CATCHMENT AREA TREATMENT PLAN

FOR

TANGNU ROMAI – I (44 MW) HEP

IN

PABBAR BASIN

TEHSIL CHIRGAON

DISTRICT SHIMLA (H. P)

PROJECT PERIOD: 2009 – 10 TO 2018 – 19

TOTAL COST OF CAT PLAN: RS. 543.13 LACS

AUGUST, 2009

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CHAPTER - 1

GENERAL DESCRIPTION OF THE TRACT

1.1 INTRODUCTION

India is endowed with a vast Hydro Power potential, assessed at 1,50,000 MW (corresponding to 84,044 MW at 60% load factor). Out of this about 26900 MW amounting to 18% of the total potential has been harnessed. The 16th Electric Power survey carried out by Central Electricity Authority (CEA) has projected a peak demand of 1,15,700 MW and an energy requirement of 7,19,100 MU by the end of 10th five year plan, while the requirement by the end of 11th five year plan has been projected as 1,51,100 MW and 9,72,520 respectively.

Himachal Pradesh has five river basins, which provide an ample scope for development of Hydro power potential. Out of these five basins, Satluj basin has the highest potential of about 9,227 MW of electricity. The Tangnu Romai Hydro Electric Project is a scheme which envisages construction of 14 m high, 66.25 m long barrage across river Pabbar, a tributary of Tons river- major tributary of Yamuna River, in Shimla District of Himachal Pradesh. Pabbar has its origin in Gangdhari Dhar ranges of Himalayas at an altitude of 5100 m and passes through dense forest areas. Pabbar River up to diversion site is about 157 sq. km. Catchment area map is enclosed. MAP-01.

A large portion of catchment is under snow and major portion is steep mountainous region with rocky outcrops & contains many glaciers, which provide the stream with perennial water flow. Toposheets Survey of India No 53 E/13 & 53 E/14 covers the catchment area. The head water catchment can be

described as an extreme high mountain catchment. The river valley of both the main Pabbar River and its tributaries are incised with very steep slides in some sections. In the downstream regions the relief reveals much more fluvial characteristics with river terraces and evident traces of recent fluvial erosion in the upper parts.

It is a well-established fact that reservoirs formed by weirs on rivers are subjected to sedimentation. The process of sedimentation embodies the sequential processes of erosion, entrainment, transportation, deposition and compaction of sediment. The study of erosion and sediment yield from catchments is of utmost importance as the deposition of sediment in reservoir reduces its capacity, and thus affecting the water availability for the designated use. The eroded sediment from catchment when deposited on streambeds and banks causes breaching of river reach. The removal of top fertile soil from catchment adversely affects the agricultural production. Thus, a well-designed Catchment Area Treatment (CAT) plan is essential to ameliorate the above-mentioned adverse process of soil erosion and maintenance of ecological balance including atmospheric equilibrium, which is vital for sustenance of all life forms, humans, animal and plants of Pabbar valley. Therefore, proper soil and moisture conservation treatment, bio-engineering works, habitat improvement by way of incentive management and Eco - development activities are required to be carried out in the Catchment Area. The human and cattle population living in and around the catchment are dependent on the natural resources. Because of which greater emphasis has been laid to undertake afforestation, pasture development, bio-diversity conservation with soil and moisture conservation works in the catchment area including eco-development activities with the provision of alternative sources of

domestic energy on a subsidized basis (50% cost to be given by the beneficiaries) to reduce pressure on the existing forest areas.

1.2 TOPOGRAPHY AND DRAINAGE:

The terrain of the catchment area is mainly mountainous, which can be described as moderate to steep with precipitous slopes. The river flows in the south westerly direction down to Rohru Township some 55 Km. from the source. Left bank area is steep to precipitous and almost continuous linear slope. Therefore most of the area drains into Pabbar River. However there are two small tributaries namely Kattan Gad and Paba Gad and four small depression drainage lines that bring the surface flow from left bank into the Pabbar River. Supin Gad, Sundru Gad and Rakhto Gad are three major tributaries and Banirath Gad, Polari Gad, Moti Gad are small ones which drain from right bank slopes to the Pabbar River. All these Gads have their bed slopes in the range of 12 to 25 percent.

