Part—Il

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

Chapter—I

Basis of proposals

General objects of management

i To protect, maintain and improve the forest cover particularly on the higher and steeper slopes of hills and also eroded undulations with a view to arrest soil erosion and conserve moisture and regulate water supply in rivers and streams.

ii. To meet bonafide requirements of the right holders for firewood , poles, timber, grazing and other produces to the extent possible and to market the supplies for consumption by local inhabitants who have no rights and to export to other markets if possible

iii. To involve the local people in increasing degree in protection and scientific mangement of the forests and to foster a sense of community ownership of forests

iv. To improve the vast potential of forests for major and minor forest produce to its optimum extent.

v. To rehabilitate the degraded forest by bringing more and more forests under joint forest management.

vi. To protect and improve wild life population by suitable measures.

.vii. Consistent with the above to maintain maximum sustained yield of minor forest produce.

Method of treatments to be adopted:-

The silviculture system adopted for forest with density above 0.4 is coppice selection. In these forests protection and management will be done in association with the local inhabitants through the VFMPCS. Microplans will be prepared by Territorial Division in consultation with the VFMPC. Broadly speaking the above system will be followed but minor changes needed will be incorporated in microplans keeping in view the demands of the local people, conditions & composition of forest and silvicultural management.

Some forests with density below 0.4 require special treatment of rehabilitation measures. These measures must be adopted on priority basis. For the forest on hill sides and also in areas where demand for small sized produce is insignificant and coppice regeneration may not be adequate, the system adopted will be selection system. For selection system, percentage removal of exploitable trees will be prescribed.

For the forests on highly steep slopes the only protection is prescribed under protection working circle.

For blanks and bushy areas the artificial regeneration is prescribed under plantation working circle.

A Wildlife management working circle is proposed for Palkot sanctuary area for which separate management plan will be prepared by the wildlife wing of the Forest Department.

Constitution of Working Circles:-

To achieve the objects of management , the forests have been divided into different working circles according to the composition, situation, silviculture needs of the forest and local requirements. The following working circles have thus been formed:

1. Coppice Selection working Circle.
2. Rehabilitation Working Circle.
3. Selection Working Circle
4. Plantation Working Circle.
5. Protection Working Circle.
6. Wildlife Management Working Circle.

1. Coppice Selection Working Circle covers all the forests where crop density is above 0.4 and coppice regeneration occurs easily. The system adopted would be coppice selection.
2. Rehabilitation Working circle comprises all degraded forests where crop density is below 0.4. Special Treatments for these areas are required.
3. The Selection working circle comprises of all forests on hill sides and other areas where coppice regeneration has failed and is likely to fail and where demand for small sized produce is meagre.
4. All the blanks, bushy areas and existing plantation areas are included in the Plantation working circle. These areas will be attempted to be restocked by artificial plantation of suitable site specific species

.5. Protection working circle will comprise of areas which are on steep hills and precludes any kind of felling except hygienic felling.

6. Palkot sanctuary has to be managed under wildlife management working circle of which separate management plan will be prepared by the wildlife wing.

Period of plan :

This working plan will be effective for a period of 10 yrs. It is however advised to review the position after a period of five years.

Chapter-II

Coppice Selection Working Circle:-

General constitution:-

This working circle covers forest areas, whose density is above 0.4 and coppice regeneration is not a problem.

Character of vegetation:-

In these areas the density of crop is good and village forest protection and management committee is working satisfactorily. As a result of their efforts, the crop is well stocked. Young and middle-aged vegetation is found in these areas. Main species found in these areas are sal and associates of sal

Special objects of management : -

The special objects of management are described as below:

1. To improve the composition and stocking of existing forests by adopting suitable silvicultural treatments. Betterment of crop shall be the object of management operations.
2. To meet the bonafide domestic and agricultural requirements of right holders as far as possible from silvicultural operations.
3. To create conditions conducive to rapid growth of suppressed saplings and poles.
4. To induce and obtain natural regeneration of sal and other economically valuable species.
5. To foster among local inhabitants a sense of value for forests and to win their active co-operation in forest conservation and management.

6. To create empyrnent opportunities for the local people so that it may ameliorate their economic conditions and reduce dependence on forest.

Area statement : The forest area to be treated under this Working Circle is 7507.73 ha. The details of area is given as below:

STATEMENT OF FOREST AREAS TO BE WORKED UNDER COPPICE SELECTION SYSTEM

Name Of Range : Simdega East

SI. No.	**NameofForest**	**Thana**	**Thana No.**	**Total Area of forest in Ha.**
1	**2**	**3**	**4**	**5**
1.	Kudrung	Simdega	69	492.45
2.	Bandarchuan	Kolebira	92	824.75
3.	Saraipani	-do-	119	590.35
Name of Range :- Gumla				
1.	Bnnda	Gumla	62	475.11
2.	Raikera	Sissai	105	99.51
3.	Sansera	-do-	106	76.00
4.	Sokrahatu RF	Chainpur	143	268.88
5.	Anjan	Gumla	11	815.62
6.	Patgachha	-do-	07	136.46
Name of Range: Kurumgarh				
1.	Kothi	Chainpur	08	487.24
2.	Chainpur	-do-	114	62.34
3.	Koda	-do-	196	156.76
4.	Ratu	-do-	117	29.95
5.	Tigawal	-do-	118	149.83
6.	Shakhu	-do-	05	304.93
7.	Dma	-do-	06	555.55
8.	Kaathgaon	-do-	07	510.34
9.	Biahanpur	-do-	153	295.15
10.	Bamda RF	-do-	131	193.63
11.	Kurumgarh	-do-	124	837.78
12.	Birkera	Raidih	49	145.10

			Total	**7507.10**

Stock map:

The forest under this working circle have been stock mapped on 4" to 1 mile scale. Descriptions of species average age, quality, density and condition of regeneration have been recorded in usual notations.

Enumeration :

Partial enumeration of varying intensity in different forests areas were carried out. The result of enumeration have been incorporated in chapter 6 (Growth & yield statistics) of part I.

Growth analysis:

No forest stump analysis was done. The age diameter relation, rotation for sal and C.A.I and M.A.l. arrived at sample plot in Banari Range of erstwhile Gumla division was accepted.

Sample plot No. 6 of Gumla Division:

Date of first formation - 1960

Date of first measurement - 1980

Age of crop at first measurement- 20 Yrs.

Area of Sample Plot 1 Acre

	1980 (Cm.)	**1985(Cm.)**	**1990(Cm.)**	**1995(Cm.)**
Avg. Dia. Of the crop	9.00	11.48	14.00	16.45
Avg. tree Volume (M^3)	.03001	.0568647	.0951544	.1429781

Mean annual increment of volume per tree comes out to be .00753 12 M3

From enumeration data of representative sample plots the average no. of sal trees / ha. Is found to be

106. Hence mean annual volume increment per ha. Is .7983072 M3 .As such mean annual volume

increment of forest areas (7507.73 ha.) to be worked under coppice selection system comes out to be 5993.474g$M^{3.}$

Growing Stock: Forest survey of lrltlia eastern zone Calcuttainhtheirreportno333dated29-3-2000 developed the following local volume equations for sal for calculating the tree volume of the forest of Gumla Division.

$V/D2 = 8.714 - 0.70158/ D + .022585/D^2$

Where V = Vol in M3 & D = Dia. In Meter.

The volume calculated from the above local volume equations are tabulated below:

Diameter Class (cm)	**Volume (m^3)**
10 – 17.5	0.0908
17.5 – 25	0.2670
25 – 32.50	0.5412
32.50 -40.00 & above	0.9133

Using the above volume table the growing stock of sal is computed as below:

Nmae Of range	Name of forest	Area (Acres)	Volume (m^3)
Simdega East	Bandarchuan	20	137.2985
Gumla	Anjan	20	77.2420
-do-	Padgachha	20	137.0284
Kumargarh	Chainpur	20	554.6384

From the above table average growing stock of sal in 20 acres or 8 ha. Works out to be 226.5518 i.e. 28.3189 M3 /Ha. Thus total growing stock of sal forest under this working circle with area 7507.73 ha. Is 212610.65 M^3

Assessment of quality: Sal forests belong to quality IV.

Silvicultural system: To accomplish the objectives of the management the silvicultural system prescribed is coppice-selection system. In this system it is suggested to rely on coppice method of regeneration & harvesting will be carried out by selection method. These will be removal of trees of harvestable size which will be only silviculturally available. At the same time adequate soil cover will be maintained.

Silvicultural availability: A tree is silviculturally available when it fulfills the following conditions.

1. It forms part of a congested crop and the principle of improvement felling warrants its removal.
2. Saplings or poles of established regeneration of the same or of equally valuable species exist to take its place.
3. Its removal does not create permanent gap in the upper canopy.

Exploitable diameter: It can be inferred from yield table of sal that C.A.I. culminates between 90 and 95 yrs though M.A.I. reaches its highest value at 140 to 145 yrs. Thus for maximum volume production , a rotation of 140 yrs would be appropriate but sites which have been incorporated under this working circle does not appear to be supportive of healthy crop for such long period. Keeping in view the demands of local habitants for 5"to 6"size poles, the exploitable diameter for sal is prescribed at 5" d.b.h. for limited purposes.

Rotation : The period of 40yrs for sal is fixed as rotation as exploitable diameter of 5"d.b.h. is attained after a period of 4oyrs. of its formation.

Felling cycle : The felling Cycle will be 10 yrs.

Regulation of yield : Annual yield will be regulated by area & volume. It is obvious from growth analysis that about80M3 volume increment per ha. may be removed in one year. Trees of diameter above exploitable diameter will be removed but volume of removal will be limited to.80 M3 ha. Volume of tree diameter wise is given as below.

D.B.H.	Volume (M3)
5" .	071
6" .	11
7" .	16
8" .	23
9" .	30

This will help in computing the volume of trees marked for felling and managing the removal of increment from annual coupes.

Method of executing fellings : While carrying out the felling in annual coupes the following prescriptions should be followed.

A) Marking rules: The following marking rules must be observed.

1. All dead , dry, top-broken and diseased trees will be marked.
2. In congested crop of healthy trees the marking will be done as if thinnings were being carried out.
3. No green healthy trees will be marked for felling where:
   i. The crop density is low
   ii. Established regeneration is absent
   iii. The slope exceeds 60
4. A well grown stem would be prefered to be retained to a badly grown stem even if the former is of inferior species and the latter of a more valuable species.
5. Other species of respective exploitable diameter will be marked on principle of thining and improvement fellings.
6. On the blanks or partial blanks, trees will be retained.
7. Al! climbers will be cut at the time of marking.

B) Fellings : The general principles of felling are

1. A 10’ wide strip within coupe should be cleared on all sides before starting the felling.
2. Annual coupes are to be divided into cutting sections for effective control. Felling should not proceed to other section till the working in the preceding section has been complete.
3. Fruit bearing species such Mahua, Kendu, Piar, Am, Harra, Bahera, Amla, Kusum are not to be felled.
4. No felling will be done over plantation areas even if it is within the coupe area.
5. Coupes which could not be worked in the year prescribed may be worked in the following year, but not in any subsequent years.

Subsidiary silvicultural oneration : The following silvicultural operations are prescribed to be implemented in the year following the main felling.

1. The high stumps will be dressed at 6” above the ground.
2. Cutting back of badly grown saplings and poles of Sal, Bija, Gamhar, Panjan will be carried out.
3. Cutting back of damaged stems of valuable species will be resorted to.

4. Climber cutting will have to be done.

5. Rate per ha. for above operations :- 12 mandays - Rs. 775.32

Treatment for regenerations:

The areas where coppice regeneration is not coming up satisfactorily, artificial regeneration will be undertaken. Minimum of one acre blank area will be taken up for artificial regeneration.

Scheme for artificial regeneration is given below:-

No.	1st year	Mandays	Amount (in Rs.)
1	Survey & Demarcation	3	193.83
2.	Bush cleaning	7	452.27
3	Trench Fencing	75	4845.75
4	Soil & moisture conservation	10	646.10
5	Pit digging (30 cm x 30 cm x 30 cm)	4	258.44
		Total	**6396.39**

SI. No.	2’ year	Mandays	Amount (in Rs.)
1	Purchase & transport of plants from permanent nursery (255 plants © Rs.2 /plant 240 plants for plantation inside forests. 15 plants for planting on trench berns.		510.00
2	Material for planting		25.00
3	Two weeding & Hoeing	5	323.05
4	Protection	7	452.27
		Total	**1310.32**

SI. No.	3 year	Mandays	Amount (in Rs.)
1	One Weeding Hoeing	3	193.83
2	Replacement 51 plants (20%)		
3	Cost of plants		102.00
4	Planting	1	64.61 .00
5	Protection	10	646.10
		Total	**1006.54**

SI. No.	year	Mandays	Amount (in Rs.)
1.	one weeding & hoeing	3	193.83
2.	Protection	10	646.10
		Total	**839.93**

		Grand-Total	**9553.18**

Species:- Bija Sal, Mahua, Aam, Arjun, Kusum, Aoula, Hare, Bahera, Asan, Karam, Neem, Imli, Karanj, Gamhar, Bamboo, Bel, Semal, Sisham.

