

## 1. Introduction

Jeera Irrigation Project is a dam project proposed in Mahanadi basin on Jeera River, a tributary to Mahanadi River, at village Duanpali; block Bhatli, in Bargarh District of Odisha. The project envisages construction of a 1958 m long Homogeneous Rolled Earth Fill dam, besides a spillway of length 72m proposed at the central portion of the dam axis.

This medium irrigation project will provide irrigation facility to 6000 ha of G.C.A and 4800 ha of C.C.A, with annual irrigation of 5840 ha in drought prone areas of Bargarh District.

## 2. Selection of Sites

As per guidelines of Forest (Conservation) Act, 1980, non-forest land equivalent to the Forest land to be diverted is to be identified for the purpose of raising Compensatory Afforestation (CA).

Therefore the Collector Bargarh instructed all Tahasildars to identification of Govt. non-forest land over 5.391 ha. for Compensatory Afforestation for Jeera Irrigation Project. 5.391 ha of non-forest land in Mouza- Jamchhapar under Sohella Tahasil of Bargarh Forest Division was identified to CA. So the present scheme aims at preparation of a site-specific compensatory afforestation scheme over 5.391 ha of non-forest land. The land schedule is given below

Tahasil	Village.	Khata No.	Plot No.	Area (in ha)	Kissam
Sohella	Jamachhapar	146	1962 (Part)	13.32 Ac	Dunguri
				Or 5.391 Ha	

### i. Description of the existing vegetation

The existing vegetation is of miscellaneous type like bushes scattered.

### ii. Soil & Topography

The topography of the Compensatory afforestation site is mainly plain with gentle slope. But the depth of the soil is good and the existing vegetation indicates the PH value.

### iii. Temperature

The average temperature varies from 13.5° C minimum in December to 45°C maximum in May.

### iv. Rainfall

The annual rainfall varies from 1200 mm to 1400 mm. The maximum rainfall is received during the rainy season from July to September.

### **3. OBJECTIVE OF THE SCHEME**

The main objective of the scheme is to restock the forest vegetation by taking up silvicultural operation of the existing forest crop and supplementing it with ANR plantation in blanks patches. The scheme also envisages carrying out adequate and appropriate soil conservation measures along with the afforestation work so as to conserve soil and water for recharging the ground water table and to check erosion of the fertile top soil.

Principal Aims of the proposed scheme:-

- i. To rehabilitate the degraded forest land through plantation with suitable indigenous species of one year eight months old.
- ii. To promote the growth of existing crop and root stock through suitable silvicultural practices.
- iii. To arrest soil erosion and to improve the soil-moisture regime of the area which will ultimately recharge the ground water.
- iv. To create a compact forest, which will be an asset for the local people from environmental, economic and aesthetic points of view.
- v. To help reduce environmental pollution.

### **4. ITEMS OF WORK TO BE TAKEN UP:**

To achieve the objective narrated in the foregoing para, the following items of work are mainly prescribed to be taken up:

#### **i. Survey and demarcation**

The proposed Compensatory Plantation Area has been surveyed and demarcated in the field by the User Agency at their cost, putting RCC pillars of 4' height at visible distance and has been checked by the officials of Forest Department. The entire area will be fenced with trench fencing and babul seeds sown on the heap of soil all along the outer side of the trench by the Forest Department at the cost of the User Agency.

#### **ii. Soil and moisture conservation.**

Soil & moisture conservation measures will be taken up as specified in the ANR cost norm enclosed in the CA. Scheme.

**iii. Fencing**

As this area is within the village forest area, there is every possibility of grazing by stray animal. It is therefore proposed for Trench Fencing/vegetative fencing along the surveyed boundaries to prevent grazing. Trench fencing will be done over 5.391 ha. An amount of Rs.1,90,841/- (wage rate of Rs. 200/- per day) will be required for taking up trench fencing.

**iv. Protection measure**

The forest block has become degraded due to biotic interference and to save the area from the same, the following protection measures are to be adopted.

**v. Watch and ward.**

The Compensatory Area will have to be protected by engaging watchers for 10 years continuously, i.e. till establishment of the planted trees and natural saplings.

**vi. Involvement of V.S.S.**

The members of the VSS, i.e. Ambahal VSS will be involved in Protection and regeneration of the area. For the purpose training, awareness and motivation of the members as well as some incentives have been provided in the present scheme.

