

PART-II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED.

CHAPTER-I

Main objects of management.

1. The entire forest area dealt with falls in the Ganga basin and constitutes the catchments of the proposed dam on the North Koel at Kutku, and on the Auranga near about Betla. In the view of frequent occurrences of flood in above rivers, these forests have assumed much importance. To control floods soil erosion, permanent forest cover on the hills and steep must be maintained.
2. The forests of the divisions are located very conveniently to centres of consumption. These are adjacent to thickly populated agricultural tract and constitute the interland of the coal fields in the Damodar Valley and the industrial complex of Dehri-on-Sone. The demand for domestic, agriculture and industrial wood has grown tremendously over the years. Requirements of small timber in the coal field are also increasing by leaps and bounds. These forests have to cater to the local demand and also to feed the different wood based industries. The management would, therefore, aim at improving production for meeting the varied and ever increasing demand of timber and other forest produce.
3. Bamboo occurs in fairly good quantity. This is an indispensable raw-material for paper industry. The future management has to take extra care for improving the existing stand and to increase the production of this vital raw material.
4. Importance of non-timber forest produce has increased significantly within as well as outside the country. Some of these, indeed have become exportable commodities. Barring bamboo and kath, no sincere and earnest efforts had been made to tap this hitherto untapped source of revenue. With increase in demand, minor forest produce are destined to play a major role in augmenting resources. Development and exploitation of minor forest produce, in which this division abounds, on a systematic basis, would be an important object of management.
5. The forests of the divisions are well stocked with a variety of wild-life. These forests have, indeed gained a well deserved recognition from all lovers of wild-life not only of India but also of foreign countries. Besides sanctuaries, (Palamau Sanctuary and Wolf Sanctuary), Project Tiger Division also boasts of having a National Park. Because of its distinctive features Project Tiger is also in operation, In the modern concept of ecosystem as a whole, management of plant life can not be treated separately from the

management of wild-life. Both are complimentary to each other and together constitute the integral whole. Apart from tourist attraction, wild life play a significant role in maintaining the ecological balance. Considering the importance of wild-life in these divisions, a well thought out plan based on modern thinking has to be devised for their management.

6. Based on the above requirements main objects of management shall be :-

(i) To manage the forests with a view to provide a permanent forest cover for affording Protection against erosion, conserving water supply in catchments areas and preventing floods down on the plains.

(ii) To create favourable conditions, as far as silvicultural practices and protective measures can provide, for progression of ecological succession in areas where retrogression has set in and, to improve the ecological balance over the rest of the area.

(iii) To improve the general condition of health, growi stocking of the principal species for augmenting the supply of timber other forest produce and to exploit the site potentialities to the maximum

(iv) To meet the domestic and agricultural requirements people based on forest produce.

(v) To provide for the development and exploitation of forest produce.

(vi) To protect, preserve and develop wild-life in a suited to the local environments.

General methods of treatment.

7. As the forests of these divisions fall in the Ganga basin and constitu catchments of two important proposed dams at Katku and Betla, one main objects of management is to protect the soil and conserve the supply in the catchments and also to prevent floods in the plains. A con forest cover shall have to be maintained on the hills and steep slopes in critical areas of the catchments. A sizeable portion of the forest will, there, have to be maintained as protection forest.

8. Bamboo is the only forest species on the plains which yields long fibn constitutes a very important raw material for paper industry. This has managed separately.

9. Parts of the forests of Betla, Chhipadohar West and Mahaudanr have been subjected to maltreatment by the local population. C hackling has reduced the crop to the status of degraded rooted waste. S areas will require particular attention.

10. Considering the increasing importance and demand of bamboo in domestic requirements and also in paper industry, there is a strong case for increasing its out-put. In these divisions there is a scope for raising plantations of bamboo. To start with, endeavor will be made to plant bamboo in the bamboo bearing areas with a view to improve the stocking. In other suitable areas also bamboo may be raised artificially.

11. There is some need for raising plantations in some forests on Betla, Chhipadohar West and Mahuadanr ranges. As a result of maltreatment over the years some parts or whole of the forest have converted into blanks. These need to regenerate artificially.

12. This division is fairly well stocked with different types and varieties of wild animals. As already stated, there are sanctuaries, National Park at Betla, and Project Tiger is being implemented in Project Tiger Division, considering the importance of fauna and flora in the eco-system and environment, special provisions will be made for the development and management of wild-life on scientific lines.

Constitution of Working Circles.

13. To achieve the above objects of management, the constitution of Working circles should have the consideration of silvicultural and other aspects of management.

14. Accordingly the following Working Circles have been constituted: (i Rehabilitation Working Circle.

- (ii) The Selection Working Circle.
- (iii) The Bamboo Over lapping Working Circle.
- (iv) The Wild-life Management Working Circle.
- (v) The Plantation Working Circle.

- (vi) The Protection Working Circle.

(i) REHABILITATION WORKING CIRCLE

Forest areas which have suffered badly due to illicit felling, uncontrolled grazing and frequent fires will be treated under rehabilitation Working Circle. The areas allotted to this working circle will be 2759.58 ha.

(ii) SELECTION WORKING CIRCLE:

15. This Working Circle embraces all the forests which are on the hills and steep slopes in the critical area of the catchments of the rivers North Koel, Burha, Aksi etc., (all

sub-catchments of SONE). It includes other forests also which were managed under 'Coppice System' in previous working plan. The object of management will be to exploit the forest under the Selection-cum Improvement system. It will be endeavored to improve the composition and density of the crop. Minimum exploitable diameters of various species will be fixed.

The total area of the Working Circle is 156.23 ,ha

(iii) BAMBOO OVERLAPPING WORKING CIRCLE:

16. This working circle comprises all the forests in which bamboo occurs in proportion sufficient to permit commercial exploitation. This overlaps the forests of the other Working circles.

The total area of this overlapping working circle is 6745.93ha.

(iv) THE WILD-LIFE MANAGEMENT WORKING CIRCLE:

17. This Working Circle embraces the entire divisions including the 'Betla National Park' "Project Tiger" Plamau sanctuary and Mahuadanr Wolf Sanctuary.

