



RECLAMATION AND AFFORESTATION SCHEME

**BAMEBARI IRON AND MANGANESE MINE
TATA STEEL LTD.**

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1.0 Introduction

Tata Steel policy is to take care of and preserve the greenery in the leasehold area for ecological balance. Trees in non-mining area are protected unless otherwise cutting them becomes an absolute necessity. Only phase wise de-forestation is done by the company for advancement of mining and allied operation. The Reclamation and Afforestation Scheme of Bamebari Iron & Manganese Mine consists of the following steps:

- Review of Afforestation already done
- Top Soil Management
- Dump and Pit Reclamation
- Budgetary Provision for Afforestation

2.0 Afforestation already done

Afforestation in the Bamebari Iron & Manganese lease area has been taken up since long. These afforestation activities were restricted to the vacant spots and geologically barren areas along with the slopes of waste dumps in every stage. Presently, all the pits are in active stage. Parts of the pits which have reached its ultimate will be backfilled.

The Detailed year-wise data since 1985-86 is given below in the Table No. 1.

Table No.- 1

Year of Plantation	Saplings Planted (Nos.)	Area (ha)	Survival Rate (%)	Tree Density/ha
1989-90	32000	6.12	73.5	3843
1990-91	40000	7.23	72.1	3989
1991-92	20000	4.32	84.5	3912
1992-93	7458	1.25	87.8	5238
1993-94	7000	1.25	79.6	4458
1994-95	5500	1.25	78.8	3467
1995-96	5000	1.25	74.56	2982
1996-97	5000	1.25	76.32	3053
1997-98	6000	1.25	85.5	4104
1998-99	5000	1.25	82.2	3288
1999-00	5000	1.25	83.5	3340
2000-01	5000	1.25	84.5	3380
2001-02	5000	1.25	84.6	3384
2002-03	5000	1.25	81.5	3260
2003-04	5000	1.25	78.6	3144
2004-05	5000	1.25	79.28	3171
2006-06	5000	1.25	80.5	3220
2006-07	15542	3.5	80	3562
2007-08	5000	2	78	1950

2008-09	4000	1.5	75	2000
2009-10	15865	1.5	75	7933
2010-2011	23740	2.5		
2011-2012	33625	4.22		
2012-2013	68110	4		
2013-2014	27100	2.5		
2014-2015	28145	3.6	62	4847
2015-2016	25710	1.1	76	17763
Total	414795	61.59		

The number of Saplings planted is higher than that proposed because the company launched the "Green Millennium Countdown" under which large-scale afforestation was taken up. The above plantation was done within the lease area.

Total area covered under afforestation is about 61.59 ha & the total no. of saplings planted is about 4.14 lakhs.

All these plantations have been taken up by TSRDS (Tata Steel Rural Development Society). This is a service oriented non-profit making organisation fully funded, supported & which is a sister concern of Tata steel. The self-help group of different nearby villages are actively participating & they are availing this opportunity from TSRDS. Saplings have been developed at our own nursery under horticultural guidance from TSRDS and District Forest Officials. These saplings are being used by us for dump rehabilitation.

TSRDS is also putting its sincere efforts outside the lease hold area in peripheral development scheme. So this is a continuous effort given by Tata Steel from every corner for developing greenery all along.

3.0 Top Soil Management

Fresh forest area will be utilised for excavation of manganese and iron ore. Whatever topsoil generated will be removed separately before the commencement of mining activities and stacked separately at the earmarked site in 1 metre height topsoil dump. Top Soil will be preserved by planting grass on slopes and top of the dump. Such preserved topsoil will be utilised in subsequent monsoon for afforestation purpose in the mine lease area & waste dump slopes. The preservation manner is shown in **Sketch-1**.