Felling Series And Annual Coupe:20 felling series are formed. The details of felling series and annual coupes are given below.

STATEMENT SHOWING THE FORMATION OF FELLING SERIES AND ANNUAL COUPES UNDER COPPIC SELECTION WORKING CIRCLE

Name of Range	SI. No.	Name of felling series	Name of forests constituti ng felling series	Thana & Thana No.	Area of forests in Ha.	Area of Felling series in Ha.	Net area of felling series in Ha.	Felling Cycle	Remarks
1	2	3	4	5	6	7	8	9	10
Simdega	1.	Kudrung	Kudrung	Simdega 69	492.45	492.45	492.45	10	
	2	Bandarch uan	Bandarch uan	Kolebira, 92	824.75	824.75	824.75	10	.
	3	Saraipani	Saraipani	Kolebira, 119	590.35	590.35	590.35	10	
Gumla	1	Brinda	Brinda	Gumla,62	475.11	475.11	475.11	10	
	2	Raikera	Raikera	Sissai, 105	99.51	99.51	99.51	10	
	3	Samsera	Samsera	-do-, 106	76.00	76.00	76.00	10	
	4	Sokrahatu	Sokrahatu	Chainpur, 14 3	268.88	268.88	268.88	10	
	5	Anjan	Anjan	Gumla, 11	815.62	815.62	815.62	10	
	6	Padgach ha	Padchha	-do-, 7	136.46	136.46	136.46	10	
Kurum garh	1	Kothi	Kothi	Chainpur, 8	487.24	487.24	487.24	10	
	2	Chainpur	Chainpur	-do-, 114	62.34	62.34	62.34	10	
	3	Koda	Koda	-do-, 196	156.76	156.76	156.76	10	
	4	Jijwal	Ratu	-do-, 117	29.95	179.78	179.78	10	
			Jijawal	-do-, 118	149.83				
	5.	Shakhu	Shakhu	-do-, 5	304.93	304.93	304.93	10	
		Dma	Dma	-do- 6	555.55	555.55	555.55	10	
	7	Kathgaon	Kathgaon	-do-7	510.34	510.34	510.34	10	
	8	Biahanpu	Biahanpur	-do-, 153	295.15	295.15	295.15	10	
	9	Bamda	Bamda	Chainpur, 131	123.63	123.63	123.63	10	
	10	Kurumga rh	Kurumgar h	-do-, 124	837.78	837.78	837.78	10	

	11	Birkera	Birkera	Raidih,49	145.10	145.10	145.10	10	

Sequence of Annual Coupes of Feffing Series under coppices selection system.

Name of Range	Name of Felling Series	Year of fellmg	Area of Annual Coupes (ha.)	Description of annual coupe
1	2	3	4	5
Simdega East	1. Kudrung	2003-2004	49.00	Part Kudrung
		2004-2005	49.00	-do-
		2005-2006	49.00	-do-
		2006-2007	49.00	-do-
		2007-2008	49.00	-do-
		2008-2009	49.00	-do-
		2009-2010	49.00	-do-
		2010-2011	49.00	-do –
		2011-2012	49.00	do-
		2012-2013	51.45	Rest of Kudrung
	2. Bandarchuan	2003-2004	82.00	Part of Bandarchuan
		2004-2005	82.00	-do-
		2005-2006	82.00	-do-
		2006-2007	82.00	-do-
		2007-2008	82.00	-do-
		2008-2009	82.00	-do-
		2009-2010	82.00	-do-
		2010-2011	82.00	-do-
		2011-2012	82.00	-do-
		2012-2013	86.75	Rest of Bandarchuan
	3. Saraipani	2003-2004	59.00	Part of Saraipani
		2004-2005	59.00	-do-
		2005-2006	59.00	-do-
		2006-2007	59.00	-do-
		2007-2008	59.00	-do-
		2008-2009	59.00	-do-
		2009-2010	59.00	-do-
		2010-2011	59.00	-do-
		2011-2012	59.00	-do-
		2012-2013	59.35	Rest of Saripani

Gumla	1. Brinda	2003-2004	48.00	Part of Brmda
		2004-2005	48.00	-do-
		2005-2006	48.00	-do-
		2006-2007	48.00	-do-
		2007-2008	48.00	-do-
		2008-2009	48.00	-do-
		2009-2010	48.00	-do-
		2010-2011	48.00	-do-
		2011-2012	48.00	-do-
		2012-2013	43.11	Rest of Brinda
	2. Raikera	2003-2004	10.00	Part of Raikera
		2004-2005	10.00	-do-
		2005-2006	10.00	-do-
		2006-2007	10.00	-do-
		2007-2008	10.00	-do-
		2008-2009	10.00	-do-
		2009-2010	10.00	-do-
		2010-2011	10.00	-do-
		2011-2012	10.00	-do-
		2012-2013	9.51	Rest of Raikera
	3. Samsera	2003-2004	8.00	Part of Samsera
		2004-2005	8.00	-do-
		2005-2006	8.00	-do-
		2006-2007	8.00	-do-
		2007-2008	8.00	-do-
		2008-2009	8.00	-do-
		2009-2010	8.00	-do-
		2010-2011	8.00	-do-
		2011-2012	8.00	-do-
		2012-2013	4.00	-do-

	4. Sokrahatu	2003-2004	27.00	Part of Sokrahatu
		2004-2005	27.00	-do-
		2005-2006	27.00	-do-
		2006-2007	27.00	-do-
		2007-2008	27.00	-do-
		2008-2009	27.00	-do-
		2009-2010	27.00	-do-
		2010-2011	27.00	-do-
		2011-2012	27.00	-do-
		2012-2013	25.88	Rest of Sokrahatu
	5. Anjan	2003-2004	82.00	Part of Anjan
		2004-2005	82.00	-do-
		2005-2006	82.00	-do-
		2006-2007	82.00	-do-
		2007-2008	82.00	-do-
		2008-2009	82.00	-do-
		2009-2010	82.00	-do-
		2010-2011	82.00	-do-
		2011-2012	82.00	-do-
		2012-2013	77.62	Rest of Anjan
	6. Padgachha	2003-2004	14.00	Part of Padgachha
		2004-2005	14.00	-do-
		2005-2006	14.00	-do-
		2006-2007	14.00	-do-
		2007-2008	14.00	-do-
		2008-2009	14.00	-do-
		2009-2010	14.00	-do-
		2010-2011	14.00	-do-
		2011-2012	14.00	-do-
		2012-2013	10.46	Rest of Padgachlia

Kurumgarh	1. Kothi	2003-2004	49.00	Part of Kothi
		2004-2005	49.00	-do-
		2005-2006	49.00	-do-
		2006-2007	49.00	-do-
		2007-2008	49.00	-do-
		2008-2009	49.00	-do-
		2009-2010	49.00	-do-
		2010-2011	49.00	-do-
		2011-2012	49.00	-do-
		2012-2013	46.24	Rest of Kothi
	2. Chainpur	2003-2004	6.00	Part of Chainpur
		2004-2005	6.00	-do-
		2005-2006	6.00	-do-
		2006-2007	6.00	-do-
		2007-2008	6.00	-do-
		2008-2009	6.00	-do-
		2009-2010	6.00	-do-
		2010-2011	6.00	-do-
		2011-2012	6.00	-do-
		2012-2013	8.34	Rest of Chainpur
	3. Koda	2003-2004	16.00	Part of Koda
		2004-2005	16.00	-do-
		2005-2006	16.00	-do-
		2006-2007	16.00	-do-
		2007-2008	16.00	-do-
		2008-2009	16.00	-do-
		2009-2010	16.00	-do-
		2010-2011	16.00	-do-
		2011-2012	16.00	-do-
		2012-2013	12.76	Rest of Koda

	4. Jijwal	2003-2004	18.00	Part of Ratu
		2004-2005	11.95	Rest of Ratu
			6.05	Part of Jijwal
		2005-2006	18.00	-do-
		2006-2007	18.00	-do-
		2007-2008	18.00	-do-
		2008-2009	18.00	-do-
		2009-2010	18.00	-do-
		2010-2011	18.00	-do-
		2011-2012	18.00	-do-
		2012-2013	17.75	Rest of Chainpur
	5. Shakhu	2003-2004	30.00	Part of Shakhu
		2004-2005	30.00	-do-
		2005-2006	30.00	-do-
		2006-2007	30.00	-do-
		2007-2008	30.00	-do-
		2008-2009	30.00	-do-
		2009-2010	30.00	-do-
		2010-2011	30.00	-do-
		2011-2012	30.00	-do-
		2012-2013	34.93	Rest of Shakhu
	6. Dina	2003-2004	56.00	Part of Dina
		2004-2005	56.00	-do-
		2005-2006	56.00	-do-
		2006-2007	56.00	-do-
		2007-2008	56.00	-do-
		2008-2009	56.00	-do-
		2009-2010	56.00	-do-
		2010-2011	56.00	-do-
		2011-2012	56.00	-do-
		2012-2013	51.55	Rest of Dina

	7.Kathgaon	2003-2004	51.00	Part of Kathgaon
		2004-2005	51.00	-do-
		2005-2006	51.00	-do-
		2006-2007	51.00	-do-
		2007-2008	51.00	-do-
		2008-2009	51.00	-do-
		2009-2010	51.00	-do-
		2010-2011	51.00	-do-
		2011-2012	51.00	-do-
		2012-2013	51.34	Rest of Kathgaon
	8. Biahanpur	2003-2004	30.00	Part of Biahanpur
		2004-2005	30.00	-do-
		2005-2006	30.00	-do-
		2006-2007	30.00	-do-
		2007-2008	30.00	-do-
		2008-2009	30.00	-do-
		2009-2010	30.00	-do-
		2010-2011	30.00	-do-
		2011-2012	30.00	-do-
		2012-2013	25.11	Rest of Biahanpur
	9. Bamda	2003-2004	19.00	Part of Bamda
		2004-2005	19.00	-do-
		2005-2006	19.00	-do-
		2006-2007	19.00	-do-
		2007-2008	19.00	-do-
		2008-2009	19.00	-do-
		2009-2010	19.00	-do-
		2010-2011	19.00	-do-
		2011-2012	19.00	-do-
		2012-2013	22.63	Rest of Bamda

	10.Kurumgarh	2003-2004	84.00	Part of Kurumgarh
		2004-2005	84.00	-do-
		2005-2006	84.00	-do-
		2006-2007	84.00	-do-
		2007-2008	84.00	-do-
		2008-2009	84.00	-do-
		2009-2010	84.00	-do-
		2010-2011	84.00	-do-
		2011-2012	84.00	-do-
		2012-2013	81.78	Rest of Kurumgarh
	11. Birkera	2003-2004	15.00	Part of Birkera
		2004-2005	15.00	-do-
		2005-2006	15.00	-do-
		2006-2007	15.00	-do-
		2007-2008	15.00	-do-
		2008-2009	15.00	-do-
		2009-2010	15.00	-do-
		2010-2011	15.00	-do-
		2011-2012	15.00	-do-
		2012-2013	10.10	Rest of Birkera

Chapter -III

Rehabifitation Working Circle

General Constitution :- This Working Circle covers all the degraded forest areas, the areas whose crop density is less than 0.4. Some of the degraded areas have been reduced to rooted wastes due to illicit felling, Uncontrolled grazing and intermittent fires.

Character of vegetation :- In these areas the density of crop is low and regeneration is not coming up due to above reasons. Crop is quite young. Main species found in these areas are Sal and associates of Sal.

Special objects of management :- Special objects of management :-

(1) To improve the composition and stocking of existing forests by adopting suitable silvicultural treatments.

(2) To protect rooted wastes of Sal and miscellaneous forests from illicit cutting, uncontrolled grazing and fire.

(3) To rehabilitate the degraded forests by planting suitable indigenous species in gaps and degraded lands where rooted stocks are not available.

(4) To meet the bonafide domestic and agricultural requirements of right holders as far as possible from silvicultural operations.

