

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER-I

BASIS OF PROPOSALS

GENERAL OBJECTS OF MANAGEMENT -The general objects of management are:

- (i) Management of environmental stability through preservation and where necessary restoration of the ecological balance that has been adversely disturbed due to serious depletion of the forests.
- (ii) Conserving the natural heritage of the division by preserving the remaining natural forest with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resources of the division.
- (iii) Rehabilitation of degraded forest and forest lands under encroachment and areas subjected to organised illicit fellings through afforestation.
- (iv) Checking soil erosion and denudation in ecologically fragile areas and the catchment areas of rivers streams etc. in the interest of soil and water conservation. Water is the limiting factor in these areas.
- (v) Increasing the productivities of forests to meet essential needs of were population for small timbers , fuel wood , fodder and non- timber forest produce.
- (vi) Creating a massive people's movement in protection and scientific management of the forest and promoting a sense of community ownership.
- (vii) To constitute Village Forest Management and Protection Committees (VFMP) and Village Eco-Development Committees(VEDC'S) in all the forests and management of forest with the active involvement of VFMP'S and VEDC'S.
- (viii) To increase extension forestry.

Present status of the Forest:-For the past two decades, the forests of the Kolhan division have been subjected to heavy destruction. It has been the result of Jharkhand Agitation to a large extent and continuous theft and smuggling in general , especially in sat conversion working circle . But the selection areas are affected to lesser extent

Approximately 7480 Hac. of forest area were destroyed by the Agitationists during the year 1975 to 1995. The detail is given in Annexure —IV

The whole division was affected by this Jharkhand Agitation. Due to Jharkhand felling, which is a clear felling in nature followed by burning of the crop and cultivation over the area had resulted into a permanent loss of the forest.

Besides the division is affected to a large extent by theft of important timber species like Bija, Gamhar, Sal Asan, Karam, etc. which come to the nearby markets of Chakardharpur and Chaibasa and Jamshedpur.

The theft mostly selective in nature, has resulted into loss of some very important spp. altogether from the forests especially Teak, Bija, and Gamhar which are conspicuously absent in the forests. In general this has resulted into the reduction in the crop density. So far as forests of Selection Working Circle are concerned they are least effected by the agitationists.

Encroachment is an matter of grave concern. The list of encroachment is annexed as Annexure IV. There is an urgent need to remove the encroachment from the hill top, and steep slopes but this is a very sensitive matter because tribals in general. Who are residing in the forest have established villages of their own and in almost all the cases, the tribals from Ranchi, East Singhbhum, Gumla, Mayurbhanj {Orissa}, Keonjhar {Orissa}, and Sundergarh {Orissa} have come to settle in the forest during Jharkhand Agitation. They have got political supports also. So their removal and resettlement is urgently required, so that the forest can regain its lost glory.

There is a silver lining. Local people have started protecting their forest. At present there are eight VFMP and sixteen Village Eco-Development Committee have started working in this division, though not in a big way. It will not be possible to protect the forest of Kolhan until and unless the Forest Department does something for the people residing inside the remote forests. Further eco development projects have to be prepared for the villages and the R.F., so that both can be developed. Village forest protection committees can be constituted and their active help and co-operation can be taken after preparation of microplan which should match the working Plan prescription for rights and concessions. The regulatory forest management, practiced in the past has led to the alienation of the local people. However, by mid and late eighties, villagers had started protecting forests in their vicinity. Presently such grass roots initiatives have gained momentum due to growing concern over the rapid rate of deforestation. With the passing of JFM resolution by Jharkhand Govt. the protection of forest by villagers have gained momentum and VFMPs have been formed which are protecting many forests. Many of these VFMPs consist of officially recognized self-initiated forest protection groups. Besides, there are a considerable number of village protecting groups which are yet to be formally recognized. People participations in protection, rehabilitation and management will help in conservation of the forests in this division. The institution of VFMPs and VEDC are strengthened by the Govt. of Jharkhand Resolution — 05 / 2000- 3658, F & E Dt. 27th August, 2002, with provision for revenue sharing mechanism also.

1. Protection, improvement and management of degraded forest will be I.-undertaken by adoption of joint forest management (JFM) as per Govt.guidehne on priority basis.

2. Management of better socked forests will be undertaken to increase the productivity of such forests.

3. Blank forest areas where no natural regeneration is possible ,will be planted with suitable indogeneous species to suit local conditions and for increasing the flow of forest products to the local people especially.

4. Special vegetative and mechanical soil and moisture conservation schemes will be implemented in all the areas.

CONSITITUTION OF WORKING CIRCLE :- To achieve the aforesaid objectives of management, the forests have been divided into following working circles according to the composition and density of vegetation, the local site conditions, silvicultural needs of the forests while taking into consideration the requirement of the local people.

1. Sal Selection Working Circle.

2. Eco-Restorestion Working Circle.

3. Improvement Working Circle.

4. Plantation Working Circle.

5. Protection Working Circle.

6. Management of Forest Villages.

1. Sal Selection Working Circle. This working circle shall comprise parts of the **forest which** were under earlier sat selection working circle in the preceding plan of sri-A.Haidery and excluding areas which now stand encroached and devoid of any worth while vegetation.Improvement and subsidiary silvicultural operations as well as soil conservation works are also prescribed for crop improvement. The area under this working circle is 26,264.15 ha.

2. Eco-Restoration Working Circle:- This working circle comprises parts of forests of erstwhile Conversion Working Circle and other F-areas where there is very good regeneration potential of sal species, but subjected to illicit felling and resultant non-availability of trees of exploitable girth. The area under this Working Circle is 8,920.10 ha.

3. Improvement Working Circle:- This Working Circle comprises parts of forests of erstwhile Coppice Working Circle , which were maltreated in the past and subjected to heavy biotic pressure , but has good coppice regeneration capacity to reestablish themselves. The area under this Working Circle is 17,636.59 ha.

4. **Plantation Working Circle:-** This Working Circle comprises parts of forests of erstwhile Plantation Working Circle and past plantations which were cleared by illicit felling and permanent gaps created by the illicit felling . Areas abandoned by encroachers after shifting cultivation are brought under this working circle.The area under this working circle is 7,968.31 ha.
5. **Protection working circle:-** All the areas on steeper hill slopes where the problem of soil erosion is acute and lack of natural regeneration is leading to denudation of hills and areas, where illicit felling and excessive biotic pressure is damaging the existing good crop is brought under this working circle. The area under this working circle is 8,676.32 ha.
6. **Management of Forest Villages:** - 540 ha. of forest land is included under this management system. This area includes forest crop also.

RANGE -WISE ABSTRACT OF AREA STATEMENT

| RANGE | Total Area in Hect. | Selection Working Circle in Hect. | Eco-restoration Working Circle in Hect. | Protection Working Circle in Hect. | Plantation Working Circle in Hect. | Improvement Working Circle in Hect. | Management of Forest Villages in Hect. |
|--------------|----------------------------|------------------------------------------|------------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------------------|-----------------------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| KOLHAN | 25898.02 | 11617.34 | 2963.67 | 2227.32 | 1247.59 | 7842.41 | 0 |
| SANTARA | 33480.05 | 14646.81 | 5956.43 | 5502.93 | 6160.72 | 850.55 | 362.61 |
| SAITABA | 10628.08 | 0 | 0 | 946.07 | 560.00 | 8943.63 | 178.07 |
| TOTAL | 70006.15 | 26264.15 | 8920.1 | 8676.32 | 7968.31 | 17636.59 | 540.68 |

CHAPTER -II

SAL SELECTION WORKING CIRCLE

General Constitution & Crop Composition :-

This working circle shall comprise parts of the forest which were earlier under sal selection working circle in the previous plan of Sri A.Haidery, excluding areas which now stand encroached and devoid of any worth while vegetation.

This working circle comprises generally the upper slopes which embraces all the dry mixed and dry sal forests of quality II, III, IV & V which are not considered fit to be included in the conversion working circle. These forests are gular and variable in quality. Sal is the predominant species which occurs ariously. Patches of dry mixed deciduous forests also occur on exposed , hill tops and on the southern aspect of the steep slopes. The species which occur most commonly in these dry mixed patches are Anoqeissus latifolia, ninalia alata, Lacjerstromia parviflora, Diospyros melanoxylon, Buchnanania ri, Madhuca indica, Gardenia gummifera and rarely Sterculia urens earing on rocky exposed sites. Sal is normally of quality IV but quite a lot of consists of terribly poor open grassy patches of quality V. Patches on steep southern aspect of the higher hills and on the tops there of, specially where s and phyllites occur, are grassy with quality V sal. Trees in such localities [are crooked, malformed and stunted seldom attaining a height beyond 15 mts. In sheltered localities of quality V area, the reproduction of sal in seedling to .y stage is adequate, indeed at some places it may be said to be profuse. .re is not uncommon in the forests of this working circle especially near the 9. There is a general deficiency of poles and saplings in certain portions. in the open and quality V crop particularly on the shales and phyllites, as for Example some hills of the Latua, Santara, and Ambia blocks, poles and sapling crop is conspicuously absent. In such localities the common associates are Gardenia gummifera, Wedlandia tinctoria, Symplocos racemosa and Eleodendron glaucum with Khajur and grass.

The crop of this working circle has not received adequate silvicultural attention. There is no doubt that if the crop is nursed and given due silvicultural treatment, forest in this working circle will improve better than what it appears at present.

Site ciuality: The general site quality of the site is II in some patches and mostly the site quality is 11/111,111, III/IV,IV and rarely V. The age-height curve of Leda 20 sample plot which is maintained under regular thinning and silvicultural regime, which comes under this working circle ,indicates that the site quality of better forests conforms to site quality II.

Special obiects of Management: -

The forests of this working circle have so far received inadequate [silvicultural

treatment. Apart from taking away a percentage of the available trees of exploitable diameter no silvicultural treatment what so ever has been applied to the crop over bulk of the area. Given the proper aid and silvicultural treatment, there is no doubt that the crop will give positive response. At some places of Santara and Latua blocks erosion has set in and is now on increase exposing rocks. It shall be the endeavor of this plan,' therefore, to focus more attention on the forests of this working circle and to manage them at best to rejuvenate the forests. Accordingly the special objectives of management are : -

- (a) To improve the composition and stocking of the existing crop by application of silvicultural treatments.
- (b) To induce and obtain natural regeneration of sal and other economically valuable species and establish and tend it for the future crop.
- (c) To carryout improvement fellings to prevent negative increment and to prevent congestion of pole crop and young recruits and thereby improving the stand quality and inducing better growth in the existing crop.
- (d) To Induce young recruits for better and healthy growth.Silvicultural operations shall be carried out in the following year of selection felling to achieve the said objective
- (e) To preserve and tend all trees under the exploitable diameter to replace the big trees.
- (f) To harvest trees, subject to numerical check of exploitable diameter as far as proper silvicultural management permits and thus to obtain a sustained annual yield.
- (g) To remove silviculturally available trees of exploitable diameter in time to prevent negative increment.
- (h) To adopt means for amelioration of the existing state of progressive desiccation of soil and to improve moisture regime *of soil* and sub soil.
- (i) To maintain the hill slopes under adequate forest cover for the prevention of soil erosion and conservation of soil moisture.
- (j) To carryout soil conservation works like contour trenching, gully plugging

Felling Series: - For the management of the forests of this working circle, four felling series, namely Ambia, Latua, Leda, and Santara have been 1, which include two P.F. blocks adjacent to felling series blocks.

Area allotment: - The total area under this working circle is 26,264.15 hectares. The following table shows the allotment to the different felling series.

ABSTRACT OF RANGE-WISE AREA STATEMENT

| Range | Name of F.S. | Block | Comptt. | Area Under Selection W.C. in Hectares | Remark |
|--------------|--------------|---------|----------|---------------------------------------|--------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Koihan | Ambia | Ambia | 1 to 24 | 5860.93 | |
| Koihan | Leda | Leda | 1 to 30 | 5756.41 | |
| Santara | Santara | Santara | 1 to 46 | 6083.80 | |
| Santara | Latua | Latua | 11 to 52 | 8563.01 | |
| Total | | | | 26264.15 | |

AREA STATEMENT OF SELECTION WORKING CIRCLE

| Comptt. NAME | Comptt. NO. | TOTAL AREA | SELECTION WC |
|--------------|-------------|------------|--------------|
| 1 | 2 | 3 | 4 |
| LEDA | 1 | 229.87 | 108.87 |
| . | 2 | 356.13 | 348.13 |
| | 3 | 327.80 | 270.80 |
| | 4 | 398.62 | 179.62 |
| | 5 | 329.02 | 247.43 |
| | 7 | 323.76 | 221.76 |
| | 8 | 353.30 | 283.30 |
| | 9 | 290.17 | 204.17 |
| 10 | | 284.50 | 204.50 |

| | | | |
|--------|----|--------|--------|
| | 11 | 235.53 | 195.53 |
| . | 12 | 242.41 | 101.00 |
| | 13 | 538.65 | 439.65 |
| . | 14 | 248.48 | 168.48 |
| | 15 | 323.76 | 191.20 |
| | 16 | 398.22 | 208.22 |
| . | 17 | 200.32 | 70.32 |
| | 18 | 430.19 | 200.19 |
| | 20 | 357.75 | 287.75 |
| | 21 | 229.46 | 152.00 |
| . | 22 | 316.88 | 201.00 |
| | 23 | 267.91 | 243.00 |
| | 24 | 403.89 | 273.89 |
| | 25 | 250.10 | 90.10 |
| | 26 | 345.61 | 148.61 |
| | 27 | 120.60 | 100.60 |
| | 28 | 342.37 | 179.37 |
| | 29 | 337.92 | 222.92 |
| | 30 | 313.64 | 214.00 |
| AMBIA. | 1. | 394.58 | 309.58 |
| . | 2 | 272.36 | 162.36 |
| | 3 | 201.54 | 165.54 |
| | 4 | 333.87 | 315.87 |

| | | | |
|-----------------------|-----|--------|--------|
| | 5 | 387.29 | 387.29 |
| | 6 | 347.23 | 347.23 |
| | 7 | 237.96 | 215.96 |
| | 8 | 339.94 | 161.94 |
| | - 9 | 389.72 | 291.72 |
| | 10 | 267.91 | 247.91 |
| | 11 | 362.61 | 362.61 |
| | 12 | 267.10 | 153.10 |
| | 13 | 347.23 | 299.23 |
| | 14 | 226.63 | 182.00 |
| | 15 | 324.97 | 262.97 |
| | 16 | 334.28 | 232.00 |
| | 17 | 317.28 | 317.28 |
| | 18 | 354.51 | 354.51 |
| | 19 | 440.31 | 302.31 |
| | 20 | 218.54 | 157.54 |
| | 21 | 194.25 | 68.25 |
| | 22 | 360.99 | 170.49 |
| | 23 | 232.29 | 103.29 |
| | 24 | 280.45 | 221.45 |
| Dimbuli RFPanta PF | | 566.28 | 47.00 |
| | | 21.45 | 21.50 |
| Latua | 1 | 370.30 | 180.00 |

| | | | |
|--|----|--------|--------|
| | 2 | 249.29 | 123.00 |
| | 3 | 250.91 | 160.00 |
| | 4 | 385.27 | 180.00 |
| | 5 | 294.21 | 130.00 |
| | 6 | 317.28 | 160.00 |
| | 7 | 353.30 | 160.00 |
| | 8 | 324.56 | 160.00 |
| | 9 | 347.23 | 80.00 |
| | 11 | 341.56 | 80.00 |
| | 12 | 334.28 | 160.00 |
| | 13 | 419.26 | 90.00 |
| | 14 | 658.03 | 400.00 |
| | 15 | 338.32 | 190.00 |
| | 16 | 339.54 | 253.00 |
| | 17 | 195.87 | 60.00 |
| | 18 | 562.93 | 274.00 |
| | 19 | 323.76 | 153.00 |

| | | | |
|--|------|--------|--------|
| | 20 | 375.56 | 223.00 |
| | 21 | 201.94 | 162.00 |
| | 22 | 297.86 | 150.00 |
| | 23 | 291.38 | 60.00 |
| | - 24 | 431.81 | 360.00 |

| | | | |
|--|----|--------|--------|
| | 25 | 196.68 | 130.00 |
| | 27 | 342.78 | 140.00 |
| | 28 | 315.26 | 141.64 |
| | 29 | 455.69 | 369.00 |
| | 30 | 390.13 | 290.00 |
| | 31 | 411.98 | 208.00 |
| | 32 | 443.55 | 294.00 |
| | 33 | 458.92 | 358.00 |
| | 34 | 203.97 | 170.00 |
| | 35 | 369.89 | 242.00 |
| | 36 | 256.58 | 130.00 |
| | 37 | 305.14 | 120.00 |
| | 38 | 189.40 | 96.40 |
| | 39 | 350.06 | 160.00 |
| | 40 | 295.02 | 141.00 |
| | 41 | 137.19 | 117.00 |
| | 42 | 99.55 | 59.55 |
| | 43 | 332.25 | 160.00 |
| | 44 | 416.02 | 210.00 |
| | 45 | 225.41 | 225.41 |
| | 46 | 282.48 | 80.00 |
| | 47 | 282.48 | 140.00 |
| | 48 | 459.73 | 228.73 |

| | | | |
|---------|------|--------|--------|
| | 49 | 388.51 | 190.00 |
| | 50 | 233.10 | 130.00 |
| | 51 | 162.28 | 42.28 |
| | 52 | 149.33 | 42.00 |
| SANTARA | 1 | 268.72 | 80.00 |
| | 3 | 391.34 | 80.34 |
| | 4 | 356.54 | 116.54 |
| | 5 | 277.22 | 157.22 |
| | 7 | 337.92 | 200.00 |
| | 9 | 405.10 | 40.00 |
| | 11 | 390.13 | 110.13 |
| | 12 | 386.08 | 136.08 |
| | 13 | 524.89 | 233.89 |
| | 14 | 224.20 | 24.20 |
| | 15 | 296.64 | 116.64 |
| | 16 | 353.30 | 63.30 |
| | - 17 | 219.75 | 159.75 |
| | 18 | 460.14 | 283.30 |
| | 19 | 274.79 | 184.79 |
| | 20 | 343.99 | 220.00 |
| | 21 | 243.22 | 100.22 |
| | 22 | 411.57 | 111.57 |
| | 23 | 353.70 | 103.70 |

| | | | |
|--------------|-----|--------|-----------------|
| | 24 | 466.61 | 300.61 |
| | 25 | 236.75 | 113.22 |
| | 26 | 344.39 | 200.00 |
| | 27 | 334.28 | 239.28 |
| | 28 | 528.53 | 328.53 |
| | .29 | 292.59 | 172.59 |
| | 31. | 249.29 | 129.29 |
| | 32 | 334.28 | 204.28 |
| | 33 | 395.39 | 300.39 |
| | 34 | 190.21 | 100.21 |
| | 35 | 418.45 | 193.45 |
| | 38 | 335.90 | 60.90 |
| | 39 | 380.41 | 115.41 |
| | 40 | 319.30 | 99.30 |
| | 41 | 382.84 | 62.84 |
| | 42 | 496.16 | 171.16 |
| | 43 | 292.19 | 222.19 |
| | 44 | 303.93 | 163.93 |
| | 45 | 191.02 | 112.00 |
| | 46 | 392.55 | 272.55 |
| Total | | | 26264.15 |

Stock Mapping: - The stock mapping is done on 4=1 mile maps.They are enclosed in stock map files.

Exploitable Diameter :- The exploitable diameter of different species are fixed as follows with a condition that their exploitation will depend only in Silvicultural availability.The exploitable dia meter of sal is prescribed to be 16” (40.64 cm) for all the felling series. According to All India Yield Table for sal the age of 16 “diameter sal will be more than 120 years in site quality III,IV and V sal trees attain maturity by 120 years and there after its tendency is to put on negative increment.Curves of Age-Mean annual increment,Current annual increment and Age-Diameter and Diameter-MAI are plotted for various site qualities of this working circle viz.,II,III,IV.Which clearly show sharply decreasing MAI and CAI above 16”(40.64Cm.) diameter. Hence ,silviculturally and financially it would be better if exploitable diameter is reduced to allow more number of mature trees to be removed . Hence, from foregoing arguements the exploitable diameter is fixed at 16 “ and trees above 16” dia and above will be marked for selection felling while when they are silviculturally available.

Analysis & Valuation of the crop: -

On the basis of two and half percent enumeration (Random stratified method) the crop valuation have been analyzed.

Growing Stock In the selection Working Circle Area of Kohan Forest Division:-

Total area of selection working circle is 26264.15 ha. Enumeration was carried out in the field applying Random Stratified Sampling method . Sample units are drawn as representative area of entire crop as far as possible in practical approach with unbiased manner. Enumeration was carried out in all four felling series, namely - Ambia, Leda, Santara, and Latua F.S. of this division. Due to scarcity of time and fund,enumeration is limited to less than three percent only ,Trees of class (I) group i.e. trees of exploitable diameter & above are Enumerated along class (II) trees i.e., trees of dia.8”-12” and 12”-16”. 9 work was done for all the other major species as Sal, Bija, Asan, Mahua, Gamhar, Karam, Semal, Dhaura etc.