1.3 GEOLOGY:

The rock units exposed in the project area is under Jutogh Group and has been named as D formation. This comprises of Psamatic rock with fine layers of Granitic rocks. Near village Janglikh Biotite Schist in layers are well developed. The rock units are folded into a regional syncline and the fold axis trends NE-SW east of Pabbar and the project area lies in the North Western limb of the syncline. The foliation of the rock units in general trends in NE-SW direction with dips of 25-30 towards South east i.e. towards the left bank of Pabbar river. The bedrock therefore is expected to be deep seated. However, the valley flanks exposes bedrock and stands steeply to the fairly height.

The rock units exposed in the project area generally comprise of schistose quartzite, quartz mica schist. Gneiss with Mica Schist bands are exposed only in the Supin Nallah and on the right bank of Pabbar in the distance of about 100m upstream of its confluence with Supin. After this the area along the river is covered with debris material along the river.

1.4 LAND USE PATTERN:

Land use describes how a patch of land is used whereas land cover describes the material such as vegetation, rock or building that area present on the surface. The catchment area above Romai Power House has been divided in to four sub- watersheds.

S.no.	Sub Watershed	Cultivation	Thin forest & grassland	Moderately thick Forests	Thin Grass Cover	Moderately thick forest & Grass land	Total Geographic area (ha)
1.	Ym3p	-	900	300	1500	-	2700
2.	Ym3q	75	1825	500	2450	-	4850
3.	Ym3r	150	1300	800	1800	50	4100
4.	Ym3s	-	825	25	3200	-	4050
	Total	225	4850	1625	8950	50	15700

The abstract of which is summarized in Table I

Table-I

Sl No	Category	Area (ha)	Percentage
1.	Cultivation	225	1.44
2.	Thin Forest and Grass land	4850	31.09
3.	Moderately thick forest	1625	10.42
4.	Thin Grass Cover	8950	56.73
5.	Moderately thick forests and grasslands	50	0.32
	Total	**15700**	**100.00**

The studies do not quantify the area under snows or alpine pastures. However, the results make an excellent base for other studies. The map of Land use is attached as Map 02. The slope map is attached as Map 03.

The land use pattern according to forest record is as follows

S. no.	Sub Water shed	Forests-Govt. (Measured as DPF, UPF)				Govt. Owned Measured by Revenue Dept.		Govt. Owned Measured From Toposheet		Private Ownership				Total
		Full Density Forest	Thaches	Ghasnis	Alpine Pastures	Grazing With Tree	Grazing Without tree	Glacier	Alpine Pasture	Cultiv ation	Orc har d	Gha sni	Gair Mu mki n	
1.	Ym3p	400	-	40	-	-	-	2	2258	-	-	-	-	2700
2.	Ym3q	1500	150	-	2350	94	17	4	620	70	5	20	20	4850
3.	Ym3r	810	62	30	875	500	20	10	1594	137	-	30	32	4100
4.	Ym3s	-	-	-	-	-	-	10	4040	-	-	-	-	4050
	Total	2710	212	70	3225	594	37	26	8512	207	5	50	52	15700

1.5 LIVE STOCK POPULATION :

Chakwise livestock population of livestock in the catchment area is as follows

	Cattle	Sheep	Goat	Horses/Mule	Total
Ambot	134	345	370	8	857
Diudi	150	375	451	7	983
Bhatwari	236	750	830	14	1830
Total(A)	520	1470	1651	29	3670
Bonwari	390	1210	954	15	2569
Thaitwari	278	700	914	15	1907
Janglikh	276	1700	1788	35	3799
Maila	98	375	472	8	953
Total(B)	1042	3985	4128	73	9220
Total (A+B)	1562	5455	5779	102	12898

1.6 HUMAN POPULATION:

According to the 2001 census of Shimla District the total population is 721745 with 380244 males and 341501 females and sex ratio is 898 females per 1000 males. The density per Sq. Km is 141 persons. According to 1991 census the population of nearly 381 households in the project area was 2514 persons. The average family size is about 7 persons. The scheduled caste population is 23.5%.

