##### **(a) Anti-poaching Squad**

The sanctuary has rugged terrain and dense vegetation. To ensure effective patrolling the squads need to patrol the forest by foot, besides normal patrolling by vehicles. Foot patrolling on following routes will help in proper surveillance and monitoring. Any change in wildlife health condition and wildlife habitat can be properly assessed by foot patrolling. Therefore it is suggested to convert following foot paths/old extraction paths for foot patrolling after proper road alignment.

The poachers from outside the sanctuary enter into it in groups of 4-8 with muzzle loaded guns and hunt sambar, barking deer, mouse deer, wild pig, & langur for meat purpose and selectively hunt tuskers to obtain tusks from them.

The poaching of elephant tuskers have increased to some extent in recent past. The existing field staffs of the Division are not sufficient to cover the entire sanctuary area either to locate the poachers or to protect the sanctuary from them.

To bring the entire sanctuary areas under clutch following arrangements have been proposed.

1. The vulnerable areas have been identified.
2. Such areas are divided into 20 protection zones.
3. 20 anti poaching squads are to be constituted one in each zone comprising 4-5 persons in each squad.

4. The routes of each squad for patrolling by walk has been determined and plotted on sanctuary map.
5. Anti poaching camps will be set at 19 places.  
In most of the cases existing buildings will be utilized as antipoaching shed. But in few cases temporary anti poaching sheds are to be constructed.
6. Surveillance and monitoring will be under taken simultaneously. The Range officers will be provided with vehicles to monitor their work.

### CONSTITUTION OF ANTI POACHING SQUAD AND THEIR ROUTES.

#### RANGE – TIKARPADA

A.P. S-1 (HQ-Majhipada)

Majhipada → Majhipada RF-C/8 → C/4→C/3→C/2→C/1→C/5  
Karasingh Khola→ C/9→ Kadalikhola watchtower.

APS-2- (HQ:-Karadapada)

Karadapada→ Majhipada RF-C/9 → C/10→C/11→ C/17→ Kadalikhola

APS-3-- (HQ:- Majhipada)

Majhipada → HatidharaRF C/25→ C/24→C/27 C/23→Naleswar→ Bipradihi

APS-4-- (HQ:- Tikarpada)

Tikarpada→ Tikarpada RF C/4→ C/1→  
C/2→Jhanajhana→C/3→Kandhaida

APS-5-- (HQ:- Tikarpada)

Tikarpada→ Tikarpada RF C/5→ C/6→ C/7→C/8→Katrang

#### RANGE- PURUNAKOTE

APS-6-- (HQ:- Purunakote)

Purunakote→ Majhipada RF-C/14→ C/15→ Hatigirija → Bada damak  
→ Sana damak→ Bada Kurudu→ Sana Kurudu→ Kadalikhola→  
Rautibahal

APS-7-- (HQ:- Baghamunda)

Baghamunda→ Baghamunda RF-C/6→ C/7→  
C/9→Rautibahal→Bipradiha

APS-8-- (HQ:- Chhotkei)

a) Chhotkei → Purunakote RF C/17→C/18→C/19→C/20→Kuannali  
→ Chhotkei

b) Chhotkei → Purunakote RF C/7→C/12→C/13→C/14→C/15→  
Chhotkei

a and b routes will be patrolled alternatively.

APS-9-- (HQ:- Purunakote)

Purunakote → Purunakote RF C/9→C/10→C/11→C/8→Purunakote

APS-10-- (HQ:- Tulka)

a)Tulka → Tulka RF C/1→C/2→C/3→C/4→ C/5→ Tulka

b) Tulka → Tulka RF C/6→C/7→C/8→C/9→ C/10→ C/11→ C/12→

Tulka

a and b routes will be patrolled alternatively.

#### RANGE- PAMPASAR

APS-11-- (HQ:-Kumuri)

Kumuri →Tainsi RF → KumuriPRF→Burti RF → Kumuri

APS-12-- (HQ:- Labangi)

Labangi→ Kantarsinga → Jaunli Asan→ Dangakhola→ Raigoda RF  
C/15

→ Raigoda → Labangi

APS-13-- (HQ:- Labangi)

Labangi→ Chuanri → Kuanali→ Chhotkei

APS-14-- (HQ:- Labangi)

Labangi→ JocabRF C/5 → C/4→ C/3→C/2→Pampasar

#### RANGE- RAIGODA

APS-15-- (HQ:- Raigoda)

Raigoda→ Rasenda → Kuadoli→ Raigoda

APS-16-- (HQ:- Raigoda)

Raigoda→ Purunapani → Nuakheta→ Raigoda

APS-17-- (HQ:- Raigoda)

Raigoda→ Tersingh → Cherpani→ Nuagarh road → 60 Acre→ Raigoda

APS-18-- (HQ:- Bhurkundi)

Bhurkundi→ Raigoda RF C/16 → C/11→ C/12 → C/13→ Bhurkundi

#### RANGE- JILLINDA

APS-19-- (HQ:- Katrang)

a)Katrang→ Katrang RF C/1→ C/2→ C/3→Katrang

b) Katrang→ KatrangRF C/7→ C/8→ C/9→C/10→ Katrang

a and b routs will be patrolled alternatively.

APS-20-- (HQ:- Siaribhundi)

Siaribhundi→ KatrangRF C/4→ C/5→ C/6→Siaribhundi

EXISTING BUILDINGS AT	TO BE CONSTRUCTED AT
-----------------------	----------------------

Majhipada	Karadapada
Kadalikhola W/T	Bipradihi
Tikarpada	Rautibahal
Kandhaida W/T	
Katrang	
Purunakote	
Baghamunda	
Chhotkei	
Tulka	
Labangi	
Pampasar	
Raigoda	
Bhurkundi	
Katrang	
Siaribhundi	
Kumuri	

### ANNUAL BUDGET

These will be 20 APS operate in the Division with forester / FG being the squad leader. There will be 4 Nos. of daily wages local people in each squad to assist. They will be engaged on consolidated wages @ Rs.3000 each, as they will work for more than 8 hours.

Three daily wages drivers will be engaged to drive the Govt. vehicles.