After enumeration the number of trees of different spp. and of different girth classes were calculated for the entire area of each compartment on the basis of simple ratio & proportion method.

The abstract of Growing stock in terms of No. of trees is given below.

| Range | F.S. | Area Under SWC | Sal | Other | Total |
|--------------|--------------|-----------------------|------------|--------------|---------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| KOLHAN | AMBIA | 5861 | 16083 | 8655 | 24738 |
| | LEDA | 5756 | 35625 | 14949 | 50574 |
| TOTAL | 11617 | 51709 | 23604 | 75312 | |
| - NTARA | LATUA | 8563 | 22788 | 9093 | 31881 |
| | SANTARA | 6084 | 8130 | 16899 | 25029 |
| | TOTAL | 14647 | 30918 | 25992 | 56910 |
| Total | | | | | 132222 |

The details of No. of trees enumerated for different girth classes & different species in the field and calculated for the entire forest area (for selection working circle only) in abstract form is appended at the end of the chapter.

Calculation for No. of trees are based on sample ratio & proportion method for (class I group tree) i.e. the trees of exploitable diameter class for rent major species in different felling series.

Rotation: - Since the yield has been fixed by the percentage removal of n trees annually existing at the time of marking, the calculation of rotation assume a theoretical interest

The average quality of the crop in this division is quality III, IV, it follows the growth curve of site quality IV of all India yield table, according to which an average crop diameter of 40.64 cm. (16") at which the exploitable diameter of sal has been fixed, will require an expected age of 120 years.

Felling Cycle: - A felling cycle of 10 years as in previous working plan has been prescribed.

Selection cum Improvement fellings. The main object is to exploit the L_r trees in time to prevent them from deterioration. The removal of such a tree is however to be done in such way that will **benefit the crop that is left** standing. This will consist of removal in a certain proportion of the exploitable trees that are silviculturally **available and at time maintaining and improving the** soil cover, tending the younger age gradation and ameliorating the soil condition so as to induce recruitment of sal and other species of economic importance. Following the

selection felling, improvement felling shall be carried out along with subsidiary silvicultural operations to induce young recruits to put on better growth, so as to tend the younger age gradation to form the better quality future crop. It is proposed to carry out silvicultural operation immediately in the area where selection felling has been carried out.

Briefly, in selection felling every tree of above exploitable diameter subject to the prescribed percentage limitation shall be removed unless there is definite Silvicultural reason for not providing it.

Exploitable Diameter for Other Important Spp.:- The exploitable diameter of different species are fixed as follows with a condition that their exploitation will depend only in Silvicultural availability. The exploitable diameter of sal is prescribed to be 16” (40.64 cm) for all the felling series. The exploitable diameter for sal s fixed at 16” and trees above 16” dia and above will be marked for selection felling while when they are silviculturally available.

| Spp. | Diameter |
|---------------|-----------------|
| Sal | 40.64 cm (16”) |
| Bija | 45.72 cm (18”) |
| Gamhar | 50.80 cm (20”) |
| Karam | 50.80 cm (20”) |
| Asan | 45.72 cm. (18”) |
| Dhaura | 40.64 cm (24”) |
| Semal | 61.00 cm. (24”) |
| Kadam | 61.00 cm (24”) |
| Other species | 50.80 cm (20”) |

Calculation of growing stock: - 2.5 % enumeration (Random stratified was carried out for the whole selection working circle of this division in four felling series.

Abstract: - Total No, of tress available above exploitable diameter. In election working circle area (On the basis of sample enumeration of all the trees f exploitable diameter and above).Abstract I s g iven g iven below. Abstract of number of trees standing on this working circle area with exploitable dia meter above is also given below.

Range-wise and felling series—wise abstract of no. of trees

year-wise no. of trees

| Range | F.S. | Area Under SWC | Sal | Other | Total |
|--------------|-------------|-----------------------|------------|--------------|---------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| KOLHAN | AMBIA | 5861 | 16083 | 8655 | 24738 |
| | LEDA | 5756 | 35625 | 14949 | 50574 |
| | TOTAL | 11617 | 51709 | 23604 | 75312 |
| SANTARA | LATUA | 8563 | 22788 | 9093 | 31881 |
| | SANTARA | 6084 | 8130 | 16899 | 25029 |
| | TOTAL | 14647 | 30918 | 25992 | 56910 |
| TOTAL | | | | | 132222 |

Felling year-wise no. of trees.

| Felling Year | Total nos. Sal Trees Available In Felling Year. | Total nos. Other Trees Available In Felling Year | Total nos. Sal Trees Available In Felling Year |
|---------------------|--------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------|
| 1 | 2 | 3 | 4 |
| 2003-2004 | 8585 | 5150 | 13735 |
| 2004-2005 | 8222 | 5061 | 13283 |

| | | | |
|-----------|------|------|-------|
| 2005-2006 | 7760 | 4736 | 12495 |
| 2006-2007 | 8453 | 5047 | 13500 |
| 2007-2008 | 8299 | 5019 | 13319 |
| 2008-2009 | 8433 | 4957 | 13390 |
| 2009-2010 | 8589 | 5080 | 13668 |
| 2010-2011 | 8153 | 4796 | 12950 |
| 2011-2012 | 8088 | 5196 | 13284 |
| 2012-2013 | 8044 | 4555 | 12598 |

No.of trees annually available for extraction

| Felling Year | Total nos. Sal Trees Available for extraction In Felling Year. | Total nos.Other Trees Available for extraction In Felling Year | Total nos. Sal Trees Available for extraction In Felling Year |
|---------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 | 2 | 3 | 4 |
| 2003-2004 | 2060 | 5494 | |
| 2004-2005 | 3289 | 2024 | 5313 |
| 2005-2006 | 3104 | 1894 | 4998 |
| 2006-2007 | 3381 | 2019 | 5400 |
| 2007-2008 | 3320 | 2008 | 5327 |
| 2008-2009 | 3373 | 1983 | 5356 |

| | | | |
|-----------|------|------|------|
| 2009-2010 | 3435 | 2032 | 5467 |
| 2010-2011 | 3261 | 1919 | 5180 |
| 2011-2012 | 3235 | 2078 | 5314 |
| 2012-2013 | 3217 | 1822 | 5039 |

Range-wise abstract of no.of trees annually available for extraction

| Range | Block | Total Area Under SWC | Sal | Other | Total |
|--------------|--------------|-----------------------------|------------|--------------|--------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| KOLHAN | AMBIA | 5861 | 6433 | 3462 | 9895 |
| | LEDA | 5756 | 14250 | 5980 | 20230 |
| | TOTAL | 11617 | 20684 | 9442 | 30125 |
| SANTARA | LATUA | 8563 | 9115 | 3637 | 12752 |
| | SANTARA | 6084 | 3252 | 6760 | 10012 |
| | TOTAL | 14647 | 12364 | 10397 | 22761 |
| TOTAL | | | | 52886 | |

Note- Other important spp. Includes the enumeration of Asan, Dhaura, amun, Mahua, Karam, Bija, semal, kadam and other miscellaneous spp.

This chart clearly shows that a total 1, 32,200 trees of above exploitable girth class are standing in selection working circle area whereas 52866 trees are available for extraction..

Regulation of yield: - The yield is regulated by area. In the given area of the annual coupe only the prescribed percentage of selection trees will be marked and not all the trees. Though the yield is fixed by volume of the growing stock the selection felling is limited to annual coupes only.

The percentage to be marked in different felling series is based on the Smythies Safeguarding formula. The yield of forest produce from annual coupes during felling cycle will be regulated by area. Smythies Safeguarding Formula will be adopted to determine the percentage of selection trees that will be felled during felling cycle.

As exploitable diameter has been fixed as 40 cm . The diameter class 32.5 cm —40 cm will be taken as class — II and diameter class of 40.46 cm and above will be treated as class — I.

Abstract of enumeration of forests of selection working circle are reproduced below:-

| Block | Area of Enumeration (In Hectare). | Class—I Trees. | Class—II Trees. | Yield Regulation (After Calculation). |
|---------|-----------------------------------|----------------|-----------------|---------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Latua | 307.00 | 817 | 1320 | 40% |
| Ambia | 86.00 | 235 | 403 | 40% |
| Leda | 196.00 | 1213 | 1555 | 40% |
| Santara | 342.00 | 457 | 1028 | 40% |

Felling cycle = **10** Years
 From age — diameter relation it has been observed that for a tree of diameter class — II takes 30 years to reach diameter class I. Hence will be taken as 30 years.

Now the number of trees of diameter class II expected to reach diameter class I during felling cycle will be given by Smythies Formula as below: $X = \frac{F}{T(ii - Z\% \text{ of II})}$

Mortality rate Z has been observed to be 30 % as taken from preceding Working Plan, which agrees fairly with field condition existing right now

$\frac{10}{30} \times 0.7 \times \text{class II trees.}$

30

The percentage of selection trees required to be felled will be determined - follows.

$$Y = \left[\frac{X}{1+X} \right] \times 100 + A = 32\% + A$$

Thus rounding off above figure by adjusting A we find that 40 % of selection trees which are silviculturally harvestable can be prescribed to be marked for felling during felling cycle .Similarly yield percentage is calculated for all the other felling series, which comes to 40% after adjusting the factor A.The yeild from annual coupes may be different depending on soundness of trees and other factors.

Felling Plan: - The sequence of felling, together with the area of annual coupes of the sal selection working circle is prescribed as follows: -

FELLING PLAN

| YEAR | NAME OF FELLING SERIES | COMPARTMENT NOS. | AREA IN HA. | PART | TOTAL AREA IN HA. | AREA OF ANNUAL COUPE |
|-----------|------------------------|------------------|-------------|------|-------------------|----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2003—2004 | LATUA | 1 | 180.00 | | | |
| | LATUA | 2 | 123.00 | | | . |
| | LATUA | 3 | 160.00 | | | |
| | LATUA | 4 | 180.00 | | | |
| | LATUA | 5 | 130.00 | | | |
| | LATUA | 6 | 80.00 | (P) | 853.00 | 0 |
| | SANTARA | 1 | 80.00 | | | |
| | SANTARA | 3 | 80.34 | | | |

| | | | | | | |
|------------|------------|----|--------|-----|--------|---------|
| | SANTARA | 4 | 116.54 | | | |
| | SANTARA | 5 | 157.22 | | | |
| | SANTARA | 7 | 200.00 | | 634.10 | 0 |
| | AMBIA | 1 | 309.58 | | | |
| | PANTA P.F. | | 21.50 | | | |
| | AMBIA | 2 | 182.36 | | | |
| | AMBIA | 3 | 85.00 | (P) | 578.44 | 0 |
| | LEDA | 1 | 108.87 | | | |
| | LEDA | 2 | 348.13 | | | |
| | LEDA | 3 | 170.00 | (P) | 627.00 | 2692.54 |
| 2004--2005 | LATUA | 6 | 80.00 | (B) | | |
| | LATUA | 7 | 160.00 | | | |
| | LATUA | 8 | 160.00 | | | |
| | LATUA | 9 | 80.00 | | | |
| | LATUA | 11 | 80.00 | | | |
| | LATUA | 12 | 160.00 | | . | |
| | LATUA | 13 | 90.00 | | | |
| | LATUA | 14 | 100.00 | (P) | 910.00 | 0 |
| | SANTARA | 9 | 40.00 | | | |
| | SANTARA | 11 | 11 013 | | | |

| | | | | | | |
|--|---------|----|--------|--|--------|---|
| | SANTARA | 12 | 136.08 | | | |
| | SANTARA | 13 | 233.89 | | | |
| | SANTARA | 14 | 24.20 | | | |
| | SANTARA | 15 | 116.64 | | 660.94 | 0 |
| | AMBIA | 3 | 80.54 | | | |

| | | | | | | |
|------------|---------------------------|--------------|---------------------------|----------------|--------|--------|
| | | | | | | |
| | AMBIA | 4 | 315.87 | | | |
| | AMBIA | 5 | 205.00 | (P) | 601.41 | 0 |
| | LEDA | 3 | 100.80 | (B) | | |
| | LEDA | 4 | 179.62 | | | |
| | LEDA | 5 | 247.43 | | 527.85 | 2700.2 |
| 2005--2006 | LATUA LATUA | 14 15 | 300.00 190.00 | (B) | | |
| | LATUA | 16 | 253.00 | | | |
| | LATUA | 17 | 60.00 | | 803.00 | 0 |
| | SANTARA | 16 | 63.30 | | | |
| | SANTARA | 17 | 159.75 | | | |
| | SANTARA | 18 | 283.30 | | | |
| | SANTARA AMBIA AMBIA | 19 5 6 | 90.00 182.29 347.23 | (P) (B) | 596.35 | 0 |

| | | | | | | |
|------------|--------------------|----------|-----------------|--------|---------|---------|
| | AMBIA | 7 | 90.00 | (P) | 619.52 | 0 |
| | LEDA | 7 | 221.76 | | | |
| | LEDA | 8 | 283.30 | | 505.06 | 2523.93 |
| | | | | | | |
| 2006--2007 | LATUA | 18 | 274.00 | | | |
| | LATUA | 19 | 153.00 | | | |
| | LATUA | 20 | 223.00 | | | |
| | LATUA | 21 | 162.00 | | | |
| | LATUA | 22 | 150.00 | | 962.00 | 0 |
| | SANTARA SANTARA | 19 20 | 94.79 220.00 | (B) | | |
| | SANTARA | 21 | 100.22 | . | | |
| | SANTARA | 22 | 111.57 | | | |
| | SANTARA | 23 | 103.70 | 630.28 | | 0 |
| | AMBIA | 7 | 125.96 | (B) | | |
| | AMBIA | 8 | 161.94 | | | |
| | AMBIA | 9 | 190.00 | (P) | 477.90 | 0 |
| | LEDA | 9 | 204.17 | | | |
| | LEDA | 10 | 204.50 | | | |
| | LEDA | 11 | 195.53 | 604.20 | 2674.38 | |

| | | | | | | |
|-----------|-----------------|----|--------|-----|--------|---|
| 2007-2008 | LATUA | 23 | 60.00 | | | |
| | LATUA | 24 | 360.00 | | | |
| | LATUA | 25 | 130.00 | | | |
| | LATUA | 27 | 140.00 | | 690.00 | 0 |
| | SANTARA | 24 | 300.61 | | | |
| | SANTARA | 25 | 113.22 | | | |
| | SANTARA | 26 | 200.00 | | 613.83 | 0 |
| | AMBIA | 9 | 101.72 | (B) | | |
| | AMBIA | 10 | 247.91 | | | |
| | AMBIA | 11 | 260.00 | (P) | | |
| | DIMBULI R.F. | | 47.00 | | 656.63 | |
| | LEDA | 12 | 101.00 | | | |
| | LEDA | 13 | 439.65 | | | |
| | LEDA | 14 | 80.00 | (P) | 620.65 | |
| 2008-2009 | LATUA | 28 | 141.64 | | | |
| | LATUA | 29 | 369.00 | | | |
| | LATUA | 30 | 290.00 | | | |
| | LATUA | 31 | 120.00 | (P) | 920.64 | 0 |
| | SANTARA | 27 | 239.28 | | | |
| | SANTARA | 28 | 328.53 | | 567.81 | 0 |

| | | | | | | |
|-----------|---------|----|--------|-----|--------|---------|
| | AMBIA | 11 | 102.61 | (B) | | |
| | AMBIA | 12 | 153.10 | | | |
| | AMBIA | 13 | 299.23 | | | |
| | AMBIA | 14 | 90.00 | (P) | 644.94 | 0 |
| | LEDA | 14 | 88.48 | (B) | | |
| | LEDA | 15 | 191.20 | | | |
| | LEDA | 16 | 208.22 | | | |
| | LEDA | 17 | 70.32 | | 558.22 | 2691.61 |
| 2009-2010 | LATUA | 31 | 88.00 | (B) | | |
| | LATUA | 32 | 294.00 | | | |
| | LATUA | 33 | 358.00 | | | |
| | LATUA | 34 | 170.00 | | 910.00 | 0 |
| | SANTARA | 29 | 172.59 | | | |
| | SANTARA | 31 | 129.29 | | | |
| | SANTARA | 32 | 204.28 | | | |
| | SANTARA | 33 | 108.00 | (P) | 614.16 | 0 |
| | AMBIA | 14 | 92.00 | (B) | | |
| | AMBIA | 15 | 262.97 | | | |
| | AMBIA | 16 | 150.00 | (P) | 504.97 | 0 |
| | LEDA | 18 | 200.00 | | | |

| | | | | | | |
|-----------|---------|----|--------|-----|--------|---------|
| | LEDA | 20 | 287.75 | | | |
| | LEDA | 21 | 152.00 | | 639.94 | 2669.70 |
| 2010-2011 | LATUA | 35 | 242.00 | | | |
| | LATUA | 36 | 130.00 | | | |
| | LATUA | 37 | 120.00 | | | |
| | LATUA | 38 | 96.40 | | | |
| | LATUA | 39 | 160.00 | | | |
| | LATUA | 40 | 141.00 | | 889.40 | 0 |
| | SANTARA | 33 | 192.39 | (B) | | |
| | SANTARA | 34 | 100.21 | | | |
| | SANTARA | 35 | 193.45 | | | |
| | SANTARA | 38 | 60.90 | | 546.95 | 0 |
| | AMBIA | 16 | 82.00 | (B) | | |
| | AMBIA | 17 | 317.28 | | | |
| | AMBIA | 18 | 250.00 | (P) | 649.28 | 0 |
| | LEDA | 22 | 201.00 | | | |
| | LEDA | 23 | 243.00 | | | |
| | LEDA | 24 | 85.00 | (P) | 592.00 | 2614.63 |

| | | | | | | |
|------------|---------|----|--------|-----|--------|---------|
| 2011--2012 | LATUA | 41 | 117.00 | | | |
| | LATUA | 42 | 59.55 | | | |
| | LATUA | 43 | 160.00 | | | |
| | LATUA | 44 | 210.00 | | | |
| | LATUA | 45 | 225.41 | | | |
| | LATUA | 46 | 80.00 | | 851.96 | 0 |
| | SANTARA | 39 | 115.41 | | | |
| | SANTARA | 40 | 99.30 | | | |
| | SANTARA | 41 | 62.8d | | | |
| | SANTARA | 42 | 171.16 | | | |
| | SANTARA | 43 | 222.19 | | | |
| | SANTARA | 44 | 80.00 | (P) | 750.90 | 0 |
| | AMBIA | 18 | 104.51 | (B) | | |
| | AMBIA | 19 | 302.31 | | | |
| | AMBIA | 20 | 157.54 | | 564.36 | 0 |
| | LEDA | 24 | 188.89 | (B) | | |
| | LEDA | 25 | 90.10 | | | |
| | LEDA | 26 | 148.61 | | | |
| | LEDA | 27 | 100.60 | | 528.20 | 2695.42 |

| | | | | | | |
|------------|-------------|-----------|-----------------|-----|-----------------|-----------------|
| 2012--2013 | LATUA | 47 | 140.00 | | | |
| | LATUA | 48 | 228.73 | | | |
| | LATUA | 49 | 190.00 | | | |
| | LATUA | 50 | 130.00 | | | |
| | LATUA | 51 | 42.28 | | | |
| | LATUA | 52 | 42.00 | | 773.01 | 0 |
| | SANTARA | 44 | 83.93 | (B) | | |
| | SANTARA | 45 | 112.00 | | | |
| | SANTARA | 46 | 272.55 | | 468.48 | 0 |
| | AMBIA | 21 | 68.25 | | | |
| | AMBIA | 22 | 110.49 | | | |
| | AMBIA | 23 | 103.29 | | | |
| | AMBIA | 24 | 221.45 | | 563.48 | 0 |
| | LEDA | 28 | 179.37 | | | |
| | LEDA | 29 | 222.92 | | | |
| | LEDA | 30 | 214.00 | | 616.29 | 2421.26 |
| | | | 26264.15 | | 26264.15 | 26264.15 |

Estimation of Timber quantity and Revenue Unit value: - For fixing volume of different species for different diameter classes prescription of preceding plan is taken into account, as its results are quite satisfactory. Analysis for volume established according to A.Haidary's working plan were based on the out-turn figures of a total of 21057 sound trees in each diameter class . On analysis the following values were fixed for the purpose of calculation of commercial quantity of timber which has worked quite satisfactorily and agrees closely with All India Yield Tables.

| Dia. Class in Inch | Girth class In cm. | Commercial out turn in M3 |
|---------------------------|---------------------------|----------------------------------|
| 8''-12'' | 60-90 | 0 15 M3 |
| 12''-16'' | 91-122 | 0.45307 M3 |
| 16''-20 | 123-152 | 0.90614 M3 |
| 20''-24 | 153-184 | 1.35921 M3 |
| 24'-28 | 184-214 | 1.81228M3 |
| 28''-and above | 214&above | 2.2653M3 |

In selection working circle felling of trees of dia class 16'' and above is only prescribed so a minimum out turn of timber per tree may be taken as 0.90614 M3 /tree

On the basis of the timber rates determined by the C.C.F. cum Director, State Trading Bihar vide his Office order No. 96 dated 21st September, 2001, the lowest rate for logs of mid girth class 120 cm to 150 cm is Rs. 8082/M3 and for mid girth class 90 to 120 is Rs. 6889/M3. So taking the lower range Rs. 6889/M3, the year wise estimated value and quantity of timber and revenue estimates are given below.