18. For areas outside the Project Tiger and Mahuadanr Wolf Sanctuary, the prescription for protection and development of wild life will be basically on the pattern of these plans with suitable modification where over necessary.

(v) THE PLANTATION WORKING CIRCLES:

This Working Circle comprises the existing plantations and blank and semi blank areas which are considered fit for raising plantation in future.

20. In these Divisions there is no need of raising large scale plantations. But in some areas of Betla, Chhipadohar West and Mahuadanr range blanks exist and need to be restocked artificially.

21. There are two possibilities for bamboo plantations in these divisions, Firstly, in the existing bamboo areas primarily with a view to enhance the density and thereby to increase acre annual turn out of the forests. Secondly, bamboo may be planted in mixed deciduous areas in the under storey.

22. Tending operation have been prescribed for the existing plantations. The total area of this working circle is 2582.08 ha.

(v) THE PROTECTION WORKING CIRCLE.

23. This Working Circle comprises only such forests or parts of forests which deserve protection due to their unique vegetation, on steep slopes against soil erosion, and for scenic and aesthetic value and from the stand-point of wild-life management.

Total area of this working circle is 1766.79 ha.

DISTRIBUTION AND AREA:

24. Detailed area statement of the Division and also of the working circles is given in Appendix -II. However, area of each circle is given below.

Daltonganj South Division (Ha.)

Range/Circles	S.W.C	P.W.C.	Plantation W.C.		Rehabilitation W.C.	Bamboo overlapping W.C.	Wildlife overlapping W.C.
			Blank	Existing			
1	2	3	4	5	6	7	8
Garu West	76.21	-	-	-	-	-	76.21
Garu East	681.38	-	204.57	-	235.38	597.66	1121.33
Baresand	2718.46	872.39	-	-	-	3590.85	3590.85
Mahuadanr	5428.71	670.12	118.56	58.41	1215.40	2042.48	7491.20
Total :-	8904.76	1542.51	323.13	58.41	1450.78	6230.99	12279.59
Project Tiger Division (Ha.)							
Betla	-	-	394.66	L_141.57	364.88	417.63	901.11
Chhipadoharwest	6584.84	224.28	1664.31	-	943.91	97.31	9417.34
Chhipadohar East	133.48	-	-	-	-	-	133.48

Total :-	6718.32	224.28	2058.97	141.57	1308.79	514.94	10451.93
Grand Total :-	15623.08	1766.79	2382.10	199.98	2759.58	6745.92w	22731.49

STOCK MAPING:

The forests has been stock mapped on 4"-1 scale topo maps prepared by enlarging, 1"=1 mile scale topo maps from state file Recorder. This afforded facility of making ocular estimate of growing stock as correctly as possible. In the stock map, the extent of Sal forests, miscellaneous forests, rooted waste, blanks, extents of bamboo, have been indicated by different color and symbol as under:

- (i) SAL ... GREEN WASH
- (ii) MISCELLANEOUS
(including 25% SAL) CRIMSON WASH
- (iii) SALAI(constituting 50%
& over the crop) BLUE WASH
- (iv) BAMBOO ... BLACK HATCHES
- (v) KHAIR RED HATCHES
- (vi) AREA FIT FOR
PLANTATION YELLOW WASH WITH
RED CROSSES.
- (vii) PLANTATION.. ... YELLOW WASH
- (viii) Blank with exposed rock &
boulders soil may or may not be
in pockets.... .. YELLOW WASH WITH
RED CROSSES.
- (xi) ROOTED WASTED.. ... YELLOW WASH WITH BLACK
CROSSES.

The age classes of sal & miscellaneous crop will be indicated by putting numbers 1 to 4 detailed below:

1. MATURE ... ABOVE 8" Diameter
- 2 MIDDLE AGED 6" to 8"
- 3 SAPLING STAGE 4" to 6"
4. YOUNG BELOW 4"

Period of the plan and necessity for intermediate revision:

29. This plan has been prepared for a period of 10 years from 2003-2004 to 20 12-13. It will be desirable to make mid-term appraisal at the end of 5 years.

CHAPTER -II

WORKING PLAN FOR REHABILITATION WORKING CIRCLE.

1.GENERAL CONSTITUTION OF WORKING CIRCLE AND CHARACTER OF VEGETATION.

A large no. of forests were allotted to coppice with standard working circle and selection W.C. circle in previous working plan. Some forests included in these W.C. have suffered badly due to onslaughts of biotic factors. These areas are proposed to be included in rehabilitation working circle. Rooted wastes and blanks are special features of such areas. Density of crop is as slow as 0.4 and even low. Intensive effort to restock these areas are required. Active involvement and cooperation of people living in vicinity of forest will be sought by mechanism of village forest protection and management committees.

The forest crops generally consist of Sal and of miscellaneous species In some areas . Sal sporadically occurs at places mixed with miscellaneous species but their percentage is quite low and quality is extremely poor which can be categorized as rooted waste. Along with the Sal the species found are Salai, Kend, Dhauta, Piar, Pandan Karama, Kari, Mahua, Amla, Khair, Galgal. Occurrence the thorny scrubs like Ber, Karauda and Dithora is common. Kend occurs in gregarious form particularly in heavily grazed areas.

2. SPECIAL OBJECTS OF MANAGEMENT:

The special objects of management of this working circle are as follows.

1. To bring about improvement in the health and stocking of the forest by adopting suitable silvicultural treatments. Betterment of crops shall be object of management operation.

2. To protect rooted wastes of Sal and miscellaneous forests from illicit felling, uncontrolled grazing and fire.
3. To supplement the growing stock by sowing and planting of suitable indigenous species in gaps and degraded lands where rooted stocks are not available.
4. To create conditions conducive to rapid growth of suppressed saplings and poles. Natural regeneration of Sal and other important species will be induced.
5. To foster among local inhabitants a sense of value of forests and to win their active cooperation in protection and scientific management of forest.
6. To create employment opportunities for local people so that it may ameliorate their economic condition and reduce dependence on forests.
7. To meet bonafide domestic and agricultural requirement of local people from material obtained from silvicultural operations.

3. STOCK MAPS:

The forest has been stock mapped on 4" = 1 Miles scale. Different colors and symbols show the Sal forest, miscellaneous forest, rooted waste, crop density, age of crop and regeneration on map.