ITEM	RATE	AMOUNT
20 APS x 4 persons x 12 months	@ Rs.3000/- per month	Rs.28, 80, 000/-
3 drivers x 12 months	@ Rs.4000/- per month	Rs.1,44,000/-
Construction of Anti-poaching sheds 3 no.	@ Rs.25,000/- per month	Rs.75,000/-
Purchase lantern, Kerosene oil, torch, battery, medicines, foods, L. S		<u>Rs.50,000/-</u>
		<b><u>Rs.31,49,000/-</u></b>

Rs. 31,49,000/- will be required annually to check the poaching in the sanctuary.

### **(b) Anti-smuggling Squad:**

The teak plantation on nearly 30 sq. km area and natural Sal, Piasal & Sisum trees have attracted the timber smugglers from out side the sanctuary to fell and remove illicitly.

Since hundreds of smugglers in a group are entering in to the sanctuary with lethal weapons, forest staff are unable to protest them. So beat system of administrative set up in Satkosia Gorge Sanctuary has proved fruitless. Therefore it is suggested to protect the forest by group of Forest Personnel. The following 16 Forest patches are highly vulnerable to illicit felling.

Tukla, Baghamunda, Raigoda, Kuadoli, Labangi, Atharmile, Katrang, Siaribhundi, Dolasingha, Tainsi, Tikarpara, Chhamundia, Manibhadra, Sisupathar, Sitalpani, Badamul, Marada & Kuturi.

All the beat Forest Guards are required to be pooled in to the nearest Section Headquarters or Range headquarters. Their number will be 13 in every group (1 Forester + 4 Forest Guards + 8 Squad men ). In Satkosia sanctuary staff strength is very less. Many posts are lying vacant. So it is proposed to engage effective, tall, strong and stout, local youths as protection Squad men at **8** most vulnerable places like Tulka, Raigoda, Baghamunda, Bhurkundi, Labangi, Kandhaida ,Siaribhundi & Majhipada **@ 8** Nos. in such vulnerable place round the year.

Required staff strength can be obtained by deploying staff from other divisions on deputation, if regular posting is not possible.

#### **6.3.1.2.5. ( c) Watch Towers at strategic locations:-**

There are 8 most vulnerable plan in the sanctuary as stated above. Watch towers with 10'X10' living room at top will be constructed which will be furnished with permanent bed, drinking water facility, kitchen and toilet at bottom

of the tower. These towers will be utilized by the Antipoaching Squad and Antismuggling squad. The tentative cost of each such tower will be Rs. 6,00,000/- each.

#### 6.3.1.2.6. Divisional Mobile Party.

Two Divisional Mobile Party are proposed to be stationed one at Angul, other at Chhamundia with one jeep each for helping the staff in the field for conducting raids, for urgent forest protection work on requisition.

Composition of DMP:	Forester ..	1
	Forest Guard ..	2
	Attendant ..	2
	Driver ..	1

The DMP jeep will have mobile VHF sets. The DMP will be provided with lathi, gun, cartridges, helmet and chest guards.

#### 6.3.1.2.7. Road maintenance for Patrolling.

Satkosia WL Division	Purunakote-Balikiary	25 kms
	Tarava-Kumuri	6 kms
	Purunakote-Baghamunda-	7 kms
	Kumuri Tarava	6 kms
	Tikarpara-Baliput	18 kms
	Pampasar-Raigoda	24 kms
	Labangi-Chuhanri-Tulka	<u>17 kms</u>
		<b>103 kms</b>
Mahanadi WL Division	Bhabapur-Padmatola	15 kms
	Sansilinga-Badmul	12 kms
	Dhipisahi-Padmatola	13 Kms.

Geredisahi-Padmatola	10 Kms.
Chhak Nimandi-Malaspadar	<u>7 Kms.</u> <b>57 Kms</b>
<b>Total :</b>	<b>160 Kms</b>

Every year these roads need maintenance on priority basis which need stone packing, earth filling, side drain cutting, provision of cross drainage, side bush cutting. All the wooden bridges will be replaced by RCC culverts to enhanced communication and make the roads all weather. Since the road repair work is labour intensive work, funds can be obtained from NRGs, NFFW. A details programme is to be drawn up and sent to Project Director, DRDA to obtain the funds so that the villagers living inside the sanctuary will have assure engagement during the lean period of work.

**6.3.1.2.8. Wireless network.**

Wireless network has already been built up in this sanctuary.

- a. 3 new base stations are required to be installed at Bhurkundi, Baliput and Kumuri.
- b. 5 new mobile sets are required to be fitted in 3 Divisional Mobile Party jeep and in 2 motor launches.
- c. 10 new hand sets are required for use by Foresters and Forest Guards.
- d. Old VHF sets need repair and replacement.

- e. VHF attendants will be engaged in 3 new base stations on daily wage basis round the year.

**6.3.1.2.9. Mobility.**

- a. 2 new jeeps are required to be purchased for the proposed Division Mobile Parties, one in Satkosia Wildlife Division and other for Mahanadi Wildlife Division.
- b. Maintenance of existing 3 jeeps and 2 new jeeps, 5 motor launches will be required for which special fund is required.
- c. P.O.L. for all the 5 jeeps and 5 motor launches are to be purchased to run the Mobile jeeps for protection of Forest and Wildlife.

**6.3.1.2.10. Secret Fund.**

- a. Collection of confidential information is an integral part in forest protection. A secret fund is to be raised for giving incentives and rewards to the informants in Wildlife offence cases.
- b. As provided in Forest Protection Rules 2005, a Secret fund will be raised out of 45% of 25% of sale value of the seized produce, which will be given to the informants and staff.

**6.3.1.2.11. Rewards.**

In the Forest Protection Rules 2005, 25% of the sale value of the seized forest produce will be given as rewards as per rule.

#### 6.3.1.2.12. Arms and Ammunitions.

Every staff working in the sanctuary is to be equipped with arms and ammunition for self defence and to drive out the unauthorized persons from the sanctuary. Though guns and rifles are there they are not functioning properly due to lack of timely maintenance.