**vii. Monitoring and evaluation**

This scheme shall be executed and monitored by the Divisional Forest Officer, Bargarh Forest Division. Nursery and plantation journals shall be maintained regularly to facilitate monitoring and evaluation of the project.

**viii. Cleaning and tendering operation**

Regeneration cleaning of the area will be taken up during the pre-planting year by cutting of unwanted growth, high stumps and singling out of promising shoots of primary species where bushy forest growth is available.

**ix. Planting of seedlings**

The proposed Compensatory Afforestation area will be planted by suitable species with a spacing of 2.5m x 2.5m and hence 800 nos of seedling per ha will be planted over 5.391 ha., so 5643 nos of seedling will be required for planting over the entire area. As the entire area is prone to grazing, suitable indigenous species will be planted as detailed below.

1. Teak ( *Tectona grandis*)
2. Bahada (*Terminalia belerica*)
3. Sissoo (*Dalbergia*)
4. Neem (*Azadirachta indica*)

5. Gambhar ( *Gmelina arborea*)
6. Amala (*Emblica officinalis*)
7. Bel (*Aegle marmelos*)
8. Karanja (*Pongamia pinnata*)
9. Bamboo (*Dendrocalamus strictus*)
10. Asan (*Terminalia tomentosa*)

For taking up plantation work, the following items of works are to be taken up.

**x. Raising of Nursery**

The nursery will be raised for eight month old seedlings during the pre-planting year. Potted seedlings will be planted @ 800 nos. per Ha i.e 4313 numbers over the total area. For the purpose 4745 seedlings are to be raised including casualty.

**xi. Survey demarcation, staking and digging of pits, silvicultural operation**

A treatment map will be prepared for the area. Pits of size 45 CM X 45 CM X 45 CM will be dug with spacing of 2.5 mts X 2.5 mts during January - March, which will help in weathering of pits. Concrete masonry pillars will be constructed along the boundary of the above forest area during demarcation. Silvicultural Operation including clearance of weed, climber cutting, high stump cutting, singling of shoots.

**5. PLANTATION YEAR.**

**i. Application of Farmyard Manure, Chemical Fertilizer and Insecticides**

To enhance fertility, farmyard manure will be applied in the pits during June after scooping of the pits. Chemical fertilizer as per norm will be applied at the time of planting and as and when required. To save the planted seedlings from termite attack, Aldrin dust or some effective insecticides will be applied at the time of planting.

**ii. Planting**

Planting of seedling will be done during the mid July after the onset of monsoon. The soil and water conservation works will be taken up before the rains.

**iii. Weeding, Soil Working, Manuring, Casualty Replacement**

1<sup>st</sup> weeding and soil working will be taken up during 1<sup>st</sup> week of August or just after establishment of planted seedlings. Soil working at 0.5 m radius around the seedling planted will be taken up. The casualties will be replaced simultaneously.

2<sup>nd</sup> weeding will be done during 2<sup>nd</sup> F.N of September or 1<sup>st</sup> week of October. 2<sup>nd</sup> dose of chemicals fertilizer @ 50 gms per plant will be applied in the crowbar holes during 2<sup>nd</sup> weeding.

- a) Silvicultural Operation involving clearance of weeds, cutting of climbers, singling of shoots etc. will be taken up during November-December
- b) Soil Conservation Measures like staggered trench / LBS will be taken up during November-December

**iv. Grass cutting and fire tracing**

To save the area from fire damage, dry grasses shall be cut in lines of 1.5 mtr width around the plantation. The dry grasses shall either be shifted or burnt in-situ with care to avoid fire hazard during summer.

**v. Watch & ward:**

Watchers shall be engaged for watch & ward of the plantation area against biotic interference, fire hazards etc throughout the year as per the approved cost norm.

**vi. Watering**

Watering will be done during 1<sup>st</sup> year from November to March (5 months) 10 days per month including cost of water, labour and transportation through Tractor / Tanker / Bullock Cart.

**2<sup>ND</sup> YEAR OPERATION.**

During the second year operation the following works will be taken up.

**i. Casualty replacement, Weeding & Prunning, Soil working, application of chemical fertilizer and Soil Conservation Measures.**

Weeding will be taken up during. Soil working with 0.5 mt radius will be done alongwith the replacement of 10% casualties and application of chemical fertilizer as per cost norm. Precaution should be taken for conservation of soil and water at the time of soil working. Soil Conservation measures will also be adopted.

