

## **CHAPTER V**

### **PAST SYSTEM OF MANAGEMENT**

#### **1.5.1 Old Reserve:-**

These forests were reserved in the year 1880-81. Selection fellings were started tentatively from that year. From 1895-96 coppice fellings were started on experimental scale through departmental agency. These fellings were restricted to the more accessible areas .such as the lower slope of the hills. Plots were selected here and there in colispi- cuously good sal bearing areas. Upto the year 1902-03, the fellings had extended over 155 acres. From then the coppiced area increased gradually and till 1912-13 the total area coppiced was 2404 acres.

Besides coppice felling annual selection fellings relatively large sized sal trees cover 4 feet girth were carried out in the cultivated as well as wooded areas. About 300 trees were felled in this way during the period 1895-96 to 1903-04. In 1910, Mr. Hart, the then Conservator of Forests proposed that the whole area might be coppice felled and divided into as many felling series as it was desirable to form, but in 1912-13 Mr. Mc Entire Conservator of Forests adopted a milder policy of abolishing departmental extraction in favour of contractors and of gradually increasing the area worked under coppice. Later the coupes began to be sold to the local people to given them a chance to earn a living from working the forests.

1.5.2 In 1914-15, a systematic working scheme drawn up by Mr. Haslet was sanctioned for 15 years i.e. up to 1928-29. This scheme provided for coppice tellings in reasonable accessible areas and selection fellings over hill tops and upper slopes. Under this system about 533 acres were coppiced annually in the four felling series viz. Kathikund, Narganj, Gopikander and Chirudih the

rotation proposed being 30 years and 30–35 standards per acre of 1'6" to 3" in girth were retained. No regular scheme of thinning was carried out. Cleanings were also not provided in the plan. This scheme worked quite well except that the retention of standards interfered with the growth of young coppice shoots.

1.5.3 In the revised working plan by Mr. Hart for the period 1929–30 to 1938–39, the lower slopes of the hills and the plain areas were allotted to Coppice Working Circle which were divided into 4 felling series, 455 acres were to be felled annually with a rotation of 40 years. Standards were provided to be retained for silvicultural reasons. Hill ridges and plateaus were allotted to selection working circle with rotation of 20 years. The minimum exploitable girth of sal,asan,karam,gamhar was 4' and that of bija,dhaura,jamun was 3'6". Bamboo overlapping working circles were created with two felling series of 4000 acres each. The cutting cycle was 3 years. The demerit of this plan was there were less number of standards left per acre. Selection fellings could not be worked out well due to inaccessibility of the area. In the bamboo working circle., the yield fluctuated from year to year since the coupes were not equiproductive. The demand of the turis had also been ignored.

#### **1.5.4 Derry's Working Plan (1940–41 to 1950–51):**

This working plan provided coppice with standards, plantation and bamboo overlapping working circles. Under coppice with standards working circle the old reserve was divided into 6 felling series viz. Mahuagarhi, Khatgaon, Kathikund, Gopikander, Nargunj and Chirudih. The first two felling series were worked on 60 years rotation and the remaining four on 40 years rotation. The Godda reserves were divided into 4 Felling Series viz. Khelari, Garial, Gandeswari East and Gandeswari West all on 40 years rotation. For standard marking two types of prescriptions were provided i) for the lower levels of the main ridges and ii) the higher levels of the main ridges. The former

did not prove practical and the later was never carried out properly. Detailed rules for felling by right holders had also been framed. In the plantation working circle attempts were made in the first few years of the plan to raise plantations in the western part of Dhamania Pahar. The area covered was nearly 400 acres. The bamboo working circle overlapped the whole of the old reserve with three felling series, one to be worked on 3 years felling cycle for general supply and two on 5 year cycle for supply of young bamboos to Mahulis. Felling rules provided for retention of four year old culms besides the culms of the year and the previous year. However, the execution of felling was defective.

#### Damin P.F. :-

Warren's scheme which covered 81 blocks of Protected Forests demarcated in Dumka Damin till 1944 was a supplement to Derry's Plan. Working Circle comprising 17 felling series was provided. Rotation was fixed at 10 years. The felling series maps had not been prepared nor the sequence of felling shown.

#### Vested P.Fs:-

The former Private Protected Forests 94.10 sq.miles in area were worked under Coppice Working Circle and Bamboo Working Circle. There were 59 felling series in the Coppice Working Circle.