(5) To induce and obtain natural regeneration of Sal and other economically valuable species.

(6) To faster among local inhabitants a sense of value for forests and to win their active cooperation in forest conservation and management.

(7) To create employment opportunities for the local people so that it may ameliorate their economic conditions and reduce dependence on forests.

Area Statement :- Area allotted to this working circle is 73321.60 ha. the details are given in appendix-Il.

Enumerations:-

The results of enumeration in following forests are given below

Name of Forests	Stem/ha
Vangaon	83
Daridih	59
Khinda	48
Parkala	52

Average	**60**

It is seen that no. of stems/ha. is quite low as compared to normal requirement for the site of quality-IV. Maximum number of stems which can be retained at different years below.

At yearl0	1739	At years30	805
At year 20	1136	At year 40	640

Thus it is proposed to retain all the stems during the plan period keeping in new the extremely low density of crop No thinning is prescribed.

Method of Treatment: Following measures will be adopted to rehabilitate the degraded forests.

1. Fencing : - The area to be rehabilitated will be effectively fenced by stone wall fencing or trench fencing . In JFM areas the VFMPCs committees will be basically held responsible for protecting the crop. In such areas fencing is not required.

2. Cut back :- Malformed high stumps, and bushy growth will be cut back to create conditions conducive for vigorous coppice shoots. Well grown saplings will be retained.

3. Planting : Blanks and scrub areas will be planted with suitable indigenous species. The details of plantation technique will be same as described in Plantation Working Circle.

4. Soil and moisture conservation measures: In the areas, badly affected by erosion, dry rubble check dams will be constructed. Contour trenches will be dug all over the areas at suitable intervals. Ploughing up the land in plain areas (wherever possible)will be taken up to assist the natural regeneration of sal.

5. Miscellaneous Regulations: Rehabilitated areas should be protected from grazing at least for five years through the cooperation of VFMPCs. Fire control should be maintained in rehabilitated areas as young saplings are highly vulnerable to fire. Besides the effective protection against grazing and fire it is very essential to protect them against illicit felling which is the main cause for degradation of these forests. There are areas where local villagers have successfully protected the forest. Such right holding villages whose forests have been included in this working circle would exercise their rights from the area due for cutting back in that year, if there is any surplus left in the cut back area it can be sold and the revenue will be distributed as per the Govt. circular issued for JFM.

Tending operations as are needed for ensuring the healthy growth of young saplings of sal will be carried out. Tending operation such as clearing will be taken up in the first year itself. In subsequent years clearings if necessary are to be carried out. Gradual thining will have to be carried out only after young crop is established. However, this operations have to carried out judiciously. Bare rock hillocks having little or no soil need sowing of seeds of hardy trees such as Ber, Prosopis, Babul, Neem, Tamarindus and Ficus species.

Financial Projections of rehabilitation Works : The model estimate for rehabilitation work is produced as under.

Unit — 1 ha, Wage Rate = Rs. 64.61 per manday.

Spacing — 3m x 3m

1st year Operation	**Mandays**	**(Rs) Amount**		
		Wages (Rs	**Material(Rs.)**	**Total(Rs.)**
1. Survey & Demarcation	3	193.83	-	193.83
2. Bush cutting & coppicing	15	969.15	-	969.15
3. Trench fencing(1.75m x 1025mx1025m	75	4845.75	-	4845.75
4. Pitdigging (450 pits/ha	9	581.49	-	581.49
5. Nursery Work (320	4	258.44	112	370.44
6. Soil conservation work	10	646.10	-	646.10
7. Entry Point Activities (i) Constitution of VFMPC/Microplaning-Rs 100/ha. (ii) Training on JFM etc. Rs.160/ha (iii) Interface activities Rs. 1718\-\ha. (Water harvesting structures, Distribution of fruit grafts)	- -	-	-	-1978.00
8. Misc. work	-	-	50	50.00
			Total	**9634.76**

2d year Operation	**Mandays**	**Amount**		
		Wages (Rs)	**Material (Rs)**	**Total(Rs.)**
1. Purchase of tumps from permanent nursery 216 stumps © Rs. 1 .57/- per stump (Shisham, Gumhar, Semal, Teak, Bamboo, Karang etc.)	-	-	-	339.12
2. Purchase of 1 year polybag plants from permanent nursery including transport (Aam, Awala, Imli, Neem, Kathal, Jamun, Mahua, Kusum, Harre, Bahare, Bel, Karam, Asan etc. 54 plants @ Rs 2/- per plant	-	-	-	108.00
3. For prepranting of stumps. (i) Purchase of polythine tube (14” x 12”xlOO) (ii) Filling of tubes.	- 2	- 129.22	35 -	35.00 129.22
4. Nursery work	3	193.83	-	193.83
5. Planting	10	646.10	-	646.10

6. Two hoeing & weeding	10	646.10	-	646.10
7. Planting on trench bern	1	64.61	-	64.61
8. Protection	7	452.27	-	452.27
9. Materials	-	-	133	133.00
10. Misc work	-	-	30	30.00
				2777.25

3rd Year Operation	**Mandays**	**Amount**		
		Wages (Rs)	**Material (Rs)**	**Total (Rs)**
1. One hoeing & Weeding	7	452.27	-	452.27
2. Materials	-	-	42.00	42.00
3. Protection expenses	10	646.10	-	646.10
4.Causality replacement	02	64.61	88	152.61
5. Repair of trench	05	323.05	-	323.05

4th Year Operation	**Mandays**	**Amount**		
		Wages (Rs)	**Material (Rs)**	**Total (Rs)**
1. One hoeing & Weeding	7	452.27	-	452.27
2. Materials	-	-	42.00	42.00
3. Protection expenses	10	646.10	-	646.10
			Total	**1140.37**
			Grand Total	**15168.41**

Since the areas allotted to this working circle is 73321 .60 ha. which is quite large, it is proposed to tackle these areas in 20 years. Annual target of areas to be tabled will be 3666 ha. The amount required to rehabilitate this much area be Rs. 5.56 crore. All the works will be carried out with the help of VFMPCs.

Chapter-IV

Selection working circle

General constitution and character of vegetation:

All the forests on high altitudes and hill sides are included in this working circle. In these forests coppice regeneration is not very good. Forests of other areas where the problem of excessive run off and soil erosion is present are also covered under this circle.

The predominant species is sal. Its important associates are Asan, Bija, Karam and Dhaura. The crop appears to be uniform and large size trees are also found here and there. In some of the areas the growth of crop Es very good such as in Rajadera felling series but steepness of the slopes does not permit coppice regeneration. In this area demand for small size timber is meagre. It would be undesirable to work these forests under coppice system.

Special objects of management :

The objects of management are following:

1. To conserve soil and moisture to the fullest extent possible.
2. To utilize trees of exploitable diameter where ever this is possible without any risk of permanent gap in the canopy.
3. To obtain natural regeneration without any difficulty from seed bearers which always remain in abundance.
4. To free advance growth by the removal of over wood.
5. To improve the quality of crop

Silviculture System:

The system prescribed will be selection cum improvement. This system follows nature in respect of its pattern of felling. Scattered single mature trees are selected all over the coupe area and felled to enable regeneration to replace them. Thus trees of exploitable size which are silviculturally available will be removed. At the same time adequate soil cover will be maintained.

Rotations : The average quality of sal in Gumla Division had been assessed to as quality IV. According to the yield and stand table of high forest sal call culminates between 90 and 95 yrs. Although M.A.I. culminates at 140 to l45yrs. for production of maximum volume rotation of 140 yrs. can be taken. However sites of this working circle are not fit to support the healthy crop up to this age. Keeping in view the demands of average size of wood in these areas 10" dia. Is fixed as exploitable diameter. For site quality IV a diameter of 10" is attained at 80 yrs. So a rotation of 80 years is presumed.

Fellinci cycle: -

The felling cycle is prescribed at 10 yrs. This is kept short to ensure that comparably larger areas are taken up for working every year and heavy felling per unit area is avoided.

Area Statement :- The area allotted to his working cycle is 17954.78 ha. The details of felling series and annual coupes are given below.

STATEMENT SHOWING THE CONSTITUTION OF FELLING SERIES AND ANNUALCOUPES IN SELECTION WORKING CIRCLE

Name of Range	Sl.No	Name of felling series	Name & forests constitution felling series	Thana & Thana No.	Area of forest in Ha.	Area of felling series in Ha	Net area on felling series in Ha.	Felling cycles in yrs.	Remarks
1	2	3	4	5	6	7	8	9	10
Simdeqa	1	Sikorda	Sikorda	Bano, 71	257.57	257.57	257.57	10	
	2	Konsedey	Konsedey	"88	80.97	80.97	80.97	10	
	3	Barkaduil	Barkaduil	"36	36.03	57.40		10	
			Chhotkadui"	35	21.37	57.40			
	5	Bano	Bano	"59	27.20	27.20	27.20	10	
	6	Sumuibera	Sumuibera	"74	111.00	418.40	418.40	10	
			Bera largi	"76	307.40				
	7	Banki	Banki	"72	201.47	201.47	201.47		
	8	Dongapani	Dongapani	Kolebira,	128.03	128.03	128.03	10	

				17					

	10	Kereya	Kereya	Thethaitnagar, 156	140.56	140.56	140.56	10	
Slmdega West Range	1	Serlonga	Serlonga	Simdega, 24	216.86	216.86	216.86	10	
	2	Keonddih	Keonddih	-do-, 28	767.44	893.85	893.85	10	
			Kobang	-do-, 29	99.86				
			Purnajari	-do-, 13	26.55				
	3	Khanjaloya	Khanjaloya	-do-, 14	100.00	186.18	186.18	10	
			Bhundupari	-do-, 22	186.18				
	4	Taisar	Taisar	Khurdug, 49	1032.16	1032.16	1032.16	10	

1	2	3	4	5	6	7	8	9	10
Gumla Range	1	Kasira	Kasira	Gumla, 102	111.50	169.15	169.15	10	
			Kulabira	Gumla, 82	57.65				
	2	Kelngo	Kelngo	Gumla, 105	97.00	97.00	97.00	10	
	3	Koinara	Koinara	Gumla,97	59.77	59.77	59.77		
	4	Jilinga	Jilinga	Gumla, 15	170.09	170.09	170.09	10	
	5	Ghatgaon	Ghatgaon	Gumla, 17	503.08	503.08	503.08	10	

	6	Kantasarh	Kantasarh	-do-, 50	273.59	273.59	273.59	10	
	7	Jorang	Jorang	-do-,56	312.14	312.14	312.14	10	
	8	Telgaon	Telgaon	-do-,52	68.82	68.82	68.82	10	
	9	Kita	Kita	Gumla,2	179.43	179.43	179.43	10	

	10	Kinderkela	Gurdardih	Basia, 24	14.12	249.60	249.60	10	24.96	
			Sakia	-do-, 25	66.07					
			Cochediga	-do- 26	56.97					
			Kindega	-do-, 134	62.24					
			Kinderbila	-do-, 136	50.20					
	11	Kinirkela	Ettam	-do-, 17	27.04	202.28	202.28	10	20.22	
			Turbunga	-do-, 19	131.90					
			Kinirkela	-do-,20	43.34					
	12	Tukal	Tukai	-do-, 116	108.06	178.36	178.36	10	17.83	
			Nirai	-do-, 146	50.00					
			Lungtu	-do-, 148	20.30					
	13	Banari	Banari	-do-, 109	102.50	182.50	182.50	10	18.25	
	14	Marwa	Marwa	Chainpur 136	231.99	659.69	659.69	10	65.96	
			Kuyo	-do-, 137	252.78					
			Keragani	-do-, 138	174.92					
	15	Bardih	Bardih	-do-, 140	72.46	102.46	102.46	10	7.24	

1	2	3	4	5	6	7	8	9	10
	16	Kolda	Kukrunja	-do-, 141	178.21	458.75	458.75	10	
			Kolda	-do-, 142	116.35				
			Keona	-do-, 144	164.19				
	17	Sengra	Sengra	Sissai, 43	85.59	84.59	84.59	10	
	18	Semra	Semra	-do-, 58	60.50	60.50	60.50	10	
	19	Kalyaripur	Kalyanpur	-do-, 103	314.02	314.02	314.02	10	
Kurumgarh Range	1	Birgaon	Birgaon	Chainpur 58	491.60	491.60	491.60		
		Putrungi	Putrungi	-do-, 33	193.68	856.41	856.41	10	
			Akashi	-do-, 32	452.35				
			Sirsi	-do-, 34	210.38				
	3	Janawal	Janawal	-do-, 97	40.30	164.82	164.82	10	
			Dipadih	-do-, 28	124.52				
	4	Dokapat	Dokapat	-do-, 98	370.19	697.11	697.11	10	
			Lupungpat	-do-, 99	326.92				
	5	Jairagi	Jairagi	-do-,22	166.06	323.63	323.63	10	
			Gaw	-do-, 31	157.57				
	6	Saksari	Saksari	-do-, 133	145.74	145.74	145.74	10	
	7	Darkana	Darkana	-do-, 123	90.50	90.50	90.50	10	
	8	Nawgain	Nawgain	-do-,56	90.19	125.52	125.52	10	
			Katari	-do-,54	35.33				
	9	Jirami	Jirami	-do-, 150	123.05	358.45	358.45	10	
			Kottam	-do-149	100.96				
			Manatu	-do-, 122	134.44				
	10	Oremar	Oremar	-do-, 125	224.51	224.51	224.51	10	
	11	Rajadera	Rajadera	-do-, 27	444.12	444.12	444.12	10	
	12	Ghurshri	Ghurshri	-do-,147	222.80	328.06	328.06	10	
			Roghadih	-do-, 152	105.26				
	13	Uru	Uru	-do-, 135	429.95	429.95	429.95	10	.