- a. Maintenance / servicing is required for existing Revolvers, Rifles and Guns.
- b. Purchase of 5 Rifles, 5 Guns and their ammunitions will be made. Rubber bullets are to be procured for firing to avoid causality.
- c. **Training on handling** the arms and ammunition is equally important. **Arms training** includes servicing, maintenance, and firing practice in ranges. Every year there will be 2 training camps for all the staff where test target firing will be organised.

#### 6.3.1.2.13. Modern Gadget:-

Besides the arms and ammunitions an VHF sets following modern gadgets are required to be used at division level. They are as follows:-

Sl.No.	Name of the Articles	Quantity	Amount (inRs.)
1	Binoculars	20	2,00,000
2	Night vision binoculars	10	5,00,000
3	GPS and its software	20	4,00,000
4	Flair gun	20	4,00,000
5	Hooter	10	1,00,000
6	Mega Phone	10	2,00,000
7	Cell phones, with recharging costs	10	2,00,000
8	Computer for crime cell	5	5,00,000
	Total		25,00,000

#### 6.3.1.2.14. Traffic control.

Wild animals die due to road accidents. There are 2 PWD roads in the sanctuary. Pampasar to Tikarpara 30 kms, Kusanga – River Bank – 10kms. These roads are being used by the public (local people) for their movement by two wheelers and four wheelers. To control their speed following steps are to be taken.

- a. Speed breakers (humps) to be made out on every beginning and end of wooded area – 10 humps.
- b. Signages to be erected with fluorescent colour for awareness of speed limit – 10 signages.
- c. Double white lines with paint will be put on the road mentioning ‘SLOW’ within 2 lines - in 10 locations.

#### **6.3.1.2.15. Check gates.**

Check gates at entry points to the sanctuary is an important aspect to protect the sanctuary from illegal entry of miscreants. Check gates are operating at sanctuary borders like Pampasar, Nuakheta, Raigoda, Baliput, Malisahi and Kusanga. But only three are being operated by staff day and night, other gates are unmanned. There are places on the border where check gates should be erected for better protection. Such places are Jagannathpur, Kumuri, Bhurkundi, Badasilinga.

Some unmanned check gates will be erected on the forest roads leading to either watch towers or vulnerable places. Such places are Karadapada, Hatibari, Purunakote, Chhotkei, Majhipada, Bhurkundi (on Kuadoli road), Lembuchali, Padmatola.

#### **6.3.1.2.16. Establishing Crime Cell and Prosecution Unit.**

The crime cell and Prosecution Unit will be established at Division office at Angul. This cell will have 3 distinct functions i.e. intelligence collection, coordination of activities among all antipoaching and antismuggling squad and enforcement and prosecution.

All the 3 functions will be monitored by 3 Forest Rangers. Computers , cell phones will be provided to them for smooth monitoring .a separate building will be constructed in the name of Crime Cell. Provision will be there to out source the services of advocates/law officers in preparing prosecution records, evidences and handling the important cases in the trial courts. Rs. 10,000/- per month will be earmarked for this purpose.

#### **6.3.2. FIRE CONTROL PLAN.**

Forest fire in Satkosia is ‘ground fire’ which burns the surface litter, loose debries on the forest floor. Forest fire in this sanctuary starts after 15<sup>th</sup> February and continues till arrival of monsoon every year. It causes irreparable damage to the young regeneration of seedlings and coppice growth and affects to some extent the saplings and pole crops.

Fire in the sanctuary is caused mostly due to intentional burning by local people rather than accidental. Forest fire normally starts along the PWD / Forest road sides and bridle paths.

##### **6.3.2.1. Specific objective.**

- i) To create awareness among the local people.

- ii) To take preventive steps.
- iii) To improve communication network and mobility.
- iv) To extinguish fire at first sight.
- v) To ensure people's participation through incentives.

### **6.3.2.2.Prescription of Activities:**

#### **6.3.2.2.1.Awareness and Training.**

During first fortnight of February every year ,it is proposed to impart training on fire fighting, awareness campaign to be arranged regarding the cause and damage of forest fire etc. Forest Department staff, NGOs and local people are to participate in the above activities. For awareness of the people following things are to be done.

- i) Signages on public road for prevention of fire will be erected .... 50 signages
- ii) Posters, leaflets are to be distributed among the villagers residing inside / around the sanctuary 150 villages
- iii) Cycle rally, pada yatra are to be organised taking forest staff, NGO and school students ..... 50 villages
- iv) Awareness campaign using vehicles and loud speaker 3 jeeps every year
- v) Range level training to forest staff, local people, EDC members, fire fighting squad on combating fire every year. during fire season 8 training camps

#### **6.3.2.2.2. Fire line Tracing.**

Along both the sides of PWD road, forest roads fire lines of 10 ft width after 15 ft away from road are to be traced by controlled burning of dry leaves, twigs etc. during first fortnight of February every year. There are 221.5 kms of forest road, 40 km of PWD road and 33.5 km of Panchayat road in this sanctuary.

It is proposed to fire trace at least 230 km of different roads every year as detailed below :

PWD road	..	40 kms
Panchayat road	..	30 kms
Forest road	..	<u>160 kms</u>

230 kms every year.

#### **6.3.2.2.3. Watch towers with watchers.**

There are vantage points on hill tops from where different large areas of valley and plain lands are visible. Tree top manchans are to be constructed from where Watchers will sit with a VHF hand set and a Binocular to locate the fire. During fire season i.e. from 2<sup>nd</sup> week of February to 2<sup>nd</sup> week of June (4 months) daily waged Watchers will be engaged. VHF hand sets and Binoculars are there. Seeing through Binoculars, the Watcher will try to locate the smoke during day time and direct sighting of the fire in night and inform the nearest VHF station of patrolling party to approach the exact location where fire has broken out. They may use Xerox copy of topo map of the locality to give reference of longitude, latitude, nalla, hill etc. for the patrolling party.

- 20 vantage points will be identified.
- 20 tree top machans will be constructed.
- 40 Daily waged Watchers will be engaged for 4 months, 2 per each vantage point.
- 10 more VHF hand sets with solar charger will be purchased and supplied to the Watchers.
- 10 more Binoculars will be purchased.