1.7 FLORA:

The forest of the catchment comprises coniferous prone with occupation of various species according to altitudinal zonation. Herbaceous alpine pastures occupy the topmost zone. Kail, Deodar, Fir, Spruce, Betula utilis, Ban Oak, Mohru oak, Kharsu oak, Alders, Rhododendrons, Aesculas indica, Bird Cherry, Maple, Juglan regia, Pyrus species, Wild popular, Salix, Alnus nitida etc. The under growth is Viola, Indigofera, Desmodium, Rubus spps. Sarcococca Saligna, Viburnum, Berberis spp, Prinsepia utilis, Prunus Cornuta, and medicinal herbs like Dhoop, Karu, Patish, Bankakri, Hathpanja, and mushaq bala etc. are also found. The forest lies between the elevation 2000 to 3900 mtr. above mean sea level. The Alpine pastures are great attraction to the migratory graziers as well as local people who have a right to graze their domestic cattle under the provision of forest settlement report, 1921.

1.8 FOREST TYPE:

The main type of forest in the catchment is as below

1. **Moist Deodar Forest** - The chief underwood comprises of poles of deodar, kail and mohru in pallas and depressions. Alnus nepalensis, Prunus comuta, Aesculus indica, Juglans regia and Rhododendron arboretum form an unevenly distributed under storey.

2. **Western mixed coniferous forest** - the habitat of this type lies above the Deodar Zone. These are broad leaved tree species like Maple, Birdcherry, and Oak occur either singly or in groups along depressions. In Janglikh UF, the fir occurs in the pure stands and at places mixed with spruce.
3. **Moist Temperate Deciduous Forests** - this type of forest occur in the area between 2300m and 2500m above mean sea level. The typical examples of this are around Janglikh and Pekha Pandhar forests. The species are akin to that of usual Fir and Spuce.
4. **Low Level Blue Pine Forest** - it is dominating type between 200m and 2750m above mean sea level. There is high level Kail in this tract.
5. **Birch Rhododendron Scrub Forests** - Ables spectabffis in an admixture with Betula utilis is met in the upper parts of coniferous forests. Practically no other kind of tree is intermingled in the forest canopy. The deforested ground is covered with bushes of Rosa macrophylla, Cotoneaster microphylla, Rhododendron species.

1.9 FAUNA :

Mammals	**Herbivores**	**Carnivores**
	Musk Deer	Snow Leopard
	Himalayan Tahr	Leopard
	Goral	Himalayan Black Beer
	Serow	Himalayan Brown Beer
	Bharal etc.	
Pheasants	Woodcock	
	Himalayan monal	
	Kaleej	

Koklass

Chukor

Snowcock etc.

1.10 BIO-DIVERSITY:

Biodiversity conservation is on the national agenda which came into force on December 29, 1993 for Nation/States which are signatory to the Conservation of Bio-logical diversity. It is well known that the Conservation of Bio-logical diversity involves conservation of ecosystem, species, land races and population including conservation of genes. Biodiversity conservation is essential not only for ecological and environmental rejuvenation but also for a sustainable development. These forests regulate the water balance in the lands around them and influence the climate to considerable extents. Apart from their ecological functions, they serve as valuable gene pools.

Anthropogenic activities, particularly economic activities influencing habitat and more particularly poaching induce an increased extinction of species. Loss of habitat need be controlled scientifically and poaching prevention must be stringently enforced. In this catchment area treatment of Pabbar efforts should be made to develop strategies for the protection of ecosystems, species and genes, taking into consideration human population processes and futuristic developmental needs. The *in situ and ex situ* conservation strategies are to be supplemented using holistic and adaptable conservation of Bio-logical diversity strategies in the catchment area. Preservation of medical plant sites, cultivation of medicinal plants for health, development of a package for growing life supporting species, fast growing

species for village commons, propagation of bamboo in households and wilderness sites and development of heritage plant sites would help preserve some of the species under threat. Priority for conservation must focus on endemic species native to a particular ecological niche region or country, as once lost, it is loss of Biodiversity forever. It is estimated that the disappearance of one plant species can result in the loss of 10 - 15 dependent insects, animals and other plants. For those who appreciate calculation in monetary terms, it has been shown that extinction of a single species of plant is equivalent to the loss of about $203 million. A proper appreciation of bio-diversity and a meticulous cataloguing of it are the essential steps to be adopted during catchment area treatment activity in efforts for its in-situ and ex-situ conservation of bio-diversity.