1	2	3	4	5	6	7	8	9	10
	14.		Jairagi	-do-, 128	178.33				
	15.	Sargaor	Sargaon	-do-,130	130.12	130.12	130.12	10	
	16	Chittarpur	Chittarpur	-do-, 121	154.45	154.45	154.45	10	
	17	Katabi	Katabi	-do-, 26	1018.21	1018.21	1018.21	10	
	18	Udri	Udri	Raidih, 30	877.20	877.20	877.20		
	19	Hutap	Hutap	-do-, 25	115.10	115.10	115.10	10	
	20	Luru	Luru	-do-, 14	250.96	250.96	250.96	10	
	21	Khatanga	Khatanga	-do-,7	354.30	354.30	354.30	10	
	22	Bondkera	Mokra	-do-, 53	93.92	443.88	443.88	10	
			Konkul	-do-, 55	10.00				
			Bondkera	-do- 59	340.56				
	23	Kondra	Kondra	-do-,60	140.30	181.00	181.00	10	
		Kalasar	-do-,61	40.70					
	24	Sarsang	Sarsang	-do-,51	116.24	216.36	216.36	10	
			Lodam Kothatdi	-do-, 38	100.12				

Analysis and valuation the crop :- The crop on the whole is very irregular. Saplings, poles and trees all occur simultaneously.

The crop density is good considering the altitudes and slopes on which most of the forests are situated.

Stock mapping: - stock maps have been prepared in scale 4” to 1 mile.

Exploitable Diameter:- The exploitable diameter for sal is fixed at 10”. For other species, the following diameter is fixed as exploitable.

Species	size
Asan	10”
Karam	12”
Dhaura	12”

Panjan	12
Gamhar	12”
Jamun	12’
Kend	12”
Bhurkund	14”
Chhatni	14”
Semal	16”
Other species	12”

The above exploitable diameters have been fixed on the basis of information obtained after carrying out a partial enumeration. The intensity of enumeration is about 2%.

Growinci Stock & Yield :- The yield will be determined by area & volume. This is determined in the following manner.

ABSTRACT OF ENUMARATIONS OF SELECTtON W.C

Range	**Name of Forest Thanaor Thana No.**	**Enumerated area in acres**	**Name of spp.**	**Diameter Classes (cms.)**			
				10-17.5	**17.50-25**	**25-32.50**	**32.50 above**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Kumar garh	Rajadera Chainpur 27	20	Sal	889	567	136	45
			Asan	16	4	-	2
			Bija	1	1	-	-
			Dhaura	-	1	-	-
			Misc	61	32	11	-
Simdega East	Bano Bano-59	20	Sal	4090	3280	560	70
			Asan	60	30	-	-
			Bija	10	70	40	20
			Dhawra	-	-	-	-
			Misc.	220	20	-	-
-do-	Sikorda Bano-71	20	Sal	300	26	4	-
			Asan	7	3	1	1
			Bija	3	-	-	-
			Dhawra.	4	-	-	-

			Misc	102	30		14	12
-do-	Konsedey Bano-80	20	Sal	226	17	7	4	294
			Asan	-	-	-	-	-
			Bija	-	-	-	-	-
			Dhawra	-	-	-	-	-
			Misc.	253	31	2	1	287

1	2	3	4	5	6	7		8	9
Kumargarh	Jairagi Chainpur-22	20	Sal		651	15	1	2	669
			- Asan		-	-	-	-	-
			Bija -		-	-	-	-	-
			Dhawra -		-	-	-	-	-
			Misc.		19	-	-	-	19
Simde ga East	Kndrung Simdega 69	20	Sal		225	13	5	3	276
			Asan		7	2	1	1	11
			Bija		2	-	-	-	2
			Dhawra		5	4	2	2	13
			Misc.		91	17	5	2	115

Average Sal Trees 20 Acres or 8 Ha. Sal 1068 653 118 20 1859

1 Ha. 133 82 20 2

For Calculation of growing stock local volume equation for sal arrived at by Forest Survey of India Eastern Zone, Calcutta in their report on forest resources for Gumla, communicated through their letter No. 50/2000 — 333 dated 29-3-2000 has been used

$V / D2 = 8.714 — 0.70158/D + .022585/D2$

Where V = Volume in m3 and D = Diameter in meter

The volumes calculated from the above local volume equations are tabulated below.

Diameter Classes (cm)	Volume m3
10-1 7.50	0.0908
17.50-25	0.2670
25-32.50	0.5412
32.50- 40.00 and above	0.91 33

Using the above volume table the growing stock of sal of representative sample plot is calculated as below

Range	**Name of Forest**	**Area (acres)**	**Volume (m3)**
Kumargarh	Rajadera	20	346.8119
Simdega East	Bano	20	1614.1350
-do-	Siborda	20	36.3468
-do-	Konsedey	20	32.5014
Kumargarh	Jairagi	20	65.4836
Simdega west	Kudrung	20	32.0709

From the above figures the growing stock of sal in 20 acres or 8Ha. Comes out to be 354.5582m3 i.e. 44.31 97 m3 *I* ha.

The total area of sal under the selection-working circle is 17954.78 ha. Hence total growing stock of sal of this working circle comes out to be 795750.46 m3.

We have already estimated M.A.l of volume per tree as .0075312 m3. As such the umber of trees per Ha. being 237 M.A.I./ Ha. Come out to be 1.7848944 m3. Hence in one ha. this much volume of wood may be removed per year.

Volume of trees diameterwise is given below.

Diameter Volume (M^3)

10” . 39

11” . 48

12” . 79

Method of executing fillings

While marking the trees for felling the following rules will be followed.

(1) All dead, dying, diseased, top-broken or otherwise defective trees will be marked.

(2) No tree will be marked where.

(a) crop density is low

(b) established regeneration is absent

(C) where the slope exceeds 60%

(3) A well grown stem would be preferred to a badly grown stem even if the former is of inferior species and the latter is of more valuable species.

(4) On the edges & blanks or partial blanks trees will not be marked.

(5) All climbers shall be cut at time of marking.

Execution of fillings

Forests of this working circle are right burdened. Hence the forest produce obtained from felling or other silvicultural operations in annual coupes will be given to right holders as per their rights.

(1) The right holders will be allowed to collect fire wood from annual coupes.

(2) The bonafide agricultural and domestic requirements of forest produce for right holders will be estimated prior to laying out of coupes. The range officer will finalise the list keeping in view the actual requirement of villagers. These requirements will be met from the forest produce of available trees in the coupe.

Subsidiary silvicultural operations:

In the year following the main felling the following silvicultural operations shall be carried out:

(1) Cutting back of damaged stems of valuable species.

(2) Cutting back of badly grown saplings and suppressed poles of Sal, Bija, Gamhar Panjan.

(3) Climber cutting.

(4) Cleaning in groups of sal saplings

(5) Removal of undergrowth interfering with the bumper growth of sal regeneration in woody or large-leaved whippy stage.

(6) Cost of Operation/ha. 12 mandays — Rs. 775.32

Grazing: - The annual coupes should be closed to grazing for five years. In other areas where soil erosion is a serious problem or regeneration is being destroyed by incidents of grazing those should also be closed.

Fire Protection: - The regeneration areas should be strictly protected from fires. Fire is a recurrent and big problem in these areas in summer season and causes a lot of damage to young seedlings. The Divisional Forest Officer should give best of his attention to prevent fire occurrences.

Chapter-V

PLANTATION WORKING CIRCLE

General Constitution: - **This working Circle covers the following forest areas**

1. Plantations which have been raised in blank areas in the past.
2. Blanks open miscellaneous and scrub forests, which consists of denuded areas, is cellaneous forests virtually with no distinct over wood, with a few trees dotted here and there.

A. Objects Of Management: - This working circle comprises areas of two categories i.e. existing plantation and plantable areas. As such a single set of. special objects of management shall not be applicable to the whole of working circle. The special objects of management are therefore laid out separately for the planted and plantable areas.

A) Special Objects of Management of Existing Plantation: -

1. To improve the quality of crop by suitable cultural operations.
2. To ensure soil and moisture conservation.
3. To provide the best condition of growth for achieving maximum increment by dopting suitable measures.
4. Consistent with the above, to meet the demands of forest produce of local people.

B. Special Obiects of Management of Plantable areas:-

1. To bring the blank areas or partially stocked areas under vegetation.
2. To check soil erosion and run off.
3. To raise plantations of indigenous species with a view to ensure increasing flow of forest produce to the local people, particularly N.T.F.P.
4. To create employment opportunities for local people and hence to add to their income.

Statement of Area:- Total area allotted to this Working Circle is 3975.19 ha. Consisting of 566.50 ha. existing plantations and of 3408.69 ha. of plantable areas. The details are given in appendix - II

Description of areas:

As far as plantable area is concerned mostly blank or semi blank areas are included in this Working Circle. Forest of these areas gradually vanished due to relentless onslaughts of the biotic factors such as unregulated grazing, illicit cutting and fire. Many areas have become degraded. Failure to regenerate after the felling has converted many areas into semi blanks also.

Previous plantations raised in blank areas should be exploited to meet the fire wood and small wood requirements of local people.

Species planted were Eucalyptus, Chakundi, Acacia etc. Plantations of indigenous species would have been more appropriate for maintaining the ecological balance.

GROWING STOCK & MEAN ANNUAL INCREMENT

1. To find out the growing stock and mean annual increment of Eucalyptus Hybrid plantations of the Division a sample plot of .8 Ha. in Charkat nagar plantation 1980) i.e. 20 year old plantation was laid out and tree enumarations with diameters at b.h were done. The data for the sample plot with the corresponding tree volumes are given below. The regression equation W - 0.0868 + 2.833 5D between tree vloume and breast height diameter used in volume 2, general standard volume tables for Eucalyptus Hybrid prepared by A.N. Chaturvedi, Menstruation officer, FRI & C, Dehradun has been adopted to calculate the tree volume which was prepared from the data obtained from Bihar, M.P. & U.P.