Apart from this some more timber and Revenue may also come through the removal of dead, dying, diseased and illicitly felled trees in conversion, coppice and also from the removal of thinning polls from the thinning coupes whose value is not included in the revenue estimates. The figures may vary depending on the accuracy of sampling, sampling error, illicit felling etc.

ESTIMATE OF ANNUAL REVENUE

| FELLING YEAR | AREA OF ANNUAL COUPE IN HECTARE | EXPECTED NOS. OF TREES AVAILABLE FOR EXTRACTION | AMOUNT OF TIMBER @ 0.90614 CUM PER TREE | VALUE OF TIMBER@ RS.6889 PER CUBIC MTS. | ESTIMATED REVENUE IN RS. LAKHS |
|---------------------|----------------------------------------|--------------------------------------------------------|------------------------------------------------|------------------------------------------------|---------------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 2003-04 | 2692.5 | 5494 | 4978.237 | 34,295,075 | 342.951 |
| 2004-05 | 2700.2 | 5313 | 4814.585 | 33,167,673 | 331.677 |
| 2005-06 | 2523.9 | 4998 | 4529.011 | 31,200,355 | 312.004 |
| 2006-07 | 2674.4 | 5400 | 4893.212 | 33,709,335 | 337.093 |
| 2007-08 | 2581.1 | 5327 | 4827.450 | 33,256,300 | 332.563 |
| 2008-09 | 2691.6 | 5356 | 4853.379 | 33,434,931 | 334.349 |
| 2009-10 | 2669.8 | 5467 | 4954.228 | 34,129,676 | 341.297 |
| 2010-11 | 2614.6 | 5180 | 4693.707 | 32,334,948 | 323.349 |
| 2011-12 | 2695.4 | 5314 | 4814.837 | 33,169,416 | 331.694 |
| 2012-13 | 2421.3 | 5039 | 4566.335 | 31,457,481 | 314.575 |

Expenditure for extraction, transportation, marketing and allied expenses are taken as 25 % of annual Revenue Projections Annual outlay of expenditure is given here under.

ANTICIPATED ANNUAL EXPENDITURE

| FELLING YEAR | ANTICIPATED EXPENDITURE PER YEAR.(IN RS. LAKH) |
|---------------------|----------------------------------------------------------------|
| 1 | 2 |
| 2003—2004 | 85.738 |
| 2004—2005 | 82.919 |
| 2005—2006 | 78.001 |
| 2006—2007 | 84.273 |
| 2007—2008 | 83.141 |
| 2008—2009 | 83.587 |
| 2009—2010 | 85.324 |
| 2010—2011 | 80.837 |
| 2011—2012 | 82.924 |
| 2012—2013 | 78.644 |

Silvicultural availability: - The exploitable tree will be said to be silviculturally available when

- (a) its removal does not cause any lasting break in the canopy.
- (b) There are sufficient number of established seedlings saplings or poles of the sal or other superior species, to take its place after removal 'or' 115
- (c) It forms part of a congested crop and its removal may be justified on above principles. Silvicultural availability will have overriding priority over every other consideration.

Marking Rules: - The following principle shall govern the marking in each annual coupe subject to their Silvicultural availability.

- (1) Marking of trees in different felling series will be done according to the percentage prescribed in that felling series.

- (2) Trees other than Sal, like Bija, Gamhar, Asan, Karam, Bhurkund, Sins, Jamun, Sidha, Panjam and Dhaura shall be marked according to their exploitable diameter fixed as shown in earlier paragraphs.
- (3) All dry, hollow, dead and diseased trees shall be marked.
- (4) Mature and over mature trees shall always be marked first in preference to those trees which, are over 16" diameter (40.64 cm) but still young and growing.
- (5) Trees standing over young growth shall be marked before those which have no such crop around them.
- (6) Preference for retention shall be given to more valuable species, but on the whole a well grown sound stem of inferior but marketable species should be favored over superior species.
- (7) All climbers shall be cut.

Method of executing the feelings :- Felling will be controlled numerically in accordance with the yield fixed. The main object is to utilize the most mature which are silviculturally available so that only the vigorous trees are retained for putting up increment. Mature trees always get preference at the time of marking. It must however be emphasized that silvicultural availability will get over-riding priority over any other considerations. Accordingly it follows that only those trees are marked which are undoubtedly silviculturally available.

Work of Improvement:-

- (A) **Subsidiary silvicultural operations:** In the year following the main felling the following silvicultural operations shall be carried out as prescribed hereunder: -
- (i) cutting back of damaged stems of valuable spp.
 - (ii) Girdling or felling of only those marked trees, left unfelled by some reason but whose removal is silviculturally desirable.
 - (iii) Cutting back of badly grown saplings or poles of Sal, Bija, Gamhar, Panjam and other superior spp.
 - (iv) Group of sal saplings or poles should be properly thinned even though the produce there of may not be saleable.
 - (v) Climber cutting.
 - (vi) In open area or blank, where regeneration is to be induced, cleaning and climber cutting shall be carried out year after year till the need may exist.

(B) SOIL AND MOISTURE CONSERVATION WORKS

Cause of soil erosion: - Erosion is mostly due to rain water. The gradual depletion of the forest cover, depleted the organic matter content in the soil. The organic matter (humus) improves the aeration of the soil increases its capacity to conserve moisture and deliver it readily to the plant roots. It improves these soil conditions favouring root penetration and the growth of beneficial microorganisms and larger organisms. It aids in processing the inorganic constituents of the soil, changing unavailable material into the available form as plant nutrients. It aids in conserving the easily soluble constituents of the soil as plant nutrients. Under a good cover of forests there is almost insignificant rate of soil loss and the runoff rate is very low.

Erosion speeds up as the more absorptive humus charged top soil is washed off to expose sublayers, which generally are of lower absorptive capacity. The continuous biotic pressure has resulted in the loss of topsoil as well as subsoil exposing the parent rocks at places. In these areas the rains are quick and heavy in the monsoon period. Due to the stripping off the absorptive top soil the loss absorptive day is exposed and 90 % of the rainfalls is lost as runoff thereby aggravating the problem of gully erosion.

Methods of Soil Conservation: - There are two types of erosion met with in this division Sheet erosion and Gully erosion.

Prevention of sheet erosion: - Sheet erosion is to be prevented by contour trenching. Contour is an imaginary line on the surface of the earth Connecting points on the same elevation. In the sloppy hills several contour trenches are to be dug up to prevent soil loss as well as helping in retention of water.

The dug out soil is kept on the lowerside of the trench. On these dugout soil babul and ber seeds are to be sown just before monsoon. The contour trenches prove very effective for checking removal of subsoil. More so the trenches also retain water and help in percolation in the hard and compact soil. The furrows catch and hold run-off water store it in the soil, thus reducing run-off and erosion and bringing about a more uniform distribution of rainfall moisture. This will also help grow in the cut back stumps or saplings.

Prevention of gully erosion: - Innumerable number of gullies are present in all sloppy hills and adjoining plains almost throughout all the felling series. More so in Kolhan forests where the land is more undulating with more hills and hillocks occurring frequently. Simultaneous to the prevention of sheet erosion gully erosion must be tackled properly in order to check further erosion. Gullies may be controlled by terracing on the gully heads. However according to the terrain it is not a practical solution. It becomes very cumbersome and needs very well planning which may be difficult to implement in the field.

Hence it is prescribed that gullies are to be stabilized with structures. Again structures may be permanent or temporarily. Structures are used in gully control work either to facilitate the establishment of vegetation or to provide protection for those critical sections which cannot be adequately protected by other measures. When our motto is only soil conservation and improvement of vegetation, temporary structures are preferred. When aim is to provide for small irrigation or making it a waterhole for the animals then permanent (brick cement mortar) structures are required . The temporary checkdams cost less and is cost effective for 5 to 6 years. It may last more even. Temporary checkdams are made of brush, wire poles or loose rock. Temporary checkdams constructed across the bed of a gully have two uses:-

- (i) to collect enough soil and water to ensure eventual growth of protective vegetation.
- (ii) to check channel erosion until sufficient stabilising vegetation can be established at that critical point.

In the previous plan under soil conservation work contour trenches have been dug some compartments. This has improved the regeneration status in these hilly areas. So it is perposec to continue this schern uncer th plan. It proposed to treat about 5000 ha. Under soil conservation schemes in selection working circle areas. Its effects may be analysed at the time of revision of the working plan. Digging of contour trenches are prescribed in the areas which are in higher slopes having less regeneration due to desiccation. These contour trenches will conserve the soil erosion also. The desired specification of contour trenches may be given as: -

Soon after the receipt of approved treatment soil and moisture conservation works will also be taken along with marking will be completed before onset of monsoon in the next year. These working include tow main operations namely, contour trenching and nala bunding dams. Emphasis would be on rainwater conservation.

Contour trenches will be dug in areas above 250 slope. Trenches will be dug in accessible areas only. Size of trenches will be 10 m. x 45 cm. x 45cm. Soil from trenches will be heaped on the lower side of the trenches. The contour interval between consecutive trenches will be 3 m. Spacing along the slopes would be 8 m. Nala bunding /check dams will be constructed to reduce run off and to arrest the silt. Nala bunding will start from the top of nala downwards. The desired specification of contour trenches may be given as under: -

Size -1 Om X 45 cm X 45 cm.

Spacing along the contour - 3m.

Along the slope - 8 m.

Piling of soil so dug will be placed down side of the contour trenches and its proper dressing will be done. Seeds may be dibbled on the plied up mounds

(A) **Fire Protection and Grazing:** - The entire working circle will be protected from fire and grazing by adopting of measures as dealt in detail in the respective chapters of Kolhan Development Plan.

Other Regulations:- If during the execution of 5 years of plan period, the felling and removal of trees from the selection working circle is done as per plan, and in the mean time protection measures for the betterment of Kolhan forests from illicit felling (in the name of Jharkhand Felling) encroachment, fire- control, grazing-control, etc. are applied successfully, then only the removal of the selection trees will be continued for further 5 years of rest of the plan period.

For this a- detailed review will be carried out under the leadership of Divisional forest officer, Kolhan and review report with his opinion for further felling will be produced to working plan Officer, Southern Circle, Chaibasa. He will verify the results and consequently send his recommendation to Conservator of Forests, Working Plan & Research Circle, Ranchi. On obtaining the approval from Conservator of Forests, Working Plan & Research circle, Ranchi, the execution of felling proposal will be continued in the selection working circle as per recommendations made by Working Plan Officer, Southern Circle, Chaibasa.

If needed on the basis of review results, necessary modification may be implemented by the working plan Officer, Southern Circle, Chaibasa.

10 Year plan for soil conservation work and estimated cost for each year is given below:-

| FINANCIAL YEAR | PHYSICAL TARGET(IN HA.) | ESTIMATED COST @ 75 MANDAY @ RS. 64.61 | ESTIMATED COST (IN RS. LAKH) |
|-----------------------|---------------------------------|-----------------------------------------------|-------------------------------------|
| 1 | 2 | 3 | 4 |
| 2003—2004 | 500 | 2422875 | 24.229 |
| 2004-2005 | 500 | 2422875 | 24.229 |
| 2005-2006 | 500 | 2422875 | 24.229 |

| | | | |
|-----------|-----|---------|--------|
| 2006—2007 | 500 | 2422875 | 24.229 |
| 2007—2008 | 500 | 2422875 | 24.229 |

| | | | |
|-----------|-----|---------|--------|
| 2008—2009 | 500 | 2422875 | 24.229 |
| 2009—2010 | 500 | 2422875 | 24.229 |
| 2010—2011 | 500 | 2422875 | 24.229 |
| 2011—2012 | 500 | 2422875 | 24.229 |
| 2012—2013 | 500 | 2422875 | 24.229 |

10 Year plan for Cultural Operation in Selection working Circle and estimated cost for each year given below:

| FINANCIAL YEAR | PHYSICAL TARGET (IN HA.) | ESTIMATED COST @ 12 MANDAY @ RS. 64.61 PER MANDAYS | ESTIMATED COST (IN RS. LAKH) |
|----------------|--------------------------|----------------------------------------------------|------------------------------|
| 1 | 2 | 3 | 4 |
| 2003—2004 | --- | -- | -- |
| 2004—2005 | 2692.54 | 2087580 | 20.876 |
| 2005—2006 | 2700.2 | 2093519 | 20.935 |
| 2006—2007 | 2523.93 | 1956853 | 19.569 |
| 2007—2008 | 2674.38 | 2073500 | 20.735 |
| 2008—2009 | 2581.11 | 2001186 | 20.012 |
| 2009—2010 | 2691.61 | 2086859 | 20.869 |

| | | | |
|-----------|----------|---------|--------|
| 2010-2011 | 2669.07 | 2069383 | 20.694 |
| 2011-2012 | 2614.63 | 2027175 | 20.272 |
| 2012-2013 | 2695.42 | 2089813 | 20.898 |
| 2013-2014 | 2421.26 | 1877251 | 18.773 |
| | 26264.15 | | |

DESCRIPTION OF SAMPLE PLOT AT SANTARA -9

1. species : Shorea robusta
2. Area in hac. : 2.104
3. Situation : Compartment 9 of Santara block
4. Height above mean : About 1400 feet
5. Interval of measurement : 5 years (Interim) and 10 years (full)

Volume Calculation for Sample Plot :

| By Diameter Classes | | | Volume |
|----------------------------|--------------------|-------------------|-------------|
| Mean Diameter Class in cm. | Number of Diameter | Basal Sq. Cm. (m) | Stem Timber |
| 1 | 2 | 3 | 4 |
| 25.1 to 30.0 | 5 | 1.187 | 5.519 |
| 30.1 to 35.0 | 21 | 6.965 | 32.910 |
| 35.1 to 40.0 | 12 | 5.299 | 94.267 |
| 40.1 to 45.0 | 19 | 10.776 | 52.695 |
| 45.1 to 50.0 | 13 | 9.210 | 51.668 |
| 50.1 to 55.0 | 8 | 6.924 | 43.621 |
| 55.1 to 60.0 | 5 | 5.191 | 35.896 |
| | 83 | | 316.576 |

Area = 2.104 acres or 0.85 ha.
 0.85 ha produces = 31 6.576 m³
 Hence 1 ha.area produces = 372.442 m³
 Period of observation isfrom 1935 to 1989 = 54 years.
 Volume increment = 372.442 m³ —240.208 m³ = 132.234 m³
 Mean Annual increment = volume/ ha/year! = 2.449 m³

SAMPLE PLOT No. 14 of Koihan Division (Leda 20)

- 1. Situation Leda 20
- 2. Object Volume increment and development of good quality sal pole crop
- 3. Year of formation 1927
- 4. Age of cropat the time of formation 60 Years
- 5. No. of trees at the time of formation 110
- 6. Area of S.P. No. 0 .30 hac.

| Year of Mea. | Av. Dia In C.M. | Av. Height in mts. | Total basal Area of S.P. In m2 | Vol / ha in Cu. meter | Mean annual increment Vol/hal Year in Cu. Meter |
|--------------|-----------------|--------------------|--------------------------------|-----------------------|-------------------------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1933 | 27.12 | 28.88 | 6.8926 | 197.3334 | 2.9899 |
| 1947 | 34.39 | 31.94 | 7.4018 | 328.4640 | 4.1058 |
| 1952 | 38.07 | 32.22 | 7.6692 | 422.2970 | 4.9699 |
| 1957 | 38.65 | 31.15 | 8.2395 | 452.0250 | 5.0226 |
| 1963 | 41.09 | 31.85 | 8.5265 | 474.3450 | 5.2705 |
| 1968 | 41.48 | 32.18 | 7.8007 | 508.5888 | 5.2978 |
| 1971 | 43.38 | 32.77 | 8.0145 | 575.6495 | 5.6995 |

| | | | | | |
|------|-------|-------|--------|----------|--------|
| 1978 | 44.56 | 36.97 | 8.5265 | 632.0184 | 6.0771 |
| 1981 | 44.93 | 37.50 | 8.5791 | 649.3864 | 6.2441 |

Analysis of the yield from selection working circle areas : From the above sample plot data the yield from selection working circle areas is compared. The average removal from the annual coupes is 1.824 cum.per ha.,which is far less than mean annual increment of Kolhan forests which is 6.224 cum. /hac. I year.

STATISTICS OF GROWING STOCK

Growing stock is calculated for sal and other important species.Two and half enumeration has been done. Values are tabulated in girth classes. Volume is calculated for all the dia classes from the volume- dia relationship correlated from various sample plots and as mentioned in the preceding working plans of Singhbhum region. Total volume for each dia class for each species for the total enumerated areas is given below

ABSTRACT OF ENUMERATION DATA AND TOTAL VOLUME

| NAME OF THE F.S. | AREA ENUMERATED | NAME OF THE SPECIES | NUMBER OF TREES/TOTAL VOLUME OF DIA CLASS | | | | | | | |
|------------------|-----------------|---------------------|-------------------------------------------|--------|--------|---------|---------|---------|---------|-------|
| | | | DIA-CLASS | 60-90 | 91-121 | 122-152 | 153-183 | 184-214 | 215-Ab. | TOTAL |
| LEDA | 196 | SAL | No.of trees | 2431 | 1555 | 730 | 271 | 154 | 59 | 5199 |
| | | | Total Vol | 364.65 | 704.42 | 661.48 | 368.3 | 279.09 | 133.7 | 2512 |
| | | ASAN | No.of trees | 1059 | 419 | 204 | 37 | 15 | 7 | 1749 |

| | | | | | | | | | | |
|--|--|---------|-------------|--------|--------|--------|-------|--------|-------|-------|
| | | | Total Vol | 158.85 | 189.81 | 184.85 | 50.29 | 27.184 | 15.86 | 626.8 |
| | | DHOUR A | No.of trees | 735 | 402 | 114 | 24 | 15 | 4 | 1326 |
| | | | Total Vol | 110.25 | 182.11 | 103.3 | 32.62 | 27.184 | 9.061 | 464.5 |
| | | BIJA | No.of trees | 183 | 56 | 13 | 0 | 1 | 0 | 254 |
| | | | Total Vol | 27.45 | 25.368 | 11.78 | 0 | 1.8123 | 0 | 66.41 |
| | | KARAM | No.of trees | 76 | 55 | 25 | 10 | 7 | 7 | 183 |

| | | | | | | | | | | |
|----------|-----|---------|--------------|-------|--------|---------|---------|---------|----------|-------|
| | | | Total Vol | 11.4 | 24.915 | 22.654 | 13.59 | 12.686 | 15.86 | 101.1 |
| | | KEND | No.of trees | 83 | 58 | 13 | 5 | 3 | 0 | 163 |
| | | | Total Vol | 6.225 | 13.137 | 5.8899 | 3.398 | 2.7184 | 0 | 31.37 |
| | | GAMHA R | No. of trees | 18 | 4 | 2 | 1 | 0 | 0 | 26 |
| | | | Total Vol | 2.7 | 1.812 | 1.8123 | 1.359 | 0 | 0 | 7.683 |
| | | OTHER | No. of trees | 2124 | 859 | 257 | 83 | 44 | 23 | 3389 |
| | | | Total Vol | 159.3 | 194.56 | 116.44 | 56.41 | 39.87 | 26.05 | 592.6 |
| | | TOTAL | VOLUME | | | | | | | 4402 |
| SANTAR A | 339 | | DIA-CLASS | 60-90 | 91-121 | 122-152 | 153-183 | 184-124 | 215-ABOV | TOTAL |
| | | SAL | No.of trees | 2791 | 1023 | 313 | 59 | 36 | 19 | 445 |

| | | | | | | | | | | |
|-------|----|-------|--------------|--------|--------|---------|---------|---------|---------|-------|
| | | | Total Vol | 418.65 | 463.42 | 283.62 | 80.19 | 65.242 | 43.04 | 1354 |
| | | DH | No.of trees | 914 | 411 | 116 | 126 | 18 | 1 | 0 |
| | | | Total Vol | 137.1 | 186.18 | 105.11 | 171.3 | 32.621 | 2.265 | 634.5 |
| | | KARAM | No.of trees | 333 | 164 | 101 | 19 | 16 | 0 | 0 |
| | | | Total Vol | 49.95 | 74:292 | 91.52 | 25.82 | 28.996 | 0 | 270.6 |
| | | ASAN | No.of trees | 1239 | 340 | 50 | 11 | 8 | 1 | 0 |
| | | | TotalVol | 185.85 | 154.02 | 45.307 | 14.95 | 14.498 | 2.265 | 416.9 |
| | | KEND | No. of trees | 79 | 40 | 13 | 8 | 8 | 0 | 0 |
| | | | Total Vol | 5.925 | 9.06 | 5.8899 | 5.437 | 7.2491 | 0 | 33.56 |
| | | TOTAL | VOLUME | | | | | | | 2710 |
| AMBIA | 86 | | DIA-CLASS | 60-90 | 91-121 | 122-152 | 153-183 | 184-124 | 215-Ab. | TOTAL |
| | | SAL | No.of trees | 867 | 403 | 140 | 50 | 22 | 22 | 1513 |
| | | | total Vol | 130.05 | 182.56 | 126.86 | 67.96 | 39.87 | 49.84 | 597.1 |
| | | ASAN | No. of trees | 332 | 159 | 32 | 9 | 3 | 2 | 503 |
| | | | Total Vol | 49.8 | 72.027 | 28.996 | 12.23 | 5.4368 | 4.531 | 173 |
| | | DH | No.of trees | 166 | 99 | 32 | 10 | 2 | 6 | 316 |
| | | | Total Vol | 24.9 | 44.847 | 28.996 | 13.59 | 3.6246 | 13.59 | 129.6 |
| | | KARAM | No.of trees | 14 | 5 | 2 | 3 | 4 | 5 | 33 |
| | | | Total Vol | 2.1 | 2.265 | 1.8123 | 4.078 | 7.2491 | 11.33 | 28.83 |
| | | BIJA | No. of trees | 22 | 17 | 7 | 6 | 0 | 1 | 46 |

Total growing stock calculated for the enumerated areas are extended to total felling series area by ratio and proportion. Total growing stock is as given below.

| FELLING SERIES | VOL Per Ha. | AREA | TOTAL GROWING STOCK IN CUBIC METERS |
|----------------------------|--------------------|-----------------|--------------------------------------------|
| LEDA | 22.460 | 5756.41 | 129,290.07 |
| SANTARA | 7.993 | 6083.8 | 48,629.94 |
| AMBIA | 11.354 | 5860.93 | 66,550.00 |
| LATUA | 11.563 | 8563.01 | 99,016.01 |
| TOTAL GROWING STOCK | | 26264.15 | 343,486.02 |

Mortality rate Z has been observed to be 30 % as taken from preceding Working Plan, which agrees fairly with field condition existing right now.

$$= \frac{10}{30} \times 0.7 \times \text{class II trees.}$$

The percentage of selection trees required to be felled will be determined as follows.

$$Y = \left[\frac{X}{1+X} \right] \times 100 + A = 32\% + A$$

Thus rounding off above figure by adjusting A we find that 40 % of selection trees which are silviculturally harvestable can be prescribed to be ,marked for felling during felling cycle .Similarly yield percentage is calculated for all the other felling series,which comes to 40% after adjusting the factor A.The yield from annual coupes may be defferent depending on soundness of trees and other factors.