#### **6.3.2.2.4.Fire fighting Squad.**

There will be 18 fire fighting squads in the sanctuary to be stationed at 7 range hqs. & at Bhurkundi, Baghamunda, Tulka, Tarava, Majhipada, Sitalpani, Marada, Nuapada, Padmatola, Dhipisahi & Purunapani.

Each Squad consists of one Forester and 5 daily waged labourers. They will be provided with fire fighting equipments, one hired jeep, one VHF handset.

Total            4 hired jeeps for 4 months

18 x 6 = 108 daily waged labourers for 4 months.

4 VHF sets to be purchased

18 set of fire fighting equipments are to be purchased

Food, water, medicine, First-aid box, torch and other logistics are to be supplied to the party.

The squad will move to the fire affected area as per messages received from the fire Watcher stationed at Watch tower by using the references in topo map.

Besides, the squad will patrol as a routine work on the roads assigned to them.

They will extinguish the fire as early as possible.

**6.3.2.2.5. List of Fire Fighting Equipments (1 set):**

Sl.No.	Name of Equipment	Price each (in Rs.)	Quantity	Amount
1	Fire proximity suit	49000	1	49000
2	Fire Retardent suit	28000	4	11200
3	Fire helmet	1100	4	4400
4	Fire shoes	1000	4	4000
5	Leather cum canvas gloves	150	4	600
6	Fire beater	520	5	2600
7	Fire Axe	700	2	1400
8	Fire bucket	275	2	550
9	Fire hook	550	2	1100
10	Fire rake	150	1	150
Total				75000 / set

18 sets of fire fighting equipments will be purchased to be used by 15 squads.

**6.3.2.2.6. Participation of Eco Development Committees.**

85 more Eco-development committees are to be formed besides 17 EDCs already formed. The EDC members will be asked to protect the sanctuary from forest fire during the fire season. For successful prevention of fire for that season 50 selected EDCs are proposed to be given an incentive of Rs.5,000/- each annually on the General Body Meeting of the Forest Development Agency. It is proposed that 5 EDCs are to be awarded with Rs.3,000/- each per year who have excelled in controlling forest fire most efficiently around their villages. An

amount of Rs.10,000/- as incentive will be given to each 30 sensitive villages for not setting fire.

**Budget:**

Incentive for 30 sensitive village per year @10,000/-=Rs.3,00,000/-per year.

Incentive for 50 EDC per year @ Rs.5,000/- = Rs.2,50,000/- per year

Award 5 EDC per year @ Rs.3,000/- per each= Rs. 15.000/- per year.

District Award, 4 districts per year @ Rs.2000/-=Rs. 8,000/- per year.

**6.3.2.2.7. Maintenance of Data Base.**

Without suppressing the fire incidents in the sanctuary, a Data base is needed to be developed for this sanctuary. Every Beat Forest Guard should maintain a fire accident register where he should write following information.

Data of occurrence.

Time of occurrence.

Place of occurrence (Geo-coordinate if possible are to be given).

Extent of fire.

Origin or source of fire.

Cause of fire, if known.

Whether the occurrence is a repetition, a fire map is to be prepared for the sanctuary.

**6.3.3. Creation and maintenance of Waterholes.**

As it has already been discussed earlier, there are 24 water reservoirs in the sanctuary. But scarcity of water during pinch period is experienced due to geological condition of the sanctuary and hence new ones are to be created and old ones maintained.

#### **6.3.3.1. Specific Objectives.**

- i) To renovate the dead water holes and water reservoirs.
- ii) To construct small water holes inside the sanctuary to quench the thirst of animals during pinch period i.e. from March to May.
- iii) Tapping the ground water.
- iv) Carrying water from river by tankers and filling the artificial water holes to be constructed along the forest roads.

#### **6.3.3.2. Prescriptions of Activities.**

##### **6.3.3.2.1. Renovation of existing water holes.**

All the water existing reservoirs are being silted gradually causing reduction of storage capacity of water. There fore it is proposed to desilt all the water holes in every year. Every year all the water holes are to be desilted during the month of May when there is least water in the reservoir. The embankments are to be strengthened. The outlets and inlets need to be repaired annually.

20 water holes @ Rs.30000/- i.e. Rs.6,00,000/- per year is required.

The activity will be undertaken during May of every year, when there is least or no water in the reservoirs.

##### **6.3.3.2.2. Construction of water holes.**

It is proposed to construct about 124 small water holes and 25 big reservoirs inside the sanctuary and 10 big water bodies in the Buffer zone to quench the thirst of the wild animals.

**Design of water holes :**

1. Saucer shaped pond of 3' depth at centre with 10' diameter. It will be made up of cement concrete with rough surface. The water hole will camouflage with the surroundings.
2. Ponds will be dug of size 10' x 10' roughly with irregular sides with 3' depth at one side, 6" at opposite side. A large sized thick polythene sheet will be spread over the pond. Clay mud collected from nearby agriculture fields will be spread 1' thick over the spread polythene sheet.
3. Brush wood shade preferably with branches of Jamun tree will be put with a height of 7 ft over the small water holes to prevent evaporation loss. Besides, the animals will get shade while drinking.

**Source of water :**

1. Rain water harvest during rainy season.
2. During summer, the water holes near to River Mahanadi will be filled up by tankers.
3. Four Bore wells will be dug near existing water holes / water reservoirs. Solar operated pump loaded over a Jeep / Tractor will be used to lift water from bore wells to fill up the reservoirs on every 10th day during the summer.

### **Proposed Location of Water holes:**

(i) **Small water holes:** These types of water holes will be constructed close to the following forest roads which are motorable for tractor and tanker. The location selected should have least biotic interference.