Sl.No.	D.B.H (cm)	Volume m3
1	8.60	.020
2	9.20	.028
3	16.80	.134
4	6.60	.007
5	11.80	.051
6	14.60	.096
7	6.30	.007
8	10.80	.039
9	8.60	.020
10	5.00	.003
11	5.40	.003
12	5.70	.003
13	8.20	.020
14	8.20	.020
15	6.70	.007
16	11.80	.051
17	24.50	.319
18	14.00	.096
19	7.00	.013
20	11.80	.051
21	6.00	.007
22	5.70	.003
23	19.00	.204
24	6.70	.007
25	31.20	.627
26	8.90	.020
27	29.60	.540
28	11.50	.051

Sl.No.	D.B.H (cm)	Volume m3
29	13.70	.080
30	27.70	.460
31	8.30	.020
32	35.00	.819
33	11.50	.051
34	8.00	.020
35	9.50	.028
36	8.90	.020
37	8.90	0.20
38	7.00	.013
39	11.0	.051
40	10.10	.039
41	8.00	.020
42	29.60	.540
43	5.00	.003
44	6.70	.007
45	7.30	.013
46	8.00	.020
47	11.50	.051
48	6.70	.007
49	5.70	.003
50	20.30	.230
51	22.90	.288
52	5.40	.003
53	7.00	.013
54	31.80	.627
55	5.70	.003
56	14.30	.096
57	10.80	.0398

Sl.No.	D.B.H (cm)	Volume m3
58	12.10	.064
59	91.80	.627
60	10.80	.039
61	14.30	.096
62	28.60	.500
63	25.50	.385
64	8.30	.020
65	26.40	.423
66	5.40	.003
68	12.70	.064
69	9.50	.028
70	8.90	.020
71	8.20	.020
72	11.10	.051
73	28.00	.500
74	34.00	.769
75	10.50	.039
76	32.50	.672
77	9.50	.028
78	14.60	.096
79	11.50	.051
80	26.40	.423
81	10.20	.039
82	11.80	.051
83	9.90	.028
84	28.60	.500
85	25.80	.385
86	9.50	.028
87	14.60	.096

Sl.No.	D.B.H (cm)	Volume m3
88	32.50	.672
89	11.50	.051
90	32.80	.672
91	11.10	.051
92	17.50	.156
93	31.80	.627
94	5.40	.003
95	32.50	.672
96	5.10	.003
97	20.40	.230
98	37.90	.925
99	10.80	.039
100	25.50	.385
101	6.00	.007
102	9.90	.028
103	12.00	.064
104	10.50	.039
105	12.00	.064
106	10.50	.039
107	7.95	3.013
108	18.80	.179
109	28.60	.500
110	7.30	.013
111	8.90	.020
112	7.95	.013
113	21.60	.258
114	35.95	.819
115	28.30	.500
116	7.00	.013

Sl.No.	D.B.H (cm)	Volume m3
117	22.90	.288
118	8.90	.020
119	19.40	.204
120	9.50	.028
121	7.30	.013
122	6.00	.007
123	27.70	.460
124	8.30	.020
125	36.60	.870
126	9.90	.028
127	29.60 .	540
128	9.20 .	028
129	8.90 .	020
130	6.70 .	007
131	8.90 .	020
132	26.70 .	423
133	1210	.064
134	24.80 .	351
135	7.60	.013
136	8.90 .	020
137	9.90 .	028
138	21.90 .	258
139	31.10	.627
140	25.50 .	385.
141	7.60	013
142	24.80	351
143	31.50 .	627
144	31.20	.627

145	10.20 .	039

Sl.No.	D.B.H (cm)	Volume m3
1*46*	7.60	.013
147	13.00	.080
148	9.50	.028
149	28.00	.500
150	12.10	.064
151	9.50	.028
152	6.00	.007
153	7.00	.013
154	11.10	.051
155	18.50	.179
156	12.40	.064
157	6.40	.007
158	11.10	.051
159	6.00	.007
160	11.80	.051
161	36.30	.870
162	8.60	.020
163	24.80	.351
164	11.10	.051
165	9.90	.028
166	7.55	.013
167	5.00	.003
168	7.60	.013
169	7.90	.013
170	7.30	.013
171	7.00	.013
172	14.95	.096
173	7.60	.013
174	6.40	.007

Sl.No.	D.B.H (cm)	Volume m3
175	8.30	.020
176	17.80	.156
177	14.30	.096
178	11.10	.051
179	13.40	.080
180	12.70	.064
181	7.00	.013
182	7.00	.013
183	24.80	.351
184	10.80	.039
185	20.30	.230
186	10.10	.039
187	26.10	.423
188	10.10	.039
189	14.60	.096
190	34.00	.769
191	9.50	.028
192	12.70	.064
193	24.80	.351
194	8.30	.020
195	9.50	.028
196	5.40	.003
197	39.10	1.039
198	18.10	.*179*
199	27.30	.460
200	9.80	.028
201	6.30	.007
202	36.90	.870
203	7.00	.013

Sl.No.	D.B.H (cm)	Volume m3
204	24.50	.351
205	28.30	.500
206	43.60	1.259
207	6.00	.007
208	7.00	.013
209	5.70	.003
210	6.30	.007
211	12.10	.064
212	20.30	.230
213	6.30	.007
214	8.90	.020
215	27.30	.460
216	22.90	.288
217	34.70	.769
218	11.50	.051
219	29.60	.540
220	23.20	.315
221	27.70	.460
222	11.10	.051
223	6.30	.007
224	40.40	1.094
225	28.00	.500
226	40.70	1.094
	Total	**41 .8230**

Total sample plot volume (.8Ha.) = 41 .823m3

Hence sample plot volume *I* Ha. = 52.2787 M3

This much volume production of wood is achieved in twenty years which implies that per year per Ha. Volume production (M.A.l) will be 2.61 M3.

From this we calculate the present growing stock of different Eucalyptus plantation of above 10 = years in the following manner in tabular form:

Name of range	Name of Plantation	Area In Ha.	Age of plantation (yrs.)	Growing stock (m3)
Simdega East	Meromdega	13.20	10	2.61x10x13.20 = 344.52
Simdega West	Garja	1.20	14	2.61x14x1.20 = 43.84
	Biru	10.00	10	2.61x14x8.20 = 299.62
	Gargarbahar	2.28	10	2.61 x 2.28 = 59.50
	Khalijar	5.00	16	2.61 x 16 x 5.0 = 208.80
	Chhatakatu	10.18	12	2.61x16x40 = 1670.40
Gumla '	Koenjara	40.00	16	2.61x16x40 = 1670.40
	Chakatanga	101.00	20	2.61x20x101 = 5272.20
	Pantha	5.00	14	2.61x14x5 182.70
	Salegutu	7.00	13	2.61x13x7= 237.51
	Turai	10.12	11	2.61x11x10.12 =290.54
	Lakeya	16.40	12	2.61x12x16.40 =513.64
	Total	**229.58**		**=9703.10**

Thus we see that growing stock of Eucalyptus plant is 42.26 m3 /ha. The total growing stock of 9703.10 m3 is proposed to removed in one year i.e. in 2003-2004. The scheme for coppice regeneration of these areas is given below.

Unit :- I ha. Wage rate :- Rs. 64.64/mandays

Year	Items of Work	Manday	Material (Rs.)	Wages (Rs.)	Total (in Rs.)
2004-2005	1. Trench fencing 2. Cleaning 3.Protection	75 12 10	- - -	4845.75 775.32 646.10 .	4845.75 775.32 646.10 **6267.17**
2005-2006	1. clearing of reduction of coppice shoot. 2. Protection	15 10	- -	969.15 646.10	969.15 646.10
				Total	**1615.25**

For estimating the growing stock of plantations of miscellaneous species like Acacia auniculac for misc. chakudi etc. the following local volume equations will be used

V = 9.5879D2 — 0.89224 D + 0.025584

Where V = Volume in m3 and D = diameter in metro

From this equation tree volume calculated for different diameter classes is given below.

Diameter Class (cm)	Tree Volume (m3)
10-17.50	.0841722
17.50 —25.00	.2689365
25.00 — 32.50	.561 5639
32.50 — 40.00	.9620569

(Area 15 acres)

A sample plot on Biru 1990 plantation was laid out and enumeration was done. The results of enumerations are summarized as below:

Diameter Class (cm)	No. of trees
10—17.50	26
17.50—25.00	17
25.00—32.50	5
32.50—40.00	1

With help of above volume table the growing stock of .5 acre plantation is estimated as 10.5301 m3. Average growing stock Per Ha. Is calculated to 52.6505 m3

Average Annual increment comes out to be 5.26 m3 Per Ha. Now we calculate the present growing stock of different plantations with mixed species in the following tabular form.

Name of range	Name of Plantation	Area in Ha.	Age of plantation (yrs.)	Growing stock (m3)
Slmdega East	Dumarmunda	20.00	11	20x11x5.26 = 1157.20
	Meromdega	13.20	10	13.20x10x5.26 = 694.32
	Muria Larba	16.00 4.00	10 10	16 x 10 x 5.26 = 841 .60 4x10x5.26= 210.40
Simdega West	Bendojar	6.00	12	6x12x5.26 = 378.72
	Garja	1.20	14	1.20x14x5.26 = 88.36
	Biru	20.01	10	20.01 x lOx 5.26 = 1052.52
	Simdega	12.00	16	12.00 x 16 x 5.26 = 1009.92
	Khuntitoli	8.90	12	8.90 x 12 x 5.26 -= 561 .76
	Khijari	8.20	14	8.20 x 14 xj 5.26=603.84

Name of range	Name of Plantation	Area in Ha.	Age of plantation (yrs.)	Growing stock (m3)
	Palemunda	40.00	14	40.00 x 14 x 5.26 = 2945.60
	T.Tangar	10.00	16	10 x 16 x 5.26 = 841 .60
	Deobahar gindra	8.52	10	8.52 x 10 x 5.26 = 448.15
	Malsara	5.00	14	5.00 x 14 x 5.26 = 368.20
	Khalijar	5.15	16	5.15 x 16 x 5.26 = 433.42
	Chhatakahu	10.18	12	10.18 x 12 x 5.26 = 642.56
Gumla	Tarn	12.50	10	12.50 x 10 x 5.26 = 657.50
	Samsera	8.00	13	8.00 x 13 x 5.26 = 547.04
	Pantha	5.00	14	5.0 x 14 x 5.26 = 368.20
	Salegutu	7.00	13	7.00 x 13x 5.26 = 478.66
	Tukai	10.12	11	10.12 x 11 x 5.26 = 585.54
	Lakeya	16.40	12	16.40 x 12 x 5.26 = 1035.16
	Total	**247.38**		**= 15950.27**

We can conclude that present growing stock of plantations with mixed species is 64.47 m3 / Ha.. The total growing stock of 15950.27 M3 is proposed to be removed in one year i.e. 2004-2005.

Methods of Treatment: - The following guidelines are prescribed for treatment of the areas included in this working circle.

1. The silvicultural systems will be artificial regeneration by planting with suitable species depending upon edaphic and biotic factors of the areas. The plantation will be done according to plantation techniques described as below.

Plantation Techniques:

For successful plantation the following techniques should be adopted.

1. The size of pits should be 45 cm x 45 cm x 45 cm or 30 cm x 30 cm x 30 cm depending upon the species to be planted. For fruit bearing species it should be larger.
2. Seedling of appropriate heights should planted. It should not be less than 2' in height. This much height is attained in 4 to 5 months time. In case of Asan and Arjun one year old plants are desirable. Similarly for stumps of Shisham and teak one year old seedlings are preferable. Before plantation the seedlings should go through the process of hardening so that survival rates remain very high.
3. Seedling should be raised in polythin bags of size 100 x 30 cm x 45 cm. The bags should be quseeted and perforated.
4. Seedlings are to be planted at the time when soil has sufficient moisture and there is no risk of seedling being dried up. Plantations should be done in time so those seedlings get sufficient time to grow.
5. Causality replacement has to be done in the same year of planting as soon as possible. It is not advisable to wait for second year for replacement of casualty.

6. Spacing of plants should 3 m x 3 m or 2 m x 2m. In the case of fruit bearing species it should not be less than 5 m x 5 m.
7. Weeding and hoeing will be done around the plants in the diameter of 1 m. It will be done twice in the year of planting. First weeding and hoeing will be carried out 15 days after the planting. Second Weeding and hoeing will be completed after rains are over in the last week of September or first week of October.
8. As regards nursery the following points should be kept in mind.

i) Seeds should be sown in drills. Broad cast sowing should always be avoided. There should not be two much shade for the seedlings.

ii) ii) Seed sowing should be done in month of October —November or Feb. So that with the onset of rains seedlings of height upto 2' may be available.

iii) iii) Excess of watering and application of fertilizer should be avoided. iv) In polythin bags the mixture of soil, sand and dung in the proportion on of

iv) 2:1 :1: should be filled. 5% Aldrin powders must be added.

v) v) The number of seedling to be raised will be 20% more than the number of pits dug up to provide for casualty replacement.

vi) vi) After the sowing has been done, the bags should be covered with paddy straw and watered twice in a day. With germination coming up the straw will be removed.

9. Choice of species will be done on the basis of soil profile of site according to following manner.

Soil Depth	Texture	Structure	Main species.
1	**2**	**3**	**4**
4’ and above	Clayey	Dense and compact	Khair, Babul, Asan.
	Loamy	Open and permeable	Casia siamea, Albizia lebbek.
	Sandy	Permeable	Shisham, Khair.
3’ to 4’	Clayey		Khair, Babul, Albizia procera. Asan
	Loamy		Sisoo, teak, Albizia lebbek.
	Sandy		Shisham, Khair, Karanj, Neem, Asan
2’ to 3’	Clayey		Khair, Babul Karanj
	Loamy		Shisham, Casia siamea. Albizia lebbek.
	Sandy		Khair, Neem.
1 1/2 ‘to 2’	Clayey		Khair, Bel, Amla, Imli, Mahua.
	Loamy		Casia siamea, Shisham, Khair.
	Sandy	.	Khair, Ber, Neem
Less than 134’	,		Babul, Ber, Ficus, Neem

Areas which are prone to water logging should be planted with species like Arjun, Asan, Jamun, Karanj, Gumhar, Kadam etc.