4. STATEMENT OF AREAS:

Area allotted to this working circle is given range wise as below:

1	Mahuadanr Range	1215.40
2.	Garu East Range	235.38
3.	Chhipadohar West Range	943.91
4.	Betla Range	364.88

Total 27595'

The detail of areas is given in Appendix- II. It is proposed to rehabilitate entire areas in 10 years. Annual target of rehabilitation task will be about 280 ha. which will be accomplished with involvement of VFMPSC.

5. METHOD OF TREATMENT:

Following measures will be adopted to treat the areas of this working circle.

(1) All high stumps, pollarded stems shall be cut back between December and March so that full growing season may be available to shoots.

(2) Healthy, straight, young saplings and poles of 3' g.b.h. and below whether isolated or in patches shall be left intact and allowed to form a part of the future crop.

(3) The produce obtained from cutback operation will be given to the right holders for their bonafide requirement.

(4) After disposal of the produce, the area shall be fenced by trench fencing or this job will be entrusted to VF MPCS, wherever it is working satisfactorily. This fencing will be maintained for five years.

(5) Complete protection against fire should be provided.

(6) The blank areas shall be restocked by sowing and planting of indigenous species.

(7) In the areas badly affected by erosion, dry rubble check dams will be constructed. In hilly area, contour trenches may be dug up all over the areas at suitable intervals.

(8) Areas should be protected from grazing at least for five years through the co-operation of VF MPCS.

(9) Protection against illicit felling is very essential. This has been main cause for degradation of these forests.

(10) Tending operations as are needed for ensuring the healthy growth of young spellings will be carried out Tending operation such as cleanings will be taken up in first year it self. In subsequent years if necessary, cleaning will be carried out. Gradual thinning will have to be carried out only after young crop is established.

PART -II

CHAPTER- III

WORKING PLAN FOR THE SELECTION WORKING CIRCLE.

General constitution and composition of the crop.

30. This working circle comprises most of the sal and miscellaneous forests of the Divisions falling in the catchments of the North Koel and the Sone, . This circle extends over Reserved Forests of Divisions. And the old protected Forests (now reserved forests) and Khalsa Reserved Forests (now Reserved Forests) and large portion of the protected forests of Mhaudanr and Guru Ranges. The total area of this Working Circle is 15623.08 ha.

31. Most of the forests occupy the steep and higher slopes of the hills and plateau. In the plains and valleys and easier slopes, Sal constitutes the main species, the quality ranging between III & III/IV. In places one comes across Qil or over QII/I. On hills higher slopes Sal occurs in varying proportions with miscellaneous species with its usual associates depending on the topography and soil condition,. The forests of this working circle have been described generally in Chapter II of part I. Besides Sal, the bamboo forms the next important species which occurs in the entire area of the circle, except on the plateau area, in pure form or as under storey in the miscellaneous forests. The mixed deciduous forests occur almost throughout the area. Pure patches of miscellaneous forest occur in certain areas in dry parts of the forests of Chhipadohar Range with their associates of dry mixed deciduous forests. Predominant species are sal, bamboo, asan, bija, karam, sidha, gamhar, salai, dhau etc.

32. The forests of this working circle have been subjected to repeated fires, frost and drought with the result that the regeneration of sal and other important species is sparse or localised in patches, where the interference of the biotic factors is the minimum.

33. During all these years all trees above fixed diameter classes have been removed without paying any regard to the future crop. This has led to the depletion of trees of higher diameter classes. The constant removal of the best trees and the lack of any effort to secure regeneration has reduced the value of the forests and has caused diminution of trees of larger girth classes. Besides, the marking of dry sal and other species has resulted in the over exploitation of forests in these felling series.

Chief objects of management:-

34. The entire forest area of this working circle falls in the Ganga basin and lies in the lower catchments of the North Koel and Sone and constitutes the catchments of the proposed dam at Kutku on the North Koel. In the present context of the frequent flooding and denudation of the area lying in the lower catchment of the North Koel and the proposed dam at Kutku, these forests have assumed much importance from the stand point of soil and moisture conservation and for prevention of floods in the plains. A fair portion of the I forests particularly that which occupies the steep and higher slopes of the hills falling in the catchment of the Kutku dam has necessarily to remain under constant forest cover and has to play the role of 'Protection Forests'.

35. The forest of these Divisions has always been very conducive habitats for variety of wildlife both herbivores and carnivores. The status of wildlife in general, however get significantly changed on account of various derogatory factors including poaching etc. In spite of this, however, the status of wildlife continues to be such as to get quickly augmented, once operation leading to creation of conducive conditions are implemented. It was in recognition of status of existing wild life as also the type of habitat that the Government of India selected majority of the forests of these Divisions to be one of the Tiger Reserves of the country under the Central Sector scheme- project Tiger. These forests were constituted as Plamau Tiger Reserve in June, 1974.

Special objects of Management:

(i) To Improve the stocking and composition of the existing crop by silvicultural treatment.

(ii) To maintain the hill slopes under adequate forests cover, to prevent soil erosion and to ensure moisture conservation.

(iii) To induce and obtain natural regeneration of sal and other economically valuable species and to establish and tend it to form the future crop.

(iv) To maintain the habitat in condition optimum to meet the basic requirements of wildlife.

(v) Consistent with the above to obtain the maximum financial return by removal of silviculturally available trees, of exploitable diameter in time to prevent negative increment accruing.

37. (A) By silvicultural availability, it is meant that the felling should not go against the general principals of silviculture i.e....

(a) There should be no fear of erosion and any permanent gap in the canopy.

(b) It form part of a congested crop and its removal would do good to the remaining crop.

(c) There are adequate number of younger age classes present to replace it.

Rights & Concessions:

38. Generally there is no right in Reserved forests old protected forests(now notified as Reserved forests.) However, rights exist in Khalsa Forests (now Reserved Forests) and in ex-zamindari forests, i.e. new Protected Forest vested to the state under the Land Reforms Act. To meet the demand of the bonafide right holders in such forests p ortion of Selection. Efforts have been made to give right holders coupes at reasonable distances from their villages. This system was followed in the last plan & it worked well in Mahuadanr Range. And in two felling series viz. Moromar and Borgi felling series of Garu Range.