PART—II

CHAPTER — III

Eco-Restoration Working Circle

General Constitution : This working circle comprises of —

(a) Parts of Areas, on the valley side, which are subjected to illicit felling during Jharkhand agitation, but having copious regeneration capacity at present.

(b) Parts of Areas, on the valley side, which previously managed under Conversion Working Circle, but presently subjected to extensive illicit felling shifting cultivation or areas left behind after jhum cultivation are placed under this working circle. Adequate, even copious regeneration of natural sal is unique characteristic of Koihan forests, especially which were earlier managed under Conversion Working Circle. Even after organised illicit felling during Jharkhand agitation, such areas still consist of very high potential of developing into a good natural crop. Hence this doesn't warrant supplementing with any artificial regeneration in the form of plantation or artificial regeneration of degraded forests. Rather any other artificial treatment may not be as effective as allowing the existing natural regeneration of sal to develop on its own into good quality crop.

c) Areas of erstwhile conversion working circle, which have been subjected to irregular felling can not warrant their continuation in the previously managed system of Conversion Working Circle.

Special Objects of Management:

1. Areas, where natural regeneration, remained after illicit felling of trees is adequate are given rest, and are allowed to grow naturally into a good quality crop so as to exploit them later on.
2. This Working Circle is transition from uniform crop to Selection Working Circle. Hence proper silvicultural systems and thinning operations with regular time frame is prescribed for creating a healthy crop.
3. Young, healthy and well formed saplings shall be allowed to remain, which would form part of future crop.
4. This areas once regenerate into a good quality stock can be placed into selection working system in the next phase.

5. To make optimum and right use of the site to achieve yield maximization!

Method of Treatment:- Following prescriptions are laid down.

1. Areas under this working circle are given rest.
2. Natural regeneration of sal is allowed to develop into a good quality stock.
3. Areas are closed for extraction of timber during the period of this working plan till natural regeneration grow up into a good quality stock.
4. Fire tracing and adequate fire protection measures are to be carried out to protect the natural regeneration of sal.
5. Encroachments in these areas and encroachments close to this working circle areas to be removed on priority basis.
6. As areas are recovered from encroachment, immediately contour ploughing operations are to be carried out to boost up the regeneration potential of the area and the existing regeneration to develop good vigor.
7. As the aim of this working circle is to convert the uniform crop into selection working circle, silvicultural operations, are to be carried out in a frame work of time. These operations include climber cutting, dressing of coppice shoots, removal of unwanted weeds. After that thinning operations shall follow to achieve transition to selection working circle and also to avoid negative growth.
8. These areas are to be protected from further illicit felling or shifting cultivation. These areas are vulnerable to illicit felling for the purpose of cultivation as seen in the past. Such activities shall be dealt with by strict coercive measures.
9. Village Forest Management and Protection Committees (VFMPC) and Village Eco Development Committees (VEDC) would be constituted in these areas on priority basis to check further forest degradation.

Areas allotted to this working circle is 8920.10 hectares.

2.3.6 2.3.6 R. F. wise area statement under this working circle is given hereunder.

AREA STATEMENT OF
ECO-RESTORATION WORKING CIRCLE

| Comptt. Name | Comptt. No. | Total Area in Hect. | eco restoration |
|-------------------------|------------------------|--------------------------------|------------------------|
| 1 | 2 | 3 | 5 |
| LEDA | 1 | 229.87 | 121.00 |
| | 2 | 356.13 | 8.00 |
| | 3 | 327.80 | 57.00 |
| | 4 | 398.62 | 64.00 |
| | 5 | 329.02 | 65.00 |
| | 6 | 369.08 | 269.08 |
| | 7 | 323.76 | 62.00 |
| | 10 | 284.50 | 50.00 |
| | 11 | 235.53 | 40.00 |
| | 12 | 242.41 | 68.00 |
| | 13 | 538.65 | 30.00 |
| | 15 | 323.76 | 82.56 |
| | 16 | 398.22 | 150.00 |
| | 17 | 200.32 | 80.00 |
| | 18 | 430.19 | 60.00 |
| | 19 | 414.41 | 198.00 |

| | | | |
|-------|----|--------|--------|
| | 20 | 357.75 | 50.00 |
| | 21 | 229.46 | 77.46 |
| | 22 | 316.88 | 53.88 |
| | 23 | 267.91 | 24.91 |
| | 24 | 403.89 | 40.00 |
| | 25 | 250.10 | 40.00 |
| | 26 | 345.61 | 90.00 |
| | 27 | 120.60 | 20.00 |
| | 28 | 342.37 | 63.00 |
| | 29 | 337.92 | 40.00 |
| | 30 | 313.64 | 42.00 |
| AMBIA | I | 394.58 | 65.00 |
| | 2 | 272.36 | 20.00 |
| | 3 | 201.54 | 36.00 |
| | 4 | 333.87 | 18.00 |
| | 7 | 237.96 | 22.00 |
| | 8 | 339.94 | 100.00 |
| | 9 | 389.72 | 65.00 |
| | 10 | 267.91 | 20.00 |
| | 12 | 267.10 | 70.00 |
| | 13 | 347.23 | 38.00 |
| | 14 | 226.63 | 31.00 |

| | | | |
|--|----|--------|--------|
| | 15 | 324.97 | 62.00 |
| | 16 | 334.28 | 50.28 |
| | 19 | 440.31 | 118.00 |
| | 20 | 218.54 | 61.00 |
| | 21 | 194.25 | 60.00 |
| | 22 | 360.99 | 13.50 |
| | 23 | 232.29 | 109.00 |
| | 24 | 280.45 | 59.00 |
| | 1 | 370.30 | 70.00 |
| | 2 | 249.29 | 70.00 |
| | 3 | 250.91 | 42.00 |
| | 4 | 385.27 | 30.00 |
| | 5 | 294.21 | 113.00 |
| | 6 | 317.28 | 40.00 |
| | 7 | 353.30 | 46.00 |
| | 8 | 324.56 | 68.00 |
| | 9 | 347.23 | 124.00 |
| | 10 | 246.86 | 138.00 |
| | 11 | 341.56 | 61.00 |
| | 13 | 419.26 | 40.00 |
| | 14 | 658.03 | 140.00 |
| | 15 | 338.32 | 100.00 |

| | | | |
|--|----|--------|--------|
| | 16 | 339.54 | 86.54 |
| | 17 | 195.87 | 43.00 |
| | 18 | 562.93 | 140.00 |
| | 19 | 323.76 | 99.00 |
| | 20 | 375.56 | 124.00 |
| | 21 | 201.94 | 39.94 |
| | 22 | 297.86 | 87.00 |
| | 23 | 291.38 | 60.00 |
| | 24 | 431.81 | 71.81 |
| | 25 | 196.68 | 30.00 |
| | 26 | 182.11 | 58.00 |
| | 27 | 342.78 | 100.00 |
| | 28 | 315.26 | 99.00 |
| | 29 | 455.69 | 30.00 |
| | 30 | 390.13 | 100.13 |
| | 31 | 411.98 | 96.00 |
| | 32 | 443.55 | 91.55 |
| | 33 | 458.92 | 100.92 |
| | 34 | 203.97 | 33.97 |
| | 35 | 369.89 | 127.89 |
| | 36 | 256.58 | 30.00 |
| | 37 | 305.14 | 50.00 |

| | | | |
|--|-----|--------|--------|
| | 38 | 189.40 | 43.00 |
| | 39 | 350.06 | 40.00 |
| | 40 | 295.02 | 80.02 |
| | 41. | 137.19 | 20.19 |
| | 42 | 99.55 | 40.00 |
| | 43 | 332.25 | 80.00 |
| | 44 | 416.02 | 100.00 |
| | 46 | 282.48 | 26.00 |
| | 47 | 282.48 | 30.00 |
| | 48 | 459.73 | 110.00 |
| | 49 | 388.51 | 100.00 |
| | 50 | 233.10 | 70.00 |
| | 51 | 162.28 | 40.00 |
| | 52 | 149.33 | 20.00 |
| | 2 | 351.68 | 100.00 |
| | 3 | 391.34 | 50.00 |
| | 4 | 356.54 | 50.00 |
| | 5 | 277.22 | 30.00 |
| | 6 | 301.90 | 30.00 |
| | 7 | 337.92 | 65.00 |
| | 8 | 371.51 | 40.00 |
| | 9 | 405.10 | 60.00 |

| | | | |
|--|-----|--------|--------|
| | 10 | 277.22 | 61.00 |
| | 11 | 390.13 | 80.00 |
| | 12 | 386.08 | 50.00 |
| | 13 | 524.89 | 91.00 |
| | 15 | 296.64 | 80.00 |
| | 16 | 353.30 | 80.00 |
| | 18 | 460.14 | 76.84 |
| | 19 | 274.79 | 30.00 |
| | 20 | 343.99 | 35.00 |
| | 21. | 243.22 | 50.00 |
| | 22. | 411.57 | 100.00 |
| | 23 | 353.70 | 70.00 |
| | 24 | 466.61 | 63.61 |
| | 27 | 334.28 | 35.00 |
| | 28 | 528.53 | 60.00 |
| | 29 | 292.59 | 60.00 |
| | 31 | 249.29 | 60.00 |
| | 32 | 334.28 | 70.00 |
| | 33 | 395.39 | 55.00 |
| | 34 | 190.21 | 50.00 |
| | 35 | 418.45 | 100.00 |
| | 36 | 207.61 | 50.00 |

| | | | |
|----------------------|----|--------|----------------|
| | 37 | 262.72 | 70.00 |
| | 38 | 335.90 | 40.00 |
| | 39 | 380.41 | 80.00 |
| | 40 | 319.30 | 40.00 |
| | 41 | 382.84 | 40.00 |
| | 42 | 496.16 | 55.00 |
| | 43 | 292.19 | 70.00 |
| | 44 | 303.93 | 60.00 |
| | 45 | 191.02 | 49.02 |
| | 46 | 392.55 | 40.00 |
| Total OF W.C. | | | 8920.10 |

CHAPTER -IV

IMPROVEMENT WORKING CIRCLE

General Constitution and crop composition:- This working circle comprises mostly those forests areas which were earlier worked under coppice working circle. These areas comprises predominantly poor type of Dry mixed forest which at most places deteriorates to scrub type of vegetation . These forests have been subjected to maltreatment in the past and some of the areas even after remaining under systematic management for quite a longer period have recorded little improvement in the stock . These areas were under heavy biotic pressure and grazing pressure, besides forests fire also deteriorated the forests a lot. The species composition in other areas of this working circle is predominated by sal with its usual dry associates while dry mixed forest species occurring in pockets. The common feature of the forest of this working circle is that the crop generally varies greatly, with sal being the predominant spp. in almost every block. The topography of this forest is mostly undulating and these forest lies on low hills and undulation and contiguous to the reserved forest blocks. These forests are mostly open with a general site quality of IV with fine mixture of miscellaneous spp. like Asan, Kend, Piar, Mahua, Bahera, Aawla, Sidha and Dhaura. Generally the size of the crop is commonly pole crop.

2. Forests under this working circle are mainly erstwhile coppice working circle forests, which have been grouped under this working circle .Only Protected Forests are placed under this working circle.

3. But part of P.F. blocks, which are under encroachment and heavy and repetitive illicit felling and burning down are excluded from this working circle.

4. This working circle contains such Sal and miscellaneous forests which can regenerate after coppicing and establish into pole crop without any special treatment

5. Local people have started protecting these forests in certain pockets. In these areas forests are in sapling to pole stages. They need thinning for proper and normal growth.

SPECIAL OBJECTS OF MANAGEMENT: - The special object management are stated as below:

1. To meet the bonafide agricultural and domestic requirements of the local people especially of the N.T.F.P. without causing deterioration to the forests.
2. To improve the stocking and quality of the forests by undertaking sound silvicultural operations.
3. To maintain the vegetative cover with a view to prevent soil erosion and to conserve moisture for regulation of water supply.
4. To foster among the local inhabitants a sense of the value of forests and to win their willing and active participation in forest conservation and management.
5. To organize the management of the forests in such a way that the people living in the vicinity of the forests may find sufficient work in forestry operations so as to earn their livelihood.

AREA STATEMENT: - The area covered under this working circle is 17,636.59 Ha. Range wise statement is given below. The area details is given in at the end of the chapter.

| Range | Total Area (in Hectare) | Improvement Working Circle (in Hectare) |
|----------------|--------------------------------|------------------------------------------------|
| 1 | 2 | 3 |
| KOLHAN | 25898.02 | 7842.41 |
| SANTARA | 33480.05 | 850.55 |
| SAITABA | 10628.08 | 8943.63 |
| TOTAL | 70006.15 | 17636.59 |

AREA STATEMENT OF
IMPROVEMENT WORKING CIRCLE.

| Range | Comptt. Name | Comptt. No. | Total Area in Hect. | Improvement Working Circle In Ha. |
|--------------|---------------------|--------------------|----------------------------|------------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| KOLHAN | DIMBULI RE | | 566.28 | 489.28 |
| | GANMORE PF | | 5070.82 | 4870.82 |
| | RAIBERA PF | | 33.18 | 33.18 |
| | DERWANPF | | 7.18 | 7.18 |
| | ANANDPUR | PF No.- 14 | 112.51 | 112.51 |
| | ANANDPUR | PF No.- 13 | 602.47 | 572.47 |
| | KARRA | PF No.- 9 | 249.70 | 149.70 |
| | SONUA | PF No -25 | 413.61 | 273.61 |
| | AGRUAN PF | | 157.02 | 127.02 |
| | HINUA PF | | 413.60 | 194.37 |
| | GOILKERA | PF No.- 19 | 330.96 | 190.96 |
| | KURKUTIA | PE No - 22 | 503.85 | 461.85 |
| | BORAI | PENo-24 | 110.18 | 68.18 |
| | SANGAJATA | PF - XXIII | 291.28 | 291.28 |
| SANTARA | KADALSUKUA | | 48.97 | 18.97 |
| | BILA | PF-XXI | 104.97 | 74.97 |
| . | JHILRUAN | PF-XX | 107.89 | 72.89 |

| | | | | |
|--------|-----------|--------|---------|----------|
| | AMRAI | PF - 8 | 252.93 | 177.93 |
| | MOHANSAI | PE - 7 | 147.31 | 87.31 |
| | KUIRA | PE - 6 | 427.76 | 307.76 |
| | ICHAHATU | PF-5 | 130.72 | 110.72 |
| SAITBA | SAITBA RF | | 8756.78 | 7132.33 |
| | CHIRUBERA | PF - 1 | 750.30 | 750.30 |
| | DOPAI | PF - 2 | 85.80 | 85.80 |
| | CHIRUBERA | PE - 3 | 874.54 | 874.54 |
| | TIUA | PE-4 | 160.66 | 100.66 |
| | TOTAL . | | | 17636.59 |

STOCK MAPS :- The forests under this working circle have been mapped on 4" = 1 mile scale. The stock maps show distribution of principal species, the average age and density of forest crop.

DENSITY:- The density varies from place to place. The density of forests allotted to this working circle varies from 0.2 to 0.4.

SILVICULTURAL SYSTEM:- The crop in these forests varies in density and quality. The well stocked areas have better quality and condition of natural regeneration is also satisfactory. The growth of trees is also good. The crop is young to middle aged and so felling for improvement will be carried out. Tending of young crop will be required. In the under stocked areas tending of existing crop will be undertaken to restock the areas. The best system to achieve the special objects of management will, therefore, be the improvement felling supplemented by planting and tending of natural regenerated crop. For coppice species the coppice crop will be the future crop. Method of treatment involves essentially the removal of inferior growing stock in the interest of better growth of the more valuable species.

HARVESTABLE GIRTH:- As a matter of fact, there is no need of a harvestable girth for improvement felling. However felling for bring normalcy and tending will take place in all girth classes for improvement in the crop and induction of regeneration. Marking will be thinning marking and therefore from all girth classes surplus trees will be removed. Scattered mature trees will not be harvested. The small wood, poles and

firewood obtained from the above felling will be utilized to meet the bonafide requirement of the local people.

FELLING CYCLE: - Felling cycle is kept at 10 years equal to the period of the plan.

REGULATION OF YIELD: - The crop is generally young to middle aged and therefore, not much yield will be available. However, during the course of improvement felling, small size timber, poles and firewood in some quantity are expected to come. These materials will be made available to the local villages and disposed off as per JFM resolution of Govt. of Jharkhand.

DEMARCATION OF COUPE: - Thinning coupes will be demarcated one year in advance of felling.

PREPARATION OF TREATMENT MAP:- Soon after the demarcation of thinning coupes, a treatment map will be prepared by ROE after thoroughly inspecting the area. This map will be verified by ACE. D.F.O. should check a few as a test case and when he is satisfied, only then next step should be taken.

(A) The treatment map will show the following areas distinctly:

1. Protection Areas:- Those will include
(a) Steep slope above 600.
(b) Nala banks and river courses 1 chain wide on either side.

2. Under Stocked Areas:- These will include areas with density below 0.4 including blanks.

3. Well Socked Areas:- Marking will be done in the same year in which demarcation will be done. Soon after the receipt of approved treatment map, marking will be done.

(B) The marking **rules will be as follows for different areas:**

1. No marking will be done in protection areas.
2. In under stocked and well stocked areas the following trees will be marked for felling:

THINNING RULES

Thinning marking will be done only in over stocked forests. The aim of thinning would be to free the crop from congestion. The coupes must be inspected by ACE or DEC before thinning starts.

- (a) Thinning shall be done keeping in view that no permanent gap in the canopy is created.
- (b) All dead, top-broken, heavily diseased and suppressed trees shall be cut back.

(c) Dominated trees shall be felled only if it is badly shaped or otherwise abnormal and produced its removal does not cause gaps in the canopy, exposing the soil to desiccation.
(d) In stools having more than one coppice shoots only the best one will be retained and the rest will be cut back.

(e) If there is a possibility of the canopy being permanently broken then even badly shaped trees in the dominant canopy as also the suppressed ones shall be left standing.

(f) Climbers if present should be cut.

(g) In stools having more than one coppice shoots only one vigorously growing Coppice shoot per stool will be retained and the rest will be cut back.

(h) Between the stems of seedling origin and coppice origin the stems of seedling origin shall be preferred. Even an inferior stem of seedling origin shall be preferred to a superior stem of coppice origin.

(i) Cutting back of badly-shaped and damaged saplings and advanced growth so as to produce better coppice shoots.

(j) Guided thinning will be done in the young regenerated crop with a view to space out the plants more or less evenly with an average spacing of about 2m X 2m.

(k) Before the actual thinning, shrub cutting in the area shall be done.

(l) Trees/poles should be retained in partial blanks, eroded gullies or along steep erodale nala blanks.

(m) Trees of sacred grooves, Sarna or Jharia shall not be cut.

(n) All edible fruit yielding trees will be reserved from felling.

(o) Removal of undesirable undergrowth or trees of inferior species, which are preventing, or likely to prevent, development of regeneration of desired species.

