

Future Management Discussed and Prescribed

Basis of proposals:-

The general forest policy was enunciated in the year 1894 by government of India vide Resolution No. 22F, dated 19th October, 1894. This policy document was revised after independence in 1952 which continued till eighties.

National forest Policy of 1988.

Over the years, forests in the country suffered serious depletion because of relentless pressures arising from ever increasing demand for fuel wood, fodder and timber, inadequacy of protection measures, diversion of forests lands to non- Forests uses without ensuring compensatory afforestation. Essential environmental safeguards were ignored and tendency to look upon forests as revenue earning was the main objective of forests management.

With a view to mitigate the above problems a new forest conservation policy based on preservation maintenance, sustainable utilisation, restoration and enhancement of natural environment was enunciated in December 1988.

The basis of objectives governing the new National Forests Policy of 1988 are as under.

- i. Maintenance of environmental stability through preservation and where necessary restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country.
- ii. Conserving the natural heritage of the country by preserving the remaining natural forests with vast variety of flora and fauna which represent the remarkable biological diversity and genetic resources of the country.
- iii. Checking soil erosion and denudation in the catchment areas of river, lakes, reservoirs in the interest of soil and water conservation for mitigating floods and droughts and for retardation of siltation of reservoirs. Increasing substantially the forests/tree cover in the country through massive afforestation and soil conservation programmes, especially on all denuded and degraded and unproductive lands.
- iv. Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations. Encouraging efficient utilization of forest produce and maximizing.

Substitution of Wood.

Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimise pressure on existing forests.

The present forest policy further states that the management of the existing forests and forest lands the emphasis should be on protection, improving their productivity, conservation of total biological diversity by strengthening the network of national Parks, Sanctuaries, Biosphere reserves and other protected areas, providing

sufficient fodder, fuel and pasture in areas adjoining forest to prevent their depletion, protection, improving and enhancing the production of minor forest to prevent their depletion, protection, improving and enhancing the production of minor forest produce (MFP or NTFPs) which provides sustenance to tribal population.

General Object Of Management:-

The ultimate object of management as proposed in this working plan for Dhanbad forests in to effect on over all important of existing natural forests and forest land so as to reach the state of sustained and maximum productivity within short period. Since most of the forests of Dhanbad Division have become highly degraded, the main emphasis is laid upon the restoration to their normal health.

The more immediate object of management are :-

- i. To protect and maintain proper forest cover to improve the existing stocks and quality for sustainable management.
- ii. Severe restriction on schemes and projects which interfere with forest that cover steep slopes catchments of river, lakes and reservoirs.
- iii. To minimise run - off soil erosion by minimising green felling slope and going for massive afforestation on govt. and private waste lands to increase tree cover in the district.
- iv. No working of forests unless these attain harvestable stage.
- v. The rights and concessions including grazing to always remain related to the carrying capacity to the forests.
- vi. Rights and concessions which can not be met from the natural forests, to be met by development of social forestry. the right and concessions enjoyed by the tribals should be protected. Their domestic requirements pf fuel wood, fodder, minor forests produce and construction timber should by the first concern.
- vii. Forest management plans to rake care of the needs of the wildlife conservation.
- viii. Effective action plan should be drawn to prevent encroachments on forests land and such forest area near urban habitation be brought under various afforestation programmes.
- ix. To encourage people's participation in rehabilitation, protection and afforestation programmes.

Constitution of Working Circle:-

To achieve the above specific objectives, the following working circles have been constituted.

1. Coppice Selection working circle.
2. Rehabilitation.

3. Plantation-cum-soil conservation working circle.
4. Protection working circle.
5. Mined over Area working circle.
6. Topchanchi wildlife working circle.
7. Social forestry working circle.

Area Statement:-

The range wise break-up of the area allotted to different working circles is given in TABLE (page no. 73)

The areas are in acre as well as hectares.

A detailed, village-wise break-up is given in ANNEXURE-1.

Blocks and compartments:-

The forest within the cadastral limits of village is a unit of the purpose of the working plan these units are shown in 16= 1 mile (1:3960) on village maps. Hostories are kept by felling series. However, no Govt, Felling was carried out during last 10 years.

Stock Maps:-

Stocks maps have been prepared on 6' = 1mile

(1:10560) Scale of topographical map.

The stock maps show the following :-

The stock maps show the following :-

1. Sal (blue wash)
 - a) Over 12' (30 c.m.) in dia.
 - b)" 8" (20 c.m.) to 12" (30cm.) in dia.
 - c)" 0" (0 cm) to 4" (10 cm.) in dia.
2. Miscellaneous (Red wash)
 - a) Over 12" (30 cm.) in dia.
 - b) Over 8" (20 cm.) to 12" (30 cm.) in dia.
 - c) Over 4" (10 cm.) to 8" (20 cm.) in dia.
 - d) Over 0" (0 cm.) to 4" (10 cm.) in dia.
3. Area fit for plantation- yellow wash with black hatches.
4. Area planted up- yellow wash with species surviving.
5. Scrub forest Area-Red hatches.
6. Rooted waste of sal- blue hatches.
7. Bamboo-black dots.

Period of The Plan

This working plan has been for a period of 10 years spread over 2000 to 2009-2010. In plantation/Rehabilitation a 10 year rotation has been laid out due to bad crop

and uneconomical harvesting. Sisal plantation has been given priority and a sub-chapter on sisal plantation has been incorporate under plantation -cum-soil conservation working circle. In coppice selection working circle no green felling has been prescribed instead only dead, dying and diseased trees would be taken out.

Working Plan For The Coppice Selection Working Circle

General constitution of the working circle

The following types of areas have been included in this working circle.