#### Nankara-Shankara Forests: -

The Nankara-Shankara estate forests 8543 acres in area, were being worked in one Working Circle viz. Coppice with Standards Working Circle. There were five

felling series with 50.00 acres coupe in each felling series and the rotation varied from 15 to 40 years according to the area of the felling series.

#### U. D. Fs:-

For the Undemarcated Protected Forests annual yield had been fixed empirically at 600 trees in Dumka Damin, 150 trees in G odda Damin and 100 trees in Pakur Damin Range. The minimum exploitable girth was 4'6".

#### 1.5.5 Prasad's Working Plan (1955-56 to 1964-65 extended upto 1975-76).

This covered in all 1620.8 sq.km. of forests. Five working circles were constituted:

- i) Coppice with Standards Working Circle.
- ii) Bamboo Overlapping Working Circle.
- iii) Afforestation Working Circle.
- iv) Old Plantation Working Circle. and
- v) U.D.P.F. Working Circle.

#### i) Coppice with Standards Working Circle;-

This consisted mainly of sal forests, situated on hills, valleys and plains. Three rotations of 30, 40 and 60 years were adopted. 30 years for valley sal, 40 years for hill sal and 60 years for old reserves.; Khatgaon and Mahua- garhi. The forests were distributed into 117 felling series of which 6 were advised complete rest. The yield was fixed by area and efforts were made to form equiproductive coupes. Three thinnings were prescribed in felling series with 60 years rotation, 2 in felling series with 40 years rotation and 1 in 30 years rotation. The plan also provided for plantation of blanks occurring in the annual coupes.

Prescriptions of plan have not been implemented in full. The control forms have not been maintained. The area statements on the maps do not represent the actual

state oii the ground. During the period of the plan the practice of kuraon took a great toll of the forests. The proportion of sal went down giving place to inferior miscellaneous species.

#### **ii) Bamboo Overlapping Working Circle**

Prasad's plan retained the three bamboo felling series as in the Old Reserve but the felling cycle was changed to 4 years. Two more felling series were created in Hijla Range. The felling rules provided for retention of current and previous years cuims. Purchasers would supply bamboo to the Mahulis at the rates prescribed by the D.F.O.

#### **iii) Afforestation Working Circle.**

This working circle comprised 3742 acres. All total seven afforestation series 2 in Hizla, 2 in Godda Damin, 3 in Pakur Damin Range were constituted. In the Mayurakhshi Dam catchment areas Kaju, siris, gamhar, sissoo, teak, eucalyptus, bamboo, khair etc. were planted. Later on a lot of Acacia moniliformis plantations were taken up. In the cath- ment areas soil conservation measures like checkdams, gully plugging, contour bunding and contour tenching etc. were taken up. Felling was prohibited in the catchments areas.

#### **iv) Old Plantation Working Circle.**

Plantation: Working Circle comprised the old successful plantations already existing in the Division. Two old teak plantations, one in Kulanga P.F. of Hizia Range and the other in Dhamania Pahar of Simra Range, were kept under this working ckrle. However, both the plantations suffered badly on account of excessive theft of Teak trees. The plan did not prescribe exploitation of mature trees.

#### **v) U.J.D.P.F. Working Circle;-**

This comprised undemarcated protected forests. Selection fellings of trees of 5' and above girth were prescribed by the number of trees to be removed. The prescriptions of this working circle were also not implemented properly.

During Prasad's plan a number of forest roads were constructed. List of roads is given in the appendix. Few bridges were also constructed during his period. List of buildings is also given in the appendix. During this plan period the boundary was fully demarcated and plotted on 16" = 1 mile cadastral maps. During this process steps were taken to consolidate the boundary pillars by replacing the earthen ones with stone masonry pillars and planting of ?\gave along the boundary line.

#### 1.5.6 Y.P.Jha's Plan (1974-75 to 1988-89)

Under this working plan five working circles were prescribed; -

- i) Coppice with Standards Working Circle.
- ii) Rehabilitation-Cum-Soil Conservation Working Circle.
- iii) Plantation Working Circle.
- iv) Bamboo (Overlapping) Working Circle.
- v) Avenue Working Circle.

#### **i) Coppice with Standards Working Circle**

Three types of rotations 60 years in old R..Fs, 40 years in old P.Fs and some good forests of the new P.Fs. and 30 years in the remaining felling series. The felling series which were kept as F.S.(B) under Prasad's working plan could be put in Rehabilitation-cum-Soil Conservation Working Circle by Y.P.Jha. Number of standards were fixed at 35 per acre.