3. As per normal stand table for quality class III site Sal the following no. of trees/ha. Will be retained and the rest will be marked.

| Diameter (in cms.) | Age (yrs) | No. of trees |
|---------------------------|------------------|---------------------|
| 6.4 | 10 | 1413 |
| 9.6 | 20 | 914 |
| 13.5 | 30 | 694 |

Age of the crop will be determined from Age-dia curve for the site quality IV

The forest produce of thinning coups will be shared & disposed off as per GOJ JFM resolution 2001.

SUBSIDIARY SILVICULTURAL OPERATIONS:- Clearing operations should be carried out every year so that the general health of the crop is improved. The following operations will be carried out, in the year following the year of thinning and in subsequent years.

(A) Cutting back Operation.

- (a) Dressing down stumps higher than 6" from the ground level.
- (b) Freeing the coppice shoot of Sal and other superior species from over top of bushes, grasses or inferior species. Singling of coppice shoots.
- © Felling of standing trees marked for felling, but not felled.
- (c) Felling of trees damaged during felling, which are not likely to recover.
- (d) Climber ,cutting.Creeper cutting, climber cutting cum miscellaneous cleanings shall be done during the rains. The process shall continue every year until these completely suppressed miscellaneous cleaning will be include cutting back all shrubby growths of useless species, which interfere with the growth of the principals species. In dry areas retention of shrubs which may be beneficial to the establishment of sal seedlings is advisable.
- (e) Cutting of coppice shoots where natural regeneration is adequate.Cutting of malformed regeneration above 15 cm g.b.h.

(B) Cleaning:- In the sixth year from the year of thinning, the following operations will be done.

- (i) Climber cutting.
- (ii) Cutting of all coppice shoots where naturally regenerated or planted seedlings are adequate and reducing them to one per stool where regeneration is inadequate.
- (iii) Removal of undergrowth interfering or likely to interfere with the growth of seedlings.

FOREST FIRE

Forest fire has been recognized as one of the deadliest enemies. Forest fires in the division are mainly man made fires. The local inhabitants and other people moving inside the forest during summer are greatly responsible for this. Careless burning of leaves to clean the floor for picking mahua flower is another reason.

FIRE PROTECTION SCHEME

Prevention Measures

1. The following prevention measures should be taken: 1
All the fire lines should be revived. They should be control burnt latest by the end of February.
2. Strips 3-4 metre wide on either side of the forest roads and important footpath should be cleaned and burnt at least wise during the fire season.
3. All the young sal regenerated areas and the plantation upto fire years of age should be fire traced by a clear strip of 3 meters width surrounding the entire area.
4. Fire watchers in sufficient numbers should be appointed to move round the forest in fire season. The VMPC should play an important role in fire protection.
5. Fire watchers huts should be constructed in the interior and lonely forest areas and a gang of 4-5 watchers may be posted there.
6. Wide publicity should be done in the adjoining villages explaining the damage caused by fires, the role to be played by the villages in controlling it and the penalties against those who will be caught in setting fires.

Large sized signboards should be erected at all the entrances to the forest showing the devastating effects of forest fires and the punitive consequences, if anybody is caught setting fires.

SOIL AND MOISTURE CONSERVATION WORKS

Cause of soil erosion: - Erosion is mostly due to rain water. The gradual depletion of the forest cover ,depleted the organic matter content in the soil. The organic matter (humus) improves the aeration of the soil increases its capacity to conserve moisture and deliver it readily to the plant roots. It improves thses soil conditions favouring root penetration and the growth of beneficial microorganisms and larger organisms It aids in processing the inorganic constituents of the soil, changing unavailable material into the available form as plant nutrients. It aids in conserving the easily soluble constituents of the soil as plant

nutrients. Under a good cover of forests there is almost insignificant rate of soil loss and the runoff rate is very low.

Erosion speeds up as the more absorptive humus charged top soil is washed off to expose sublayers, which generally are of lower absorptive capacity. The continuous biotic pressure has resulted in the loss of topsoil as well as subsoil exposing the parent rocks at places. In these areas the rains are quick and heavy in the monsoon period. Due to the stripping off the absorptive top soil the loss absorptive day is exposed and 90 % of the rainfalls is lost as runoff thereby aggravating the problem of gully erosion.

Methods of Soil Conservation: - There are two types of erosion met with in this division: Sheet erosion and Gully erosion.

Prevention of sheet erosion :- Sheet erosion is to be prevented by contour trenching. Contour is an imaginary line on the surface of the earth connecting points on the same elevation. In the sloppy hills several contour trenches are to be dug up to prevent soil loss as well as helping in retention of water.

The dug out soil is kept on the lowerside of the trench. On these dugout soil babul and ber seeds are to be sown just before monsoon. The contour trenches prove very effective for checking removal of subsoil. More so the trenches also retain water and help in percolation in the hard and compact soil. The furrows catch and hold run - off water store it in the soil , thus reducing run-off and erosion and bringing about a more uniform distribution of rainfall moisture . This will also help grow in the cut back stumps or saplings

Prevention of gully erosion :- Innumerable number of gullies are present in all sloppy hills and adjoining plains almost throughout all the felling series. More so in Koihan forests where the land is more undulating with more hills and hillocks occurring frequently. Simultaneous to the prevention of sheet erosion gully erosion must be tackled properly in order to check further erosion. Gullies may be controlled by terracing on the gully heads. However according to the terrain it is not a practical solution. It becomes very cumbersome and needs very well planning which may be difficult to implement in the field.

Hence it is prescribed that gullies are to be stabilized with structures. Again structures may be permanent or temporarily. Structures are used in gully control work either to facilitate the establishment of vegetation or to provide protection for those critical sections which cannot be adequately protected by other measures. When our motto is only soil conservation and improvement of vegetation, temporary structures are preferred. When aim is to provide for small irrigation or making it a waterhole for the animals then permanent (brick cement mortar) structures are required. The temporary checkdams cost less and is cost effective for 5 to 6 years. It may last more even.

Temporary checkdams are made of brush, wire poles or loose rock. Temporary checkdams constructed across the bed of a gully have two uses.

- (i) to collect enough soil and water to ensure eventual growth of protective vegetation.
- (ii) to check channel erosion until sufficient stabilising vegetation can be established at that critical point.

In the previous plan under soil conservation work contour trenches have been dug in some compartments. This has improved the regeneration status in these hilly areas. So it is proposed to continue this scheme under this plan. It is proposed to treat about 2500 ha. under soil conservation schemes in improvement working circle areas in ten years. Its effects may be analysed at the time of revision of the working plan. Digging of contour trenches are prescribed in the areas which are in higher slopes having less regeneration due to desiccation. These contour trenches will conserve the soil erosion also. The desired specification of contour trenches may be given as :-

Soon after the receipt of approved treatment soil and moisture conservation works will also be taken along with marking will be completed before onset of monsoon in the next year. These working include two main operations namely, contour trenching and nala bunding dams. Emphasis would be on rain water conservation.

Contour trenches will be dug in areas above 25% slope. Trenches will be dug in accessible areas only. Size of trenches will be 10 m. x 45 cm. x 45cm. Soil from trenches will be heaped on the lower side of the trenches. The contour interval between consecutive trenches will be 3 m. Spacing along the slopes would be 8 m. Nala bunding /check dams will be constructed to reduce run off and to arrest the silt. Nala bunding will start from the top of nala downwards. The desired specification of contour trenches may be given as Size - 10m X 45 cm X 45 cm. Spacing along the contour - 3m. Along the slope - 8 m. Piling of soil so dug will be placed down side of the contour trenches and its proper dressing will be done. Seeds may be dibbled on the piled up mounds

METHODS OF REGENERATION:- In the year following year of thinning, the naturally regenerated seedlings will be cleared off all undergrowth and will be spaced out uniformly so that no. of seedling per ha. required by the normal stand table for given site and composition of the crop shall be maintained. In the areas with inadequate natural regeneration, artificial regeneration will be taken up in the year following the year of thinning.

OTHER REGULATIONS:

Protection: - Protection from fire and grazing is the prerequisite for the success of regeneration. Since the areas are in the proximity of the villages, special efforts will be required to protect these areas from fire, grazing and illicit cutting. The Thinning coupes will be rigidly fire protected for a period of five years from the year of felling. These coupes will remain closed to grazing for a period of five yrs. from the year of felling. Rotational grazing should be practiced. To have success in this mission, local villages

should be involved right from formulation of scheme to the final implementation of rotational grazing.

Estimate of future revenue generation when the site is improved:

The mean annual increment from the analysis of coppice sample plot in Ganmore P.F. is calculated to be 2.78 cum. /hac./year. If the improvement working Circle areas are brought to normal state with good quality coppice crop these areas yield at an average of 2.78 cum. of growing stock annually, which is equivalent to 29 to 30 nos of selectable poles of 20 cm . dia and 3 m. long which is valued at the rate of Rs. 160.00 per pole as per the prevailing State Trading Depot rates. Hence, annual out come per hac. will be Rs. 4800.00 in immediate future at the end of this working circle. Total out come of the whole working circle areas will be around Rs. 804 lakhs. The analysis of the coppice sample plot is given at the end of the chapter.

10 YEAR PLAN FOR CULTURAL OPERATION WORKS IN IMPROVEMENT

WORKING CIRCLE

| FINANCIAL YEAR | PHYSICAL TARGET(IN HA.) | ESTIMATED COST @ 75 MANDAY @ RS. 64.61 PER MANDAYS | ESTIMATED COST (IN RS. LAKH) |
|-----------------------|---------------------------------|-----------------------------------------------------------|-------------------------------------|
| 1 | 2 | 3 | 4 |
| 2003—2004 | 500 | 387660 | 3.877 |
| 2004—2005 | 500 | 387660 | 3.877 |
| 2005—2006 | 500 | 387660 | 3.877 |
| 2006—2007 | 500 | 387660 | 3.877 |
| 2007—2008 | 500 | 387660 | 3.877 |
| 2008—2009 | 500 | 387660 | 3.877 |
| 2009—2010 | 500 | 387660 | 3.877 |
| 2010—2011 | 500 | 387660 | 3.877 |
| 2011—2012 | 500 | 387660 | 3.877 |
| 2012—2013 | 500 | 387660 | 3.877 |

**10 YEAR PLAN FOR SOIL CONSERVATION WORKS IN IMPROVEMENT
WORKING CIRCLE**

| FINANCIAL YEAR | PHYSICAL TARGET (IN HA.) | ESTIMATED COST @ 12 MANDAY@ (INRS. RS. 64.61 PER | ESTIMATED COST LAKH |
|---------------------------|------------------------------------------|-----------------------------------------------------------------------------|--------------------------------|
| 1 | 2 | 3 | 4 |
| 2003—2004 | 250 | 1211438 | 12.114 |
| 2004—2005 | 250 | 1211438 | 12.114 |
| 2005—2006 | 250 | 1211438 | 12.114 |
| 2006—2007 | 250 | 1211438 | 12.114 |
| 2007—2008 | 250 | 1211438 | 12.114 |
| 2008—2009 | 250 | 1211438 | 12114 |
| 2009—2010 | 250 | 1211438 | 12.114 |
| 2010—2011 | 250 | 1211438 | 12.114 |
| 2011—2012 | 250 | 1211438 | 12.114 |
| 2012—2013 | 250 | 1211438 | 12.1 14 |

S.P. No. 38 of Kolhan Division at coupe no. 5 of Ganmor P.F.S.

1. Object : To study the growth of sal Coppice crop
2. Year of formation : 1967
3. Age of crop at the time of formation: 32
4. No of trees at the time of formation: 97
5. Area of S.P. : 0.23 hac.

| Sl. No. | Year of Mea. | Av. Dia In cm. | Av. Height m. | in Total basal Area S.P. of in m2 | Mean Annual Increment Vol/haciyear In m3 |
|----------------|---------------------|-----------------------|----------------------|------------------------------------------|-------------------------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | 1970 | 21.8 | 18.71 | 3.4584 | 2.3821 |
| 3 | 1976 | 24.4 | 19.41 | 4.3329 | 2.9408 - |
| 4 | 1980 | 24.7 | 21.17 | 4.4227 | 3.0140 |
| 5 | 1981 | 24.8 | 20.25 | 3.7029 | 2.9424 |
| 6 | 1983 | 25.0 | 20.77 | 3.8237 | 3.2674 |

CHAPTER-V

PLANTATION WORKING CIRCLE

GENERAL CONSTITUTION - Areas which have been earlier under plantation working circle, but presently devoid of any vegetation or scanty vegetation is put under this working circle. Some earlier plantations were subject to heavy organized illicit felling. This resulted in permanent gaps in the forest cover.

2. Such areas under erstwhile selection W.C. which are presently subjected to illicit felling and where burning and clearing of the land is continuing repetitively are also placed under plantation working circle. Report of illicit felling year-wise and compartment-wise is annexed in annexure-II. Some compartments were repetitively subjected to illicit felling. During stockmapping it has been seen that some areas have been cleared and vegetation has been burnt repetitively, such activities led to creation of permanent gaps in the forest cover. In these areas such destruction has led to loss of natural regeneration.
3. It is required to take up gap plantation in such areas to restock the areas.
4. Besides areas left abandoned after shifting cultivation or encroachment are also to be recovered and the have to be restocked with plantation.
5. Encroached areas, where there are permanent gaps need to be restocked after evicting the encroachments.

SPECIAL OBJECTS OF MANAGEMENT: - In view of this working circle a single set of objects of management shall not be applicable to the whole of the working circle. The objects of management are therefore set forth separately for the planted and plantable areas:

SPECIAL OBJECTS FOR THE MANAGEMENT OF PLANTABLE AREAS:-

- (a) To revegetate blank areas with a view to increase the vegetation cover and forest productivity.
- (b) Consistent with the above to ensure soil and moisture conservation.
- (c) To plant a mixture of species so that income starts flowing after one year.

In Kolhan Division forest have been subjected to organized illicit felling during the Jharkhand agitation. The intention behind the clearing the forests is to bring areas undershifting cultivations or establishing a permanent habitation. The details are given hereunder.

Year wise detail is as follows —

TABLE -1

| SI. No. | Year. | Illicit felling (in acres) |
|---------|-------|----------------------------|
| 1. | 1979 | 223.00 |
| 2. | 1980 | 2821.00 |
| 3. | 1981 | 1842.62 |
| 4. | 1982 | 751.75 |
| 5. | 1983 | 1125.00 |
| 6. | 1984 | 564.00 |
| 7. | 1985 | 1140.00 |
| 8. | 1986 | 567.25 |
| 9. | 1987 | 827.05 |
| 10. | 1988 | 1911.00 |
| 11. | 1989 | 485.00 |
| 12. | 1990 | |
| 13. | 1991 | |
| 14. | 1992 | 484.00 |
| 15. | 1993 | 275.00 |
| 16. | 1994 | |
| 17. | 1995 | 20.00 |
| 18. | 1996 | 11.50 |
| 19. | 1997 | 39.00 |

| | | |
|--------------|------|-------------------------------------------------|
| 20. | 1998 | 20.00 |
| 21. | 1999 | 5.00 |
| 22. | 2000 | 0.00 |
| 23. | 2001 | 147.00 |
| Total | | 13259.17 or 5368.09 Hectares (7.65%) |

*Source D.F.O'S Kolhan Division Letter no. dt.

The compartments wise and Block wise details of illicitely felled area has been given in the appendix —V

List of areas which have been repeatedly subjected to illicit felling with year of felling, thereby rendered blank is given below.

| COMPARTMENT NAME | COM NO. | AREA (HA.) | YEARS DURING WHICH ILLCIT FELLING WAS REPEATED. |
|-----------------------------|----------------|-----------------------|----------------------------------------------------------------|
| 1 | 2 | 3 | 4 |
| | | KOLHA | N RANGE |
| Ambia | 1 | 65 | 92,88,85,84,. |
| Ambia | 3 | 83 | 92,86,85,84,83,82,80,. |
| Ambia | 7 | 22 | 93,88,86,85,84,. |
| Ambia | 8 | 30 | 93,92,86,83,. |
| Ambia | 9 | 147 | 86,85,83,82,80,. |
| Ambia | 12 | 149 | 97,88,87,85,. |
| Ambia | 14 | 32 | 85,83,82,80,. |

| | | | |
|-------|----|-------|---------------------------|
| Ambia | 15 | 54 | 83,82,81,80,. |
| Ambia | 16 | 16 | 83,82,80,. |
| Ambia | 18 | 39 | 86,85,83,82,81,80,. |
| Ambia | 19 | 87 | 85,83,82,81,80,. |
| Ambia | 20 | 158 | 85,83,82,80,. |
| Ambia | 23 | 61 | 83,82,81,80,. |
| Ambia | 24 | 92 | 83,82,81,80,. |
| Leda | 1 | 21 | 88,87,86,. |
| Leda | 3 | 69 | 89,88,87,. |
| Leda | 6 | 110.8 | 88,87,86,84,83,82,81,80,. |
| Leda | 7 | 155 | 92,88,84,83,82,81,80,. |
| Leda | 8 | 66 | 93,92,89,88,87,86,84,83,. |
| Leda | 9 | 91 | 89,88,87,86,83,81,80,. |
| Leda | 12 | 47 | 92,87,86,85,81,. |
| Leda | 13 | 41 | 88,87,86,85,80,. |
| Leda | 14 | 70 | 88,87,86,85,84,83,81,80,. |
| Leda | 17 | 11 | 87,86,85,. |
| Leda | 19 | 54 | 86,85,80,. |
| Leda | 20 | 111 | 88,85,84,83,82,80,. |
| Leda | 21 | 85 | 92,86,85,82,81,80,. |
| Leda | 22 | 138 | 92,88,86,85,82,81,80,. |
| Leda | 24 | 26 | 93,86,84,83,. |

| | | | |
|----------------------|----------|------------|---------------------------|
| Leda | 25 | 72 | 92,87,86,85,84,81,80,. |
| Leda | 26 | 105 | 92,87,86,85,81,80,. |
| Leda | 27 | 84 | 93,87,86,85,84,83,. |
| Leda | 29 | 22 | 86,85,82,81,. |
| Leda | 30 | 60 | 85,84,83,82,. |
| Agruwan | PF | 30 | 82,81,80. |
| Ganmore | North | 334 | 87,86,85,83,82,81,80,. |
| Ganmore | Sout | 479 | 87,86,85,83,82,81,80,. |
| Hinua | PF | 258 | 92,86,85,84,83,81. |
| Kara | PF | 206 | 84,83,82,81,80. |
| Kurkutia | PF | 42 | 92,83,81. |
| Sonua | PF | 148 | 84,83,82,81,80. |
| SANTARA RANGE | | | |
| Latua | 1 | 109 | 89,88,83,81,80,. |
| Latua | 2 | 87 | 88,82,81,. |
| Latua | 3 | 18 | 89,85,81,. |
| Latua | 4 | 66 | 89,88,85,83,. |
| Latua | 5 | 35 | 89,88,87,83,81,. |
| Latua | 6 | 138 | 88,86,85,81,80,. |
| Latua | 7 | 58 | 88,83,81,80,. |
| Latua | 8 | 124 | 89,88,86,85,83,82,81,80,. |
| Latua | 9 | 108 | 88,86,85,83,82,81,80,. |

| | | | |
|-------|----|-----|------------------------|
| Latua | 10 | 109 | 92,88,86,85,81,80,. |
| Latua | 11 | 36 | 96,82,81,. |
| Latua | 13 | 250 | 89,86,82,81,80,. |
| Latua | 14 | 175 | 86,83,82,81,80,. |
| Latua | 16 | 45 | 89,84,81,80,. |
| Latua | 17 | 10 | 86,84,80,. |
| Latua | 18 | 144 | 86,84,81,80,. |
| Latua | 19 | 42 | 88,86,81,. |
| Latua | 22 | 102 | 87,86,80,. |
| Latua | 24 | 58 | 88,81,80,. |
| Latua | 25 | 52 | 88,87,81,80,. |
| Latua | 27 | 83 | 88,81,80,. |
| Latua | 28 | 100 | 89,88,86,85,83,. |
| Latua | 29 | 136 | 93,88,87,86,81,. |
| Latua | 32 | 101 | 88,85,83,82,81,80,. |
| Latua | 33 | 43 | 95,86,85,81,. |
| Latua | 34 | 28 | 88,86,83,. |
| Latua | 35 | 277 | 92,88,87,86,85,83,81,. |
| Latua | 36 | 74 | 95,88,83,81,80,. |
| Latua | 37 | 34 | 85,83,81,. |
| Latua | 38 | 22 | 87,86,85,83,. |
| Latua | 39 | 232 | 89,88,87,85,82,81,80,. |

| | | | |
|----------------|----|-----|---------------------------|
| Latua | 40 | 92 | 89,88,87,86,85,83,. |
| Latua | 43 | 61 | 89,88,83,81,. |
| Latua | 44 | 162 | 92,88,83,82,81,80,. |
| Latua | 49 | 9 | 86,83,82,. |
| Latua | 52 | 138 | 89,88,86,85,81,80,. |
| Santara | 1 | 30 | 89,88,87,84,. |
| Santara | 2 | 152 | 92,88,87,86,85,83,82,81,. |
| Santara | 3 | 90 | 93,88,87,86,84,83,82,. |
| Santara | 4 | 78 | 87,82,81,. |
| Santara | 5 | 51 | 86,84,81,. |
| Santara | 6 | 86 | 88,87,85,84,82,80,. |
| <i>Santara</i> | 7 | 33 | 88,87,86,80,. |
| Santara | 8 | 108 | 88,87,85,84,81,80,79,. |
| Santara | 9 | 114 | 88,87,86,85,84,82,80,. |
| Santara | 10 | 161 | 88,87,86,85,84,82,80,79,. |
| Santara | 11 | 100 | 93,88,87,86,80,. |
| Santara | 12 | 69 | 01,93,88,87,86,82,81,80,. |
| Santara | 13 | 298 | 01,93,89,88,87,86,82,81,. |
| Santara | 14 | 102 | 93,92,87,83,82,81,80,. |
| Santara | 15 | 266 | 93,88,87,86,84,83,82,81,. |
| Santara | 16 | 151 | 96,93,92,88,87,86,83,82,. |
| Santara | 18 | 214 | 88,86,84,83,82,81,80,. |

| | | | |
|---------|----|-----|---------------------------|
| Santara | 19 | 98 | 83,82,81,. |
| Santara | 21 | 36 | 99,93,89,88,86,84,82,. |
| Santara | 22 | 92 | 99,95,93,92,89,83,82,80,. |
| Santara | 23 | 152 | 96,89,88,87,86,85,83,82,. |
| Santara | 24 | 90 | 92,88,87,86,85,82,81,. |
| Santara | 25 | 59 | 96,88,87,82,. |
| Santara | 26 | 22 | 87,86,82,. |
| Santara | 28 | 30 | 87,86,84,. |
| Santara | 29 | 22 | 88,83,81,80,. |
| Santara | 30 | 38 | 93,88,85,81,. |
| Santara | 33 | 23 | 93,84,81,. |
| Santara | 35 | 128 | 97,96,93,88,86,84,82,81,. |
| Santara | .6 | 86 | 88,87,82,80,. |
| Santara | 37 | 70 | 89,88,87,83,80,. |
| Santara | 38 | 75 | 88,84,83,82,80,. |
| Santara | 39 | 49 | 98,86,85,84,83,82,. |
| Santara | 40 | 264 | 01,85,84,82,81,80,. |
| Santara | 41 | 75 | 92,86,85,81,80,. |
| Santara | 42 | 167 | 01,97,95,87,83,82,80,. |
| Santara | 43 | 72 | 86,85,84,83,. |
| Santara | 44 | 148 | 92,89,88,87,86,85,84,83,. |
| Amrai | PF | 25 | 88,82,81. |

| | | | |
|----------------------|----|-----|------------------------|
| Kadalsukwa | PF | 20 | 86,85,83,82,81,80. |
| Kuira | PF | 155 | 87,86,85,83,82,81. |
| SAITABA RANGE | | | |
| Anjeedbera | | 186 | 88,86,85,84,82,80. |
| Banko | | 9 | 89,88,86,. |
| Kundrugutu Pasubera | | 365 | 89,88,82,80,79,. |
| PetaPeti 1 | | 219 | 89,88,87,86,85,84,82,. |

For the purpose of priority of plantation , this working circle areas are divided into two catogories.