39. In some areas it has been considered desirable to group a few adjacent right holding villages and right holders coupe has been suggested for them at one place instead of village wise. Here too, efforts have been made to give right holders coupe to the villagers at a very reasonable distance from their villages as far as possible.

Silvicultural System:

40. In order to obtain the above objects of management the silvicultural system prescribed is Selection-Cum-Improvement Felling with adequate emphasis on wildlife. This will consist of removal of a certain percentage of the exploitable trees that are silviculturally available and at the same 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. It is however noticed that almost no care was taken of the forests in past, so special attention has to be paid for tending of the younger age gradation to form the future crop.

Exploitable diameters:-

41. Generally the exploitable diameters of important species of the last plans have been retained. For Sal it will be 12”.

Exploitable diameters for some important miscellaneous species will be as noted below for all the felling series but their exploitation will depend only on the silvicultural availability as mentioned earlier.

1. Bija ... 16”Diameter
2. Gamhar ... 16”
3. .Karam ... 20”
4. Asan ... 16”
5. Salai ... 12”
6. Dhautha ... 16”
7. Sandan ... 12”
8. Other species ... 16”

Rotation:-

42. Since the yield has been fixed by removal of a certain percentage of selection trees existing at the time of marking, the calculation of rotation assumes merely theoretical interest. Though the average quality growth curve of site quality of the crop is lower than ‘III’ it is expected to follow the growth curve is of lower site quality IV of All India Yield table according to which an average crop diameter of 14.8” is obtained in 148 years. On the basis of data available so far, It is expected that an average diameter of 12”, 14” and 16” would be attained at an age around about 120 years, 140 years and 160 years respectively.

STATEMENT OF AREA:-

The total area of this working circle is 15623.08 ha. . The detail of the areas is given in Appendix —II.

Felling Cycle:-

43. The felling cycle of 20 years as of the last plans has been retained.

Stock Maps.

44. All the forests have been stock mapped on 4" =1 mile topographical maps. These have been attached in the respective compartment histories.

ENUMERATION:-

45. Enumeration for Sal and other important species in the forest of this working circle was carried out statistically in this current plan. The enumeration was done by simple random method.

46. The summary of enumeration of Sal trees is given on page 23 of part-II

Regulation of Yield.

47. The yield is regulated by area. In the given area of the annual coupe only the prescribed percentage of the selection trees will be marked

Method of calculating the yield.

48. The yield will be expressed as a proportion of the selection trees existing at the time of marking. This should permit division of each felling series into definite annual coupes by area for the whole felling cycle. There may be difference in the actual yield on account of the crop being irregular, unsoundness, inaccurate data and error in enumeration.

The yield of selection trees will be worked out according to Smithies formula, which defines the yield available during the felling cycle as the number of trees of the next lower diameter class (class II) that may be expected to survive and grow up into the exploitable size(Class I) during the felling cycle. The formula is :- X_1 (II- Z% of II) where

- (i) 10" to 13" diameter class is class -I.
- (ii) 7" to 10" diameter called 'approach class' that survive and pass into the next diameter class (I class).

f = The length of felling cycle in years i.e 20 years.
 t = The average length of time in years that the class II trees take to pass up into class I.

11 = Number of approach class i.e. the class immediately next to the selection class.

Z = The mortality percentage, i.e. the percentage of class II trees that disappear, from any cause during 't' years.

The annual yield is then expressed as a percentage of the selection trees present in the coupe at the time of marking. This is worked out by the formula:-

$$Y = \frac{X}{I + X/2} \times 100 \text{ A where,}$$

Y The annual yield expressed as a percentage.

X= The yield during the felling cycle as worked out in the previous paragraphs.

I= The number of class I trees as enumerated.

A= An arbitrary value adopted for purposed of adjustment of rounding off figures.

Value of 't' and 'Z'.

As this current plan is concerned, the value of 'z' has been obtained on the basis of the statistical date furnished by the Forest Research Division, Jharkhand, which is 25% on the basis of the results of sample plot No.5 (Barea and compartment-9) and sample plot No. (Baresand Compartment-2).

For the purpose of this plan, it will be safer to fix the value of 't' at 40 for the exploitable diameter of 12",

Calculation of the yield.

49. The yield is a volume expressed as a percentage of green marketable sal trees of and above the exploitable diameter that may be removed if silviculturally justified.

$$\frac{1}{X=2} \times 0.75 \times \text{II} \quad ,\text{taking the value of t as 40 we get,}$$

$$= \frac{1}{2} \times \frac{3}{4} \times \text{II}$$

$$= \frac{3}{8} \text{ II}$$

Marking Rules:

51. Marking will be controlled as the percentage of exploitable sal trees. The most matured trees that are silviculturally available should be marked. The young and vigorously growing trees should be retained. The trees should be such as are not likely to deteriorate in the next 20 years. In other words marking will have leanings towards improvement rather than revenue, and will to certain extent fulfil the role of thinnings. The following marking rules will be observed.

(i) Marking will be done with hammer and digits at breast height and on the uphill side of the base of trees.

(ii) All trees marked shall be listed in prescribed form.

(iii) Only one out of 2.5 trees of exploitable diameters will be marked if silviculturally available. However, no marking will be done in the following areas. Where density is low and the crop is open.

(a) Where established regeneration is absent.

(b) Where the slope is very steep.

(iv) All trees of Bija, Gamhar, Asan, Dhautha, of 16" and over in diameter and Karam of 20" diameter and over Salai of 12" diameter and over Sardar of 12" diameter and over and other species of 16" diameter and over, if silviculturally available, will be marked for felling.

(v) All dead, dry, top broken, hollow and diseased trees, if they can be utilized, will be marked leaving two trees per ha. for wild life.

(vi) Hollow trees having green foliage shall be retained for nesting of birds. (vii) All trees of miscellaneous species interfering with the growth or proper development of Sal or other valuable species will be marked.

(viii) Among the exploitable size trees mature and over-mature trees should be marked first in case of sal.

(ix) Trees standing over young growth should be marked first before marking those which have no such crop under them.

(x) Special precaution will be necessary while marking along the edge or inside blank or near blank areas. Here exploitable trees shall be left standing as seed bearers for the blanks.