## **ii) Rehabilitation-cum-Soil Conservation Working Circle.**

All the derelict, waste areas and catchment areas of river projects like Nayurakshi Dam, Sundar Dam etc. were kept under this working circle. Prescriptions were given for rehabilitation of vegetation, conservation of soil moisture and protection of existing vegetation. Under this working circle a total of 143 felling series were created.

## **iii) Plantation Working Circle.**

This embraced all the raised plantations, illicitly kuraoned patches and blank areas. Tending operations were prescribed for the existing plantations.

## **iv) Bamboo(Overlapping) Working Circle.**

This working circle embraces all the bamboo bearing areas where bamboos were still workable. The cutting cycle was fixed at 4 years. A total number of 8 bamboo felling series has been constituted. Provisions were made for not damaging the bamboo culms of the previous season. In one clump no less than 8 green culms are to be left. Removal of bamboo roots and extraction of rhizomes was prohibited. Bamboos to be cut above the second visible node or 12 inches from the ground level.

## **v) Avenue Working Circle;**

This working circle was meant to take up avenue plantation works along the metalled roads of the Division. A total of 206 km. length of road was prescribed to be taken up for avenue plantation.

The species prescribed for taking up avenue plantations were Teak, Mahogany, Mango, Jamun, Mahua, Kusum, Eucalyptus, Toon, Karanj, Neeni and Ficus species. Detailed plantattion techniques was prescribed for the purpose.

## RESULTS OF THE PREVIOUS WORKING PLAN:—

The working plan procedures were not at all followed. The forms prescribed for coupe working were not filled up at all. There is no record available in the felling series history records. However, there is no sign of improvement of the stocking from the previous plan period. Wherever sal forest is present, it is mostly of pole or sapling size. Very few areas of Narganj, Sillingi, Sirnra and Godda contain sal trees above 3 ft. sizes. Rampant kuraon activities had left the 'upper hills barren'. It seems during the plan period little effective steps were taken up for containing the kuraon. Most of the sal areas have been converted to rooted stock areas. A large number of illegal fallings are seen throughout the area.

Plantations done during the last five years show very poor performance. According to the amount of funds received for plantation work by the Dumka Division the existing plantations show little correlation. It seems as if the plantation activities were thoroughly neglected.

The fabulously stocked bamboo areas during the plan period only now are mute spectators to the through devastation caused by the expliters. Absolutely no bamboo areas have been seen suitable for exploitation. This sorry state of affairs might have been the results of not sticking to working plan procedures for bamboo exploitation, unchecked illegal fellings and not meeting to the demands of the Mahulis.

Roadside avenue plantations show good results at places.



**CHAPTER—VI**

**STATISTICS OF GROWTH AND YIELD.**

1.6.1 The statistics of growth and yield compiled at the time of the last plan have been made use of in this plan as well.

### 1.6.2 Stump mortality:-

During the course of the last plan in order to clarify the doubt whether the forests were regenerating properly under the Coppice with Standards system, it was felt that if adequate number of stools do not produce successful coppice shoots and if the replenishment by natural regeneration does not make up the loss due to stump mortality then either the system would have to be changed or at least some special steps taken to check the deterioration of the stocking. It was thus necessary to assess the stump mortality and the augmentation of the stock by natural regeneration. The assessment was done in the manner described below:-

1.6.3 During the course of field work representative plots were laid out in the coupes coppiced in the previous year. In order to study the effect of topography upon the stump mortality if any, representative plots  $\frac{1}{4}$  to  $\frac{1}{2}$  acres 10 hec. to 20 hec were laid out on steep, moderate and gentle slopes and flat areas along the fertility gradient. The number of stools that had successfully coppiced and those which had failed to coppice were enumerated in 15 cm (6U) girth classes for sal and other miscellaneous species separately in order to study their different coppicing power. Simultaneously fresh recruitment over the area was also enumerated to know how

### **TABLE NO.**

### **STUMP MORTALITY ( DUMKA FOREST DIVISION )**

Year working	species	Aggregate area of the representation plots in Hect./Acre		15.24 cm to under 30.84 cm. (6" to under 1"0")	30.40 cm to under 45' 72 cm. (1'-1.5')	45.72 cm to under 60.96 cm (1.5'.2')	60.96 cm to under 76.20 cm (2'-2.5')	76.20 to under 91.44 cm (2.5'-3')	91.44 cm to 106.68 cm (3'-3.5')	106.68 cm to 121.92 cm. (3.5'-4')	121.92 cm to 137.16 cm (4'-4.5')	137.16 cm to 152.40 cm (4'.5'-5')	152.40 cm and up (5' & up)	Total	Natural recruitment	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