1.11 RIGHTS OF THE PEOPLES:

i) **Grazing:** In almost all the forests, right for grazing exist for each demarcated and un-demarcated forests. The field studies conducted indicated that 70% requirements of the fodder are met from the forest area. The settlement provides for free grazing to all animals of the right holders in their own chaks and no ceiling has been fixed on the number of cattle that might be grazed. The graziers availing summer grazing facilities in the alpine pastures are not allowed to graze their animals outside chaks unless allowed as special concessions or through payment of a certain grazing fee. A large number of cattle graze in these forests leading to great damages to the vegetation as well as to the plantations. This right of grazing also comes in the way of taking up more closure for raising plantations of different species

as the consent of the local people is to be obtained before plantation work can be undertaken.

ii) **Collection of fuel wood:** people have the right to collect dry and fallen wood for their domestic use as per the forest settlement record. In the project area people depend entirely upon fuel wood for their day to day use. Annual consumption of fuelwood per house hold has been assessed to be 6.50 tonnes during the field survey. Mainly the requirement is fulfilled from the Kunish tree which is found in abundance along the river banks.

iii) **Timber:** People have the right to get timber at nominal rates for construction/repair/maintenance of their houses. The concessional rates were fixed at the time of forest settlement. No limit on the number of trees to be sanctioned was placed. A stage has now been reached that not a single tree is available on silvicultural basis in some of the forests for the right holders.

iv) **Cutting of Grass and lopping of trees:** people have the right to cut grass and lop trees for fodder purpose. Cutting of grass is being done as of present in the forests without paying any fees to the department.

v) **Minor Forest Produce reported (1996-1997)**

The local people collect medicinal plants and other valuable products of commercial value from the forests and alpine pastures. The details

of products collected and exported from Kashdhar Range during 1996-1997 are given in Table below

S.No.	Name of Species	Quantity Qtl.
1.	Bhojpatra	157
2.	Mahmeda	267
3.	Dhoop	499.5
4.	Goodbuch	66
5.	Anjhar	65
6.	Kakarsinghi	20
7.	Buchhang	22.45
8.	Ravcnchini	70
9.	Karoo	12
10	Mitha Palis	27
11.	Chora	7
12.	Mithatelia	7
13.	Mushkbala	0.35
14.	Kunish Cones	80
15.	Guchchi	66

1.12 GENERAL CONDITION AND DENSITY:

The composition and condition of the forests is not so good and tends to vary considerably with the altitude and aspect. DPF's and UPF's which are in the entire and away from habitations are fairly well stocked. The forests in

nearby habitation area under a lot of pressure of the right holders for the T.D. requirement for building of houses. The status of regeneration is very poor. The present poor state of affairs is the cumulative result of heavy grazing lopping TD marking etc.

1.13 SOCIO-ECONOMIC PROFILE:

There are 3 Panchayats in and around the catchment area of Pabbar in and around the project area having a human population of 2514. The average family size is 7 persons. The Joint family and polyandry system are responsible for large size of family. The Scheduled caste population is about 23.5%. Horticulture development has not been fully explored despite it being apple belt. Most of the people are employed in the PWD office, school and tourism. Agriculture is not merely an occupation but an established tradition and an expected way of life. The major crops grown in the area are Maize, Wheat Barley. Electricity is available to all household however the supply is erratic and load is also inadequate. Apart from the agricultural land, livestock is the major asset of rural population. People own milk yielding livestock like goats and cows. People are seen carrying spindles and spinning the thread. Their folk lore and culture is full of references to the forests and wild life. Having regard to the symbiotic relationship between the people and forests, a primary task of all agencies responsible for forests management and to associate the people closely in the protection, regeneration and sustainable management of forests as well as to provide gainful employment to people living in and around the Catchment area. While safeguarding the customary rights and interests of such people.