4.0 Dump & Pit Reclamation

It is envisaged that as mining pits will be expanded to go deeper as well as new area will be utilized for extraction of iron and manganese ore; reclamation of pit is not immediately possible. However, parts of the pits which have reached its ultimate depth will be backfilled. Moreover, attempts are being made to prove the barrenness in some of the bottom most areas of the pits already exhausted by DTII drilling so as to ascertain the existence of ore and subsequent preparation for back filling. While proposal for further back filling has been worked out it needs to be approved by the competent authority as per the Mining Plan / Scheme of Mining and Progressive Mine Closure Plan for subsequent plan periods, before the same can be taken up.

The process of inactive dump slopes being biologically stabilized with multi-species afforestation will continue. Parapet walls for some of the active dumps will be taken up during the first year itself.

The details of the area to be reclaimed and afforested in a phased manner is given in the table no. 2

Table No: 2
Bamebari Iron and Manganese Mine

Year	Bamebari			Joribar			Boneikela			Total		
	Backfilling	Plantation										
		Area	Nos									
2016-21	6.560	5.324	13310	0.000	4.000	10000	0.000	1.000	2500	6.560	10.324	25810
2021-26	9.447	8.000	20000	0.000	2.656	6640	2.716	1.000	2500	12.163	11.656	29140
2026-31	3.554	8.000	20000	9.071	7.330	18325	4.670	2.716	6790	17.295	18.046	45115
2031-onward	5.197	6.128	15320	5.637	8.071	20178	5.770	10.252	25630	16.604	24.451	61128
Total	24.758	27.452	68630	14.708	22.057	55143	13.156	14.968	37420	52.622	64.977	161193

5.0 Bio-diversified Afforestation /Reclamation.

The species to be planted in the reclamation programme are given in Table no.3.

Table No.- 3

Sl No.	Botanical Name	Common Name
1	Albizzia lebbek	Siris
2	Prosopis juliflora	Juliflora
3	Melia azadirachta	Bakain
4	Terminalia arjuna	Arjun
5	Luceana lucocephala	Subabul
6	Melina arborea	Gamhar
7	Psidium guajava	Guava
8	Acacia auriculiformis	Acacia
9	Azadirachia indica	Neem
10	Terminalla tomentose	Asan
11	Zizypus jujube	Ber
12	Shorea robusta	Sal
13	Tectona grandia	Tekak
14	Delbergia sisso	Sisham

6.0 Method of Plantation

The steel company proposes to reclaim the mining pits and dumps by afforestation, when they are permanently abandoned. The afforestation of the dumps and mining benches will be done by the following methods.

(A) Method of Pitting & Planting:

- i) The worked out mining benches will be reclaimed by making pits of 0.5m x 0.5m x 0.5m size, 2m apart. The pits will then be filled with sweet earth, sand and cow-dung.
- ii) Neem cake powders are proposed to be applied in the pit to protect the plants from white ants.
- iii) Such ground preparation is proposed to be done before monsoon after which appropriate varieties of saplings will be planted during the monsoon.

The method of pitting and planting has been explained in **Sketch-2**

(B) Method of Planting by Contour Trenching:

This method is proposed for slopes wherein contour trenches are dug at 3m interval along the contour. The excavated earth is stacked on the edge of the trench on the lower slope side to arrest the water flow that comes due to rains and accumulates on the trenches and gradually seeps through the strata enabling the planted saplings to get water and nutrients regularly for healthy growth.

The method of pitting and planting has been explained in **Sketch-3**

7.0 Present Organization and Man Power

Since 1989, an Environment Management Department has been set up exclusively for Tata Steel to monitor and execute all environment-related activities of all the mines of our Division including our Bamebari Iron & Manganese Mine. This department has been occupied with well-experienced professionals drawn from different disciplines like mining, botany, horticulture and chemistry backgrounds and the organisational structure shown in Chart-I. These professionals are now regularly interacting with our TSRDs who has much expertise in this field and seeking advice from different Govt. forest officials & officials of MoEF to make the afforestation programme of each mine, a success. Bamebari Iron & Manganese Mines, being an important mine of the Company, receives due attention and care in all the environmental matters including afforestation and reclamation.