**ii. Grass cutting and fire tracing**

Cutting of dry grasses and fire tracing will be done during December and January like previous year.

**iii. Watch & Ward**

Watchers will be engaged for the whole year as like previous year.

**3<sup>RD</sup> YEAR OPERATION.**

**i. Weeding pruning and deep soil working**

Weeding and deep soil working will be taken up during July and August. Pruning of planted trees and tending of natural species will be done during November.

**ii. Grass cutting and fire tracing:**

Like previous years grass cutting and fire tracing will be done during December/ January.

**iii. Watch and Ward:**

Watchers shall be engaged for the whole year as in previous years.

**4<sup>TH</sup> YEAR OPERATION.**

**i. Cleaning and pruning:**

Cleaning of existing crop and Pruning of planted trees will be taken up during December/ January.

**ii. Fire Tracing**

Like previous years grass cutting and fire tracing will be done during December/ January.

**iii. Watch and Ward:**

Watchers will be engaged for the whole year as like previous years.

**5<sup>TH</sup> YEAR OPERATION.**

**i. Cleaning and pruning:**

Cleaning of existing crop and Pruning of planted trees will be taken up during December/ January.

**ii. Fire Tracing**

Like previous years grass cutting and fire tracing will be done during December/ January.

**iii. Watch and Ward:**

Watchers will be engaged for the whole year as like previous years.

#### **6<sup>TH</sup> YEAR OPERATION.**

**i. Cleaning and pruning:**

Cleaning of existing crop and Pruning of planted trees will be taken up during December/ January.

**ii. Fire Tracing**

Like previous years grass cutting and fire tracing will be done during December/ January.

**iii. Watch and Ward:**

Watchers will be engaged for the whole year as like previous years.

#### **7<sup>TH</sup> YEAR OPERATION.**

**i. Cleaning and pruning:**

Cleaning of existing crop and Pruning of planted trees will be taken up during December/ January.

**ii. Fire Tracing**

Like previous years grass cutting and fire tracing will be done during December/ January.

**iii. Watch and Ward:**

Watchers will be engaged for the whole year as like previous years.

#### **8<sup>TH</sup> YEAR OPERATION.**

**i. Cleaning and pruning:**

Cleaning of existing crop and Pruning of planted trees will be taken up during December/ January.

**ii. Fire Tracing**

Like previous years grass cutting and fire tracing will be done during December/ January.

**iii. Watch and Ward:**

Watchers will be engaged for the whole year as like previous years.

#### **9<sup>TH</sup> YEAR OPERATION.**

**i. Cleaning and pruning:**

Cleaning of existing crop and Pruning of planted trees will be taken up during December/ January.

**ii. Fire Tracing**

Like previous years grass cutting and fire tracing will be done during December/ January.

iii. **Watch and Ward:**

Watchers will be engaged for the whole year as like previous years.

**10<sup>TH</sup> YEAR OPERATION.**

i. **Cleaning and pruning:**

Cleaning of existing crop and Pruning of planted trees will be taken up during December/ January.

ii. **Fire Tracing**

Like previous years grass cutting and fire tracing will be done during December/ January.

iii. **Watch and Ward:**

Watchers will be engaged for the whole year as like previous years.

**DETAILS OF ITEM-WISE FINANCIAL OUTLAY FOR AFFORESTATION.**

<i><b>Sl No.</b></i>	<i><b>Item of work</b></i>	<i><b>Total outlay</b></i>
01	ANR Plantation (800 seedlings / Ha) over 5.391 ha. @ 54800/- per ha	2,95,427.00
02	Trench Fencing	1,90,841.00
<b><i>SUB-TOTAL</i></b>		<b>4,86,268.00</b>
03	Escalation cost @ 20%	97,254.00
<b><i>GRAND TOTAL</i></b>		<b>5,83,522.00</b>