1. Areas clear felled for shifting cultivation but abondened after use These areas are to be recovered by bringing them under afforestation immediately.
2. Areas where encrochers Setteled permanently or cultivating continuously Afforestation will be taken up only when eviction is accomplished.

Suggestion for Removal of Encroachments and Treatment of encroached forest Areas:-

The main cause of concern in Kolhan Forest Division is that the large extent of area encroached and subsequently degraded . Removal of encroachment is a sensitive matter indeed and the steps must be taken carefully, firmly and systematically.

(a) **Extent of Encroachments** :- 18240.55 hectare forest area is reportedly encroached either permanently or intermittently.. List has been given in annexure VI.

(b) **Types of Encroachments** The encroachments can be classified into following types depending upon the nature of encroachments — **Category — A** - Forest land where permanent construction in the form of houses etc. has been done and the encroachers are living there and cultivating adjacent forest land on the permanent basis.

Category — B - Forest land which is being cultivated continuously year after year reducing it to the blank without existence of any significant root stock. **Category — C** - Forest land which is cultivated intermittently with a gap of 2 to 5 years in between.

Category — D - Forest land which is not cultivated but after every 3 to 4 years, bushes and regenerations are cut and burnt to prevent the land being converted into dense forest. By indulging in such activity, encroachers intends to show their might and right on the land.

Category — E - Lands where the forests are simply clearfelled and subsequently these lands are encroached for cultivation.

Suggestions for Removing Encroachments :- For removing the encroachments, following steps may be taken —

(i) The lands falling under category E should be taken up for removal and rehabilitation first and then category D, C, B and A should be taken up.

(ii) The forest land falling under category D and E does not attract the action under provisions of Bihar Public Land Encroachment Act, such lands may be attempted first for removal of encroachment.

(iii) The forest lands under category A, B , and C require the persuasion and dialogue with the encroachers directly , through effective mediators such as local people’s representative, Manki, Munda and such other persons . If such attempts do not produce desired results, the action under the Indian Forest Act. And Bihar Public Land Encroachment Act may be taken.

(iv) Afforestation must be followed immediately as soon as the encroachment is removed from such land.

STATEMENT OF AREAS:- The total areas allotted to this working circle consisting on 7968.31 Hac. including existing plantations and the plantable areas. The details are given below.

| Name of Range | Total Area (in Hect.) | Plantation Working Circle(in Hect.) |
|----------------------|------------------------------|---------------------------------------------|
| 1 | 2 | 3 |
| KOLHAN | 25898.02 | 1247.59 |
| SANTARA | 33480.05 | 6160.72 |
| SAITABA | 10628.08 | 560 |
| TOTAL | 70006.15 | 7968.31 |

R.F.-wise area statement

| R.F.Block | Total in ha. |
|-----------|--------------|
| Leda | 1080.59 |
| Ambia | 167.00 |
| Latua | 1399.81 |
| Santara | 4390.91 |
| Saitaba | 930.00 |
| Total | 7968.31 |

**AREA STATEMENT OF
PLANTATION WORKING CIRCLE.**

| Comptt. Name | Comptt. No. | Total Area in Hect. | plantation |
|-------------------------|------------------------|----------------------------|-------------------|
| 1 | 2 | 3 | 4 |
| LEDA | 4 | 398.62 | 155.00 |
| | 5 | 329.02 | 16.59 |
| | 6 | 369.08 | 100.00 |
| | 7 | 323.76 | 40.00 |
| . | 8 | 353.30 | 70.00 |
| | 9 | 290.17 | 86.00 |
| | 10 | 284.50 | 30.00 |

| | | | |
|-------|----|--------|--------|
| | 13 | 538.65 | 69.00 |
| | 14 | 248.48 | 80.00 |
| | 15 | 323.76 | 50.00 |
| | 16 | 398.22 | 40.00 |
| | 17 | 200.32 | 50.00 |
| | 18 | 430.19 | 35.00 |
| | 19 | 414.41 | 87.00 |
| | 20 | 357.75 | 20.00 |
| | 22 | 316.88 | 62.00 |
| | 24 | 403.89 | 40.00 |
| | 25 | 250.10 | 30.00 |
| | 26 | 345.61 | 20.00 |
| AMBIA | 1 | 394.58 | 20.00 |
| | 9 | 389.72 | 33.00 |
| | 16 | 334.28 | 52.00 |
| | 19 | 440.31 | 20.00 |
| | 21 | 194.25 | 22.00 |
| | 23 | 232.29 | 20.00 |
| LATUA | 7 | 353.30 | 70.00 |
| | 9 | 347.23 | 143.23 |
| . | 10 | 246.86 | 50.00 |
| | 11 | 341.56 | 40.00 |

| | | | |
|--|----------|--------|--------|
| | 13 | 419.26 | 60.00 |
| | 26 | 182.11 | 124.00 |
| | 27 | 342.78 | 50.00 |
| | 31 | 411.98 | 50.00 |
| | 32 | 443.55 | 58.00 |
| | 36 | 256.58 | 60.00 |
| | 37 | 305.14 | 70.00 |
| | 38 | 189.40 | 50.00 |
| | 39 | 350.06 | 70.00 |
| | 40 | 295.02 | 74.00 |
| | 43 | 332.25 | 92.25 |
| | 48 | 459.73 | 121.00 |
| | 49 | 388.51 | 50.00 |
| | 51 | 162.28 | 80.00 |
| | 52 | 149.33 | 87.33 |
| | <i>1</i> | 268.72 | 80.00 |
| | 2 | 351.68 | 130.00 |
| | 3 | 391.34 | 220.00 |
| | 4 | 356.54 | 120.00 |
| | 5 | 277.22 | 90.00 |
| | 6 | 301.90 | 171.90 |
| | 8 | 371.51 | 330.00 |

| | | | |
|--|----|--------|--------|
| | 9 | 405.10 | 200.10 |
| | 10 | 277.22 | 126.22 |
| | 11 | 390.13 | 200.00 |
| | 12 | 386.08 | 200.00 |
| | 13 | 524.89 | 200.00 |
| | 14 | 224.20 | 150.00 |
| | 16 | 353.30 | 140.00 |
| | 17 | 219.75 | 60.00 |
| | 18 | 460.14 | 100.00 |
| | 19 | 274.79 | 60.00 |
| | 21 | 243.22 | 50.00 |
| | 22 | 411.57 | 200.00 |
| | 23 | 353.70 | 130.00 |
| | 25 | 236.75 | 60.00 |
| | 26 | 344.39 | 60.00 |
| | 28 | 528.53 | 30.00 |
| | 29 | 292.59 | 60.00 |
| | 30 | 324.16 | 160.16 |
| | 33 | 395.39 | 40.00 |
| | 35 | 418.45 | 125.00 |
| | 36 | 207.61 | 75.46 |
| | 37 | 262.72 | 72.07 |
| | 38 | 335.90 | 235.00 |
| | 39 | 380.41 | 185.00 |

| | | | |
|------------|----------|---------|---------|
| | 40 | 319.30 | 100.00 |
| | 41 | 382.84 | 100.00 |
| | 42 | 496.16 | 100.00 |
| | 45 | 191.02 | 30.00 |
| SAITBA RF | | 8756.78 | 500.00 |
| TWA | PF -4 | 160.66 | 60.00 |
| KADALSUKUA | | 48.97 | 30.00 |
| BILA | PF - XXI | 104.97 | 30.00 |
| JHLRUAN | PF - XX | 107.89 | 35.00 |
| AMRAI | PF-8 | 252.93 | 75.00 |
| MOHANSAI | PF -7 | 147.31 | 60.00 |
| KUIRA | PF-6 | 427.76 | 120.00 |
| ICHAHATU | PF-5 | 130.72 | 20.00 |
| | | | 7968.31 |

METHOD OF TREATMENT:- The following prescriptions are laid down for guidance:

(i) By and large the treatment would aim at filling up the intermittent blanks by planting suitable indigenous species depending on edaphic and biotic factors of the areas. The details of the method of treatment would be as per the guidelines for plantation issued by the C.C.F. Development, Jharkhand , form time to time.

(ii) Plantation areas will be protected at least for three years.

(iii) Cultural operations including casualty replacement should be carried out.

SILVICULTURAL SYSTEM:-

The silvicultural system adopted is clear felling with artificial regeneration. Species that coppice well will be regenerated by coppice growth. Natural regeneration of valuable species wherever found in blank areas would be tended and adopted as one of the planted seedlings and would be given the same treatment as that to the planted seedlings.

TREATMENT OF AREA AND PLANTATION OPERATIONS A. PREPARATION OF SITE MAP

A site map of the plantation area of 16"=1 mile or of any suitable scale shall be prepared. This map will indicate in detail the following features.

- (i) Natural and plantation species.
- (ii) Sal and miscellaneous rooted waste areas
- (iii) Depth of soil and its texture
- (iv) Natural regeneration, if present of valuable species
- (v) Length of boundary line with indication suitability of cattle proof trench fencing and boulder fencing.

The above map will form the basis of subsequent operations recommended. The details of the plantation technique, the cost involved etc. would be guided by the schedule of rate approved by Chief Conservator of Forests (Development) and **VANROPAN PADHATHI** Presprouted Semal, Shisam, Gamhar, Mahua, Amla, Chakundi, Kend, Karanj, Khair, Karam, Kathal, Toon, Ailanthus, Bakain, Bamboo, Neam would be planted. Under this working circle plantation would be done under following schemes. Govt. of Jharkhand Scheme:

1. Quick Growing Species.
2. Soil conservation & Afforestation
3. Development of Minor Forest produce
4. Lac Development

10 years financial estimate of the plantation is given at the end of the chapter. Plantations models based on local need may be developed. Operations to be followed are (I Requirement of seedlings to be calculated and nursery raised well in time for 20% seedlings in excess, so that the required number of healthy

seedling of the selected species are available for planting Just by the onset of monsoon, which is usually expected in the district by the third week of June.

(ii) Pits of 1' x 1' x 1' to be dug in the required number well in advance of the approach of the monsoon, preferably by the end of March.

(iii) Soil conservation measures such as gully plugging, contour bunding, contour trenching and check dam construction etc, as required by the slope and erosion status and other land features of the area shall be taken up.

(iv) Fodder grasses may be seed broadcast sown in hoed ground between the lines of pits just after the first pre monsoon showers.

(v) Planting up the blanks after the first monsoon showers.

(vi) Two hoeing and weeding operations in the first year of plantation one in the second and one in the third.

(vii) An unambiguous understanding about grazing and sharing of produce to be reached with the village forest committees.

(viii) Casualty replacement

(ix) Soil & moisture conservation works should be done where ever required gully plugging, check dams, contour bunds ,diversion channels, silt detention dams , contour trenches, box trenches etc shall be made to prevent soil erosion.

(x) Thinning in plantation areas will be done in the 6th yrs. depending upon the requirement of species.

Selection of Species-

General guidelines for selection of species are as follows_

i. Timber species — 30% - 60% -Timber species such as shisham, rosewood, gamhar, semal etc. may be sprouted from root-shoot cutting and planted.

ii. Oil bearing species_ 10-20 % Karanj may be planted as this has got market and has bearing on the local economy. This is one of the most economic NTFP of the state.

iii. Plants of myrobalans_ Aonla,Harre, Bahera may be planted up to 30 %.

iv. Bamboo plantation — At least 5% rhizome raised seedlings of bamboo will be planted at each plantation site. v. Other species — 30-39% will include species like asan, karam, salai ,sirir, mahua,neem,bakain,champa, kekar,bel,arjun, jamun , bher, sarifa, mango, tamarind, kusum , palas, dhaura, toon shall be planted.

vi. On trench berms species like khatal, shajan, jamun, sharifa may be planted at 6 m interval. In between Subabu, Kachanar and Babul may be planted at 1 m by 1 m spacing for providing fodder and fuel to the local people.

vii. Sabai grass at suitable places may be planted in plantation areas.

viii. Soil and moisture works may be taken on large scales. It is important to arrest rain water, so emphasis should be given on construction of Check Dams, Rahar, Ponds etc. Contour trenches and gully plugging may be done as per requirement of site. Presently soil conservation works form part of the plantation schemes.

ix. Thinning in plantation areas is needed for optimum growth so plantation may be thinned in the 10th and 20th year.

x. Species may be planted in small pure patches these will help in future management of plantation area.

xi. It will be mandatory on part of executing DEC to give information regarding planting area to WPO. This will help in planning.

xii. Plantation will be carried out on the basis of schedule of rates approved by CCF Development, Jharkhand.

xiii. More and more plants from permanent nurseries shall be used for plantation. This

xiiiiv ensure continuous running of the permanent nurseries.

xiv. Grass from plantation areas may be given to VFMPSC and record should be maintained.

xvi. Cost benefit statement of plantation should be maintained in territorial DFO office.

CHOICE OF SPECIES :- The species should be so selected as ensure success of the plantation according to present condition and edaphic factors and ph. Value of soil. Preference will be give to the indigenous species Khair, Sidha, Asan, Mahua, Sisoo, Gamhar, Karanj etc. ,preference for other species should be selected with the concurrence of local villagers where the work will be started. On eroded and gravelly soil khair may be tried

SEQUENCE OF OPERATION Forest management has to aim at successful rehabilitation of area by treatment of artificial regeneration and afforestation. To achieve this strict adherence to schedule of operation is called for a model guideline, the different operation recommended in the above paras has been summarized below:

- (i) Annual plantation coupe is to be laid out one year in advance.
- (ii) A site treatment map 16"=1 mile is to be prepared along with the laying out of the coupe.
- (iii) Coupe worked by department to be completed by 31 March.
- (iv) Fencing has to be taken up well in advance or old fencing is to be repaired early so that coppice shoots as and when they come should be protected.
- (v) Nursery work from Jan on wards.
- (vi) Planting operations be completed by the end of July.
- (vii) Hoeing and weeding in planted area be complete by end of September! October.
- (viii) Any other operation is recommended as per Afforestation Technique. (ix) Thinning in plantation in 6th years.
- (x) Felling of bamboo after 4 yrs..

E. FIRE PROTECTION

Fire protection of the area is a must and rigid fire protection measures should be taken up to protect the plantation areas form fire.

F. PROTECTION AGAINST GRAZING

Rigid protection measures against grazing at least for 5 years from plantation be ensured to enable the young coppice shoots and seedlings to get fully established.

Expenditure Estimates For Plantation Works

| YEAR | Physical Target In Ha. | Advance work at the rate of 17252 per ha. in RS. Lakhs | Completion work at the rate of 6855.61 per ha. in RS. Lakhs | 3 rd year maint. at the rate of 3224.79 per ha. in RS. Lakhs | 4 rd year maint. at the rate of 2262.3 per ha. in RS. Lakhs | Total in RS. Lakhs |
|------------|------------------------|--------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|--------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2003- 2004 | 100 | 17.252 | 0 | 0 | 0 | 17.252 |

| | | | | | | |
|-------------|-----|--------|-------|-------|-------|--------|
| 2004 -2005 | 100 | 17.252 | 6.856 | 0 | 0 | 24.108 |
| 2005-2006 | 100 | 17.252 | 6.856 | 3.225 | 0 | 27.332 |
| 2006- 2007 | 100 | 17.252 | 6.856 | 3.225 | 2.262 | 29.595 |
| 2007 -2008 | 100 | 17.252 | 6.856 | 3.225 | 2.262 | 29.595 |
| 2008- 2009 | 100 | 17.252 | 6.856 | 3.225 | 2.262 | 29.595 |
| 2009- 2010 | 100 | 17.252 | 6.856 | 3.225 | 2.262 | 29.595 |
| 2010_-2011 | 100 | 17.252 | 6.856 | 3.225 | 2.262 | 29.595 |
| 2011 — 2012 | 100 | 17.252 | 6.856 | 3.225 | 2.262 | 29.595 |
| 2012- 2013 | 100 | 17.252 | 6.856 | 3.225 | 2.262 | 29.595 |
| 2013- 2014 | | 0 | 6.856 | 3.225 | 2.262 | 12.343 |
| 2014 — 2015 | | 0 | 0 | 3.225 | 2.262 | 5.487 |
| 2015 -2016 | | 0 | 0 | 0 | 2.262 | 2.262 |

CHAPTER-VI

WORKING PLAN FOR PROTECTION WORKING CIRCLE

General constitution :- This working circle will comprise of all areas on steeper hill slopes where the problem of soil erosion and natural regeneration is fast converging of such hills into barren hills. Besides, there are areas where the crop density is good but due to repeated illicit cutting by head loaders and other offenders, crop does not reach in pole and middle aged mature trees. Here the crop remains in sapling stage or in bushy stage. These areas need proper protection against illicit felling and are included in this working circle. In addition to this, preserved trees, sample plots and certain patches or stripes of unique flora will form part of this working circle. In general, this working circle will cover the areas prone to illicit felling and hill tops where soil-erosion is a problem and natural regeneration requires special attention.

Special objects of Management: - The special objectives for constituting this working circle are

- (1) To protect and preserve the forests on steeper hill slopes.
- (2) To continue maintenance of the preservation plots and to protect individual trees of especially large dimensions to serve as proud symbols of the majesty and potentialities of these forests.
- (3) To improve the health of the crop by hygienic felling and to perpetuate patches of rather unique and interesting flora.
- (4) To preserve and develop certain areas for their scenic worth.

Area and distribution: - The total area allotted to this working circle, is Hectare. The compartmentwise details of the area has been given in the appendix

Silvicultural System

Only improvement felling will be done which will consist of the removal of dead, dying and over mature trees and also cutting of woody climbers in 10 years cycle.

Method of Treatment:-

- (i) The areas where the crop is having good density but is not establishing in pole stage due to repeated illicit cutting and grazing will be provided necessary measures while taking into consideration edaphic and biotic factors. The measures will include fencing of the area, cut back and protecting the coppice shoots for at least 3 years. The local village forest protection committees are going to play a major role in protecting such forests.

(ii) During the course of Silvicultural operations all dead,dying,diseased and overmatured trees will be digit marked for felling.All woody climbers shall be cut. (iii) Fire protection measures would be undertaken.Special attention needed in improvement of felled areas for at least 3 years.