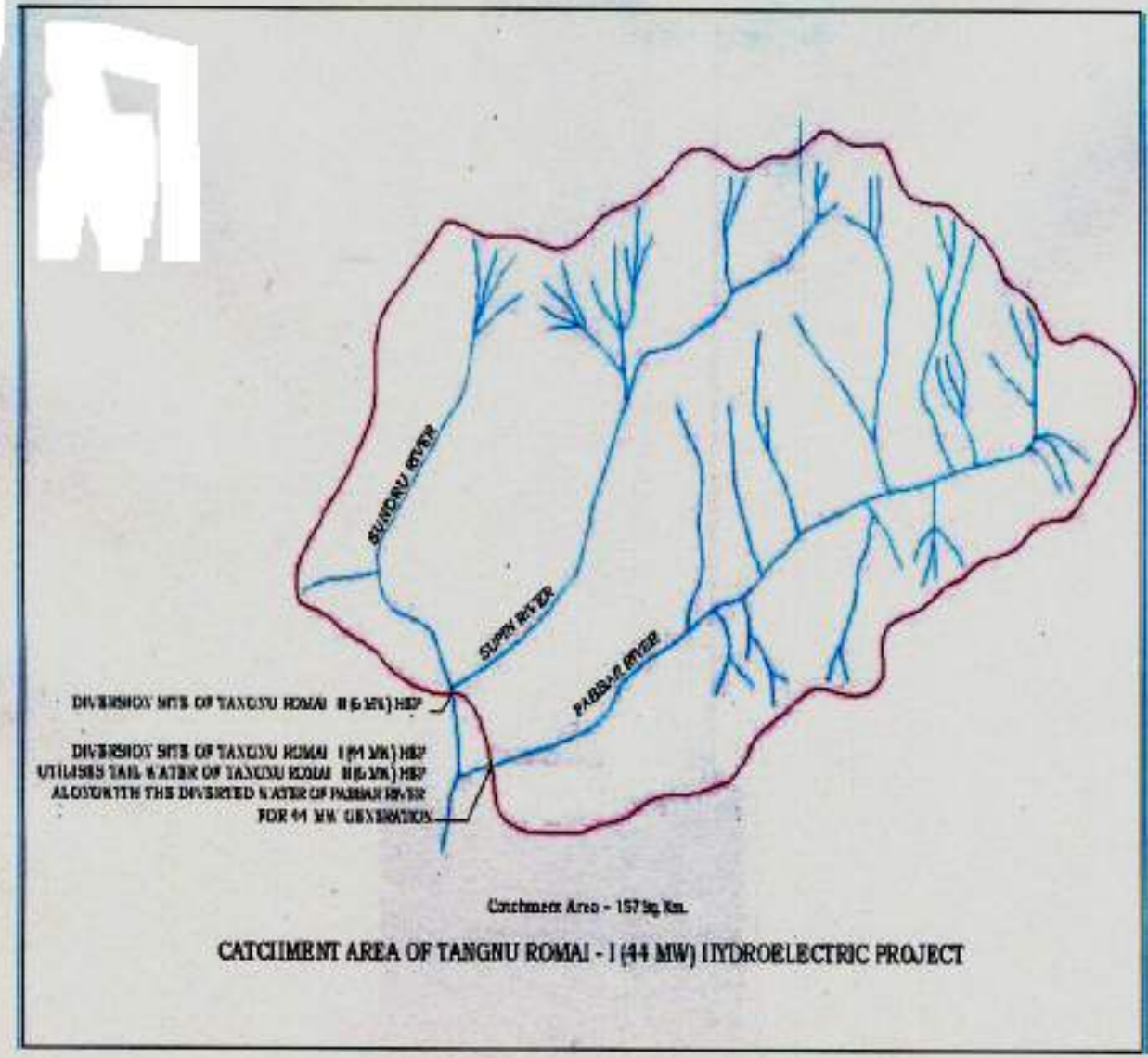
1.14 PERIOD OF CAT PLAN:

The CAT plan has been formulated for a period of ten years with effect from 2008-09 to 2017-18. For the first year of the plan not much of works have been prescribed and only establishment of nursery will be done besides minor works and purchase of some equipments. However, from the second year onwards works will be done in full swing and will gradually take off 6th year onwards and completed the work during the plan period.