**(Rupees Five Lakhs Eighty Three Thousand Five Hundred Twenty Two) only**

  
Divisional Forest Officer  
Bargarh Forest Division,  
Bargarh



**COST ESTIMATE FOR ASSISTED NATURAL REGENERATION OF DEGRADED FOREST  
PLANTATION OF 800 SEEDLINGS/HECT.**

1.	Type of the Plantation.	ANR Plantation
2.	No. of seedlings to be planted.	800 Nos. per hectare
3.	Spacing to be adopted.	2.5m x 2.5m
4.	Size of pits.	45cm x 45cm x 45cm
5.	Wage rate.	Rs.200/- per manday.
6.	Species to be planted.	1. Teak ( Tectona grandis) 2. Bahada (Terminalia belerica) 3. Sissoo (Dalbergia) 4. Neem (Azadirachta indica) 5. Gambhar ( Gmelina arborea) 6. Amala (Emblica officinalis) 7. Bel (Aegle marmelos) 8. Karanja (Pongamia pinnata) 9. Bamboo (Dendrocalamus strictus) 10. Asan (Terminalia tomentosa)
7.	The user agency will pay the wage rate as and when enhanced.	

**0<sup>th</sup> year (Advance work) Pre-planting operation.**

Sl. No.	Item of work	Man-days	Labour rate @ Rs.200/-	Material cost	Total
1	2	3	4	5	6
1.	Survey, Demarcation & Pillar Posting, GPS reading with Mapping	2	400	-	400.00
2.	Site Preparation	2	400	-	400.00
3.	Silvicultural Operation including clearance of weed, climber cutting, high stump cutting, singling of shoots	5	1000	-	1000.00
4.	Raising of nursery @ 220 seedlings / ha (including 10% casualty replacement) and watch and ward (Part-1)	32	4800	1600	6400.00
5.	Contingency and unforeseen expenditure	1	0	200	200.00
<b>Sub Total</b>		<b>42</b>	<b>6600</b>	<b>1800</b>	<b>8400.00</b>
<b>1<sup>st</sup>Year/ Planting</b>					
1	Maintenance of Nursery (Balance)	16	3200	-	3200.00
2	Pitting 30 cm cube size	28	5600	-	5600.00
3	Carriage & Planting including casualty replacement	18	3600	-	3600.00
4	Complete weeding, soil working, manuring	22	4400	-	4400.00
5	Cost of Vermi compost & Insecticide	12	-	2400	2400.00
6	Cost of Chemical Fertilizer	4	-	800	800.00
7	Fire line Tracing	3	600	-	600.00
8	Silvicultural Operation involving clearance of weed, climber cutting, high stump cutting, singling of shoots etc.	15	3000	-	3000.00
9	Soil Conservation Measures	20	4000	-	4000.00
10	Watch & Ward	8	1600	-	1600.00
11	Contingency & Unforeseen Expenditures	2	-	400	400.00
<b>Sub Total</b>		<b>148</b>	<b>26000</b>	<b>3600</b>	<b>29600.00</b>

2 <sup>ND</sup> YEAR					
1	Casualty Replacement including cost of seedling, carriage and planting	8	1600	-	1600.00
2	Complete weeding and pruning	8	1600	-	1600.00
3	Soil Working and manuring	8	1600	-	1600.00
4	Cost of Fertilizer & Insecticide	4	-	800	800.00
5	Fire line Tracing & Inspection Path	1	200	-	200.00
6	Soil Conservation Measures	8	1600	-	1600.00
7	Watch & Ward	8	1600	-	1600.00
8	Contingencies and unforeseen expenditure.	1	-	200	200.00
<b>Sub Total</b>		<b>46</b>	<b>8200.00</b>	<b>1000.00</b>	<b>9200.00</b>
3 <sup>RD</sup> YEAR					
1	Complete Weeding & Pruning	4	800	-	800.00
2	Soil Working	4	800	-	800.00
3	Fire line Tracing	1	200	-	200.00
2	Watch and ward (Whole Year)	8	1600	-	1600.00
<b>Sub Total</b>		<b>17</b>	<b>3400</b>	<b>0</b>	<b>3400.00</b>
4 <sup>TH</sup> YEAR					
1	Fireline Tracing	1	200	-	200.00
2	Watch and ward (Whole Year)	2	400	-	400.00
<b>Sub Total</b>		<b>3</b>	<b>600</b>	<b>0</b>	<b>600.00</b>
5 <sup>TH</sup> YEAR					
1	Fireline Tracing	1	200	-	200.00
2	Watch and ward (Whole Year)	2	400		400
<b>Sub Total</b>		<b>3</b>	<b>600</b>	<b>0</b>	<b>600</b>
6 <sup>TH</sup> YEAR					
1	Fireline Tracing	1	200	-	200.00
2	Watch and ward (Whole Year)	2	400	-	400.00
<b>Sub Total</b>		<b>3</b>	<b>600</b>	<b>0</b>	<b>600.00</b>