(xi) In areas of steep slopes where crop is of poor quality and regeneration is not sufficient, no marking of trees will be done as a precaution against erosion.

(xii) In already eroded and gullied areas rules .

(x) will apply.

(xiii) wherever there is established regeneration, even single or isolated exploitable size tree may be marked for felling, since they develop into wolf tress and suppress the regeneration to an indefensible extent.

(xiv) At the time of marking trenches of 60 cm. X 60 cm. Across section and of 5 meters long may be dug around the salai tress which are to be marked for felling to induce regeneration by root suckers.

(xv) Climber cutting be done along with the marking.

Sequence of Felling:

The sequence of felling be followed for 20 years in all the felling series of the circle. They have been indicated in the respective felling series maps dividing the area of the felling series in 20 coupes.

Approximately 1/20 of the area of the felling series has been marked as the annual coupe with \pm 10% deviation to straighten the coupes line or to include or exclude the whole or small patch of forests.

Execution of fellings:

(1) All tress marked for felling should be felled.

(2) Felling should start by the **16th** October and end by the 30 June of the following year.

(3) Felling should commence from one end and there-after proceed with an even front to the other end.

(4) All marked trees must be felled as near the ground as possible but the lower mark must be left in tact.

SUBSIDIARY SILVICULTURAL OPERATION.

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

- (i) All badly damaged stems as a result of the main felling shall be cut back.
- (ii) All stems of inferior species suppressing young regeneration of Sal and other important species shall be cut back.
- (iii) All badly grown saplings and poles of sal and other important species shall be cut back.
- (iv) Wherever there is regeneration, shrubs cutting should be done during rains to help regeneration to establish.
- (v) In open areas or blanks where regeneration is to be induced cleanings and climber cuttings shall be carried out and shall be repeated year after year till the need exists.
- (vi) All climbers shall be cut.

Thinning:-

The intensity of thinning shall have to be decided by the Divisional Forest officer according to crop conditions. The annual coupes will be inspected by him at the time of the main felling in order to decide the areas where thinning are to be carried out. 56. Thinnings should aim at providing enough crown space without exposing the soil. The canopy should fill up completely within the felling cycle.

Works of Improvement: Soi & Moisture Conservation.

The forests allotted to this working circle area of vital importance in view of the catchments of the North Koel. Thus there is need for giving more attention for soil and moisture conservation. Many of the forests falling in this working Circle are on the steep and higher slopes. Where contour trenching will be most advantages to ensure moisture conservation.

A series of contour trenches properly spaced will reduce the surface run off and conserve moisture in the sub-soil. Soil-erosion would also be reduced. It is therefore recommended that continuous contour trenches 0.5 meter wide and 0.5 meter deep with 1 meter uncut soil to guard against lateral flow, at every 10 meters would be dug at a spacing of 20 met along the slope. This work may be done in all annual coupes in the years followings the main fellings.

Berms of the trenches which should be formed by prior breaking of its base, should be utilised for sowing and planting sal and other valuable species.

Anti-erosion works should be taken up in areas where gully formation has been extending. These will consist of gully, plugging construction of vegetative check-dam and diversion channels.

In areas, blanks of 1 hectare and above will be located by the marking staff and shown on the compartment map. Soil working and plantation will be done in the year following the main fellings. The method of soil working and plantation will be as per the prevailing afforestation technique.

Fire Protection:

The entire working circle be protected from fire.

Grazing.

The annual coupes shall be closed to grazing for a period of seven years.

Constitution of Felling Series Under Selection Working Circle:-

Name of Range	Name of F.S.	Name of forest Constituting F.S	Area in Ha.	Total Area of F.S	Felling Circle In yrs	Area of annual Coup S in Ha.	Remarks
1	2	3	4	5	6	7	8
Mahuad anr	1. Orsa	1. Orsa 2. Kabrapat	724. 02 202. 51	926. 53	20	46.32	

	2.Durup	1.Durup	1971.53	1971.53	20	98.57	
	3. Soharpat	1. Sharpat 2. Manil 3. Besrakona 4. Chromarwa	383.75 405.00 100.00 200.00	1088.75	20	54.43	
	4. Jamdih	1. Jamdih	433.89	433.89	20	21.69	
	5. Aign	1. Aign 2. Hysmn 3. Arahans	151.09 512.05 33.87	697.01	20	34.85	
	6. Duari	1. Jamdih 2. Duari	46.63 150.50	197.13	20	9.85	

	7. Shahpur	1. Shahpur	80.94	80.94	20	4.04	
	8. Chiro	1. Chiro	185.14	185.14	20	9.25	
	9. Champa	1. Champa	218.40	218.40	20	10.92	
	10. Karkat	1. Karkat 2. Kewarki	303.64 37	368.21 ⁸⁴	20	18.41	
	11. Barudhi	1. Barudhi	277.78	277.78	20	13.88	
	12. Beiwar	1. Beiwar	96.06	96.06	20	4.80	
	13. Kukud	1. Kukud	470.80	470.80	20	23.54	
	14. Paharkapa	1. Paharkupa	299.	299.25		14.96	

			25			
	15. Jon	1. Jon	21.4 6	21.4 6		14.96
	16.Danna	1.Danna	746.93	746. 93		37.34
Chhiopa dohar West	1. Sindhorwa(N)	1. Sindhorwa (N)	981. 03	981. 03	20	49.05
	2. Sindhorwa(s)	1. Sindhorwa (s)	981. 09	981. 05	20	49.05
	3.Mandel	1.Mandal	1084 .55	1084.55	20	54.22
	4.Saidupe	1. Saidup Comt-9 2. Saidupecomt -10	1113 .36 1042 .48	2155.84	20	107.7 9
	5.	1.Naurnago	226.	226.	20	N.32
	Naurango		50	50		
	6.Patradih	1.Patradih	76.21	76.21	20	3.81
	7.Lat	1.Bere 2. Lat	123.17 133. 48	256.65	20	12.83
	8. Tanwai	1. Tanwai T.F 2. Tanwai KRF	885. 42 20.2 0	905. 62	20	45.28
	9. Ghasidag	1.Ghasidag	127. 04	127. 04	20	6.35
Garu East.	1. Hurdag	1. Simakhes 2.Hurdag	166. 25 636. 46	802. 71	20	40.13
	2. Daldalia	1. Kin 2. Dalдати	122. 04 87.3 2	209. 36	20	10.46
	3.Kotam	1.Kotam	133.25	133. 25	20	6.66