10 PIahtàtihäieas will be giv otectioby means fencing. The size of trench will be 1.75 m x 1.25 m x 1.25 m. In the areas where stones are available in abundance the stone wall fencing may be resorted to.

11. Prescribed time table of plantation work.

Month	**Work**
Oct.	Bush cutting, Fencing etc.
Nov.	Bush cutting, cleaning, fencing and purchase of polythin bags and other materials.
Dec.	Pit digging.
Jan.	Pit digging, Fencing, selection of Nursery site, Arranging soil, Sand and Aldrin powder. Collection of seeds of Shisham, Teak, Khair, Sins, Ber, Amla, etc.
Feb.	Trench fencing, Completion of pit digging completion of stone wall fencing, filling of polythin bags, preparation of seeds and sowing of seeds, collection of seeds.
March	Completing advance work like pit digging, Trench fencing, Stone wall fencing, filling of bags and sowing of seeds.
April.	Sowing of Khair seeds, Bel, Ber, Sharifa etc. Sorting of failed bags.
May	Pit digging for causality replacement of last year's plantation and repair old fencing. Hardening of seedlings in the nursery.
June	Sowing of seeds of Babul, Khair, on bund of trench fencing of there is good rains, the seedlings should be planted. Sowing of seeds of Mango Mahua, Jamun, Kathal.
Jith	Planting of seedlings. Application of Phosphate with plantation., hoeing and weeding in the last year's plantation, repairing of old trench fencing.
August	First weeding and hoeing, applying urea and replacing casusalty
September	Second weeding and hoeing.

2. Plantation areas will be protected at least for three years.

The sciprofile of Gumla Division is given below. This would help in choosing the species for plantations in different soil conditions. The detailed chemical analysis has been done in the soil laboratory of F.D.

S.No	District	Division	Name of forest	DOR	PIT NO (in cm)	Depth	pH
1	Gumla	Gumla Divn.	Bano Nursery	6.3.67		10--15	5.4
2	Gumla	Gumla Divn.	“	“		15--30	5.2
3	Gumla	Gumla Divn.	Simdega Nursery	“		0--15	5.9
4	Gumla	Gumla Divn	"	"		15--30	4.8
5	Gumla	Gumla Divn.	"	"		20—15	4.9
6	Gumla	Gumla Divn	"	"		15--30	5.2
7	Gumla	Gumla Divn.	Gumla Nursery	“		1O--15	5.6
8	Gumla	Gumla Divn.	“	“		15--30	5.4
9	Gumla	Gumla Divn.	Gumla Outskirts	“		10—15	5. 9
10	Gumla	Gumla Divn.	"	“		15--30	5.6
11	Gumla	Gumla Divn.	“	“		20--15	4.9
12	umla	Gumla Divn.	“	"		15--30	5.2
13	umla	Gumla Divn.		"		30--15	6.3
14	Gumla	Gumla	“	“		15--30	5.9
15	Gumla	. Gumla Divn.	Ranchi West Divn. Pltn. N	12.4.68		11--5	5.4
16	Gumla	Research	“	“		5--2O	5.2
17	Gumla	Research	“	“		20--45	5.2
18	Gumla	Research	"	“		45--90	5.2
19	Gumla	Research	“	“		90--140	5.3
20	Gumla	Research	"	“		140--180	5.4
21	Gumla	Research	Pltn. No. 74 of 1920 at N	“		11--5	5.7
22	Gumla	Research	Pltn. No. 74 of 1920 at N	12.4.68		15--20	5.8
23	Gumla	Research	“	“		20--45	5.3
24	Gumla	Research	“	“		45--90	5.2
25	Gumla	Research	“	“		90--140	5.4
26	Gumla	Research	“	“		140--180	5.2
27	Gumla	Research	Olidih Expt. Plot no.27	“	•	10--10	5.7
28	Gumla	Research	“	“		10--28	5.7
29	Gumla	Research	“	“		28--98	6.2
30	Gumla	Research	"	“		98--180	6.2
31	Gumla	Researàh	Olidih Expt. Plot no. 28	“		10--lO	5
32 Gumla		Research	“	“		10--25	4.6
33 Gumla		Research	."	“		25--65	4.7
34 Gumla		Research	"	“		65—160	5.4

COARSE SAND	FINE SAND	SILT	CLAY	TEXTURE	COARSE MATERIAL	WHC	TSS
38.65	21.6	11	27.75	CL	35.2		
32.2	20.5	13.75	32.35	CL	45		
37.95	15.2	10.35	35.4	Clay	39.7		
36.95	14.8	10.45	35.05	Clay	43.7		
45.9	19.4	10.05	23.9	CL	35.5		
40.65	15.75	14.25	28.05	CL	36.3		
38.65	28.1	16.95	15.05	CL	36.3		
36.95	23.15	20.35	18.5	L	35.7		
43.3	23.2	10.2	22.3	Cl	39.2		
43.85.	20.15	8.7	25.8	CL	34.1		
39.55	22.5	8.2	28.9	CL	34.1		
					43.3		
					36.7		
					39		
3.65	42.5	25.85	27.45	SicI	26.8	58.1	0.22
2.95	35.3	17.95	42.85	C	46.3	52.7	0.17
11.95	15.8	20.9	49.45	C	36.7	53.8	0.14
2.4	29.8	19.05	47.3	C	41.4	54.4	0.15
2	24.15	21.45	51.5	C	55.8	55.6	0.17
1.15	27.7	15.9	53.9	C	54.9	48.1	0.14
3.35	38.1	29.15	27.8	SicI	47	59.1	0.18
2.7	31.25	27.8	37.25	SicI	37	48.4	0.19
1.55	32.35	25.1	40.15	SIc	36.5	53.7	0.14
1.8	30.1	26 41	.25	Sic	38.1	48.5	0.1
0.76	23.75	28.4	46.6	Sic	48.8	51.9	0.15
COARSE SAND	**FINE SAND**	**SILT**	**CLAY**	**TEXTURE**	**COARSE MATERIAL**	**WHC**	**TSS**
1.15	26.15	20.15	51.8	C	61.9	39.8	
2.15	34.55	25.15	37.45	SicI	9.3 46	7 0.	1
1.9	29.2	23.3	44.9	C	19.8	49.8	0.01
0.95	22.1	33.4	42.95	Sil	25	54.3	0.25
0.45	31.45	27.6	39.8	Sicl	27.8	53.5	0.2
13.2	50.25	15.4	20.3	L	11	33.6	
10.5	38.3	20.35	30.75	Cl	3.7	40.3	
25.25	28.6	17.52	28.35	CI	53.5	43.4	
31.1	35.9	16.8	16	L	25.2	31.1	0.05

ORG MAlT ORG CARB. NITROGEN C/N P P.P.M K% CaCO3

0.024
0.042
0.029
0.032
0.029
0.021
0.07 1
0.045
0.06
0.048
0.046

0.250

3.55	2.06	0.168	12.2	0.0036	0.098
1.69	0.98	0.105	9.3	0.0039	0.098
0.95	0.55	0.07	8	0.0038	0.082
0.59	0.34	0.045	7.5	0.0072	0.058
0.4	0.23	0.038	6	0.0029	0.071
0.34	0.2	0.029	7	0.0056	0.054
4.05	2.35	0.21	11.2	0.0029	0.102
1.53	0.89	0.063	14.1	0.0026	0.068
0.84	0.49	0.045	10.9	0.0026	0.065
0.44	0.28	0.056	4.6	0.0036	0.058
0.33	0.19	0.055	3.5	0.0029	0.066

ORG MAlT. ORG CARB. NITROGEN C/N P P.P.M K% CaCO3

0.24	0.14	0.049	2.9	0.0026	0.071
0.34	0.2	0.038	5.3	0.0016	0.0156

0.25

0.22	0.13	0.27	4.8	0.0016	0.192
0.25					
0.14	0.08	0.024	3.3	0.0023	0.0264
0.5					
0.12	0.07	0.024	2.9	0.0015	0.0168
0.5					
0.45	0.26	0.038	6.8	0.0015	0.0192
0.25					
0.36	0.21	0.013	16.1	0.0059	0.0228
0					
0.19	0.11	0.042	2.6	0.0074	0.0288
0					
0.07	0.04	0.014	2.8	0.0074	0.0216
0.25					

‘District -GUMLA
Summary statistic of various soil characteristics
H5A

	pH	COARSE SAND %	FINE SAND %	TOTAL SAND %	SILT %	CLAY %	COARSE MATERIAL %	CONDUCTIVITY	M.W.H.C. %	W.H.C. %	T.S.S.	ORG MATE %	ORG CARB %
MAXIMUM	6.3	45.9	50.3		33.4	53.9	61.9			59.1	025	4.05	2.35
MINIMUM	4.6	0.45	148		8.2	*15.05*	3.7			31.1	0.01	0.07.	10.04
MEAN	5.41 17	17.9261	27.5		19.08	*34.5435*	*35.325*		j	4.4.429	0.1475	0.842	0.489
S.D	0.4205	1Y.7684	8.43		6.907	11.0382	16.5061		L	8.2499	0.0608	1.1046	0.6408

	NIT	C/	P(	Kc	Ca	C	CA% [	J	Fe	C	TMG	K	P

		ROGEN ‘	N	P.P.M.)		Co 1	EC	MG% IJ____			O3	aO%	O ‘*Ic*			, O%	205	
	MAXIMUM	0.27	16.1	0.01	0.192	*0.5*												
	MINIMUM	0.013	2.6	0	0.0156	0												
	MEAN	0.0594	7.09	0	0.0617	0.098												
	S.D	0.0569	4.043	0	0.0419	0.1 &4												

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• NITROGEN%

— Expon. (NITROGEN%)

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pH

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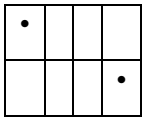

• W.H.C.%

—Expon. (W.H.C.%)

70

pH -W.H.C. qraph

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1 2 3 4 5 6 7

pH

3. Cultural operations including causality replacement should be carried out in time.
4. A 10 year plantation scheme for plantable areas should be prepared for the whole Division. Annual target should be 340.86 ha. This task may be fulfilled by Social orestry Division, Simdega. After 5 years of plantation, the areas should be handed over to Territorial Division for protection and management
5. Plantations, which are more than 10 years old should be harvested. The system adopted will be coppice system for Eucalyptus. After the area is clear felled. it should be closed to grazing for three years. Reduction of shoots will be done in third year.

   For other areas silvilcultural system will be clear felling and replanting the area afresh. The felling & replanting plan is given below:

Year	**Harvestable Area**	**Advance Work**	**Completion Work**	**Maintenance**	**Maintenance**
2004-05	.247.30				
2005-06	-	247.30			
2006-07	-	-	247.30		
2007-08	-	-	-	247.30	
					247.30

Fund for the above plantation work will be made available from sale proceeds of harvested forest produce. Funds will be deposited in the Bank Account of concerned territorial DFO as per JFM resolution of GOJ.

Financial Projections:- The total amount required for plantation and its maintenance in four years comes out to be Rs. 25000? ha. . So fund required would be Rs. 85.22 lacs per year. which should be made available to the concerned Division.

C hapter-VI

Protection Working Circle

General Constitution of Working Circle: The areas on steeper hill slopes where the problem of soil erosion and natural regeneration is acute are included in this working circle.

Snecial Obiects of Management:- The special objects of management are as follows:

1. To protect and preserve the forests on steeper hill slopes.
2. To prevent soil erosion and run off and to conserve moisture and water for regulated supply in streams and rivers.
3. To improve the health of crop by hygienic felling.
4. Consistent with the above, to meet the local requirement of forest products.

Statement of Area::- The total area under this working circle is 9630.48 ha

The details of area is given in appendix — II

Silvilcultural System:- Only hygienic felling which involves the removal of dead dying , diseased, to p broken trees and also cutting of woody climbers in 10 years cycle will be done.

Method of Treatment :- The areas will be treated as follows.

(1) Grazing will not be allowed during plan period.

(2) Areas will be fully protected against fire.

(3) Protection against illicit felling will be ensured.

(4) Contour trenches of size lOm x 45 cm x 45 cm will be dug along contour lines for moisture conservation where site permits. 70 trenches/ha.

(5) Gully plugging with dry rubble stones will be done where required.