1.15 COST OF THE PLAN:

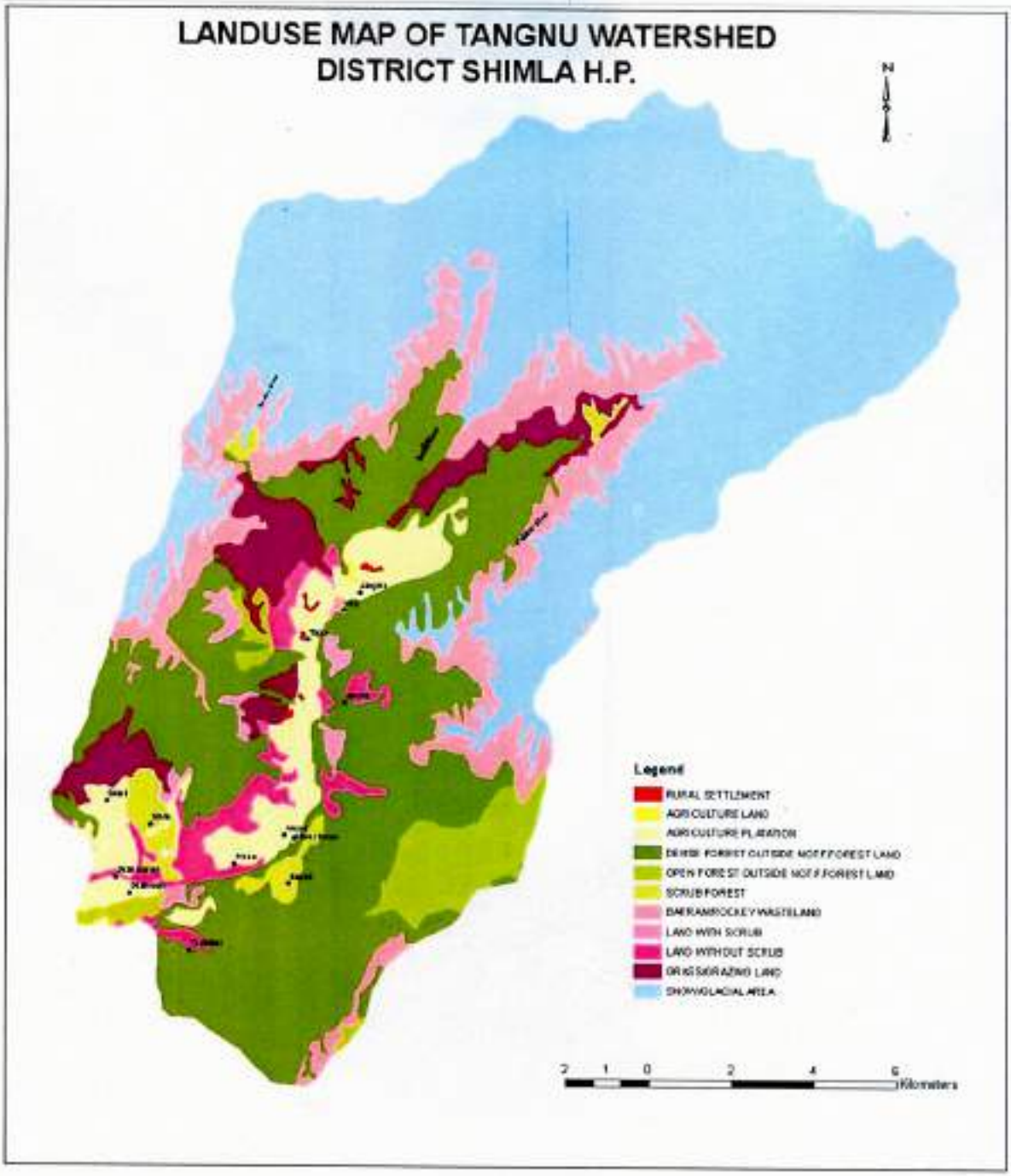
The total outlay envisaged for the implementation of this CAT Plan is Rs. **543.13 Lacs**.