Selected forest roads	Total length (in kms) Appendix-59	No. of water holes
Tulka-Labangi	14.0	3
Chhotkei-Katrang	17.0	8
Pampasar-Raigoda-Lembuchhali	20.6	10
Tulka-Chhotkei-Purunakote	15.0	8
Karadapada-Kandhaida	6.0	3
Purunakote-Baghamunda	9.0	5
Tarava-Kumuri	7.0	4
Tikarapara-Katrang	15.0	5
Karadapada-Kadalikhola	12.0	5
Bipradihi-Karadapada	10.0	8
Tulka-Bhurkundi-Rasanda chhak	17.0	19
Badasilinga-Gergedhi	15.0	8
Dhipisahi-Padmatola	10.0	6
Kuturi-Marada	8.0	4
Bhapur-Padmatola	15.0	6
<b>TOTAL</b>	<b>157.6</b>	<b>124</b>

### (ix) **Big water reservoirs:**

**CORE ZONE:** The locations are near Takarsingha, Labangi, Majhipada, Hadibasa baro, Baghamunda, Raigoda, Siaribhundi, Jocub, Salor, Karadapada, Sitalapani, Godighati, Marada (Compt. No. 11, 4, 5 of Padmatola RF), Panchakiari, Salap ganda, Purunapani, Bethiasahi, Dhipisahi, (Compt. No. 2, 7, 9, 15, 16 of Mahanadi RF) Compt. No. 2, 4, 15, 17 of Mahanadi RF, Compt. No. 1, 4 of Padmatola RF & in Compt. No. 4 of Arakhapadar RF.

**BUFFER ZONE:** At 2 places in Balikiary R.F., 2 places in Nyagarh R.F. and at once place each in Nandinia R.F. , Nuakheta R.F., Balang R.F. and 2 places in Hatidhara R.F. and Labangi D.P.F.

#### **6.3.3.2.3. Vigilance over water holes.**

During summer, every day, the local staff will visit the water holes twice. This will prevent poachers to come to water holes. Every day the water will be tested by smelling or pH will be tested by using litmus paper, if required, to check whether any poisoning is made. It is to be recorded what type of animals are often using the water holes.

#### **6.3.3.2.4. Prevention of domestic cattle.**

Water holes closer to villages are often shared by domestic cattle. They not only compete with the wild animals but transmit infectious diseases to them and contaminate the water of water holes. The staff visiting water holes will see the number of domestic cattle using the water holes from their hoves, dungs etc. Digging of more number of village ponds in nearby villages under Eco-Development activity will prevent the domestic cattle using the water holes meant for the wild animals.

#### **6.3.3.2.5 Salt licks :**

All the game tanks must have salt licks near to them. At least 20 such sites will be maintained every year especially during October to June for 8 months. The sites are Hatigija, Pointiri, Kandhaida, Kadalikhola, Ranibandha,

Kantarsingha, Takarsingha, Satidhara, Khajurinalia, Routbahal, Padmatola, Sitalpani, Katrang ghat, Nandini nala, Rasanda, Bramhandei, Srota India, Badakheta, Nadapathar, Buchundabhogra, Kuturi, Shankarjhol, Nimandi, Salapaganda, Dhipisahi, Marada & Sunakhania.

#### **6.3.4. Animal health care & surveillance.**

Foot & mouth disease is reported from the wild & many Gaurs perished during 1978-79. Similarly livestock suffers from foot & mouth diseases, rinderpest etc. Since the wild animals & domestic cattle often share the same water hole, there is chance of disease outbreak. The uncontrolled grazing inside key habitat may transmit disease. The P.A. Authority has to carry out prophylactic vaccination program for the livestock within P.A. boundary. Vaccination of livestock of fringe villages within the zone of influence has to be taken up by Sanctuary authority & State Veterinary Department annually.

The plan proposed to have an animal health monitoring & disease surveillance cell which can look after wild health monitoring, post mortem, collection & preservation of materials, packing & dispatch of specimen, recording of biological information viz. migration of animals, carcass collection, sanitation procedure etc.

It is proposed to establish a veterinary unit at Tikarpada for meeting the above objectives. As discussed earlier, necessary action has been taken in establishing a rescue & rehabilitation center for fresh water reptiles at Tikarpada. Also the same is proposed to be established for other wild animals there.

#### **6.3.4.1. Specific objectives.**

- i) To maintain the general vigour and sound health of the wild animals in the sanctuary.
- ii) To check infection from domestic livestock by prophylactic measures.

#### **6.3.4.2. Activities.**

**6.3.4.2.1. Establishment of Veterinary Unit:** In order to carry out systematic research & monitoring work with respect to wildlife health, to carry out effective vaccination programme, to involve in animal physical immobilization, translocation, capture of problematic wild animals, rescue of wildlife, chemical restraints with modern tranquilisation methods 2 small veterinary units will be established at Tikarpada and Chhamundia with all modern equipments and drugs. It is proposed that units will have one veterinary surgeon and two livestock inspectors in each with some past experiences in wildlife treatment.

**6.3.4.2.2. Vaccination of domestic cattle:** It is discussed in sub para – 8 of Para 6.2.2.4 of Chapter-6.

**6.3.4.2.3 .Food supplements:** Vitamin supplement, salt supplement, anti helminth tablets and oral vaccines can be given in the small water holes or salt licks near to it for improving the health of wild animals.

**6.3.4.2.4. Pathological tests :** Fresh faecal samples will be collected from the field and tested in the laboratory established at Tikarapara to know about the endo parasites, helminth infection. The infected animals in the locality can be identified. Treatment can be given in salt licks or small water holes. If

severe infection is suspected in a herd, blood sample, nasal swab, vaginal swab can be collected from any selected animal after tranquilization.

**6.3.5. Weed eradication.**

Weeds like Chromolaena, Ageratum, Coryzoides, are dominating in areas which are being opened due to illicit felling. In most of the areas the undergrowth is replaced by weeds causing suppression of palatable indigenous herbs and shrubs.

**6.3.5.1. Specific Objectives.**

To remove weeds in the areas which are required to be covered under plantation and development of pasture land.

**6.3.5.2. Activities.**

**6.3.5.2.1. Manual uprooting:** In order to cover certain areas under pasture land, it is proposed to eradicate the weeds in a phased manner. The eradication will be done by uprooting them manually just before flowering and piling them at places to burn them. The manual uprooting will be followed by planting of fodder on the same patch for continuously 3 years and continue for entire plan period.

**6.3.4.2.2.** Block plantation of fuel wood, fodder species and grass species will be undertaken in all the enclosed villages over revenue land – 500 ha.