- i. Comprises of Sal and miscellaneous forests of Tundi and Topchanchi ranges which are located in comparatively protected region where regeneration is fairly well.
- ii. Crop density is more than 0.4

120. In last plan 13.87% of total forests areas were allotted to coppice working circle which was 3719.91 Ha. (9192.00 acres). Part of this has now been transferred to plantation-cum-soil conservation working circle as well as Rehabilitation of degraded forests working circle where protection against grazing by fencing the area is proposed to enable coppice shoots to grow and establish.

In hilly areas covered with miscellaneous species the response to coppicing has not been encouraging and as the miscellaneous species to regenerate such area have been allotted to R.D.F. working circle and protection working circle.

AREA :-

These forests occur primarily in Tundi and Topchanchi Ranges. The area of the working circle is 1937.40 Ha. This comes to 7.16% of total forest area of the Division.

SL No.	Range	Area of R.F.	W.C. P.F.	IN Ha. Total	% Of the area to that of range	% Of the area to that of division
1.	Tundi	468.85	77.50	546.35	4.77	2.02
2.	Topchanchi	159.31	1231.74	1391.05	13.14	5.14
3.	Chas	Nil	Nil	-	-	
Total		628.16	1309.24	1937.40		7.16

Though it is desirable to coppice these forests, it is proposed to carry regular green felling only after 10 years of current plan period. Right now the forests allotted to this working circle be provided strict protection against grazing and illicit removal. There are two important reason to do so.

a) First, the past history of coppice areas shows that the coppice coupes were not worked by state trading wing of forests department due to uneconomic production during last 10-15 years.

The area suitable for allotment to this working circle decreased from 3719.91 Ha. of the last plan to only 1937.40 ha. in current plan. So it is recommended that no further coupes should be worked during current plan period unless these forests become economically viable.

b) The other important reason is that during the last plan i.e. approx. 25 year, a majority of forests of this Division were prescribed for R.D.F.-cum-plantation as well as Protection Working Circle. Fencing and cut back was prescribed as two stages. Either pole crop or bushy stage. Ideally a good forest composition must belong to different age classes. Under such situation if felling in the coppice areas are recommended without rehabilitating or treating the degraded forests, the chances are that the forest of Dhanbad division will be devoid of even pole stage forest.

Therefore, the scientific approach will be to bring back at least an area equal to 20% of Division forest cover to good pole crop through better silvicultural methods.

However, removal of silviculturally available dead, diseased, dying or wind fallen will be carried out during this plan period to meet local people's demand.

Special Object Of Management. :

The special object of management are:-

i. To improve the forests, both composition and density by suitable tending operations.

ii. To manage the forest in such a way so that the demand of local people is met partially while the forest is improved for the benefit of local population.

iii. To ensure success of coppice regeneration.

Silvicultural System :- The coppice Selection system is best suited to meet the special objects of management for this Working Circle. This is flexible as well as retaining what so ever good forest is left to maintain ecological balance.

The growing stock has depleted in most of the areas, primarily due to disappearance of seedling reproduction and stunted growth of coppice. The continuous removal of forest produce has also resulted in the decrease in coppice vigour. The miscellaneous species, which are associates of Sal, coppice less vigorously compared to Sal. The absence of seedling reproduction can be attributed to heavy grazing, fire and illicit removal of pole size crop. The subsidiary silvicultural operations which were recommended in last plan have also not been carried out altogether. Therefore, to fully re-stock the area reliance will be made on effective closure, artificial regeneration and involvement of people's participation. It would be advisable to retain old crop as mother trees so that regeneration through seeds can be ensured.

Rotation :- For the reasons discussed in para-123, there is no need to prescribe rotation, as green and regular coupe felling has not been recommended during present plan period. Otherwise for academic interest rotation is 20 years which was also the same in last plan.

Selection Marking:- Although there shall no regular felling during the current plan period, but once the forest is protected and taken care of, it is expected that crop willk improve considerably. After completion of this plan period, review should be made to ascertain the economic and ecological viability of forests. Once the coppice forests are found to be viable, trees having 15 cm and above dia. would be marked for felling.

Marking Rules For Selection Felling:-

The Following rules are laid down for the guidance of marking officer:-

- a) The stems selected for the felling should be healthy, well formed and vigorously growing stems of 15 cm and above dia at breast hieght
- b) Asam, Bija, Siris, Karam, Toon, Dhaura and Panjan Would have equal preference with Sal provided they are healthy and promising.
- c) More tress should be retained near and around blanks, gullied and eroded areas.
- d) While extracting the selection felling efforts should be made not to damage tree around it,
- e) 40 mother trees should be retained per ha. of different species, who will help regeneration through seeds.

Supply To Right Holders:-

- a) regular felling ha not been recommended during current plan, right holders from dead, dying, diseased and windfallen trees which shall be removed regularly for the bonafide right holders,
- b) Forest produce denied out of routine thinning and cut-back will be handed over to right holders and members of village forest protection committees (VFPCs)
- c) Demands of the right holders would be determined by the Divisional Forest Officer.

Since coupe felling is not proposed in current plan therefore sequence of felling has not been prescribed when the next working plan of this division is due after 10 years.

Method Of Effecting Felling:-

- a) Only dead, dying, diseased and wind fallen trees will be removed regularly.
- b) Bamboo, Semal, Kushum, Palas, Ber, Amla and other fruit bearing trees shall not be felled.
- c) No felling would be carried out in 30M wide strip on either side of P.W.D. District Board or Forests Department roads.

- d) Felling should be done in such a way that mother trees and fruit bearing trees are not damaged. All trees including old high stumps and pollards should be cut with sharp slope to discourage accumulation of water.
- e) Trees standing in Jahiras and Saranas (Sacred Grove) would not be felled or removed.