MAP - 01

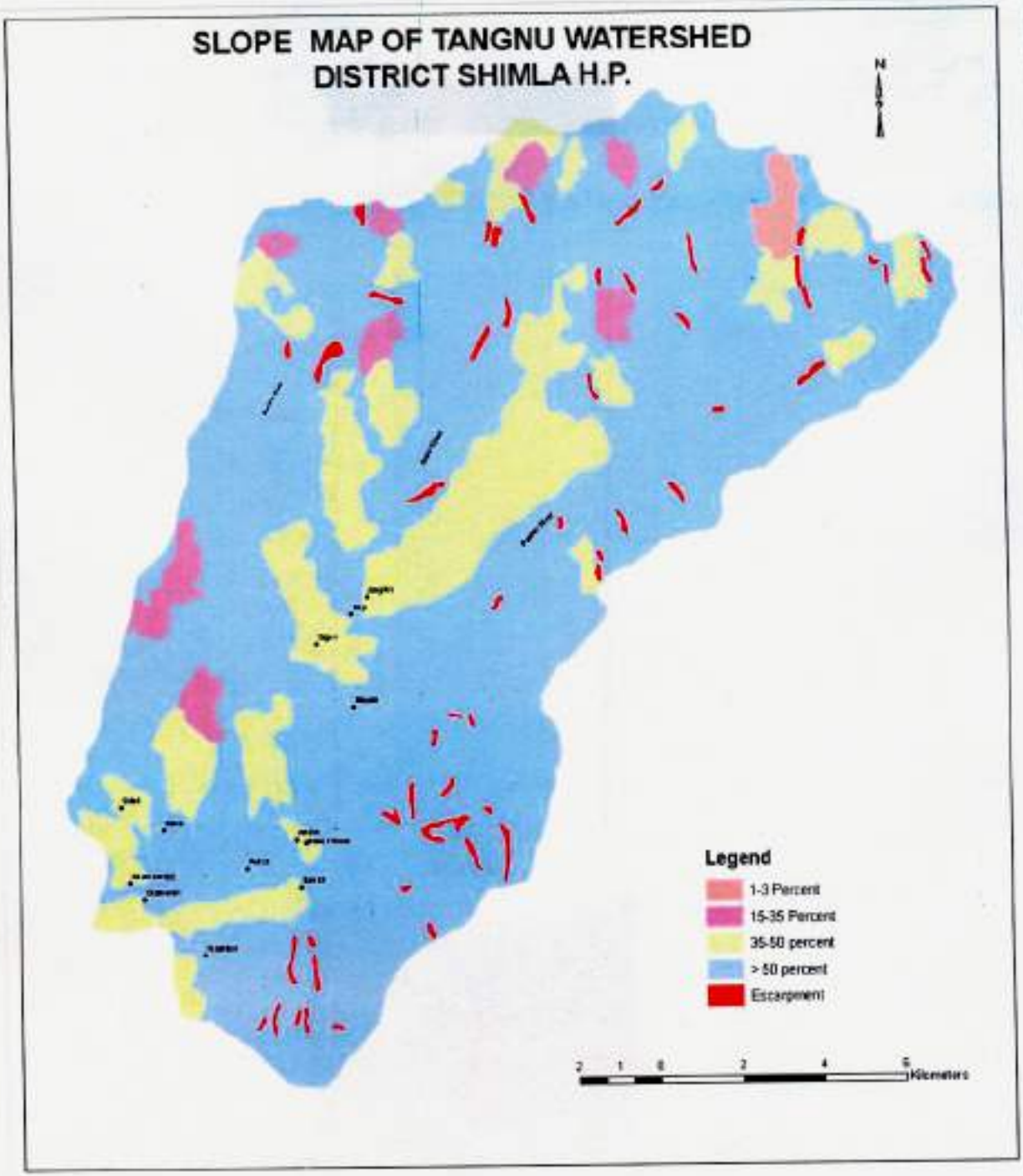


CATCHMENT AREA OF TANGNU ROMAI - I (44 MW) HYDROELECTRIC PROJECT

MAP - 02


LANDUSE MAP OF TANGNU WATERSHED
DISTRICT SHIMLA H.P.
N
Legend
RURAL SETTLEMENT
AGRICULTURE LAND
AGRICULTURE PLANTATION
DENSE FOREST OUTSIDE NOTIFFOREST LAND
OPEN FOREST OUTSIDE NOTIFFOREST LAND
SCRUB FOREST
BARE/ROCKEY WASTELAND
LAND WITH SCRUB
LAND WITHOUT SCRUB
GRASS/GRAZING LAND
SNOW/GLACIAL AREA
2 1 0 2 4 6
Kilometers

MAP - 03


SLOPE MAP OF TANGNU WATERSHED
DISTRICT SHIMLA H.P.
N
Legend
1-3 Percent
15-35 Percent
35-50 percent
> 50 percent
Escarpment
Kilometers

CHAPTER - II

PROBLEM ANALYSIS AND OBJECTIVES

The study area designed for the Catchment Area treatment is experiencing all the classic vagaries of the nature on large scale. The terrain and geology of the area susceptible to incidence of land slides/slips/glaciers and water erosion. Bulk of soil erosion takes place due to scurrying action of water running off the surface during melting of snow. The run off water first form localized channels which in turn form bigger gullies leading to serious Soil erosion problem.

2.1 SOIL EROSION:

Soil erosion may be defined as the detachment and transportation of soil. Water is the major agent responsible for this erosion. In many locations, winds, glaciers, etc. also cause soil erosion. In the catchment area of a hilly area like that being considered for the proposed project, water erosion is a common phenomenon and the same has been studied as a part of the Catchment Area Treatment (CAT) plan. The problem has aggravated in last few years and the silt level in all the rivers and streams have gone up to the alarming level in Himachal. This is causing great problems in the power generation and lowering the efficiency of turbines in various hydroelectric projects in the state.

2.1.1 Soil erosion leads to:

- Loss in production potential
- Reduction in infiltration rates