### **6.3.6. Plantation Plan.**

#### **6.3.6.1. Specific objectives.**

- a. To rehabilitate the degraded and illicitly felled open forest areas.
- b. To raise plantation of fuel wood, small timber species in revenue areas / private fallow lands.

#### **6.3.6.2. Activities.**

**6.3.6.2.1. RDF Plantation :** Due to biotic pressure and repeated illicit felling some dense forest areas are turning in to open forest. Unpalatable shrubs and weeds like Eupatorium and Ageratum are coming up as under growth. It is proposed to go for RDF plantation in those areas which will include weed eradication, regeneration, cleaning, soil working, soil and moisture conservation measures.

Nearly 2500 ha of such open forest or degraded land will be identified from following forest blocks and plantation will be done @300plants per ha for 10 years.

Location:

Forest Block	Compartment No.
Tulka RF	5, 7, 8, 9
Raigoda RF	12, 13, 14, 16
Bolang RF	11, 12
Jocub RF	2
Takarasingha RF	1, 2
Chhotamunda RF	1, 2, 3
Tainsi RF	1, 2, 5
Baghamunda	7, 9

Kuru RF	1, 3, 7
Purunakot RF	7, 12, 15
Padmatola	4, 5, 8, 9, 10, 11
Arakhapadar RF	1,2
Mahanadi RF	3,7

Choice of species will be purely indigenous. Fodder, shade bearing species & palatable shrubs.

### **6.3.7. Thinning Regime in Jagannath Bana Prakalpa (JBP) Plantation.**

#### **6.3.7.1. Aim of JBP:**

Plantation has been raised for sustained yield of timber for utilising them in construction of chariots of Lord Sri Sri Jagannath of Puri.

#### **6.3.7.2. Area of Plantation:**

Jagannath Bana Prakalpa plantations have been raised over 200 Ha of revenue land inside Satkosia Gorge Sanctuary during 2000-01 to 2003-04.

The village-wise area distribution and year of creation is given below:

Year	Village	Range	Area in Ha	Total
2000-01	Labangi	Pampasar	10	
	Raigoda	Raigoda	10	
	Chhotkei	Purunakote	10	
	Katrang	Jillinda	40	70
2001-02	Purunakote	Purunakote	10	
	Chhotkei	Purunakote	15	
	Ramimunda	Tikarapara	15	
	Hatibari	Tikarapara	10	50
2002-03	Hatibari	Tikarapara	10	
	Jocub	Pampasar	10	
	Baghamunda	Purunakote	10	30
2003-04	Kulang	Pampasar	10	
	Raigoda	Raigoda	10	

	Tuluka	Purunakote	10	
	Baghamunda	Purunakote	10	
	Katrang	Jillinda	10	50
Total			200 Ha	200 Ha

Species like Phasi (*Anogeissus acuminata*), Ghambar (*Gmelina arborea*), Simili (*Bombax ceiba*), Asan (*Terminalia tomentosa*), Kansa (*Hymenodictyon excelsum*) and Maha limba (*Ailanthus excelsa*) have been originally planted. In some patches with massive failure patches replacement with (*Acacia auriculiformis*) has been done. All the above species will be utilized as timber in construction of chariots.

#### **6.3.7.3. Maintenance:**

The plantation will be maintained up to 7 years.

#### **6.3.7.4. Rotation period:**

No rotation period has been fixed in the scheme. It appears there will be selection working to obtain the desired length and girth of the timber.

#### **6.3.7.5. Thinning:**

Thinning is a felling made in an immature stand for the purpose of improving the growth and form of the tree that remain, without permanently breaking the canopy. High powered steering committee of JBP on Dt.8.11.2005 have decided in agenda No.4 to take up thinning in the plantation.

#### **6.3.7.6. Objective of Thinning:**

1. To distribute growth potential of a site amongst the trees retained.

2. To reduce the inter competition among plants for the limited food, moisture in soil and light above the ground.
3. To maintain hygienic condition in the stand by eliminating dead, dying, diseased and suppressed plants.

#### **6.3.7.7. Thinning regime:**

Thinning regime may be defined as the whole set of thinning carried out in a crop from the earliest stage to maturity.

Thinning regime has been narrated in the **Para 2.1 and 2.4** of the scheme for **Shree Jagannath Bana Prakalpa** , the extract is given below.

Para 2.1 : The prakalpa envisages close spacing ( i.e. 2m X 2m) planting of 2500 seedlings / ha. of desired species. This will help, promote growth in height and achieve clear bole of many trees. The first mechanical thinning of plantations shall be undertaken between 8<sup>th</sup> to 10<sup>th</sup> year. The pre commercial thinning shall be undertaken between 15<sup>th</sup> to 20<sup>th</sup> year. The commercial thinning shall be undertaken between 25<sup>th</sup> to 30<sup>th</sup> year. Thinning will help achieve the desired increment in girth of trees. It is expected that the retained trees shall be available for final felling from 35<sup>th</sup> to 40<sup>th</sup> year.

Para 2.4: First mechanical thinning shall be undertaken from 8<sup>th</sup> to 10<sup>th</sup> year. Alternate plants shall be removed to provide growing space to the remaining promising plants. The thinning materials may be given free of cost to the nearby villagers , whose willing cooperation is absolutely necessary for the success of these plantations . The concern DFOs shall strive to seek wiling cooperation of the

villagers ”. Besides, elite thinning may also be undertaken if felt necessary by the DFO.

Name of Plantn.	1 <sup>st</sup> Mech. Th. (8 <sup>th</sup> – 10 <sup>th</sup> Yr.)	Pre Com. Th. (15 <sup>th</sup> - 20 <sup>th</sup> Yr.)	Com. Th. (25 <sup>th</sup> -30 <sup>th</sup> Yr.)	Final Felling (35 <sup>th</sup> – 40 <sup>th</sup> )
2000-01 (70 Ha.)	2008	2015	2025	2035 onwards
2001-02 (50 ha.)	2009	2016	2026	2036 onwards
2002-03 (30 Ha.)	2010	2017	2027	2037 onwards
2003-04 (50 Ha.)	2011	2018	2028	2038 onwards

### **6.3.8. Subsidiary Silvicultural operation in Bamboo.**

Bamboo forests spread over a vast area of the sanctuary and constitute a major fodder component for elephants in the sanctuary. Preservation and propagation of bamboo is equally important so far as Mahanadi Elephant Reserve is concerned. Bamboos get damaged due to congestion, fire and exposure of rhizome. So to protect bamboo clumps SSO work is required .