(6) Pucca check dams will be constructed in feeder channels of rivers for silt detention. Cost estimate Rs. 6 lacs/check Dam.

(7) No felling is prescribed. Hygienic felling and climber cutting will be done in 10 years

ycle. Requirement of right holders will be met with from the forest produce so obtained.

(8) Areas allotted to this working have been demarcated on the map. It is proposed to delineate the areas on the ground.

CHAPTER-VII

Wildlife Management Working Circle

A. General Constitution of Working Circle:

The areas declared as Palkot Sanctuary are included in this Working Circle.

B. Special objects of Management:

1. To protect and preserve the existing fauna of the Sanctuary.
2. To manage the Sanctuary so as to increase the fauna to its carrying capacity.
3. To effectively prevent poaching in the Sanctuary.
4. Simultaneous to the conservation of Fauna, Flora conservation is to be done.

C. Statement of Area:

The total area included in this working circle is 18318.43 ha. (App-VIII) Management Plan for

he Sanctuary is under preparation by the concerned Division. After getting sanction from the Chief Wild Life Warden it will be sent for GOl's approval. After GOl's approval the management plan will be a part of this working circle.

Chanter — VIII

Non Timber Forest Produce

1. Kendu Leaf: -

Kendu leaf is the most important non timber forest produce of the Gumla Division as far as revenue collection and employment of local people is concerned. Its trade was nationalized in 1973. As a result it came under direct Government control. During 1985 the entire management of Kendu leaf was transferred to State Forest Development Corporation. Now the collection and its marketing has been streamlined. This has helped in ensuring payment of fixed minimum wages to the labourers engaged in the collection of Kendu leaves.

The quality of kendu leaves of Gumla Division is good. The potential of its collection is quite high and still higher yield can be obtained if properly managed and pilferage checked. Some unscrupulous contractors resort to pilferage of Kendu leaves. Even local people sometime indulge in pilferage of Kendu leaves from forests and sell to local traders and Bin manufacturers of Lohardaga, Gumla and Latehar. A parallel trade is going on. This needs to be checked effectively.

Collection centers of each unit, known as ‘Phanris’ has been selected and notified by Govt and each of them is being managed by Munshi. Lamps or Packs which are cooperative organizations also collect leaves at these centers independently and hand over to the corporation. The corporation ensures payment of minimum wages fixed by Govt every year. Fixed rates of collection per standard bag for th last five years is given below

Year	Collection Rate/standard Bag (Rs.)
1997	225
1998	225
1999	225
2000	285
2001	350
2002	400

Cclection figures of the Division for thr last five year is given below:-

Year	Collection Quantity (Standard bag)	Revenue (Rs in lakhs)	Collection expenses (Rs. In lakhs)
1997	45,129	117.748	101.541
1998	41,937	175.401	94.359
1999	52,888	197.172	134.865
2000	47,366	181.534	134.994
2001	40,888	143.162	143.109

One standard bag consists of 1000 poias of 50 leaves each. The leaves are dried and bagged at Phanris. The bags are numbered and transported to the central godowns under permits. The godowns are supervised by Forest Guards or Van Upaj Adhikari. Kendu leaves are sold by open auction at General Manager/D.M. ‘s level or at M.D. ‘s level. The sale is effected at per kg basis and highest bidder gets the products. Agreement is signed. He deposits 10% security for big lots and *25%* for small lots at the time of auction. He receivesthe material as per payment of installments. Auction is done advance before collection of Kendu leaves. This facilitates the sale before the collection of leaves.

However, the quality and quantity of Kendu leaves can be enhanced if the following silvicultural treatment to Kend trees are carried out.

i)Pruning of branches of Kend trees will be done annually before 31 March.

ii) Pruning of thin branches below 20 c.m. girth will be done. No branch above 20 c.m. irth will be pruned.

iii) For pruning only sharp axes or other instruments will be used.

iv) No tree will be coppiced from root.

v) Kend plants of height between 60 cm. to 90 c.m or sticking to ground will be coppiced rom root.

vi Pollarding will be done on saplings of less than 30 cm. g.b.h. pollarding will be done on

aplings at a height of 60 c.m. to 90 c.m. from the ground.
It is estimated that the following rates for these operatioqns will do.
Area= 1 ha wagerate=Rs. 64.61

Item of work	Mandays	Amount (Rs.)
coppicing or pruning	10	646.10

It is assessed that these treatments will ensure more fresh leaves from Kend trees and collection will be 11/2 to 2 time more than the present collection. The quality of kendu leaves will be also better. Generally, kendu leaves are graded on the basis of size, thickness and elasticity of green leaves. The larger size, thinner and more elastic, more prices are fetched in auction or tender. On this basis processing must be done. This will ensure more price and revenue collection. VFMPCs must be associated in the collection of kendu leaves.

2. Sal seed

Sal seed is important non timber forest produce of the Division. Its collection and trade is being managed by State Forest Development Corporation. Presently it is being sold by advance tender or auction for the whole state. Its collection is done through Mushi appointed by tenderers. State Forest Development Corporation ensures minimum price/kg to the collectors of Sal seed collection charges are paid by tenderers. He also p[ay the royalty to Corporation.

The details of collection and revenue receipts for the last five year of the division is produced below.

Year	**Collected quantity (M.T.)**	**Sale proceeds (Rs. in lakhs)**	**Expenditure (Rs. in lakhs)**
1997	*8*57,525	22.190	14.217
1998	155.080	6.536	3.462
1999	231.370	11.247	*5.193*
2000	1067.809	9.687	24.291
2001	--	Collection cannot be done	

3. Tanning Bark

It is not commercially exploited from the forests of Gumla division as the removal of bark leads to drying of trees. However the leathermen may be allowed to remove the bark of Asan. (T. tomentosa) and Arjun (T.Arjuna) only from the current coupe for their own requirements. As the large chunk of forest areas of division have degraded and need special treatment of rehabilitation by artificial regeneration in the gaps. The species of Asan (T. to mentosa) and Arjuna(T.Arjuna) may be planted in the gaps. Particularly in water logging areas Arujun should be planted. This will ensure greater availability of trees yielding tanning bark.

4. Karan seeds :-

Seed of Karanj (Pongamia glabra) produce oil. which is used by villagers in skin diseases. It is not presently exploited commercially. It is recommended that in plantation areas 20% Karanj plants should be planted. This will go long way in ensuring more yield of Karanj seeds in these forests. Villagers may be allowed to collect the Karanj seeds free of cost.

5. Myrabolans

Collection of Harra nut were carried out in two years i.e. 1998 & 1999 but could not be sold. At present, no regular exploitation of Myrabolans is carried out. Its collection rights may be auctioned in range wise lots. Collection of figures of Harra nut for 1998 & 1999 is produced below :-

Year	Collected quantity (M.T.)
1998	51.964

1999	0.350

It is &nimeñdéd that in the plantation areailO% Myrabolans should be planted. This will give a boost to the yield of Myrabolans in future.

6. Mahulan leaf:- (Bauhinia Vahlii)

Mahulan leaves have been collected and marketed by State Forest Development Corporation and details for the last five years given below

Year	Collected quantity (MT.)	Sale proceeds (Rs. in lakhs)	Expenditure (Rs. in lakhs)
1997	75.972	0.550	1.89
1998	--	--	--
1999	124.384	0.910	3.10
2000	174.40	3.210	4.36
2001	127.332	1.810	3.18

However, efforts should be made to auction collection rights for the whole division.

7. Gums:

It formed an important forest produce from the forests of Gumla Division. Indiscriminate tapping, has , however, ruined most of the trees and at present yield has reduced very much. It s suggested that permission may be given for tapping only on a cycle of four years. Tapping rights may be auctioned.

8. Bamboo:-

Although Bamboo do not occur in the forests of Gumla Division in significant quantity, it is suggested that Bamboos may be planted in degraded forests along nalas and on hill slopes in miscellaneous forests. The spacing may be kept at Sm x Sm. Dendrocalamus strictus is only Bamboo species which is found in these areas. Emphais should be laid on the propagation of this species. However, the other species of Bamboo may be tried. It is proposed to plant bamboo over 150 ha/year. This will be done in Rehabilitation and Plantation Working Circles. Per hectare cost will Rs. 18684. 13 details of which are given below: -

Estimate for Bamboo Plantation

No. of Plants :- 400/ha Unit — 1 ha.

Wage rate = Rs. 64.61 per manday.

Spacing 5m x 5m

SI. No.	Items of Work	Mandays	Materials (in Rs.)	Wages (in Rs.)	Total (in Rs.)
	A. 1st year Operation				
1.	Survey& Demarcation	3	-	193.83	193.83
2.	Bush cutting	7	-	452.27	452.27
3.	Trenchfencing(1.75mx1.25mx l.25m)	75	-	4845.75	4845.75
4.	Pit digging (.45mx.45mx.60m)	40	-	2584.40	2584.40
5.	Purchase of Bamboo rhizone	480	960	-	960
6.	Soil and water conservation work	10	-	646.10	646.10
.7	EntryPointwork	30	789	1938.30	2727.30
8.	Nursery work 9Dec. to March)	4	-	258.44	258.44
9.	Material	-	366	-	366
10.	Misc. work	-	50.00	-	50.00
	Total	**169**	***2165***	**10919.09**	**13084.09**

Si. No.	Items of Work	Mandays	Materials (in Rs.) .	Wages (mRs.)	Total (in R5
	A. 2nd year Operation				
1.	Nurserywork	4	-	258.44	258.44
2.	Planting	9	-	581.49	581.49
3.	Two hoeing and weeding	9	-	581.49	581.49
4.	Planting on trench bern	2	-	129.22	129.22
5.	Protection	7	-	452.22	452.22
6.	Material (Fertilizer rate)	-	160	-	160.00
7.	Misc. work	-	30.00	-	30.00
8.	Entry Point Work	-	383.00	-	383,00
	Total	**31**	**573**	**2002.86**	**2575.86**

Si. No. .	Items of Work	Mandays	Materials (in Rs.)	Wages (mRs.)	Total (in Rs.
	A. 3rd year Operation				
1.	One hoeing andweeding	6		387.66	387.66
2.	Material (Fertilizer rate)	-	34	-	34
3.	Protection	10	-	646.10	646.10
4.	Repair of trenches	5	-	323.05	323.05
5.	Replacement of causality	1	-	64.61	64.61
6.	Entry Point work	-	287.00	-	287.00
	Total	**22**	**343**	**1421.42**	**1742.42**

Si. No.	Items of Work	Mandays	Materials (in Rs.)	Wages (mRs.)	Total (in Rs.
.	A 4th				
1	One hoeing and weeding	6	-	387.66	387.66
2.	Material (Fertilizer rate)	-	34	-	34
3.	Protection	10	-	646.10	646.10
4.	Entry Point Work	-	192	-	192.00
	Total	**16**	**226**	**1033.76**	**1259.76**
	Grand Total	**238**	**3307**	**15377.13**	**18684.13**

9. Mahua seeds and flowers :-

Mahua (Madhuca indica) trees are very useful to the local people. Its flowers are collected and eaten by them . They also prepare country liquor from it. Mahua seeds from which edible oil is extracted have been commercially expedited by Corporation. Some data concerning Mahua seed collection is available which is given below

Year	Collected quantity (M.T.)	Sale proceeds (Rs. in lakhs)	Expenditure (Rs. in lakhs)
1998	6.351	0.458	0.474
1999	1.820	0.132	–
2000	10.075	0.733	0.753

However Mahua seeds may be sold by auction in single lot for whole division. Although

Mahua is a slow growing species, it is suggested that one or two year old seedlings should be raised for plantations in degraded forests. At least 5% seedlings should be of Madhuca indica. This will enhance the prospect of more yield of Mahua flowers and seeds.

10. Chiraungi (Buchanania latifolia):

It is not commercially exploited.However,the local people may be allowed to collect the seeds free of charge. It's seed is very nutritious and sold at high prices. It is used in making Haluwa and Ladoo.

11. Grasses:

Fodder grass may be removed by villagers free of charge from the forests. Commercial

removal of grasses from plantation areas may be charged at the rate fixed by department.

12. Honey:-

Honey is generally collected by villagers for their own use. Honey bees prefer Karanj flowers. Hence the plantation of karanj will no doubt enhance the yield of honey from forests. However, bee keepingmay be encouraged among villagers. This will fetch remunerative prices for them.

13. Lac

Lac insects may be reared on trees of Ber, Palas and Kusum, which are found in abundance in Gumla Division. Villagers may be given incentive in form of Lac seeds at subsidized rates. Seedlings of Ber may be planted in rocky areas of Gumla Division and Lac cultivation may be encouraged by propagation and training.