1952-53	sal	9.915	Total no. of stumps	947	618	459	200	87	62	22	11	12	1	2419	4626
		24.50													
			Success fully coppiced stumps.	947	609	437	176	66	44	10	2	3	1	2295	
			Felled stump mortality	-	9	22	24	18	12	9	9	-	124		
			Stump mortality percent age.	Nil	1.4 %	4.8 %	12%	24.1%	29.3 %	54.5 %	81.8 %	75 %	Nil	5.1%	191.2%
1952-53	Miscellaneous	9.915	Total no. of stumps	769	632	474	277	112	68	35	25	15	4	2411	6178
		24.50													
			Success fully coppiced stumps	768	621	445	244	91	51	25	17	6	3	2271	
			Felled stump mortality	1	11	29	33	21	17	10	8	9	1	140	

			Stump mortality percentage.	0.33 %	1.7 %	6.1 %	11.9 %	18.75 %	25 %	28.5 %	32 %	60 %	25 %	5.8 %	255.4 %
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Comparatively much less *than* for sal as will be evident from Table below:-

**T A B L E NO.**

Species					
	76.20-91.44 cm. (2.5'3')	91.44-106.68 cm (3'-3.5')	106.68-121.92 cm (3.5'-4")	121.92-137.16 cm. (4'.-4.5')	137.16-152.40 cm. (4'.5'-5')
1	2	3	4	5	6
Sal	24.1	29.0	54.5	81.8	75.0
Miscellaneous	18.75	25.0	28.5	32.0	60.0

N.B. Mortality has been expressed as a percentage of the total stools enumerated.

1.6.5 The lower mortality percent for the stools of higher girth classes of miscellaneous species explains the predominance of the miscellaneous species in the growing stock, sal having been replaced by them in localities where sal stools of old age predominate. It was unfortunate that during that study it was not possible to lay out representative plots on steep and moderate slopes in adequate numbers as most of the coppice coupes of the previous year were on flat or gently sloping ground. Only 9(nine) plots were laid on

steep slopes and 19(nineteen) plots on moderate slopes which do not provide adequate data for conclusive derivations. However, the trend of behaviour can be indicated by the study. The consolidated data is given in Table No. below:-

far the stump mortality is being mitigated by natural regeneration. The stump mortality and the fresh recruitment were then expressed in terms of the percentage of the total V number of stumps enumerated. The result is given in the attached table. 1.6.4 From the attached table (Table) the following interesting observations can be made.

1) It can be seen that while for sal the mortality percent is 5.1, the fresh recruitments amount to 191.2 percent, and miscellaneous species, the stump mortality amounts to 5.8 percent and the fresh recruitment to 255.4 percent. Hence it can be safely concluded that the growing stock is in no danger of depletion, as the fresh recruitment compensates very much more than the stump mortality. In fact, the stocking is expected to improve in density with proper protection and tending.

2) The stump mortality of salis almost negligible for the stump up to P girth, stump mortality increases with the increase in girth being 1.4 percent, 4.8 percent, and 12 percent for 30.48 cm-45.72 cm.( 1'-1.5'), 45.72-60.96 cm (1.5'-2'), and 60.96 cm-76.20 cm(2'-2.5') girth classes respectively. Mortality shows sharp rise for higher girth classes being 24.1 percent to 81.8 percent. Coppicing should therefore, be satisfactory **for** sal of upto 76.20 cm(2.5') girth only whereafter coppicing should be discouraged. This result compares favourably with the All India experiments and observations on the subject.

3) For the miscellaneous species the behaviour is almost similar to sal except that for the girth classes

76.20-91.44 cm (2.5'-3') and higher the mortality percent is

1.6.6 The following observations can be made:-

1) The stump mortality increased almost proportionally with the gradients. While for plain ground and gentle slopes the stump mortality percent for sal is 4.2, it increases to 5.1 and 13.2 for moderate and steep slopes respectively.

For the miscellaneous species almost similar behaviour is observed, the stump mortality being 2.7 percent for flat and gentle slopes increasing to 8.2 percent and 9.4 percent for moderate and steep slopes respectively. Obviously, it goes to account for the poor density of the crop with increasing slopes. Lesser soil depth, higher exposures and desiccating conditions are unfavourable for natural regeneration on the one hand and the incidence of stump mortality is higher on the other.

2) The miscellaneous species have retained the distinctive feature of having lower mortality percentage than that of sal even on varying gradients. It shows that sal needs more protection than the other species, more so while coppicing poles of larger sizes.