Subsidiary Silvicultural Operations:-

Cultural operation has been neglected in these forests during last 15-20 years resulting into deterioration of forests. Resource crunch has been the main reason for that. It is recommended that subsidiary silvicultural operations should be meticulously pursued during current plan. These will consist of :-

- i) All high stumps shall be cut back
- ii) Shoots of sal and other valuable species shall be reduced to 2-3 per stool.
- iii) All inferior species found interfering with growth of sal and other valuable species shall be cut back.
- iv) Climbers and creepers shall be cut.

The best time for clearing is during the rains. But in case it is not possible to attain due to paucity of labour or fund, effort should be made to complete it immediately after the rains latest by February.

Grazing:-

The forests that are completely free from right, would be closed for grazing. In the rest of the forest where cultural operation would be carried out, the grazing shall be closed. This closure has to be enforced vigorously.

Near populated areas it may sometimes be necessary to fence the forest against grazing. Areas where such fencing would be required should be left to the discretion of the Divisional Forests Officer concerned.

Fire Protection:-

Rigid fire protection shall be provided for the first 5 years to enable the young coppice shoots to come up well and grow vigorously.

Working Plan For The Rehabilitation Working Circle:-

General Constitution Of Working Circle:-

This working circle includes such forest areas which has been reduced to bushy stage having sal rooted waste as miscellaneous species. This degradation to these forests have occurred due to adverse biotic situation like unregulated removal of forest produce, excessive grazing and frequent fires. The forest crop contains sparse sal on miscellaneous species with scrub forest. Such forests have the average height of 3-4 metres and diameter below 5 cm.

The density of such forest are much below than 0.4 Such forest contains leaves, twigs, grasses and small branch wood which are constantly exploited by local people.

Area :-

Total area of this working circle is 5014.37 ha. In the last plan this working circle was combined along with Plantation working Circle having combined area of 9358.75 Ha. Detailed area statement of this working circle is given in Annexure ii. Range wise details of area statement of this working circle is given below:-

Sl.No.	Range	Area of	W.C.IN	Ha.	% Of Area	% Of Area
		R.F.	P.F.	Total	To That Of Range	To That Of Divn.
1.	Tundi	1910.79	717.11	2636.00	23.05	9.75
2.	Topchanchi	62.43	1636.37	1698.80	16.04	6.28
3.	Chas	-	678.67	678.67	13.55	2.51
	Total	1982.22	3032.15	5014.37		18.54

Areas suitable for allotment to this working circle are found in all the Ranges.

Special Objects of Management:-

The special object of Management are :-

- i) To rehabilitate the rooted waste of sal and miscellaneous species from unregulated cutting, grazing and fire.
- ii) To replenish the blanks with the support of artificial regeneration by suitable species.
- iii) To meet the legitimate requirement of the local population and involve local community to participate in improving the quality of forest.

General Prescription:-

The main time of action towards the management of such forest under this working circle will be as follows:-

- i) Rehabilitation of such degraded forest will be the concern during the current plan. There is approximately 5000 ha. of forest in this working. Every year RDF operations to the tune of 500 ha. Year should be taken up, so that it would be possible to cover the entire.
- ii) Role of village forest management and protection committees (VFMPs) will be important in regenerating the protected forests. Forests Department shall carry out RDF work in reserve forest Right holders can be provided forest produce received from subsidiary silvicultural operations.

Treatment methods

Fencing:-

Fencing will be the important aspect in regenerating such forests. Cattle proof trenches stonewall fencing or brushwood fencing can be taken up depending on site and availability of fund. However trench fencing of 75m size is most desirable. Seeds of Khair, Bamboo, Babool and other thorny specie will be sown on the dung soil duped alongside the trenches.

Cut-Back:-

After fencing all the high stumps will be cut back to 15 cm from the ground in the first year. Later on multiple shoots arising out of the coppices should be brought to 2-3 shoots per stump.

Blank Plantation:-

Large blanks i.e. between 2.5 ha. will be planted with suitable species in the first rainy season after the cut-back operation completed. Regular weeding and hoeing should be carried out as per the guidelines in Vanropan Pustika (Plantation Manual) issued by the CCF, Development, Bihar, Similarly one hoeing and weeding will be carried out in the second year along with the repairs of the fencing.

Soil and Moisture Conservation Measures:-

Such areas also need soil and moisture conservation to support the growing forest. It will be desirable if contour trenches and V ditches are dug on which seeds of grass shrubs shall be grown. The trench fences shall be covered with Agave, Babool, Acacia or other suitable species. ditches will be dug at 50 cm spacing along the contour and will be reinforced with grasses and shrubs at 10-15 cms interval.

Protection Against Fire & Grazing:-

It. is essential to protect the treated areas from fire and grazing. Local community participation through JFM should be channelised in the protection against the fire and grazing. Since the Department fund and resource to achieve this end is not sufficient voluntary participation and involvement of the local population is very much desirable.