14. Tussar Silk:

Tussar Cocoons may be reared on the leaves of Asan (T.Tomentosa) ande Arjun (T.Arjuna) which are found in forests of Gumla Division. Seedlings of Asan and Arjun may be planted in degraded forests.

State Forest Development Corporation is presently focusing it attention on the collection and marketing of the Kendu leaf Other non timber forest produce has not been given much attention as the time of the collection of Kendu leaves and other forest produce is approximately the same. However, the importance and potential of these forest produce is quite high as far as their contribution to the village economy is concerned. It is suggested that concerted efforts should be made to enhance the yield of the non timber forest produce from the forest of Gumla Division. As such the villagers living in the vicinity of forests will be weaned away from the felling the forests and selling it in the market to earn their livelihood. In the plantation areas, at least 30 to 40% seedlings of fruit bearing species should be planted.

It is recommended that the collection of non-timber forest produce be carried out through VFMPC wherever it has been constituted. Marketing of these must be done by State Forest Development Corporation. Training of members of VFMPCs regarding the collection and processing of these produce is proposed to be arranged by Dept. of Forests and Environment. Net revenue must be ensured to VFMPCs.

Chapter -IX

Miscellaneous Regulations:

1. Grazing:

Grazing is a permanent and serious problem in the forests of this division. The villagers keep a large number of cattle for the purpose of dung as a manure in their fields. No milk can be produced by their cows which are local breed. The cattle are let to roam about in the forests and eat whatever they get. Due to overgrazing the quality of grasses is poor and their incidence is low. To supplement their feed, lopping and pollarding of trees is resorted.to by graziers. This tends to destroy the trees. Trampling by herd of cattle leads to soil erosion and interferes with percolation of rain water. The surface soil gets compact and regeneration of vegetation is hampered, it is therefore essential to check the pressure of grazing.

Although the incidence of grazing cannot be eliminated, it can be controlled and regulated . Rehabilitation and plantation areas will be completely closed to grazing. In such areas, publicity boards in this regard must be displayed.

2. JFM:

In the villages where VFMPCs have been constituted or will be constituted, microplans will be prepared as per guidelines of Government. The forestry regulations will be guided by the prescriptions given in the working plan. Minor deviations in Microplans regarding silvicultural operation may be allowed in these areas. microplans will be prepared in format given in appendix. A toti of 792 VFMPCs/VEDCs would be constituted in the Gumla Division. At present there are 125 VFMPC working in the division. (List given in Appendix). It is proposed to constituted 66 VFMPCs/Year.

3. Fire

Generally fire occurs from March to May. with onset of monsoon the fire hazard disappears. The fire that breaks out is surface fire which scorches seedlings and young saplings, burns humus and leaf litter, hardens the soil rendering it unfit for seeds to germinate and strike roots in to the ground and as years pass by sheet erosion is accelerated to gully form on slopes. Timber gets affected by dry rot and unsoundness is the result.

Fire is deliberately caused by the local people to get new flush of grass in hot weather for cattle feed. It is also caused by the villagers to clear dry leaves under Mahua trees so the Mahua

Flower may be collected easily and quickly. Firemay be caused by stray passing through roads in the forests who ignite fire for cooking at camping sites or for smoking and leave the fire burning. The splinters from which are easily blown off in to the adjoining forests to set fire to it. The following prescriptions shall be followed to eliminate the occurrence of fire :

i) The existing boundary lines shall be fire traced and control burnt from February to March every year.

ii) Villagers should be encouraged to sweep dry leaves to facilitate the collection of Mahua flowers by holding meetings, demonstrations and distribution of hand bills. very effort should be made to educate the people about the evil effects of forest fires on the forests and environment.

iii) The forest personnel of all categories should remain alert during summer and should do their best to extinguish the fire whenever or wherever in the forest it comes to their notice. In this task VFMPCs must be involved wherever they exist.

iv) Right holders should be appealed to assist in the matter of clearing and burning of boundary lines within forest thy exercise their rights. However, some funds should be earmarked for providing food and water to them during fire lighting operations.

v) Award of cash prizes for good work in protecting forest from fire either by prevention or by remedy is highly recommended. The prizes may be given individually or collectively to a village.

vi) Printed hand bills explaining the causes of fire, their preventive and remedial measures and the cooperation of the people needed to protect the forest from fire should be widely circulated in every village, every school, thana and post office. It should also incorporate the announcement of various each prizes to be awarded annually.

vii) The distribution of prizes should be made in October every year during wildlife week.4. 4. Maps :-

The division is fully equipped with cadastral maps of 16”=lmile scale showing forests there in Topo maps of l”=lmile scale are also available there. Stock maps of forests have been prepared on 4”=l mile scale. A working plan map of the division on l”=lmile scale will also be supplied to the territorial divisions along with the revised map.

Fire maps will be maintained on a scale of l”=lmile in the division and in the ranges. Occurrence of forest fire shall be shown in the map of felling series histories every year by

distinctive symbols as per Working Plan Procedure Code. the symbols beginning from 2001 would indicate as given below :-

Year	Symbols
2001	\\\\\\\\
2002	XXXX
2003	
2004	IIIIIII
2005	////////

The fire maps on 1 “=1 mile scale has to be maintained for 5 years. After 5 years they shall be kept as record and next set of maps will be started from 2006 onwards with the same set of one set of symbols as from 2001 above. Each felling series history will have one set of fire map on 4”=lmile scale maintained for 5 years and repeated with the some symbols in the next *5* years.

5. Two sets of felling series histories complete in all respects will be prepared, one for the range and other for record in the division. During rainy season from July to September every year, it will be duty on Amin Inspectors in the divisional office to make necessary entries in the felling series history of divisional office form up to date entries of range office copy.

6. Three complete sets of control forms have been prepared in loose leaf clutch file. One set is for the DFO’s use and office record. One set is for use and record in office of the Working Plan Officer. The third set is a flying set which will be filled up yearly and sent to W.P.O. within two months of the close of working plan year (1st July to 30th June).

7. Maintenance of Boundaries :-

There are 1,72,222 boundary pillars in the whole division. The conditions of boundary pillars are not satisfactory. About half of these pillars need repairs but it is assessed that 20,000 pillars require immediate repairs and a scheme for repair of these pillars is given as below :-The estimate of construction of pillars is given in appendix.

Year	No of pillars to be repaired.	Amount required (Rs. in lacs)
2001-02	2000	6.00
2002-03	2000	6.00
2003-04	2000	6.00
2004-05	2000	6.00
2005-06	2000	6.00
2006-07	2000	6.00
2007-08	2000	6.00
2008-09	2000	6.00
2009-10	2000	6.00
2110-11	2000	6.00

8. Petty fellings

A few trees beyond the prescriptions of the plan may be felled by order of Divisional Forest Officer for meeting the following demands.

a) For use in departmental works

b) For supply of sample timber to Forest Research Institute, Dehradun.

c) For meeting free grants.

These will be recorded in Manual Form No.2

9. Forest Roads : The total length of forest roads is 180.5 kms . Annual maintenance will be done and culverts causeways etc. would be constructed as per requirement or as per microplans.

Work Programme of Plan

Year 2003-2004.

Working Circle	Silvicultural Operations		Artificial Regeneration	
	Area in ha.	Amount (in Rs.)	Area in ha	Amount (Rs in lac.)
1	2	3	4	5
Coppice Working Circle	-	-	3666(Adv.Work)	353.00
Rehabilitation Working Circle	-	-	-	
Selection Working Circle	-	-	340.86(Adv.Work)	-
Plantation Working Circle	-	-	Contour trenches in 963ha.+_1_check dam	44.26
Protaction Working Circle	-	-		40.00

Working Circle	Silvicultural Operations		Artificial Regenera	
	Area in ha.	Amount (in Rs.)	Area in ha.	Amount(Rs in lac.)
1	**2**	**3**	**4**	**5**
Coppice Working Circle	750 .00	5.81	150 (Adv. Work)	9.60
Rehabilitation Working Circle			3666 (Completion Work+3666(AdvWork)	452.00
Selection Working Circle	1795.00	13.91		
Plantation Working Circle			340.86(Completion + 340.86 (Adv.	81.72
Protaction Working Circle			Contour trenches in 963ha.+_1_check dam	40.00

Year 2005-2006

Working Circle	Silvicultural Operations		Artificial Regenera	
	Area in ha.	Amount (in Rs.)	Area in ha.	Amount(Rs in lac.)
1	**2**	**3**	**4**	**5**
Coppice Working Circle	750 .00	5.81	150	11.56

			ha(completionWork +150(Adv. Work)	
Rehabilitation Working Circle			366 ha(Advance)	414.26
Selection Working Circle	1795.00	13.91	-	-
Plantation Working Circle	-	-	340.86 ha(maintenances)+340.86 ha Completion + 340.86 ha (Adv.Work)	96.19
Protaction Working Circle			Contour trenches in 963ha.+_1_check dam	40.00

Year 2006-2007

Working Circle	**Silvicultural Operations**		**Artificial Regenera**	
	Area in ha.	Amount (Rs in lac)	Area in ha.	Amount(Rs in lac.)
1	**2**	**3**	**4**	**5**
Coppice Working Circle	750 ha	5.81	150(Maintenance) +150(completion)+150(Adnances)	13.06
Rehabilitation Working Circle	-	-	3666 ha(Maintenance) 3666 ha(Maintenance) +3666 ha(completion) +3666 ha(Adnances)	414.26
Selection Working Circle	1795 ha	13.91	-	-
Plantation Working Circle	-	-	3666 ha(Maintenance) 3666 ha(Maintenance) +3666 ha(completion) +3666 ha(completion) +3666 ha(Adnances)	96.19
Protaction Working Circle	-	-	Contour trenches in 963ha.+_1_check dam	40.00

In 2007-2008, 2008-2009, 2009-2010, 2011-2012, 2012-2013, 2013-2014 the programme would be same as above.

Receipts

Year 2003 -2004

Working Circle	Volume of Forest (Harvested) Produce	Expected sale proceeds. (Rs in lac.)
1	2	3
Coppice Working Circle	600M^3	63.00
Selection Working Circle	3200 M^3	*560.00*
Plantation Working Circle	9703.10 M^3	1020.00
Total	**13503.10 M^3**	**Rs 1643.00 lacs.**

Year 2004-2005

Working Circle	Volume of Forest (Harvested) Produce	Expected sale proceeds.(Rs in lac.)
1	**2**	**3**
Coppice Working Circle	600 M^3	63.00
Selection Working Circle	3200 M^3	560.00
Plantation Working Circle	15950.27 M^3	1680.00
Total	19750.27 M^3.	Rs 2303 lacs

Year 2005-2006

Working Circle	Volume of Forest (Harvested) Produce	Expected sale proceeds.(Rs in lac.)
1	**2**	**3**
Coppice Working Circle	600 M^3	63.00
Selection Working Circle	3200 M^3	560.00
Total	**3800 M^3.**	**Rs 623 lacs**

In 2006-2007, to 2013-2014 the receipts will be same as above 623 lacs.

FINANCIAL FOREST AND COST OF THE PLAN,

FINANCIAL FORECAST.

1. With inflation price of every thing, including that of all forest produce is increasing day by day. The revenue collection shown in the plan is the result of last 10 year back and price of timber and other forest produce has been increased @ 10% per year. In this division only timber and firewood are available for selection felling and it

   occurs on small pockets of the forest division. There fore the revenue of this division including the price of miner forest produce will be about Rs. 6,00,00000/- peryear.
2. Cost on development work- A lot of money will be expended on the development work like plantation on blank, silvicultural operation etc. The rate of wage of labour and cost on materials are also increased by the Govt. day by day. Hence this cost cannot be estimated as a fix amount per year. The cost on development work is estimated to be 5,00,00000/- per year.

   COST OF THE PLAN:

   (1) this plan was prepared during February 1998 to March, 1999. the expenditure incurred during this period is given below :-

1. Payof the officers and staff :	1,66404.80
2. C.L.A. of officers and staff	2,14556.40
3. Travelling allowances :	27999.80
4. Office expenses :	50356.33
5. Motorvehicle :	72841.55
6. Uniformof staff :	6619.10
7. Telephone of the W.P.O. :	9480.80
8. cost on filed work stock mapping : and enumeration	1,73029.02
9. Electric :	5326.82
10. Rent and taxes :	2966.00
Total	**6,94,580.62 182**

This expenditure was done for preparation of working plan . There fore expenditure per acre is Rs. 2.21 pai. and Rs. 55O per ha.