(iv) Soil and moisture conservation measures will be undertaken which will constitute contour trenching and gully plugging etc.

(iv) If there is any blank,sowing and planting operation should be done. **Rangewise Area under Protection Working Circle given below :-**

| Name of the Range | Total Area (in Hect.) | Protection Working Circle |
|--------------------------|------------------------------|----------------------------------|
| 1 | 2 | 3 |
| KOLHAN | 25898.02 | 2227.32 |
| SANTARA | 33480.05 | 5502.93 |
| SAITABA | 10628.08 | 946.07 |
| TOTAL | 70006.15 | 8676.32 |

AREA STATEMENT OF

PROTECTION WORKING CIRCLE.

| Comptt. Name | Comptt. No. | Total Area in Hect. | Protection Working Circle In Ha. |
|---------------------|--------------------|----------------------------|-----------------------------------------|
| 1 | 2 | 3 | 4 |
| LEDA | 12 | 242.41 | 73.41 |
| LEDA | 18 | 430.19 | 135.00 |
| LEDA | 19 | 414.41 | 129.41 |
| LEDA | 24 | 403.89 | 50.00 |
| LEDA | 25 | 250.10 | 90.00 |

| | | | |
|---------------|---------------|---------|--------|
| LEDA | 26 | 345.61 | 87.00 |
| LEDA | 28 | 342.37 | 100.00 |
| LEDA | 29 | 337.92 | 75.00 |
| LEDA | 30 | 313.64 | 57.64 |
| AMBIA | 2 | 272.36 | 90.00 |
| AMBIA | 8 | 339.94 | 78.00 |
| AMBIA | 12 | 267.10 | 44.00 |
| AMBIA | 13 | 347.23 | 10.00 |
| AMBIA | 14 | 226.63 | 13.63 |
| AMBIA | 21 | 194.25 | 44.00 |
| AMBIA | 22 | 360.99 | 177.00 |
| DIMBULI RF | | 566.28 | 30.00 |
| GANMORE PF | | 5070.82 | 200.00 |
| ANANDPUR | PF No.- 13 | 602.47 | 30.00 |
| KARRA | PF No.- 9 | 249.70 | 100.00 |
| SONUA | PF No - 25 | 413.61 | 140.00 |
| AGRUAN PF | | 157.02 | 30.00 |
| HINUA PF | | 413.60 | 219.23 |
| GOILKERA | PF No.- 19 | 330.96 | 140.00 |
| KURKUTIA | PF No - 22 | 503.85 | 42.00 |

| | | | |
|-------|----------|--------|--------|
| BORAI | PF No-24 | 110.18 | 42.00 |
| LATUA | 1 | 370.30 | 120.30 |
| LATUA | 2 | 249.29 | 56.29 |
| LATUA | 3 | 250.91 | 48.91 |
| LATUA | 4 | 385.27 | 175.27 |
| LATUA | 5 | 294.21 | 51.21 |
| LATUA | 6 | 317.28 | 117.28 |
| LATUA | 7 | 353.30 | 77.30 |
| LATUA | 8 | 324.56 | 96.56 |
| LATUA | 10 | 246.86 | 58.86 |
| LATUA | 11 | 341.56 | 160.56 |
| LATUA | 12 | 334.28 | 174.28 |
| LATUA | 13 | 419.26 | 22926 |
| LATUA | 14 | 658.03 | 118.03 |
| LATUA | 15 | 338.32 | 48.32 |
| LATUA | 17 | 195.87 | 92.87 |
| LATUA | 18 | 562.93 | 148.93 |
| LATUA | 19 | 323.76 | 71.76 |
| LATUA | 20 | 375.56 | 28.56 |
| LATUA | 22 | 297.86 | 60.86 |
| LATUA | 23 | 291.38 | 171.38 |
| LATUA | 25 | | 36.68 |

| | | | |
|---------|----|--------|--------|
| LATUA | 26 | 182.11 | 0.11 |
| LATUA | 27 | 342.78 | 52.78 |
| LATUA | 28 | 315.26 | 74.62 |
| LATUA | 29 | 455.69 | 56.69 |
| LATUA | 31 | 411.98 | 57.98 |
| LATUA | 36 | 256.58 | 36.58 |
| LATUA | 37 | 305.14 | 65.14 |
| LATUA | 39 | 350.06 | 80.06 |
| LATUA | 44 | 416.02 | 106.02 |
| LATUA | 46 | 282.48 | 176.48 |
| LATUA | 47 | 282.48 | 112.48 |
| LATUA | 49 | 388.51 | 48.51 |
| LATUA | 50 | 233.10 | 33.10 |
| SANTARA | 1 | 268.72 | 108.72 |
| SANTARA | 2 | 351.68 | 121.68 |
| SANTARA | 3 | 391.34 | 41.00 |
| SANTARA | 4 | 356.54 | 70.00 |
| SANTARA | 6 | 301.90 | 100.00 |
| SANTARA | 7 | 337.92 | 72.92 |
| SANTARA | 8 | 371.51 | 1.51 |
| SANTARA | 9 | 405.10 | 105.00 |
| SITARA | 10 | 277.22 | 90.00 |
| SANTARA | 14 | 224.20 | 50.00 |

| | | | |
|-----------|----|---------|---------|
| SANTARA | 15 | 296.64 | 100.00 |
| SANTARA | 16 | 353.30 | 70.00 |
| SANTARA | 20 | 343.99 | 88.99 |
| SANTARA | 21 | 243.22 | 43.00 |
| SANTARA | 23 | 353.70 | 50.00 |
| SANTARA | 25 | 236.75 | 57.05 |
| SANTARA | 26 | 344.39 | 84.39 |
| SANTARA | 27 | 334.28 | 60.00 |
| SANTARA | 28 | 528.53 | 110.00 |
| SANTARA | 30 | 324.16 | 164.00 |
| SANTARA | 31 | 249.29 | 60.00 |
| SANTARA | 32 | 334.28 | 60.00 |
| SANTARA | 34 | 190.21 | 40.00 |
| SANTARA | 37 | 262.72 | 120.34 |
| SANTARA | 40 | 319.30 | 80.00 |
| SANTARA | 41 | 382.84 | 180.00 |
| SAN TARA | 42 | 496.16 | 170.00 |
| SAN TARA | 44 | 303.93 | 80.00 |
| SANTARA | 46 | 392.55 | 80.00 |
| SAITBA RE | | 8756.78 | 946.38 |
| TOTAL | | | 8676.32 |

CHAPTER -VII

JOINT FOREST MANAGEMENT

Introduction: - The Koihan Division has a widespread problem of encroachments. The magnitude of encroachment is enormous and its nature has been dealt with in the chapter of Rehabilitation Working Circle . Most of the forests has been ravaged and are still being ravaged. The need of the hour is to enforce the rule of law strictly and to organize local people, convince them and utilize them against the encroachers who are outsiders. The Department of Forest & Environment , Govt. of Jharkhand has already promulgated a “SANKALP “dt. 27.04.2001 . This resolution provides for the creation of village forest management and protection committees in Protected Forests and Eco- development committees for protection of Reserve Forest.

Resolution :- Resolution the Govt. of Jharkhand to strengthen the peoples participation in forest protection and management is appeneded. 2.7.2. The Committees Working in Kolhan Division :- At present , following committees have been constituted in the division but these are in infancy . These needs to be taken care of and supported by the department.

LIST OF VFMPc IN KOLHAN FOREST DIVISION

| S.N. | Nameof Village Forest Management and Prot- ection | Name of Forest Beat | Name of Related Villages | Name of Forests . | Area in Hect. | Remark |
|------|------------------------------------------------------------|------------------------|--------------------------------|-------------------------|------------------|--------|
| | | | | | | |

| | | | | | |
|---|------------|-----------|------------------------------------------------------|------------------------------------------|--------------------|
| 1 | Kuira | Kuira | Kuira | Kuira PF | 427.76 |
| 2 | Ichahatu | Kuira | Ichahatu | Ichahatu PF | 130.72 |
| 3 | Mohansai | Kuira | Amrai,Buruduia Mohansai,Beraduia , Jhilruan | AmraiPF Mohansai ,JhilruanPF | 508.13 |
| 4 | Dopai | Khuntpani | Dopai | Dopal PF | 439.50 |
| 5 | Chirubera | Khuntpani | Chirubera | Chirubera | 403.89 |
| 6 | Dumaria | Goilkera | Dumaria,Sipua,Kul a | FS Goilkera DPF | 330.96 |
| 7 | Sonpokhari | Posaita | Sonpokhari | Ganmore | 328.83 |
| 8 | Barposh | Timra | Barposh,Raidih, Dhipa | North PF Ganmore South PF TOTAL | 4605.20 7091.75 |

LIST OF ECO-DEVELOPMENT COMMITTEES IN KOLHAN FOREST DIVISION

| SI No. | Name of Eco-Development Committee | Name of Beat | Name of Village | Name of Forests | Area in Remain Hectare |
|--------|-----------------------------------|--------------|-----------------|---------------------------------|------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | Banki | Banki | Banki | Latua 1 to 6, 38,39,40,43,44 | 3450.02 |
| 2 | Buruborta | Borta | Borta | Latua 12 to 18, 47,48 | 3590.04 |
| 3 | Husipi | Sangajata | Husipi | Satara 21 to | 3657.28 |

| | | | | | |
|-----------------|-----------|-----------|--------------------------------------------------------------------------|----------------------------|---------|
| | | | | 26,33 to37 | |
| 4 | Rajabasa | Banki | Rajabasa | Latua 28 to 37,41 | 3748.28 |
| 5 | Gitilpi | Kuira | Kadamdiha, Chhota Kuira,Gitilpi, Barukuti,Dorbo, Ichahatu. | Santara 3 to 11 | 7536.24 |
| 6 | Kuira | Kuira | Kuira,Latarsai, Janaksai,Salikuti, Kundruburu, Siringkocha, Kandarkocha. | Santaral,2, 12 to 16. | 5989.48 |
| 7 | Khuntpani | Khuntpani | Khuntpani | Khuntpani F.S. | 1415.22 |
| 8 | Rangamati | Barkela | Rangamati | Kundrugutu-Pasubera F.S. | 178.07 |
| 9. | Ututua | Khuntpani | Ututua | Hijia Part | 364.24 |
| 1(1 | Hijia | Khuntpani | Hijia | Hijia Part | 323.76 |
| 11. | Patung | Goilkera | Patung,Rairawan | Leda 231028 | 1730.47 |
| 12. | Karkara | Goilkera | Karkara | Leda 4,5 | 727.64 |
| 13. | Lajora | Goilkera | Lajora | Leda 5,6 | 698.10 |
| 14. | Soda | Timra | Soda,Surguiya | Ambia 9,15 to 17 | 1366.25 |
| 15. | Khajuria | Goilkera | Khajuria | Leda 13 to 17, 19,20,29,30 | 3079.72 |
| 16. | Kentora | Goilkera | Kentora,Purana-Goilkera,Rumkut, Torangsai | Leda 1,2,3 | 913.80 |
| Total :- | | | | 38319.80 | |

Sharing of Revenue: - The resolution has a very elaborate arrangement for the sharing of revenue. As far as sharing of revenue earned through exploitation of Reserve Forest is concerned, it is proposed to spend 50% of net revenue of eco-development schemes. Exact percentage will be decided by the concerned territorial Divisional Forest Officer concerned depending upon the level of involvement of committees in protection, conservation and management of the forests.

CHAPTER- VIII

MISCELLANIOUS REGULATION

Elephant project:-

After Saranda, maximum number of elephants are found in Kolhan Division. Number of elephants reside in this Division is around 61 as per 2002 census. More number of elephants are found in areas of more denser forests like Saranda, Koihan and Dalma Wildlife Sanctuary as compared to the other divisions due to degradation of habitat and shrinkage of forest cover in those divisions. The data about the elephant vis-à-vis its environmental its interrelationship, interaction with the surroundings or conflict with the human population dependant on the forest is enumerated in detail as given below.

Hence keeping in view the huge population of elephant residing in the Koihan Division and interrelationship with the Koihan forests and conflict with the people will call for constitution of a elephant Project to address Various issues related to elephant. The area of the Koihan Forest Division has been included in the Elephant Project which has been approved by the Govt. of India. A large number of Elephant killings during the last few years is unfortunate and the preventive measures are immediately required. No of Elephants killed in last ten years

| Year | No. | of | Nature | of | No. of Elephants killed in | Remarks |
|------|----------------|----|--------|----|----------------------------|---------|
| | Elephants died | | death | | poaching/ collision train | with |
| 1992 | 1 | | 1 | | --- | |
| 1997 | 1 | | 1 | | --- | 1 |
| 1999 | 4 | | 2 | | 2 | |

| | | | | | | | |
|-------|----|--|------|--|----|--|---|
| 2000 | 6 | | ---- | | 6 | | 1 |
| 2001 | 4 | | --- | | 4 | | |
| 2002 | 2 | | 1 | | 1 | | |
| Total | 18 | | 5 | | 13 | | 1 |

No of persons killed by the Elephants in the last 10 years

| Year | No. of Person Killed | Compensation Paid |
|--------------|----------------------|-------------------|
| 1992 | 1 | 20,000!- |
| 1993 | 1 | 20,000/- |
| 1994 | 1 | |
| 1999 | 3 | 60,000/- |
| 2000 | 3 | 1,75,0001- |
| 2001 | 2 | 1,25,0001- |
| 2002 | 6 | 3,25,0001- |
| Total | 17 | 7,25,000!- |

Extent of crop damage acres, where much more crop villagers.

Kolhan Division falls through the territorial divisions, as reported in the last ten years is 152.26 area damaged, has gone unreported by their main Singhbhum tract (West) which passes namely Saranda, , Porahat, Chaibasa South, & Chaibasa North. There are patches of compact Moist Peninsular Sal forest in Koihan Division, which harbour the largest population of elephants in this tract. Koihan Division and contiguous parts of Porahat Division also have moist peninsular sal forest along with Dry peninsular sal forests and Dry mixed Deciduous forests..

Conservation problems and issue: Threa

of habitat fragmentation :-

Some continuity of forest cover exists in the forests of Saranda and Koihan Divisions. It is, however pointed out that, Jharkhand Agitationists have cleared the valley portions of pristine forests, which in reality , is the best habitat of elephants. Mining is the next most important factor responsible for fragmentations of habitat in Koihan Division. Mining activities have disturbed the habitat by causing huge breaks in the continuity of habitat. It has led to decrease in the density of forests. People living in and around forests have also contributed towards the habitat degradation and fragmentations in Kolhan Division. Driven by poverty and unemployment, people living in the proximity of forests indulge in illicit felling of trees, thereby causing damage of the habitat.

Jharkhand fellings are a major 'reason for the fragmentation of elephant habitat in the region. It has cost a heavy toll on the forests, especially in the valley portion of hill forests which constitute the best habitat of elephants. Koihan Division forests, as of today, is heavily encroached by local habitants as well as by people coming from the adjoining Ranchi District. As a result elephant habitats have been destroyed by a number of settlements which have come up within the forests. Such population is thus often exposed to movement of elephants and consequently man- animal conflicts have become a recurring problem. Railway lines have also fragmented the elephant habitat in the reserve. Railway lines within Singhbhum Region are the busiest due to industrial areas being in the vicinity. Consequently, apart from passenger carriages, unending racks of minerals, raw materials and finished goods move constantly. In the last few years, several elephants have been killed by speeding trains while crossing railway tracts linking Nagpur to Tatanagar during night hours in Kolhan Division.

Anthropocenic pressures on habitat.

The large human population both within and along the periphery of the reserve has made substantial impact on the vegetation in the reserve. The local inhabitants are dependent on the forests for fuelwood, collection of NTFPs (Non timber forest produce), poles and other resources of the forests.

Elephant — human conflict.

Since the elephant habitat in the reserve is highly fragmented, this reserve has very serious problems of elephant- human conflicts. Crop depredation by elephants is common in this forest division. Cases of manslaughter by elephants, often associated with crop depredation are also common in the division reserve. Man- elephant conflict reaches its highest peak during the ripening season of crops like paddy and jack fruit. It has been noted in Kolhan Division that during

the paddy season, elephants take shelter in Ganmore protected forests throughout the season and regularly come out in the night hours to forage on paddy. It seems that elephants have developed a taste for paddy and other forms of agricultural crops in this reserve. It has also been observed that elephants are attracted towards the local drink(Hadia) which is widely consumed by people in the reserve. There have been instances where elephants have damaged houses in order to get access to the local drink kept in side houses. All this factors have contributed to an increasing level of man- elephant conflict in the Koihan Division.

Poaching :- Stray cases of elephant poaching have been noticed in the reserve. Several of these cases have been detected and stringent action have been taken against the culprits and several elephant tusks have been recovered from them. As of today, there is no apparent evidence of organized poaching gangs operating in this reserve. In comparison to the sex ratio of elephants of south India , this reserve boasts of much healthier male elephant population.

Recommended Action.

The main priorities for elephant conservation in this division include habitat maintenance, increasing forest cover through plantations, conserving crucial elephant corridors, minimizing man- elephant conflicts, controlling ivory poaching and possibly evicting encroachers living in side forest areas.

Corridor linking Kolhan Forest Division in Singhbhum West tract and Bonai Forests in Orissa.

This corridor is relatively intact with patches of forests which have a sense of contiguity. Elephants migrate from Bonai District of Orissa and enter Saranda Division. Then after it moves into Koihan Division crossing the Nagpur- Tata Railway tract and enters Porahat Division. A splinter group of elephant further migrates from Porahat Division and enters the adjoining Gumla District. Elephant death caused by speeding trains on the railway tracts is perhaps the biggest problem of this otherwise safe and intact corridor. Adequate measures have been undertaken by the Forest Department in co-ordination with railways to prevent elephant deaths by speeding trains.

Control of poaching.In this reserve, stray cases of poaching have been detected. Time and again poachers have been arrested and have been tried under the wild life protection act 1972. Apparently, there have been no tangible signs of any major poaching network operating in the reserve. An antipoaching team comprised of trained persännels should be constituted. This team should be equipped with the latest devices to combat poachers. Given the good number of tuskers in the reserve, there is a likely wood that poachers from other reserves may enter the reserve to poach tuskers for ivory. Thus an alert approach is the need of the hour.

Plantation: - Plantation of bamboos, other fodder species and fruit bearing species shall be taken up as a measure to confine them to forests and to discourage them from straying into human habitations in such of forage. 4. Construction of water holes: Water holes shall be constructed at the interior of forests to meet the water requirement of pachyderms.

Minimizing elephant human conflict.

Man —elephant conflict is a major impediment in the success of the survival of elephants in this reserve. Due to a highly fragmented habitat, elephants have been moving astray from their traditional migration routes into cultivated fields and human settlements for easy forage. This in turn has led to loss of several human lives as well as elephant deaths due to poisoning by angry villagers. This has brought about lot of resentment amongst people living in the reserve.

Adequate and timely compensation of loss of human lives, human injuries, property damage and crop damage needs to be given. The procedure of getting compensation is complex and rather time taking. This procedure needs to be simplified to bring quick relief to the affected people. Some elephants which have been identified as threat to human life and notorious crop raiders may have to be captured.

The existing habitat in the reserve needs to be maintained and protected. The crucial corridors also need to be given prime importance. Certain suitable plant species like bamboos and fruit bearing species need to be planted inside the habitat so that the elephants will not come out in the cultivated fields and human settlements for forage. The technique of changing crop patterns by the villagers can also be an effective means of keeping the elephants away. Lastly, the people living in the reserve need to orient their lives to co-exist with elephants in this reserve. An effort to sensitize and educate the inhabitants of interior forests and villagers on the fringes of forests for attitudinal reorientation will go a long way in resolving the conflicts and preserving elephant population.

Forest Fire Protection Management :- Forest Fires are the main cause of concern. For sometime in the past fire has been occurring almost regularly in most parts of these forests and even regenerated areas are getting burnt. The writers of previous plans also sounded a note of warning against equanimity or indifference regarding forest fires and emphasized the necessity of effective fire protection. There are several causes for the worsening of situation in regard to forest fires. Several new weekly **hats** have since sprung up either within or at the fringe of these forests. It has been noticed that fire during summer commonly starts about midday on hat days. It is caused by the people going to the hat who carelessly throw away the lighted stubs of bin on to the dry leaves. Another factor abetting forest fire is the progressive desiccation of these forests. The cumulative consequence of all these is that despite all vigilance of the staff, forest fire have been most difficult to master in the given conditions. The remarkable capacity of a forest to recuperate from the attack of forest fire is something to provide relief. But the burning away year after year of the humus and forest litter robs the forest of its capacity to absorb and conserve moisture or prevent soil erosion. Repeated forest fire inevitably lead

to accelerated soil erosion and desiccation and in course of time these fine forests are burnt , if the fires are not recognized as one of the deadliest enemies , to reach the doleful state of the erstwhile private forests wherein the streams dry up shortly after the rains and the eroded dry soil supports only poor crop. It is generally experienced that in these forest also streams are getting drier year after year and many streams that were perennial in the past now dry up before summer has started or advanced far enough. This drying up of streams is directly attributable to forest fire which burns away the humus and forest litter and hardens the soil into which the rain water does not get a chance to seep and most of it runs away. There is unmistakable evidence in these forests, that it is moisture that decisively controls the quality of trees. The best crop is found in the valley bottoms or on the lower slopes chiefly because more moisture is available there. It follows therefore that if forest fire continues annually to sweep these forests the moisture content of soil will gradually decrease and in course of time reach a stage where even in the valley bottom there will be very little sub- soil moisture left after the rains. The resultant picture can very well be visualized. The quantity of the crop will seriously deteriorate and Q I or Q II sal will give place to Q III / IV and may finally to Q V . This consideration will help in the assessment of the very severe though insidious damage that is relentlessly being brought by forest fire. It will be doing permanent injury to overlook these facts or to economise in expenditure over measures to banish forest fire from these forests. It is proposed to prepare. a fire map of the division based on the following aspects_

(i) On both sides of the forest roads 33'. stretch of strip would be cleared and controlled burning shall be carried out before the fire season.