Model Estimate:-

A model estimate for rehabilitating such areas is given here below:-

Detailed Unit Cost Estimate Of Rehabilitation Of Degraded Forest

District: Dhanbad/Bokaro

Wages Rates: 51.01 per M/D by O. ONo. 122 Dt. 24.11.98, CCf. (Dev.) Bihar

Sl. No.	Particular of Works	Man day	Materials	Wages in Rs.	Total Expenditure	Remarks
1.	2.	3.	4.	5.	6.	7.
A) Advance Work						
1.	Survey & Demarcation	3	-	153.03	153.03	
2.	Site clearance	15	-	765.15	765.15	
3.	Trench fencing 1.75M X 1.25M	73	-	3723.73	3723.73	

	X 1.25M					
4.	Soil work 0.3m X 0.3m x 00. 3M	20	-	1020.20	1020.20	

5.	Nursery advance work for 1200 plants.	9	-	459.09	459.09	
6.	Soil conservation (if needed to check gully	10	-	510.10	510.10 (Add work)	
7.	Materials	-	343.00	-	343.00	
	Total :-	130	343.00	6631.30	6974.30	
B) Completion Work :-						
8.	Nursery completion	12	-	612.12	612.12	
9.	Plantaion	22	-	1122.22	1122.22	
10.	Two Hoeing & Weeding	22	-	1122.22	1122.22	
11.	Protection	7	-	357.07	357.07	
12.	Materials	-	217.00	-	217.00	
13.	Sowing of seeds on trench	02	-	102.02	102.02	
14.	Other work	-	50.00	-	-	
	Total :-	65	267.00	3315.65	3532.65	
C) Maintenance Work						
15.	One weeding & hoeing	14	-	714.14	714.14	
16.	Protection	10	-	510.10	510.10	
17.	Repairing of fencing	5	-	255.05	255.05	
18.	Replacement of dead seed	02	-	102.02	102.02	
	Total :-	31	-	158.31	158.31	
Grand Total :- (A+B+C)		226	610.00	11525.26	12138.26	

Note:- This schedule of rate is subject to revision by C.C.F. (Dev.) Bihar.

Working Plan for the Plantation-Cum-Soil Conservation

Working Circle

General Constitution of the Working Circle:-

This working circle comprises all such areas having blanks, open scrub and miscellaneous forest, afforestation areas including area treated under D.V.C. soil conservation programmes. It also includes open miscellaneous and scrub forest which are considered suitable for replacement by plantations. Gullied and eroded areas in need of soil protection and anti-erosion measures are also included in this working circle.

SL. No.	Range	Area of R.F	W.C. In Ha. P.F.	Total	% Of Area to that Range	% Of Area to that of Division.
1.	2.	3.	4.	5.	6.	7.
1.	Tundi	3048.55	2359.99	5408.54	47.30	20.01
2.	Topchanchi	988.08	4171.47	5159.55	48.74	19.09
3.	Chas Total	-	4308.60	4308.60	86.06	15.95
Total		4036.63	10840.06	14876.69	-	55.04
:-						

Plantation carried from 1985 to 1988 is given in Appendix-4

Objects of Management:-

The special objects of management for area allotted to plantation cum-soil conservation working circle are as follows:-

- i) To provide tree cover to blank and semi-blank with suitable species which can tolerate the adverse local conditions and survive to produce maximum biomass?
- ii) To tend the existing plantation and harvest the mature plantation;
- iii) To reafforest the harvested plantation areas as early as possible;
- iv) To check soil erosion and conserve moisture;
- v) To develop pastureland and plant fodder species for local villagers and reduce grazing pressure. on the local forest;
- vi) To improve socio-economic condition of the local people by planting medicinal and fodder plants along with sisalana.

Description of Vegetation of Afforestation Areas:-

Afforestation in Dhanbad Division has been taken up since 1953. Later on with allotment of funds from D.V.C. for afforestation and soil conservation works in denude forest areas within the upper Damodar catchment, large scale plantation programme was taken up by the Dhanbad Forest Division as well as by the Soil Conservation Department (forestry Section) of the D.V.C. A list showing the areas treated by Dhanbad Division has been given in Appendix-4

Although the Dhanbad Division has long done afforestation work in territorial areas of its own but chas Range of the Division has been doing plantation in the territorial Jurisdiction of Hazaribag East Division (presently Bokaro Division.)

During 1985 to 1991 afforestation activities in the Division was high and on an average 1200 ha. of areas were taken up. The pace of afforestation has come down drastically from 1992. This trend is highly unsatisfactory and is likely to give adverse

impact on the ecology of the district. The annual afforestation activity of Dhanbad Division is given below:-

Sl. No.	Year of Block Plantation R.D.F. Road Side Plantation						
	Plantation	H.F.	No. of Plant in Lakhs	H.A.	No. of Plants In LKS	K.M.	No. of Plants In Lks
1.	1985	705.00	18665	-	-	-	-
2.	1986	1390.04	34761	-	-	-	-
3.	1987	1420.00	35500	-	-	14	1.20
4.	1988	1655.00	40623	-	-	-	-
5.	1989	1221.05	29614	-	-	-	-
6.	1990	1060.00	26499	-	-	-	-
7.	1991	1400.00	35000	-	-	-	-
8.	1992	385.00	9635	-	-	14	1.20
9.	1993	1210.00	22000	1500	1500	20	1.565
10.	1994	254.05	6344	-	-	14	1.390
11.	1995	216.29	5134	-	-	12.5	0.760
12.	1996	80.00	150	17.0	0.170	-	-
13.	1997	375.00	9125	-	-	-	-
14.	1998	1428.00	35700	-	-	-	-
Grand Total :-		12801.23	310.100	167.00	167	74.05	6.115

During last plan, the programme of afforestation in most of the area has been a combined process of treatment of Sal rooted waste by doing cut back operation and plantation of blanks and scrubs forests suffering from varying degree of erosion and denudation with suitable species. Few of the existing old plantation areas is thus a combination of treated natural regeneration and artificially introduce species.