7 <sup>TH</sup> YEAR					
1	Fireline Tracing	1	200	-	200.00
2	Watch and ward (Whole Year)	2	400	-	400.00
<b>Sub Total</b>		<b>3</b>	<b>600</b>	<b>0</b>	<b>600.00</b>
8 <sup>TH</sup> YEAR					
1	Fireline Tracing	1	200	-	200.00
2	Watch and ward (Whole Year)	2	400	-	400.00
<b>Sub Total</b>		<b>3</b>	<b>600</b>	<b>0</b>	<b>600.00</b>
9 <sup>TH</sup> YEAR					
1	Fireline Tracing	1	200	-	200.00
2	Watch and ward (Whole Year)	2	400	-	400.00
<b>Sub Total</b>		<b>3</b>	<b>600</b>	<b>0</b>	<b>600.00</b>
10 <sup>TH</sup> YEAR					
1	Fireline Tracing	1	200	-	200.00
2	Watch and ward (Whole Year)	2	400	-	400.00
<b>Sub Total</b>		<b>3</b>	<b>600</b>	<b>0</b>	<b>600.00</b>

### ABSTRACT

Year	Personal Days	Labour	Material	Total
0 <sup>th</sup> Year	42	6600	1800	8400.00
1 <sup>st</sup> . Year	148	26000	3600	29600.00
2 <sup>nd</sup> . Year	46	8200	1000	9200.00
3 <sup>rd</sup> . Year	17	3400	0	3400.00
4 <sup>th</sup> Year	3	600	0	600
5 <sup>th</sup> Year	3	600	0	600
6 <sup>th</sup> Year	3	600	0	600
7 <sup>th</sup> Year	3	600	0	600
8 <sup>th</sup> Year	3	600	0	600
9 <sup>th</sup> Year	3	600	0	600
10 <sup>th</sup> Year	3	600	0	600
<b>Total</b>	<b>274</b>	<b>48400</b>	<b>6400</b>	<b>54800.00</b>

Total Cost: Rs. 54800 X 5.391 Ha = Rs. 2,95,426.80 or 2,95,427/-

(Rupees Two Lakhs Ninety five Thousand Four Hundred Twenty Seven) only

  
Divisional Forest Officer  
Bargarh Forest Division,  
Bargarh

**NORM FOR TRENCH WITH GREEN FENCING.**

Size:- Top-2 mt, Bottom-1 mt, Height – 1.5 mt.

Volume of Earth :- 2.25 cum per running meter.

Cost Estimated in hard Soil:

@ Rs.88.00 per cum =  $2.25 \times 88.00 = \text{Rs.}198.0$  per RMT.

Plantation of green hedges on the Soil

Mound alongwith material cost @ Rs.10.00 /- per RMT.

**Cost of Trench**

Rs.198.00 per RMT

**Cost of green hedges**

Rs.10.00 per RMT

**Total Cost.**

Rs.208.00/-per RMT

**COST NORM FOR TRENCH WITH GREEN FENCING (PER HA.)**

***Labour Cost @ 200/-***

Sl No.	Item of works	Mandays (In Rupee)	Labour cost	Material cost (In Rupee)	Total (In Rupees)
01	Trench of 2 mt. x 1 mt x 1.5 mt over 170 mt per ha @ Rs.208.00 per cum = @ Rs.208.00 @ RMT for 170 RMT per ha.	177	35400	0	35400

**Total Rs. 35400/- x 5.391 = Rs. 1,90,841.40 or Rs. 1,90,841/-  
(Rupees One Lakh Ninety Thousand Eight Hundred Forty Two) only**

**NB:** *Trench fencing has been provided in the Compensatory Afforestation Scheme over 5.391 ha in lieu of 5.391 Ha forest land to be diverted for Jeera Irrigation Project. The cost norm has been approved in the Industrial Plantation Scheme by Govt. of Odisha, Forest & Environment as suggested in the minutes of 3<sup>rd</sup> meeting of the Board of Trustees of the "Orissa Environment Management Fund Trust" held on 30.05.2009.*

  
Divisional Forest Officer  
Bargarh Forest Division,  
& Bargarh