8.0 Financial projections of the proposed reclamation scheme

The financial projection for the proposed reclamation and afforestation scheme, based on the current prices as indicated in Table No.: 4 & the rate has been calculated per hectare plated. Based on these projections the budgetary provisions that are necessary to be made for entire plan period are given in Table No.-5

a) Cost estimate for reclamation & afforestation (estimation is for one ha.)

During the first year the Dept. will make the plantation of specified saplings & from second and subsequent year due take care will be taken for its better survival in future.

Table No.- 4**COST OF ESTIMATES FOR RECLAMATION AND AFFORESTATION OF ONE HECTARE OF LAND**

Sl. No.	Item of work	Man days	Labour rate @ Rs. 280	Labour Cost	Material cost	Total
1	2	3	4	5=3 x 4	6	7=5+6
1st Year : Planting Operations						
2	Site preparation	8	0	2240	0	2240
4	Digging of pitting (30 cm ³)	40	0	11200	0	11200
5	Nursery cost (one year old seedling) part.	75	0	21000	25000	46000
6	Contingencies & overheads (10% of Sl. 1 to 5)	0	0	0		6088
Sub Total		127	0	35560	25000	65528
1st and 2nd Year : Maintenance During plantation year and one year maintained						
1	Carriage of seedlings to site cleaning including casuality replacement	25	0	7000	0	7000
2	Cost of insecticide & fertilizer	20	0	5600	2000	7600
3	1 st Weeding (Complete Weeding)	7	0	1960	0	1960
4	Manuring	5	0	1400	2500	3900
5	2 nd Weeding (Complete Weeding)	5	0	1400	0	1400
6	Soil working (50 cms. Radius around plants)	8	0	2240	0	2240
9	Watch & ward and brush wood/live fencing at 15% length of periphery to prevent cattle entry	7	0	1960	0	1960
10	Watering at least 6 days in a month for 8 month (April to July & Dec. to March) on LS		0	0	0	100000
11	Contingencies (10% of Sl 1 to 10)					12970
Sub Total		90	0	25200	4500	139030
Grand Total		217	0	60760	29500	204558

Table No.-5

Budgetary Provisions for Plantation

Year	Nos. of plantation	Area	Provision for Budget (in Rs.)
2016-21	25810	10.324	2111857
2021-26	29140	11.656	2384328
2026-31	45115	18.046	3691454
2031-onward	61128	24.451	5001648
Total	161193	64.477	13189286

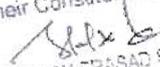
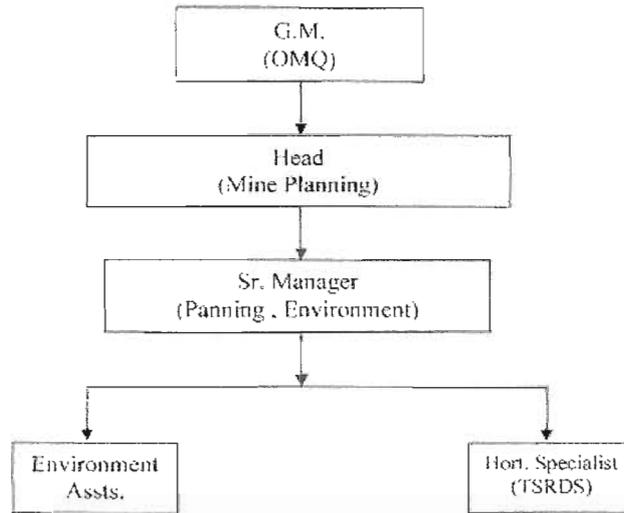
FOR TATA STEEL LTD.
By their Constituted Attorney

(GANESH PRASAD SAHU)
Head (Ferro Alloys Production)
Ferro Alloys & Minerals Division

CHART-1

**Organisation Chart
Mine Production Planning & Environment**



FORTATA STEEL LTD.
By their Constituted Attorney
(Signature)
(GANESH PRASAD SARIJ)
Head (Ferro Alloys Production)
Ferro Alloys & Minerals Division