Successful establishment and growth of the artificially introduced species vary from site to site, depending upon the conditions and the effective protection provided to the crop. Most of the areas are inhospitable and suffers seriously from varying degree of erosion. Rigid protection against the fire and grazing is not physically possible in present day situation. Forest land in most of the locality in the Division is cut up in small patches varying from less than a hectare to few hundred thickly populated villages and cultivation. Such patches are also found within the forest boundaries as enclaves. The condition make it extremely difficult for the protection of plantations against grazing and theft.

In Chas Range particularly, the hunger for firewood is so extreme that almost all the plantations are kept clean, swept by constant removal of all leaf litter by local people and it is a common site to see large number of men, women and children engaged in this act from sunrise to sunset. No accumulation of humus oriented site improvement is possible. Although removal of leaf litter has helped in keeping away fire from the plantation area. Natural regeneration of planted species is entirely

absent. Only in one plantation area in village Barajore in Chas Range one comes across natural regeneration of *Acacia auriculiformis*.

Bamboo has been quite successful in areas having deep loam soils in plain forest. It has also come reasonably well on well drained hills having soil cover. However the practice of bamboo plantation has been discontinued for the last fifteen years due to paucity of funds as well as the inadequacy in protective measure.

Earlier *Eucalyptus* sp. and *Acacia ariculiformis* happens to be the main species of plantation. With the creation of JAAC (Jharkhand Autonomous Area Council) for the Chhotanagpur and Santhal pargana there have been a lot of hue and cry against these exotic species. Awareness of environment among the common mass has also resulted in the outcry against these species. In fact, JAAC has issued a specific order in this regard to ban completely the plantation of all exotic species and instead of them, the indigenous species have been recommended.

Crop formation of the planted species and the growth under varying edaphic condition *Acacia auriculiformis* and *Cassia siamia* shown tendency of drying in older plantations. Top drying in *Acacia* is common in refractory sites and in certain old plantations of 15 years and above, there is gradual disappearance of this species. A few that survives also show a sign of decay.

Dhanbad Division being typically forest deficit areas situated in one the most industrialised part of Bihar, theft of forest produce is extensive and it is very difficult to protect the growing stock once it reaches utilisable size of 10 cm (4") diameter and above.

Acacia auriculiformis which forms bulk of the miscellaneous species planed assume an average size of 10 cm. in diameter in 10 years. Most of the other species mainly exotic also assume harvestable size that time.

The Forest Research Division, Bihar has taken some adhoc measurements of *Acacia* plantation in this State. These suggest that the NAI/ha (average) in 1963 in Konar plantation was 4.33 m³ and of 1960 Badla plantation was 3.73 m³. This indicates that there is a tendency of N.A.I. to fall after 12th year. However, no such research data are available for last 10-15 years.

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 and would be given the same treatment as that to the planted seedlings.

Rotation:-

Keeping all these points in view rotation for plantations shall be 10 years.

Exploitation of Old Plantation:-

A total of 12801 Ha. plantation have been raised since 1985 till date. The success of old plantation are not very good. At the time of maturity one hardly gets 30-40% plants of the total planted.

It will be in fitness of things that the mature plantations of 10 years and above should be exploited by State Trading wing of the Forest Department to meet local demands of people and mining industries. It was observed during revision of these working plans that old plantation have not regularly been harvested, as few of them still exists. Divisional Forest Officer must ensure that all such plantations which has attained the age of 10 years should be harvests on priority otherwise there is probability of being felled illicitly. The Department many loose considerable amount of revenue in this regard.

Most of these plantations are of fast growing species like Acacia, Eucalyptus and Chakundi (Cassia-Siamea.) In Dhanbad Division their growth after 10 years is not up to mark. Therefore, they should be felled and subsequent upon replanting should be carried out in next year.

This is no consistency in afforestation work in this Division. Sometime the level of annual plantation is more than 110-1200 Ha. it falls drastically, afterwards. During 1992-97. average annual plantation happens to be in the tune of 250 Ha. It is recommended that on an average 1200-1400 Ha. of plantation should be taken up annually for this division to keep the vegetation patches in fact.

Preparation of Site Map:-

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

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

The above map will from the basis of subsequent operations recommended.

Methods of Execution of Fellings:-

- a) In addition to trees retained along the boundary line no Bamboo, Semal, Mahua, Kend, Kusum, Kaju and Karanj shall be felled.

- b) Before starting regular working in plantation coupes a 20' wide strip shall be cleared along the boundary line inside the coupe. Felling shall start from one end and progress systematically. Haphazard and selective felling shall not be allowed. Felling will be taken up section wise and it will not proceed in next section till the work in the preceding one has been completed.
- c) Young, healthy and formed saplings of uneconomic importance shall be allowed to be left which would form part of the future crop.
- d) Fellings are to be done in such a way that the retained trees are not damaged. All trees including old high stumps and pollards shall be cut with sharp tool to give a clean cut as close to the ground level as possible. The stumps shall not be more than 15 cms. in height in any case and should preferably have a slight slope to discourage any accumulation of water on the top.
- e) All climbers on the retained trees in the coupes area will be cut along with main felling.
- f) Trees falling in Jahiras or Sarnas (sacred groves) shall not be felled.
- g) Re-forestation shall be immediately taken up once the plantation coupe has been worked.

Advance Work for Natural Regeneration.

Natural regeneration of artificially introduced species in ascent in Dhanbad Forest Division, so no advance work for such area is recommended.

Treatment of Area and Plantation Operations.

The treatment after main felling or clearance of site shall aim at rehabilitating the areas falling within the plantation coupe by fencing, plantations and by exercising rigid protection from fire, grazing and unregulated fellings.

In the past, vast areas have been treated under Soil conservation cum-Afforestation schemes, the funds for which have been provided by the D.V.C. It is therefore, necessary to maintain continuity of forest cover in all such. This is possible only with restoration of vegetation by artificial means.