(ii) The regenerated area should have measures of special protection and a girdle of 100 feet width should be cleared of all shrubby growth and control- burnt like the fire-lines twice each summer season.

(iii) All the exterior and interior boundary lines should be properly cleared and burnt twice , once at the end of March and again at the end of April. Leaf fall is normally not complete before the middle of April each year and hence the burning in March is not fully effective. These again become vulnerable by subsequent leaf falls. In order that these lines may serve their purpose in a more effective manner it becomes essential that a second burning be done at the end of April when the leaf fall is complete. It is also suggested that these boundary lines be burnt to a width of 100 feet. Beside the clear felled strip of a boundary line, all the shrubby growths toward the forest side should be cut so as to make the total width 100 feet and be burnt as suggested above.

(iv) All the roads and important foot-paths inside the forest area should be properly fire traced by cutting and burning all the shrubs in a strip 10 feet wide on either side of each road and important foot-paths.

(v) The villagers normally burn their gora lands in April each year. They usually light the fire in the evening and let it burn unguarded . Very often the fire escapes to the adjacent forest and does the damage . This practice is one of

the major sources of forest fires and calls for some measures of control. It is accordingly recommended that each Beat Officer should collect a detailed information of all the gora lands adjacent to forest boundaries in each of the villages falling within his beat and , in consultation with the villagers concerned, fix a time schedule for burning the gora lands in different villages under the direct supervision of forest staff.

(vi) On each hat day an intensified patrolling of important foot-paths leading to the hat concerned should be arranged. If possible each patrolling party may be equipped with an amplifier set so that the passers-by may be constantly re-mined to observe the strictest possible fire protection measures.

(vii) Since it is difficult these days to get voluntary labour for extinguishing forest fires even though the forest law provides for it, there should be provision for adequate funds in the budget for this purpose.

(viii) Provision of more fire patrols than at present.

(ix) Building of fire watch towers to detect fires.

(x) Every range should have a motor —truck placed at its disposal, at least for the months between February and June, for the purpose of rushing labour to the point nearest to the forest fire. At present even though labour may be readily available it takes too much time to reach the men to the scene of forest fire and meanwhile much damage is caused.

(xi) There should be a system of rewards for meritorious work in the fire protection. it is recommended that rewards should be liberally granted and should be paid to outsider as well as to forest staff who have successfully prevented or extinguished forest fires.

(xii) There should be intensive publicity to bring home to the people residing near the forest or visiting it for purpose of pleasure the evil consequence of forest fire. Posters should be put at important points and printed leaflets should be distributed each year before the fire season starts. Publicity meetings be held in each of the local hats and the far reaching damaging effects of forest fire be explained in the local dialect with the help of slides and films.

(xiii) Control of forest fire at the early stage is comparatively much easier because at the time the front outline of the fire is small. Hence detection of fire at

the earliest stage should be aimed at. For this sufficient number of fire watchers should be employed during the fire season. These fire watchers will be attached to different fire stations. The fire watchers will always be on move during fire season. In the event a fire is detected he will himself try to control the fire then and there with whatever local assistance is available and in the meantime he will send message to the fire station for rushing the fire fighting squad.

(xiv) During annual tribal hunt fire is generally set to the forest to drive away the wild animals in a particular direction. Hence special precautions should be taken against such forest fires. For this the tribal hunters should be warned about serious consequences of forest fire. A few fire watchers may also be deputed with the hunters to ensure that fire is not set to forest.

Minor Forest Produce:-

Kendu Leaves: The potential of Kendu Leaves are very high in the Kolhan division. Collection by Forest Development Corporation could not do justice with the potential and needs efficient management. Pre silvicultural treatments are not being undertaken and thus the output and quality both are suffering. The quality of Kendu Leaves is determined on the basis of larger size, thinner and more elastic nature. The process, place and duration of drying also play important part for getting higher prices for the bagged leaves. Usually 50 leaves half bundled in one direction and half in other direction constitute a "Pola". The presilvicultural prescriptions are following

- (i) Pruning of the branches of Kend tree will be done annually.
- (ii) Pollarding will be done on saplings of less than 30 cms. Gbh. Pollarding will be done on such saplings at a height of 60 to 90 cms. from the ground.
- (iii) The pruning must be completed before **31st** March every year.
- (iv) For pruning ,only sharp instrument should be used.
- (v) No tree will be coppiced from root.
- (vi) Kend plants of height between 60 cms. To 90 cms. Or sticking to the ground will be coppiced from root.

Collection of sal, Mahua and Karanj seeds : The collection of these seeds suffer because the Forest Corporation concentrate on the collection of Kendu Leaves only and in the process the collection of seeds is neglected. Special efforts are needed to collect these important seeds.

Kendu leaf obtained from the forests has emerged as a big revenue earner since the year 1973 when the kendu leaf trade was nationalized and monopoly was created in favour of Bihar Forest Department by an amendment of the State Legislature. Comprehensive rules have been framed under the Act to regulate the collection and marketing of kendu leaves. The policy about the working of kendu leaves is decided from time to time on the State level and they are enforced all over the State uniformly. It is proposed that Kendu leaves may be collected through VFMP. Jharkhand Forest Development Corporation will market the kendu leaves. Net profit will be deposited in the accounts of VFMP as per JFM resolution.

OTHER MINOR FOREST PRODUCE

SAL SEED: Of late sal seed, like kendu leaf has gained importance from the revenue point of view. Previously sal seed used to be collected by private contractors. Since 1977 this is being done departmentally through the agency of Bihar Forest Development Corporation. At present the procedure is to purchase sal seed at fixed rates from the local villagers who collect the fruit from the forest. The sal seed is marketed in kernel form. It is proposed that Sal seed will be collected through VFMP, marketed by JFDC and net profit will plough back to VFMP as per JFM resolutions.

OTHER OIL SEEDS:

Due to increasing demand of vegetable oil in the country the demand for oil seeds produced in the forest has been increasing. Mahua and Kusum are *the* most important among the oil seeds produced in the forest. The seeds are collected by villagers by virtue of their right for their bonafide domestic

Consumption. These should be collected by VFMP low Sal seed and Kendu leaves.

FRUITS AND FLOWERS:

Mahua flowers: The corolla of Mahua flowers is collected on a very large scale from trees growing inside and outside forest. It plays a significant role in the economy of rural population. The flowers are eaten by the villagers. Part of it is locally distilled for liquor. A very significant portion of the total produce is sold away in the hats which ultimately goes to distilleries.

Myrabolans: The fruits of Harra(Terminalia chebula), Bahera(T. belerica), and AmIa(Emblica officinalis) jointly known as myrabolans have since long been collected for medicinal use. The villagers collect and sell the fruits to local vendors in the hats. These fruits have little domestic use in the villages. Hence these can be safely disposed of by public sale without interfering with rights of people. Large scale plantation of myrabolans especially hybrid Aonla should be planted. This may be collected and marketed through VFMP.

Chiraunji: The kernel of Buchanania lanzan nut is known as chiraunji. It is collected by villagers and sold in the local hats during season. The chiraunji kernel is rich in oil content and is used as dry fruits in making sweets. Buchanania lanzan is very commonly found in the forests of this Division. But the production of kernel is much less as compared to its occurrence. The reason for this is the felling of the trees either for fruits itself or for gum. Villagers sometimes, cut away the tree itself for collection of ripe fruits. There is necessity for protection of chiraunji trees.

The trade of chiraunji kernel is in the hands of mahajans. The villagers hardly get the proper wages. The mahajans get the major profit. Marketing of Chiraunji may be done by VFMP or JFDC. Presently it is observed that due to absence of marketing infrastructure, the villagers are severely affected in prices. Evolving a local marketing infrastructure strategy with JFM assuming a leading role will go a long way in ensuring remunerative prices to primary collectors and thereby improving the village level economy.

Mahulan: The mahulan (*Bauhinia vahlii*) is a common climber in moist localities. It grows to giant size and does a lot of injury to valuable species. The stem of the climber is used as chope for rope making by the villagers and the leaves are used for making Patta (leaf plates). The Patta made of mahulan leaves has good market in the south. Steps should be taken to increase the production of Mahulan leaves.

2.8.8.9. Other wild fruits like bher, wild mango and herbs like chiraita also form part of village economy, whose organized marketing is yet to be streamlined and institutionalized.

Roads :- Although the bulk of the division has well connected roads, there are still such areas which are inaccessible. A careful maintenance of existing roads and to make them all weather roads is desired. All the existing forest roads will be properly maintained and improved.

There is still much scope to reduce the gradient and ease the sharp turnings. A regular scheme needs to be introduced to gradually replace the existing wooden bridges and culverts with pucca ones. Apart from this there is a great need to provide pucca causeways at some places to make the areas easily approachable and thereby to make the extraction more easy. List of forest road is annexed as annexure - III

Buildings :- The division is well provided with rest houses. Ranger's rest houses are needed at some places in order to facilitate effective supervision of field works. Further, in view of the proposed splitting of the existing unweildly beats and sub-beats some more quarters for forester's and forest guards will be required. The building list of division has given in Appendix - IV

There has been some infiltration and enhancement of nexalites activities in the past few months. Instead of making scattered and lonely quarters, it is necessary to elect the proper places for the forest quarters and these should be constructed in groups and considering the security of the forest and forest employees both.

Maintenance of boundaries

Divisional boundary :- This is maintained on a five —year programme. The quinquennial scheme will continue but it is most important that a part of the line annually programmed for should be checked every year by the Range Officers in person and the Divisional Forest Officer himself to ensure that it is being properly cleared and that the boundary pillar numbers agree with those on the map. The Divisional Forest Officer

shall submit a certificate with the control form that not less than 25 % of the boundary lines in the annual programme of each beat have been inspected by the range officers in person and 10 % by himself.

A scheme has been drawn up afresh showing the length of boundaries and the and the number of boundary pillars to be inspected each year.

Boundary Pillers: - There are 4196 number of boundary pillars in this division. Some of them are not good shape, in some cases they are missing all together .770 Nos. of boundary pillars were repaired in 2002-2003 and 647 boundary were repaired in 2001-2002. It is proposed construct and renovate other damaged boundary pillar in the plan period.it is proposed to construct 2500 boundary pillars in 5-year scheme.

| year | Boundry Piller | | |
|-----------------|-------------------|-----|-------|
| Physical Target | Cost in Rs. Lakhs | | |
| 1 | 8 | | 9 |
| 2003 | 2004 | 500 | 0.974 |
| 2004 | 2005 | 500 | 0.974 |
| 2005 | 2006 | 500 | 0.974 |
| 2006 | 2007 | 500 | 0.974 |

Compartment Histories The compartment history forms an essential record of great importance and its importance and its upkeep in meticulous detail is stressed. Acoñipiete duplicate set has been prepared for the division and this will be maintained in conformity with instructions contained in the Code of Working Plan Procedure and as the Conservator may from time to time direct. They will be inspected and checked periodically by the Conservator Of Forests or the Working Plan Officer. It is essential that adequate arrangements are made to record the outturn from each compartment.

Maps :-

Existing stock maps are best checked each year at the time of demarcating the annual coupes. Any discrepancies noticed should be recorded on tracings of contour map prepared specially for this purposes. These should be checked by the Divisional Forest Officer after which they will be incorporated in the printed contour maps by the Working Plan Officer at the next revision of the plan.

The Divisional maps :- A complete set of maps on the scale of 4 inches to one mile will be kept filed unfolded in the drawer of a suitable map almirah in the divisional office and maintained up to date. The following will be shown on this set.

1. All boundaries and boundary pillars and these will be checked periodically.
2. All existing roads , building and plantations and other items of a permanent nature, any newly constructed roads etc. will be neatly entered by means of the prescribed symbols as soon as completed.
3. This map is not intended for use as a coupe map and coupes and other information which is not of a permanent nature will not be shown.
4. The range and divisional working sets of maps will be periodically brought up to date from the divisional master set. Range Officers

must be warned against the misuse of maps and measures must be taken to see that only the standard symbols are used.

5. A tracing of all addition to the divisional maps , or if more convenient the original sheets, must be submitted to the Conservator of Forests for incorporation in the circle maps.

Removal of fodder Grass: Right holders may remove the fodder grass free of cost from forest and plantations. Commercial removal can be done on payment. Local people and V.F.M.P.C.'s will be encouraged to introduce stall feeding.

Petty Felling :-Felling of petty nature as detailed below may be carried out :-

(I) Dry or green trees required for departmental work.

(ii) Trees to be felled in course of experiment or for supplying timber specimens to the Forest Reseach Institute, etc.

Sample Plots and preservation plots: - Sample plots with their surrounds, preservation plots, protected trees and field experiments shall be excluded from exploitation.Total 8 no. of sample plots are located in this division.

| | | |
|--------|------------|--------------------|
| S.P.1 | SANTARA-16 | L.T.I.OF SAL |
| S.P.2 | SANTARA-18 | L.T.LOF SAL |
| S.P.3 | SANTARA-18 | L.T.I.OF SAL |
| S.P.4 | SANTARA-23 | L.T.I.OF SAL |
| S.P.6 | SANTARA-23 | L.T.I.OF ANOGISIS. |
| S.P.36 | SANTARA-18 | L.T.LOF TEAK |
| S.P.39 | LEDA-14 | L.T.I.OF GAMHAR |
| S.P.40 | LEDA-4 | L.T.I.OF TEAK |

Forest Journals The forest journal will be maintained according to standing orders.

Fire records A fire map of the division will be maintained according to the order in force . Areas burnt will be indicated by the standard symbols given in

Appendix 11(V) of Working Plan Code. A brief note will also be recorded in form (f) of compartment history. Areas burnt will not be marked on the compartment history maps but on a tracing maintained in the history.

Control Forms All the control maps as provided in the working plan code must b duly filled and submitted by the concerned territorial D.F.O.,the failure of which in the past has resulted in serious irregularities.

Protection of Forests :- Protection of Forests should be given top priority because this is the only significant reason for the degradation of the forest area in this division.Following prescriptions needs to be adhered to :-

(i) All the vacant posts of Forest Gaurds,Foresters and Range Officers should be filled at the earliest.

(ii) The officer concerned must manage the forests strictly on the basis of approved working plan and micro plan. A lot of damage has already been done due to careless and adhoc management of forests without any long term planing. (iii) Sufficient vehicles at the divisional headquter (At least two)and one jeep in each Forest Range should be provided.

(iv) Wireless net work ,presently ,is not working effectively needs to be strengthened so that the communication should be fast and productive.

(v) Lady Forest Gaurds should also be appointed and posted in each ranges to tackle with the forest offences being committed by the women and also for better communication with them.

CHAPTER-IX

MANAGEMENT OF FOREST VILLAGES

General Constitution :- The areas comprised in this Working Circle are parts of reserved and protected forests where entire or part compartment of Reserved Forest Blocks had been set apart for the purpose of establishing forest villages in order that labour for cultural or exploitative work may be readily available.

Special Objects of Management — The objects of management of this working circle are

- (i) to ensure maximum availability of labour with the minimum sacrifice of valuable forest land.
- (ii) to silviculturally manage the forest still standing within the limits of each forest village and to prevent wasteful deforestation.
- (iii) to rationalise the agricultural practices and to aid the forest villagers in producing the maximum quantity of food from the minimum acreage of land , by subsidising preparation of terraced fields , and by providing irrigation facilities.
- (iv) to make provision for medical and irrigation facilities for the forest villages, to improve housing condition and drinking water supply , to ensure hygienic living and elementary education, and improve condition generally.

Area and Distribution :- The details are as follows:-
Name of Villages

| Sl. No | Name of Village | Block | Compartment | Area in Hectare |
|--------|--------------------------|---------|-------------|-----------------|
| 1 | 2 | 3 | 4 | 5 — |
| 1 | Rajabasa Forest Village | Latua | 53 | 84.99 |
| 2 | Husipi Forest Village | Santara | 24,25,36 | T9Jö |
| 3 | Tambahaka Forest Village | Santara | 47 | 86.60 |

| | | | | | |
|---|----------------------|--------|---------|--|--------|
| 4 | Rangamati Village | Forest | Saitaba | | 178.07 |
| | Total | | | | 540.67 |

The total area under this working circle is 540.67 Hactares.

Methods of Treatment— To achieve the objects of management the following prescriptions are made.

Management of the forest still standing within the boundary of each forest village:-

The limits of composite land set apart for each forest village , whose area is stated in column 3 of the above table ,have been demarcated by cleared line and boundary pillars. The composite land supports homestead, cultivated land orchards , grazing ground and forest . The forest still remaining within the boundary of each village is however not delimited either on the map or on the ground. The forest villagers cut in this forest and utilize whatever they like. They also clear any portion of the forest for extension of cultivation. In fact the forest is considered as having been allotted finally and inalienably to the control and dispensation of the villagers concerned and no account or note whatsoever is taken of how the forest is being treated. There is no doubt that the forest and the land comprised in a forest village are intended for use by the settlers, and they should have access to and reasonable use thereof. But in practice it is noticed that the forest is being misused in most places. Fine forest patches are sometimes cut and cleared just to prepare untterraced fields for marginal upland cultivation. Such cleared slopes are cultivated for a year and two and then rested a number of years or even abandoned . Such clearance and use of good forest land is demonstrably uneconomical and should not be allowed . Also the villagers wastefully cut trees when they want small timber and poles for house or machan, building , and create gaps in the forest or riddle it with high stumps. If instead cutting be done in the manner of thinning., the necessary produce can be obtained while at the same time the forest will be conserved. It should not be forgotten that some of the valuable valley forest and potentially rich land had to be set aside for establishment of forest villages and every effort should be made to reduce the sacrifice to the minimum purpose.

Therefore the following **prescriptions** are made :-

- (i) The portion of forest still standing in each fOrest village should be demarcated by an internal demarcation line and posts.
- (ii) No fresh clearing therein shall be permitted.

(iii) No green sat or miscellaneous trees of 8" and above in diameter shall be cut without the permission of and marking by the Range Officer. Such marking shall be done in the nature of thinning and improvement felling. The headman of the village shall see to it that wasteful cutting of miscellaneous trees is not done nor gaps or blanks are created in the process.

(v) So far as possible , the forest of each village shall be divided for purposes of grazing into two parts and grazing should be done alternately in each.

2.9.5. Irrigational Facilities:- For irrigation of agricultural lands and of fruit and vegetable orchards, irrigation channels tapping perennial streams should be constructed on the lines of Kumdi, Thalkobad and Tirilposi forest villages in the Saranda Division. Given sufficient water all the year round two crops may well be taken from the land which yeild but one precarious crop at present . Also fruit and vegetable growing may be encouraged. Intensive agriculture and horticulture will not affect labour availability for forest work since in the family there generally are members who may be physically unfit for forest work but can very well attend to agriculture

or fruit and vegetable growing. Forest labourer can also attend part-time to this side of family's activities.

Medical and Educational Facilities At present no medical facilities are available **unless** one **goes** to Goilkera, Sonua or Chaibasa . **A mobile** dispensary is recommended for service to the forest villagers and also to the forest staff working for long months in the forest or staying permanently in the interior Perhaps one properly equipped van may serve by turns the two adjacent Forest Divisions of Kolhan and Porahat. The existing facilities for education of the children of forest villagers are far from adequate. It is recommended that through the Education Department one primary school in each of the forest villages may be established and run regularly and properly. It may be arranged with the authorities of the Education Department that lump sum grants on account of pay of teachers, maintenance of building and equipment etc. , be annually placed at the disposal of the Forest Department who will actually disburse the amount and render account to the Education Department . The later can not , for remoteness of the area, directly disburse the pay in time or look after the school , and the state of affairs prevailing today confirms this.

Drinking Water Supply: - The availability of hygienic supply of drinking water is generally is deficit. In summer months villagers have to drink unhealthy and muddy water. It is recommended that at least one good well be dug in each village where it does not exist.

Funds for general maintenance of the forest villages :- A separate chapter is added in which details of the development activities in the villages within and adjacent to the forests are given.

Preservation Plot :- There exists an interesting patch of moist miscellaneous forest in the Banko Felling Series which may be set aside as a preservation plot. It contains

Caryota urens, a species of humid forests . This is the only locality in this state where this has been recorded to occur and is worthy of preservation All possible measures shall be taken to preserve this patch and no fellings in any circumstance shall be done. The areas under Protection and Preservation plot shall be demarcated on the ground as and when opportunity offers.

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