#### **6.3.8.1. Objective**

1. To increase productivity of bamboo to supplement fodder requirement of herbivores in general and elephants in particular in Mahanadi Elephant Reserve.
2. To reduce fire hazard.

#### **6.3.8.2 Activity**

1. Dried, burnt, broken, splited, high stump, diseased and grossly damaged culms will be removed from the clumps.

2. Minimum number of culms per clump will be maintained as per rule.
3. The debris will be cleaned within 1 mtr. radius of the clump and either removed out or control burnt.
4. A crescent shaped trench will be dug near the clump on uphill side to store rain water.
5. The exposed rhizome will be covered by soil, scrapping from the surrounding.
6. Stone packing around the rhizome will be given to retain soil on down hill side.
7. The cleaning materials will be supplied to the local people living inside sanctuary for their bonafide use and handicrafts. If no body is willing to take, the same may be burnt.

**6.3.8.3. Area of operation in following coupes year wise**

1 <sup>st</sup> year( 2006) 5 <sup>th</sup> year(2010)	2 <sup>nd</sup> year(2007) 6 <sup>th</sup> year(2011)	3 <sup>rd</sup> year(2008) 7 <sup>th</sup> year(2012) 9 <sup>th</sup> year(2014)	4 <sup>th</sup> year(2009) 8 <sup>th</sup> year(2013) 10 <sup>th</sup> year(2015)
Jocub 4,5,6	Jocub 2	Jocub 1,11,12	Jocub 3
Raigoda 11,12,16	Raigoda 11,15,18	Raigoda 1,2,3,4,5	Raigoda 7,8,9,10
Tulka 1,2,8,9,10,11	Tulka 3,4,5	Tulka 6,12	Tulka 7
Purunakote 1,2,3,4,5 Purunakot PF	Purunakote 17,18,19,20	Purunakote 6,7,8,9,10,11	Purunakote 12,13,14,15,16
Takurgarh 1,2,3,4	Chhotamunda 2,3,4,5	Kuru 1,2,5,6	Kuru 3,4,7,8,9

Katrang 1,2,3,4,5 Katrang PF	Tikarapada 3,7,8,9	Tikarapara 1,2,4,5,6 Tikarapara PF	Katrang 7,8,9,10,11
Majhipada 1,2,5,6,7,8	Majhipada 10,11,16,17	Majhipada 3,4 Majhipada PF Hatidhara 23,27	Majhipada 12,13,14,15
Baghamunda 8,9,10,11,12,13 Baghamunda PF	Baghamunda 2,4,5	Baghamunda 3,6,7 Tainsi 2,3,4	Tainsi 1,5,6,7,8,9,10
Kumuri (P)	Kumuri (P)	Kumuri (P)	Tainsi PF
Jodum (P)	Jodum (P)	Jodum (P)	Jodum (P)
Padmatola 1,2,5,6,7,8	Padmatola 3,4,9,10,11	Arakhapada 1,2 Nandagada PF	Mahanadi PF Chhomundi PF Phadi PF
Mahanadi 1,2,3,4	Mahanadi 5,6,7,8	Mahanadi 10,11,12,13	Mahanadi 9,14,15,16,17

48 coupes have been earmarked in the sanctuary to be worked as above.

On an average in each coupe 1000 clumps deserve working. The working cost per clump has been estimated to be 2 mandays @ Rs. 70/-.

### **6.3.9. Communication & Infrastructure Development.**

Communication system includes road communication and VHF net work. The infrastructure includes building, vehicle, equipment and furniture.

#### **6.3.9.1. Road network.**

There are 221.5 km of Forest roads, 40 kms PWD road, 33.5 kms of Panchayat road. Roads are lifeline of the sanctuary, extensively used by staff for patrolling, used by visitors and local people. Importance of roads for protection of forest has been discussed in para 6.3. The importance for tourism has also been discussed in Chapter-7.

Respective departments are maintaining PWD and Panchayat roads. They will be allowed to repair and maintain the roads without further widening of the same as and when required.

All the forest roads are earthen roads. They are damaged during every rainy season. Ghat roads are totally washed out. Wooden bridges are damaged, culverts washed away. Nallas crossing the roads damage them severely. Therefore it is proposed that

1.	Every year 221.5 kms. of forest road will be maintained. Maintenance includes side bush clearance, side drain cutting, stone pitching wherever required, filling the earth in damaged places etc. Maintenance of 130 kms of forest road essential for forest protection has been mentioned in para 6.3.1.2.7. Balance 91.5 km of forest road will be maintained every year under management	length = 91.5 km
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	intervention.	
2.	At every nalla crossing point there should be stone pitched saucer shaped channel. At wide nalla causeway of cement concrete will be constructed.	Saucer shaped channels 100 nos. x 10 yrs and causeways 3 nos. X 10 years.
3.	At ghat roads and steep gradient places on the road a permanent approach is required. 20-50 mt length of road at such vulnerable places will be made cement concrete so as to avoid heavy recurring expenditure every year.	0.5 km/ yr x 10 yrs
4.	Wooden bridges need replacement by RCC slab bridge	2 no/yr x 5 yrs
5.	Some new culverts / bridges will be constructed	2no /yr x 10 yr.

It is proposed to convert 130 kms of forest roads gradually metalled with special emphasis on plain portion and hilly portion.

The detailed estimate of Metalling with morum spreading & drainage facilities is furnished below:

- Length of Forest road .. 130 kms
- Length of Hill road .. 30 kms
- Length of Plain road .. 100 kms

(a)	For hill roads @ 1,20,000/- per km x 30 kms	Rs.36,00,000/-
(b)	For plain roads @ 80000/- per km x 100 kms	80,00,000/-
(c)	Construction of new culverts and RCC bridge	30,00,000/-

	@ 100000/- each x 30	
(d)	Construction / repairs to causeways @ 50000/- each x 30	15,00,000/-
(e)	Cement concreting at most vulnerable places 5 kms. @ 2 lakh	10,00,000/-
(f)	Cross drain with saucer channels 1000 nos. @ 1000	10,00,000
	Total	1,81,00,000/- (Rupees One crore eighty one lakh )only

### 6.3.9.2. Building.

It is proposed to construct following new buildings and maintain annually the existing buildings.