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 VANROPANPADHATHI.

CHOICE OF SPECIES:-

- i) Rhizome planting of bamboo is recommended in suitable areas where bamboo has come up very well Bamboo rhizomes can be

taken out from the existing clumps keeping in view the cutting rules.

- ii) Sisal is an useful plant and can grow on shallow soils and in drier areas. It is also very useful in Soil Conservation measures. It is suggested that its plantation may be carried out in drier areas of Chas range especially area around Chand colliery it best.
- iii) Cassia siamea, Terminalia arjuna, Albizzia procera, Albizzia lebbek, Ailanthus excelsa etc. are recommended to be raised in mixture. Pure plantation of any one of the species is not advisable.
- iv) Semal can be successfully mixed at wider spacing.
Khair is recommended in eroded area and on heavy soils.

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 operations is called for as a model guideline, the different operation recommended in the above paras have been summarised below.

- i) Annual plantation coupe is to 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 are 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 operations is recommended as per Afforestation Technique.

Fire Protection:-

Fire 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.

Technique and Economics of sisal Plantation:-

Introduction:-

Sisal fibre is obtained from a plant called Agave sisalana. It is native of Mexico. The fibre is used where tensile strength is needed. It is also in marine fibres and in manufacture of articles of daily usages. Such as various types of brushes, carpets, bags, etc.

Earlier India used to import sisal fibres for its domestic use.

Objects:-

The plantation of sisal is a proven soil conservation measure. Besides it is not very much demanding in its requirement of soil and moisture. This is another important point in favour of this plantation for utilizing the soil which is neither fit for agriculture nor for the cultivation.

Soil and Climatic Requirements:-

Sisal is found to grow on a soil depth of less than 30 cm. and it can develop on any type of soil. It is drought resistant plant by nature which require 750-1000 mm. of rainfall annually for its existence.

Planting Materials:-

Sisal can be raised either by bulbils or by suckers. Bulbils are borne on poles, which appears only once in the life cycle of a sisal plant. These bulbils are small are small in Size and are nurtured in nursery beds of standard size at a spacing of 20 cm x 20 cm for 12-15 months. They are transplanted in field when they attain size of 25-30 cms.

Suckers are thrown out every year around sisal plants from the roots of the plants. Suckers usually become available form the 3rd year at the rate 2-5 suckers per plant. These suckers are transplanted when they attain a size of 25-30 cm. They do not need any rearing in nursery beds and can be transplanted directly. Normally, a sucker is a better planting material.

Fencing:-

No fencing is required. Protection against trampling by cattle may however be provided for a period of at least two years.

Soil Working:-

Pits of 30 cm x 30 cm. are dug up in the plantation areas during October to March. The soil is heaped by the side of pit weathering. The clods of earth are upturned for weathering. Soil working may be completely abandoned and the plants can be transplanted directly in the field with the break of monsoon in good sites where the top soil is light loam or loam.

The spacing adopted is of double row of plants that is 1m X 1mX 2.5 m. Every double row or 1 m X 1m is separated by a 2.5 m wide strip to facilitate inter cultural operation, harvesting and carriage of leaves. The plants are staggered in the double row. The population of plant comes to 3850 per hectare (or 2300 per acre.)

Transplantation: Pretreatment:

Before actual actual transplanting uprooted suckers or nursery raised bulbils are subjected to certain pre-treatment with a view to initiate root growth. After uprooting they are carried to the planting site. Adventitious roots are trimmed by a sharp axe or scythe. Then the outer most layer of leaves (say-1-3 leaves) are removed

exposing the cream-coloured bulb. the process is called root trimming. The root-trimmed plants should be transplanted immediately. Normally, the entire operation from uprooting to transplanting may be completed within 24-28 hours though sisal plant has been known to withstand much rough handling.

Transplanting:-

Suckers or nursery raised bulbils are transplanted preferable with the outset of monsoon. This operation must be completed end of July. In view of the drought resistance of plants, pre monsoon transplanting may be resorted to, the cost however, tends to go higher in the latter case.

The cream coloured portion of the bulb is planted in the soil which is tightly pressed around it by the feet of plants. The newly transplanted plants should never yield to normal pressure when pulled out.

Intercultural Operations:-

Contrary to general belief, Sisal plants demand attention throughout its entire life which is normally of 10 years. It is desirable for its economic returns.

Weeding and Hoeing:-

Every plant is potential donor of leaves which are sources of fibre, hence as a rule individual care must be bestowed upon each of them. In strip of 150 cm. width were the double row of sisal plants have been planted, all weeds may be removed for a period of at least 2-4 years consecutively. No weed should prop up above the height of the sisal plants.

The soil is loosened up to a depth of 15-20 cm in the 150 cm wide strip without disturbing the soil in the radius of 15-20 cms around the plant. This essential for the healthy growth of plant and to promote production of suckers.

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Manuring:-

Sisal plants are calciphilous. Hence calcium fertilisers must be applied to them besides nitrogen phosphorus and potassium. The following dose per plant has been found to be good for plants growing in Latehar Forest Division.

Urea- 28 Gms.

Muniate of Potash- 8 Gms.

Dicalcium Phosphate 36 Gms.

This works out to nitrogen 75 kg/ha. phosphorus 70kg/ha. potash 30 kg/ha and calcium 50 kg./ha.

The mixture of fertiliser in the above proportion is applies in a radius of 15-20 cm for the centre of the plant after 15-20 days from transplanting. The application of fertilisers must be completed by 15th -31th August. Single super phosphate and dolomite may be substituted for bicalcium phosphate. Ammonium sulphate or Ammonium sulphonitrate may not be used as they promote soil acidity. The latter is not beneficial to sisal plants.