3) On moderate and steep slopes, the mortality percent of sal is distinctively greater than those for other miscellaneous species which explains the increasing proportion of miscellaneous species on steeper slopes.

### **STUDY OF GROWTH**

1.6.7 Age/D.B.H. (curve)-Stump Analysis:- To study the

growth, stump analysis had been carried out for sal. The apparently different behaviour of Hill sal and Valley sal towards growth led to their study separately. Unfortunately no data could be collected for other species due to non-availability of well grown trees in the localities. A large number of stools of various sizes were selected in different localities and the data were collected. **The radii corresponding to the rings at different decades were measured.**

Measurements were taken along four radial directions and their mean taken. After making proper allowance for the age corresponding to average stump height, graph was plotted showing diameter under-bark at stump height against age. From the field observations, relation between diameter under bark at stump height and diameter over bark at breast height was found for different stump heights and was graphically represented. On the basis of the above a final graph showing age against diameter at breast height-over-bark was plotted which is attached herewith (Graph no.1)

1.6.8 On the same graph, curves showing age and average diameter-over-bark at breast height of the standard coppice qualities A and B (vide Howard pocket Book) were superimposed for comparative study. From Graph No. 4 the following observations can be made:-

1) The two types of sal of Valley and Hill differ in their growth behaviour. The Valley sal is superior in quality to the Hill sal.

2) The Valley sal up to about 56 years of age corresponds to a quality better than coppice quality 'B' but for higher ages the quality decreases below the coppice quality 'B'. Hill sal is of quality poorer than coppice quality 'B'.

3) The rotations required for Valley and Hill sal come to 30 and 40 years respectively as the average diameter at these ages is 15.24 cm (6") and 15.74 (6.2") respectively, which is the average size required

to meet the demand of fire wood and of the local population.

Locality	Age in Years	D.O.B.B.H. cm/(inches)	Corresponding D.O.B.B.H. cm/(inches)		C.A.I. in Cm/inches of D.O.B. B.H.	M.A.I. in Cm inches of D.O.B.B.B.
			4	5		
1	2	3	4	5	6	7
Hill sal	10	3.5/1.4	-	-	0.35/0.14	0.35/0.14
	20	8.1/3.2	-	-	0.46/0.18	0.41/0.16
	30	11.4/4.5	-	-	0.33/0.13	0.38/0.15
	40	15.7/6.2	-	-	0.43/0.17	0.38/0.15
	50	19.6/7.7	-	-	0.38/0.15	0.38/0.15
	60	23.4/9.2	-	-	0.38/0.15	0.38/0.15
Valley sal	10	6.1/2.4	-	-	0.60/0.24	0.60/0.24
	20	10.2/4.0	-	-	0.41/0.16	0.51/0.20
	30	15.2/6.0	-	-	0.51/0.20	0.51/0.20
	40	20.4/8.0	-	-	0.51/0.20	0.51/0.20
	50	25.1/9.9	-	-	0.48/0.19	0.51/0.20
	60	27.7/10.9	-	-	0.25/0.10	0.46/0.18

1.6.9 Average height (curve):- The height of healthy sal trees of different girths were measured. With the average figures a graph was drawn with diameter at breast- height-over-bark against average height. Now, from Graph no.1 the age corresponding to different



diameters were found out and finally the following table (Table No.\_\_\_\_\_ was prepared showing relation of age and height. A graph (Graph No.\_\_\_\_\_) was then drawn accordingly. Graphs for standard Q A and Q B were also superimposed thereon.

Locality	Age in Years	D.O.B.B.H. cm/(inches)	Height in cim/ft.
1	2	3	4
Hill sal	10	3.5/1.4	2.38/7.8
	20	8.1/3.2	5.79/19.0
	30	11.4/4.5	8.38/27.5
	40	15.7/6.2	11.58/38.0
	50	19.6/7.7	14.02/46.0
	60	23.4/9.2	16.15/53.0
Valley sal	10	6.1/2.4	6 .01/20.0
	20	10.2/4.0	10.06/33.0
	30	15.2/6.0	14.48/47.5
	40	20. 4/8.0	17.83/58.5
	50	25. 1/9.9	20.36/66.8
	60	27.7/10.9	21.27/69,8

1.6.10 The Valley sal approaches standard coppice quality 'B' while Hill sal is of inferior quality. The low quality of the Hill sal is due to exposure, desiccation and lesser soil depth on steeper gradients. It will also be seen that the Valley sal is more vigorous in growth than the Hill sal, more so in the younger age.