Abstract of enumeration of Sat trees

SI. No.	Name of Range	Name of forests	Ttiana of Thana No.	Total area In	Area of enumeration	Percent age enumeration	Dlamter Class				Total
							4" - 7"	7" - 10"	10"- 13"	13" above	
1	Mahuadanr	Orsa	Mahuadanr-109	879.50	24.00	2.70	493	275	66	39	873
2	Mahuadanr	Soharpat	Mahuadanr-154	447.20	8.00	1.80	5	194	427	615	1241
3	Mahuadanr	Chomiarwa	Mahuadanr - 173	239.60	8.00	3.30	7	141	346	389	1083
4	Mahuadanr	Goelkhr	Mahuadanr-147	67.36	12.00	17.80	330	69	16	8	423
5	Mahuadanr	Chiro	Mahuadarir - 104	495.68	12.00	2.40	3	4	2	1	10
6	Baresand	Durup	Mahudnar-84	1971.53	24.12	1.20	271	527	528	202	1528
7	Chhipodohar West	Mandal	Barawadih-38	1084.55	20.20	1.80	60	200	260	74	59h

8	Chhipodohar West, East.	Saidupe comptt.No.9	Barwadhi-53	1113.36	14,14	1.27	449	942	730	511	2632
9	Garu East	Hurdag	Mahuadanr-42	636.46	12.12	1.90	1403	1281	324	76	3084
10	Garu East	Kotam	Garu-32 Mahudanr-	113.25	2.02	1.78	132	83	47	60	322

11	Garu East	Kui	44	112.04	2.02	1.80	34	65	65	66	203
	12 GaruEast	Simkhgs	Mahudanr-20	410.64	8.08	1.96	541	476	271	102	1390
				7199.17	146.70	2	3728	4257	3082.2	2143	13210

Assessment of Growing Stock:- Growing stock of sal under selection working circle is assessed on the basis of local volume equation developed for sal forest of Ranchi District which is adjoining district of Latehar by Forest Survey of India Eastern Zone, Calcutta in their report No. R-50/2000-33 dated 29.3.2000, which is stated as below.

$$V = 8.7 \text{ 14 D}^2 - 0.70 \text{ 158D} + 0.022585$$

On the basis of this equation the volume of sal trees for different diameter classes is calculated and expressed in tabular form as under:

Diameter Class	Unit Volume (M3)	No. of trees/ha	Total Volume / ha (M3)
10 Cm.—17.5Cm.	0.090	25	2.25
17.5Cm. — 25Cm.	0.26	29	7.54
25 Cm.—32.5Cm.	0.54	21	11.34
32.5 Cm.& above	0.91	15	13.65
Total		90	34.78

Thus we find that growing stock of sal / ha is 34.78M³. The total area of S.W.C. is 02 ha. Therefore total growing stock of sal under S.W.C. is 54337.72.M³.

CHAPTER-IV

WORKING PLAN FOR THE BAMBOO WORKING CIRCLE. GENERAL CONSTITUTION OF THE V₂,WORKING CIRCLE AND CHARACTER OF THE VEGETATION.

This working circle overlaps other working circles mainly Selection working and

comprises all the area containing bamboo bearing forest whether well stocked or degraded

64. The total area of the forests under the Bamboo working circle is 6745.93ha.

65. Dendrocalamus strictus is the only species of bamboo found in the area. It is commonly found in dry mixed forests and also in Sal forests in varying proportions . The quality and growth are generally very good specially in the forests of Garu Range. Bamboo forests of these Ranges are among the best bamboo forests of the State. In Mahuandanr and Chiipadohar Range, adjoining Garu Range respectively, the bamboo forests are generally of good quality but it quality deteriorates in the 'pat' area of Mahuadanr Range specially in southern and western portions. Similar is the case with the bamboo forest of Chhipadohar Range adjoining Betla Range . Bamboo forests of Bet Range, which were one of the best forests of state, have now deteriorated to such extent due to elephant damage etc. that they have almost turned into bamboo rooted waste and need rest and rehabilitation.

66. Bamboo clumps occur both scattered and densely. Efforts have been made to stock map the bamboo bearing area. However the entire forest area of a even included in the cutting series for convenience of, management.

SPECIAL Object MANAGEMENT.

The special objects management are:-

(i) to works scientifically the entire bamboo forests in order to improve their growth and productivity.

(ii) to meet the bonafide requirement of the right-holder local people and the demand of turees (basket makers)

(iii) to meet the increasing demand of the paper mills.

(iv) Consistent with above, to obtain the maximum sustainable yield of bamboo

Stock maps:

Bamboo area has been shown by an independent symbol i.e. black hatches in the stock maps prepared on 4" — 1 mile scale. This has roughly given in indication of bamboo bearing area in each forest.

Area and distribution:

A list of bamboo bearing areas together with acreage in which commercial exploitable bamboo occurs has been given in Appendix II.
[Cutting cycle:](#)

A cutting cycle of 4 years was adopted in previous plan. However cutting cycle of 4 years is prescribed.

METHOD OF TREATMENT:

The silvicultural system to be followed may be termed as the selection system in as much as only the selected culms are to be felled

Constitution of Cutting Series:

Bamboo bearing forests which have workable quantity of bamboo culms are grouped into following cutting.