Extaction of Fibers.

Sisal plants become mature to yield leaves from the 4th year. In the first harvest only the peripheral leaves are cut leaving 20 heaves in the centre. The unfurled column of leaves in the centre is not taken into account. In the subsequent harvest only 15 heaves are left excluding central column of unfurled leaves.

Leaves are cut by a curved scathe with a long handle as close to its base as possible, but with out injuring the trunk of the plant. This instrument is called ' sisal leaf cutter'. Sisal leaves contain only 3% fibre. Harvested leaves are decorticated on sisal-decorticator machine. The fibre is baled in baling machine into 50 kg or 100 kg bundles. This now becomes ready for sale.

Harvesting of leaves is continued from 4th year to 10 th year. After which plants are uprooted and new plantation are raided. This usually coincides with the poling, after which plants die out.

Economics:-

The cost of raising of one hectare of sisal plantation and extraction of fibre, etc. is given below; Estimate based on minimum wages Rs. 51.01 per manday

First Year

Advance work

1. Survey and demarcation -	2.5 M.D.	- 127.52
2. Site clearance -	5 M.D.	- 255.05
3. Soil work -	132 M.D.	- 6733.32
4. Nursery (for one year including material -	162 M.D.	- 8263.62
5. Trench Fencing 1.5M X 1M X 1M	70 M.D.	- 3570.70
Total: -	371.5M. D.	18950.21

Second Year

1. Nursery (April to June) -	56 M.D.	- 2856.56
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2. Planting	-	145 M.D.	- 7396.45
3. Weeding and hoeing (twice)	-	145 M.D.	- 7396.45
4. Fertilizer	-	L.S.	- 1200.00
5. Protection	-	4 M.D.	- 204.04
6. Miscell.	-	L.S.	- 100.00

19153.50

Third Year

1. Weeding and hoeing twice including maintenance of extraction path.	-	145 M.D.	- 7396.45
2. Protection	-	4 M.D.	-
204.04			

7600.49

Fourth Year

1. Weeding and hoeing twice including maintenance of extraction path.	-	145 M.D.	-
2. Fertilizer	-	L.S.	-
3. Shrub Cutting	-	4 M.D.	-
4. Protection	-	4 M.D.	-
7396.45			
1200.00			
204.04			
204.04			

9004.53

Fifty Year

1. Maintenance of extraction Path	-	10 M.D.	-
2. Protection	-	4 M.D.	-
510.10			
- 204.04			

714.14

Sixty Year

204.04	1. Shrub and climber cutting -	4 M.D. -
510.10	2. Maintenance of extraction -	10. M.D. -
714.14		

Seventh Year

7396.45	1. Weeding and hoeing twice - including maintenance of extraction of path.	145 M.D. -
1200.00	2. Fertilizer -	L.S. -
100.00	3. Miscell. -	L.S. -
8696.45		

Eight Year

510.10	1. Maintenance of extraction Path -	10 M.D. -
100.00	2. Miscell. -	L.S. -
610.00		

Ninth Year

610.00	1. Same as eighty year -	
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Tenth Year

610.00	Do-	

64833.45

Working Plan for the Protection Circle.

Genera Constitution of the Working Circle:-

This working circle comprises the forest of Jharia Water Board situated in the catchment of the Rajdaha reservoir near Topchanchi and those hilly areas which are unfit for coppice selection working circle or plantation working circle. Such areas also include those hilly slopes which are steep where plantation can also not be successful.

They also include precipitation slopes, hillocks with scanty or no vegetation and rock outcrop of Tundi and Topchanchi Range.

A small patch of plantation along with regeneration around the Chas Forest Rest House on Chas Range has also been taken up in this working circle.

Area Statement:-

The areas of the working circle is 3901.00 has. which comes to 14.43% the total Divisional Forest area.

A detail of area statement has been given in Annexure II of this plan. Range wise break up of this working circle is as follows.

SL No.	Range	Area of R.F.	W.C.IN P.F.	Ha. Total	% of Area to that Range	% of Area to that of Division
1.	Tundi	2028.56	814.97	2843.53	24.86	10.52
2.	Topchanchi	1038.87	-	1038.87	9.81	3.84
3.	Chas	-	18.60	18.60	0.37	0.06
Total		3067.43	833.57	3901.00	-	14.43

Special Objects of Management:-

The special objects of management of this working

- i) To protect and conserve whatsoever vegetation on steep hills and slopes,
- ii) To maintain the Rajdaha catchment of the Jharia water board as full forest cover to reduce soil erosion and to improve water conservation. It also aims to reduce siltation in the reservoir.
- iii) To create conditions conducive to the introduction advanced silvicultural technique in future.

Treatment:-

No felling is to be carried out in these forests. There would should be rigid protection against fire, grazing and unregulated felling.

Soil conservation treatment should be done to the barren hills or the hills with miscellaneous scrubby growth, Lantana, etc. According to the fund availability.

As grazing and trampling are the major causes of degradation of such areas, an effective fencing is recommended against the same. Among the live fence

plantation of hardy species like sisal (Agava mexicama) at least on the boundary lines in 4 to 6 rows are suggested. In areas where soil depth is not sufficient for even sisal growth, stone or boulder-wall fencing should be opted for effective protection against cattle.

In the blanks of the forests of Rajdaha reservoir catchment area plantations of suitable indigenous species should be made with caution as these degraded areas are liable to faster erosion.

Fire Protection:-

Rigid measures against trampling and fire must be taken within the catchment of the Rajdaha reservoir for proper build up of conditions for reducing silt load to the minimum. Elsewhere in the old plantations and forests areas, fire protection measures shall be continued to be taken as in the past.