#### For Office:

- New Annexure at Division office at Angul and Nayagarh.
- Maintenance of existing buildings.

#### For residence of staff:

- Maintenance of existing buildings.
- 6 New Forester Quarters and 6 new forest guard quarters centrally at Angul and 5 New Forester Quarters and 6 new Forest Guard quarters centrally at Chhamundia for stay of the family members of the field staff working in most interior part of sanctuary.

#### For visitors: ( Locations described in Chapter 7)

- Rest houses at all tourism complexes – 7 nos.

- Maintenance of existing F.R.H.
- Dormitory 2 nos.
- Interpretation hall – 2 nos.
- Amphi theatre – 1 no.
- Information centre – 2 nos.
- Watch towers – 6 nos.

**For Protection:**

- Barrack for protection squad – 5 nos. ( at Kumuri, Tulka, Labangi, Purnakote, Siaribhundi).
- 8 New VHF sheds

**For Animal health:**

- Veterinary hospital – 1
- Rescue centre - 1

**For Researchers:**

- Laboratory.
- Quarters for Researchers.

**6.3.9.3. Vehicles:**

Following new vehicles are required to be purchased besides maintenance of existing vehicles.

**For Protection:**

- One Commander Jeep.
- One closed Jeep (Marshal or Tata Sumo or Bolero like vehicle)

( Described in para 6.3.1.2.9)

**For Tourists:**

- Two Mahindra mini buses
- Two closed bodied Jeeps.

**6.3.9.4. Furniture:**

To promote eco-tourism and providing facilities to the tourists as well as to patrolling party, researchers, doctors, wooden, plastic, steel furniture are required which will be furnished as soon as construction of a building is completed.

**6.3.9.5. Equipment:**

Following equipments will be purchased.

- Tranquilizing
- Pathological testing
- Forensic testing,

- Arms and ammunitions.
- Fire fighting
- Survey
- Gadgets

#### **6.3.9.10. Disposal of seized timbers.**

There are revenue villages within the sanctuary, where the villages have their individual and community right over land and property. Sometimes it is seen that these inhabitants are indulged in illicit felling and hoarding of timber in their village premises or tanks or on roads or in nallas. During village raid, house searches, many timber are seized and cases are booked. These seized timber are recovered and brought to the custody of forest officers. Unless these timber are disposed off there will be chances of theft, fire, pilferage and shortage of storage space. Looking in to these practical problems it is proposed to dispose off seized forest produces by way of delivering them to the State owned Forest Corporation.

#### **6.3.11. Special attention in Buffer Zone.**

Buffer zone around the sanctuary has been determined in to the zone of influence over the sanctuary. This includes forest areas out side the sanctuary but frequently used by wild animals for their feeding, breeding and migration. Similarly some villages have been included in the buffer zone .The people of which used to depend on sanctuary for their daily requirement. Buffer zone has been constituted taking the forest areas of adjoining territorial divisions who are

guided by approved working plans. Working Plan recommends timber and bamboo working in their forest areas which have been included in the buffer zone of this management plan. Therefore it is essential to have check on activities like tree felling, hunting, poaching, mining as well as protecting the breeding areas of important species and migratory path of long ranging animals. Activities described in Working Plan like forest protection measures, fire control measures, water availability and other similar activities will also be implemented in the buffer zone of the sanctuary.

#### **6.3.12. Removal of degraded teak plantations:**

There are 27.29 Sq. Kms. teak plantations area in the sanctuary out of which majority area have been found degraded due to repeated illicit felling. Poor quality coppice shoots mingled with eupatorium under growth are noticed in those areas making them useless for the wild animal use. Therefore it is suggested to convert such degraded plantations into meadows and fodder tree plantations which will harbour many herbivores. The old teak stumps will be uprooted mechanically, coppice shoots will be cut from the base and the stumps will be treated with concentrated inorganic acids to discourage further coppicing. Eupatorium and other undesired species will be uprooted manually and then the area will be ploughed ,hybrid grass slips will be planted , tree fodder species will be raised towards the border of the meadows, soil conservation measures if required will be undertaken there. Every year, 5 Ha. Of such plantation will be converted into meadows and fodder plantations.

### **6.3.13. Special intervention for Giant Squirrel:**

Giant squirrel is noticed through out the sanctuary. They need continuous canopy cover for their forage and movement, but it is noticed that forest roads passing across the sanctuary fragments the continuous canopy cover at some places. It is suggested to link the canopies, over the forest roads, joining both sides by long bamboo or poles at 20 feet above ground level. Road side tall trees can be connected by such method to facilitate movement of Giant Squirrel the places where tall trees are not available on road side, Banyan (*ficus bengalensis*) will be planted on either side of road in such areas. Banyan trees bear fruits for at least six months in a year which is mostly preferred by the Giant Squirrels. When the planted banyan trees will grow tall, the spreading branches will not only connect the canopy as a over bridge on the road, but also provide sufficient food material for them. There are 226.5 Kms. of forest road, 40 Kms. of PWD road and 33 Kms. of Panchayat road inside the sanctuary which need such type of treatment over the plan period. There fore it is suggested to cover 30-40 Kms. per year such roads every year.

### **6.4. Monitoring mechanism.**

Monitoring of habitat conditions will be taken up by the authority in every month to ascertain the trend. Similarly a feed back mechanism will also be developed. Every month the DFO shall take stock of the various trends of habitat conditions, animal migration and breeding etc. through various review

meetings of ACFs and Range Officers, guide enforcement and regulate activities in accordance with the findings of the said review meeting. The authority will also systematically keep the record of relevant observations on specific parameters to establish trends in different zones of the sanctuary including buffer and calibrate management and enforcement in response to the perceive trends. The detail monitoring protocols, parameters and indicators of trends have been vividly described in **Chapter- 9**.