Sl No	Name of Range	Name of felling Series	Name of forest	Thana and Thana No.	Total area in ha.	Area included in felling Series (ha.)	Total area of felling Series in Ha.
1.	Baresanr	1.Dump	1 .Durup P.F 2. Jon PF	Mahuadanr, 84 Mahuadanr, 115	1971.53 102.63	1971. 53 101.63	2073.16
	2.Dauna	1 .Dauna. PF	Mahuadanr, 78	746.93	746.93	746.93	746.93
3.	Garu East	1 .Kottam 2.Hurdag	1 .Kottam PF 2.Hurdag PF	Mahuadanr, 32 Mahuadanr, 12	133.2 5 636.4 6	133.2 5 636.46	133.2 5 636.46

Statement showing the Sequence of Annual Coupes

Name of Range	SL. No	Name of felling Series	Name of annual coupe	Year of felling	Area in Ha.	Remarks
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Basebanr	1.	Durup	C	2003 -2004	518. 00	Part Dump PF.
			D	20004- 2005	519. 16	RestDuupPF and whole of Jon PF.
			A	2005-2006	518	Part Dump P.F.
			B.	2006-2007	518	Part Dump P.F.
	2.	Dauna	C.	2003-2004	186	Part Dauna P.F.
			D.	2004-2005	188.93	Rest Dauna P.F
			A.	2005-2006	186	Part Dauna
			B.	2006-2007	186	Part Dauna
Mahuad anr	3.	Bandua	C.	2003-2004	218	Part Bandua
			D.	2004-2005	218. 39	Rest Bandua
			A.	2005.-2006	218	Part Bandua
	4.		B.	2006-2007	218	Part Bandua
		Orsa	C.	2003-2004	219	Part Orsa
			D.	2004-2005	219	Rest Orsa
			A.	2005.-2006	219	Part Orsa
			B.	2006-2007	219	Part Orsa
	5.	Karkat	C.	2003 -2004	131	Part Karkat P.F
			D.	2004-2005	134. 55	Rest Karkat P.F
			A.	2005.-2006	98	Part Kabrapat P.F

	B.	2006-2007	101. 95	Rest Kabrapat+Par t Karkat
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6.	Korwadi h	C.	2003-2004	87	Rest Kewri+Part Korwadih
		D.	2004-2005	90.1 9	Rest Korwadih
		A.	2005.-2006	87	Part Kewarbi
		B.	2006-2007	87	Part Kewarbi
7.	Kottam	C.	2003-2004	33	Part Kottam
		D.	2004-2005	34.2 5	Rest Kottam
		A.	2005.-2006	33	Part Kottam
		B.	2006-2007	33	Part Kottam
8.	Hurdag	C.	2003-2004	159	Part Hurdag
		D.	2004-2005	159. 46	Rest Hurdag
		A.	2005.-2006	159.	Part Hurdag
		B.	2006-2007	159	Part Hurdag

The sequence of annual Coupes have been fixed in accordance with working Scheme of Bamboo forest of Daltonganj South Division already approved by GOI.

The bamboo forests which have degraded due to biotic factors are detailed as below. These forests need rehabilitation. Most of clumps of these forests are deficit clumps and need only cleaning and other tending operations like soil workng around clumps and application of fertilizer during rainy season. Restocking by artificial plantation of bamboo is also required to be done.

Name of Range	Name of forests	Thana & Thana no.	Area in Ha.
Baresand	Duari P.F.	Mahuadanr, 142	150.50

Mahuadanr	Korwatoli P.F. Shahpur P.F		Mahuadanr,143 Mahuadanr,150	35.11 354.68
Garu East	Daldalia	P.F.	Mahuadanr, 48	87.32
	Hethtola	P.F.	Mahuadanr, 45	209.87
	Korwai	KRF	Mahuadanr, 46	111.36
	Banratola KRF		Mahuadanr, 47	93.72
Chhipadohar West	Barichhatan OldP.F		Latehar, 39	230.36
Betla	Dorami	KRF	Latehar, 07	211.41
	Rabadi	KRF	Latehar,26	99.63
	Lukumkhanr P.F.		Latehar, 61	406.31

Yield:-

The yield of bamboo cuims will be regulated by area. The out turn may be different for different annual coupes. To estimate yield/ha. five random sample plots were laid out in different five bamboo forest areas and no. of clumps and. cuims in each clump were enumerated. The data so obtained area are given in Appendix. The abstract of enumerations are reproduced below.

Sample Plot No.	No. of Clumps	No. of harvestable Cuims	No. of harvestable Stumps of height above
1.	375/ha	11992	1.2m
2.	342/ha	1528	3937
3.	61/ha	326	1024
4.	272/ha	1442	1250
5.	191/ha	1025	2094

From above data we find that average yield /ha. is 326iculms and 2769 stumps.

All the bamboo cutting series of Betla Range have degraded to such an extent due to elephant damage etc. that no working of these coupes has been suggested till they rehabilitate.

METHOD OF EXECUTING THE FELLINGS.

Demarcation of annual coupes.

The bamboo coupes will be demarcated on the round by 1.5 metre clear lines and at suitable intervals double white ring marks(paints) will be given at breast height on the trees of the coupe side of the lines. In the section line two white half rings marks on trees at suitable interval will be given to distinguish from other coupes. In all cases sign boards indicating the cutting series and name and number of the coupe with its area should be put up at conspicuous places and specially where coupe boundaries are crossed by road or paths.

Cutting Rules:

The following bamboo cutting rules are prescribed (a) Culms less than a year old commonly known karils shall not be cut or damaged.

(b) Older healthy green culms equal to the number of karils shall be left provided that the total of such older culms must not be less than in any clump. In case there is no karil in any clump seven older healthy green culms shall be left

(c) No clump containing less than 8 culms shall be worked except for the purpose of the cleaning the clump. Cleaning shall mean removal of damaged dying or dead culms and the high stumps.

(d) The clumps should be worked from inside out. The older culms should be left mostly on the periphery so as to provide necessary support to the karils

(e) Except the culms to be retained under the above rules, all other culms in the clump including damaged, dying and dead culms be felled.

(f) Every clump shall be cleaned of debris to a distance of at least one meter as a precaution against forest fire.

(g) Removal of bamboo routes and extraction of rhizomes are prohibited.

(h) culms shall be cut just above the second visible node or at 30 cm above the ground level whichever is less cutting of bamboo must be done with a sharp axe in such a way that the stump is not split or torn.

(i) When a clump is in flower, no bamboo shall be cut from it until after the seeds have fallen and then all the flowered clump would be cut and removed. The green culms that have not flowered but are in the same clump shall not be felled.

(j) In exploiting any clump the first to be cut shall be damaged, malformed, dead or dying culms. Only there after straight and healthy cuim will be cut leaving the prescribed number.

(k) The leading exterior cuim shall not be out in any circumstances even if they be malformed.