Working Plan For the Mined-Over Area Working Circle Overlapping:-

General Constitution -

This overlapping working circle contains all such forest areas which are at present under occupation of mining operations. Dhanbad and Bokarao district which fall under this Forest Division are primarily mining districts. Dhanbad is one of the most important coal mining areas of the country. It is headquarter of Bharat Cooking Coal Ltd. (B.C.C.L.), a subsidiary of Coal India Ltd. (C.I.L.) due to excessive coal mining there has been tremendous urbanization and industrialisation in this areas which already contains very less percentage of forests cover.

As a considerable area of forest is directly affected by coal mining it would be advisable that restoration mined-over area should attract immediate attention. In spite of the District being a major cooking coal producing centre, The rural population still depended largely upon firewood for cooking purposes. Requisite amount of forest cover is required to contain air, water and noise pollution. Hence this working circle is being constituted in addition.

Special Objects of Management:-

- i) To rehabilitate wooded waste forest under mining area,
- ii) To encourage afforestation activities over mining dumps,
- iii) To check soil, water and air pollution in and around mines,
- iv) To mobilise public opinion in favour of environmental issues.

General Prescription:-

- i) The Forest Department shall undertake suitable steps to rehabilitate and restock degraded forest area in and around

mines through its RDF programme. This should be accorded top priority over other afforestation programmes.

- ii) Compensatory afforestation be carried out under the provision of Forest Conservation Act 1980 as soon the resources are made available.
- iii) Where ever there is a conspicuous chunk of mined over forest land, its ecological restoration may be the prime concern. All such over burdened dumps should be biologically reclaimed. Local species be given preference and mixed plantation should be encouraged in lieu of monoculture
- iv) Mining company should undertake road side plantation, creation of green belts, parks and gardens and community nurseries to maintain the ecological balance of the area.

Model Estimate:-

A model estimate of reclamation of overburdened dumps is given below for reference. Resources for this operation should come from the concerned mining unit/district administration. This estimate has been incorporated from the Rajiv Paryavaram Yojana of Dhanbad District prepared by Divisional Forest Officer, Dhanbad.

Detailed Unit Cost Estimate of Reclamation Of Over Burden Dumps. District Dhanbad.

Wages Rate : 51.01 per M/D Oct:98.

A)	Advance Work	Amount
1.	Survey & demarcation 3 M/D per ha.	153.03
2.	Trench Fencing (1.74 mx 1.25m X 1.25m) 70 M/D per Ha.	3570.70
3.	Terracing of dumps terrace size 75 cm at 2m across the contour 230 M/D per ha.	11732.30
4.	Pit digging 30 cm ³ on terrace in staggered lines 70m/D per ha.	3570.70
5.	Transportation of good soil by truck including loading & unloading truck per ha. Rs. 900.00 per. truck	5400.00
6.	Breaking of earth & earth filling in pits by carrying head load 50 m/d, per hac.	2550.50
7.	Material purchase (cow dung, Polythene tubes, BHC, Aldnu, Seed and Biheli etc) hac. including coddung manure to be filled in pits.	3000.00
8.	Advance nursery work 20 M/D/ ha.	1020.20
		30997.43
	Add contingency 2% Sub Total	31617.37

Completion Work	
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1.	Nursery completion 30 M.D/ha	1530.30
2.	Planting work 75 M.D/hac.	3825.75
3.	Two hoeing/weeding 55 M.D/hac	2805.55
4.	Material (including Rs. Insecticide & fertilizer Rs. 1350.0/ha	1350.00
5.	Irrigation/camp labour arrangement @ 600/hac	600.00
6.	Protection 14 M.D/hac	714.14
		10825.74
	Add Contingency 2%	216.51
	Sub Total	11042.25

Maintenance Work		
1.	Casualty replacement 20% 55M.D/ha	2805.55
2.	One hoeing/weeding 30 M.D./hac	1530.30
3.	Repairing of trench 10 M.D./ha.	510.10
4.	Protection (for 12 Month) 21 m. d/hac	1071.21
		5917.16
	Add Contingency 2%	118.34
	Sub Total	6035.50
	Grand Total- (A) +(B)+(C) = 48695.12 or say	48690.00
(Rs. Forty Eight Thousand Six Hundred Ninety Only		
(Source:- Rajiv Paryavaran Jojana of Dhanbad		

Treatment Model for Reclamation of Over Burden Dumps:-

District- Dhanbad -

- i) First of all survey & demarcation of purposed area will be done.
- ii) The whole area will be fenced by trench fencing or stone wall fencing according to the ground feature specification of trench will be 1.75 m X 1.25m 1.25 & stone wall 1.25 M X 1M X 1M
- iii) In case of sharp undulating dumps, terracing will be done. The terrace size will be 57 cm. to 2m. spacing across the contour.
- iv) Pits will be dug on 75 cm terraced line well in advance at a size of 30 cm. Good fertile soil will be transported from out side & it will be in filed in the pits after mixing cow dung & insecticide.
- v) Nursery will be raised near the plantation site so that the burden of transportation for seedling at the time of plantation will be removed.
- vi) Whatever materials for nursery & plantation will be purchase the stock register for receipt and dispatch will be maintained.
- vii) Two hoeing weeding is essential in the first year of plantation. First hoeing weeding will be done after 21 days or latest 1 Month after planting & second hoeing weeding will be done at the end or rainy season. Specification of hoeing 11.2ft around the plant and weeding in the following year.

- viii) Casualty replacement will be done maximum 20%
- ix) Trench fending will be repaired wherever it is necessary in the third year.
- x) Local labour will be engaged for protecting the plantation.