(I) No felling is permitted between the 1st july and the **15th** October.

Execution of fellings.

(a) Felling in the coupe would start from one and proceed systematically along an even front. Haphazard and selective felling would not be allowed.

(b) To regulate felling, the coupes would be divided into a number of sections. If upon completion of work in any given section, it is found that some culms has been left behind in the clump that should have been cut and cleared or has not touched any clump at all, the some will be cut and cleared again.

(c) When two clusters of clumps are at distance of one metre or they are to be treated as two separate c lumps for enforcing the felling rules. If however the two clusters are less than one mtr. apart they are to be taken as parts of the same clump. In finding out this distance of one mtr the nearest cuims or green stumps 60 cm. or more in height should be taken into account.

(d) Only green stumps 1.2 mtrs or more in height may be left to be counted toward the requisite number of older cuims in deficit clump. Stumps less than 1.2 mtrs height should be allowed to be cut just above the second visible node or at 30 cm from the ground level which ever is lower. In leaving such high stumps as are 1.2 mtrs or more in height care should be taken that older culms are first counted and if their number falls short of the requisite number of culms to be left then only these height stumped are to be left. It should be noted that these high stumps are not to be taken as full culms and are not to be equated with them. They are to be left only to make up the deficiency.

(e) In the case of deficit clumps only the older culms or older high stumps that are to be retained should be ringed with coaltar . Karils need not be ringed. The marking should be as low possible and in any case not above the second node.

Subsidiary cultural operations:

Working bamboo in accordance with the cutting rules prescribed in the foregoing paragraph and if supervised properly, may not necessitate intensive subsidiary cultural operations. However, in the year following the cutting, the bamboo coupes will be gone over and all dead the dry culms, high stumps and hanging branches, if any shall be removed. Climbers, if any, damaging the clumps shall be cut . With a view to increase the hitherto low out tern per acre in certain cutting series viz. Skahpur, Baridhor, Morwaihkalan coupe D, orsa coupe A, B andua coupe C, M ahuadnr coupe etc. and in consideration of the tendency of bamboo to regeneration naturally and availability of sites suited to bamboo in Daltonganj south Division, the following operations are recommended:-

- (a) Immediately after the main cutting and with the first break of a shower the soil around the deficit clumps should be hoed up to a radius of one meter.
- (b) In suitable sites within the coupe area, seeds of bamboo may be sown after disturbing the surface soil either in patches or in lines depending on the configuration. This operation too should be done immediately after the main fellings when the rains start.
- (c) Patches where sowing has been done, may be attended, if funds permit, in the next and subsequent years.
- (d) Planting of bamboo seedlings as per standard bamboo planting technique may also be done in such cutting series.
- (e) In bamboo areas, not included in the bamboo working circle, felling for the improvement of the clump according to the felling rules and measures, to protect against grazing and theft, shall be taken.

Special prescription for Bamboo Coupes of Betla Range.

For rehabilitation of bamboo coupes of Betla Range the following special measure should be adopted.

- (1) No regular working of all the bamboo cutting series of Betla Range shall be done till they rehabilitate.
- (2) Every year all the clumps or cuims up rooted or damaged by wild Elephants should be removed departmentally against fire hazard.
- (3) Cleaning of clumps should be done departmentally as and when required.

(4) Immediately after the break of the monsoon, the deficit, deteriorated and sony-dry bamboo clumps should be hoed up to a radius of one meter around the clumps to conserve soil moisture for the improvement of the clumps.

(5) On hill slopes contour trenches should be dug at suitable intervals in the entire bamboo area. To improve the density, sowing of bamboo seeds should be done on the berms s soon as the monsoon sets in. Bamboo seedling should also be planted as per standard planting technique.

(6) Strict measure should be adopted. against fire, theft and grazing by village cattle.

Supply of bamboo to right holders:

The system of supply of bamboo to right holders was almost stabilized and was working almost satisfactorily. About 1/5 of the annual coupe was left out to meet the bonafide requirements of rightholders who either cut themselves or obtain cut bamboo on paying the cost of cutting. Necessary permit for cutting and extraction is given by the lessee. Any surplus left in the rightholder's section after meeting the rights is extracted by the lessee. The lessee also carry out rectification, if any required , in the said section at his own cost. This system is now modified as below to ensure proper utilization, felling and extraction of bamboo by rightholders and to provide sufficient time to carry out rectification by the Govt., if any required after rightholders have exercised their rights in the area allotted, to these.

The part of the coupe earmarked for exercise of rights by the right holders which would be upto 1/5 of the area of the coupe, should be divided into two sections. The right holders will, to start with, cut and appropriate bamboo from one section only. In the event of their bonafide demands remaining unsatisfied, the second sections will be opened. Immediately after the completion of working in the 1st section, the Govt. would carry out rectification and cleaning wherever required as per cutting rules.

Supply to turees:

The turees cut nothing but the new culms. These new cuims are just those that keep the bamboo clumps away from extinction. They use only freshly cut bamboo and so they visit the forests throughout the year. So far the efforts to make them use freshly cut old bamboo and to store such bamboo for their use during rainy season have borne no fruit. There are instances where bamboo forests have almost been completely wiped out at the hand of the turees. This is a serious menace and needs to tackled with all seriousness and sincerity.

Fortunately the turees are not found all over the d ivision. They are i n small pockets and can, therefore, be brought round somewhat easily. It may be possible to assees their weekly requirements of bamboo and the manner in which they will like to draw their requirement once a week or twice a week.

They may obtain their requirements on the day agreed upon from the nearest current bamboo coupe on payment under the supervision of forest staff who will see that they do not cut Karils. This should not be difficult during the working season. During the rains, however, sale to turees may be made on departmental permits from the coupes due for felling and if possible from such areas which lie outside the cutting series and contain scattered bamboo clumps. During this period the cutting of bamboo by turees has to be done without exception under the proper supervision of the forest staff, who must be present on the days agreed upon in consultation with the turees.

Not more than one culm per clump will be cut for supply to the turees. The clumps from which supply will be made to the turees will be marked to obviate any dispute.

Other regulations.

The working circle should be protected from fire and lopping of bamboo, for purpose of feeding cattle is prohibited.