- Reduction in water-holding capacity
- Loss of nutrients
- Increase in tillage operation costs
- Reduced transport and storage capacity and
- Reduction in water availability

2.1.2 Methodology for the Study for Soil Erosion:

Main aim of study involves:

- To study erosion characteristics of the terrain.
- To evolve a proper plan to minimize the rate of erosion.

A comprehensive database on terrain conditions, different types of soil of the catchment, natural resources and socio-economic status etc. is essential to evolve a treatment plan. In high hills variability of site parameters such as topography, soils, land use, climate and rainfall matters. Not all areas contribute equally to the erosion problem. Several techniques like manual overlay of spatially index-mapped data have been used to estimate soil erosion in complex topography.

In order to ensure the latest and accurate data is taken for the analysis, satellite data has been used for data and ground realities have also been taken into account. Geographic Information System (GIS) is a tool to store, analyze and display various spatial data. GIS is a computerized resource data base system and has a capacity to perform numerous function and operations.

2.1.3 Study of the Problem:

The different data layers of the catchment area used for the study are as under:

- Land use classification map
- Correct management practices
- Catchment area map
- Soil map
- Slope map

2.2 STATUS OF EROSION IN THE REGION:

Due to steep slopes, the Run off and erosion are active. Landslides and movement of debris in steep nallahs take place in the area particularly during the rainy season. The land under agricultural use is not at all terraced. Pabbar and its tributaries having high velocity of flow, cause serious erosion and flow problems. In rainy seasons when these are in full spate, they bring down boulders, stones and coarse material with muddy water. Although commercial felling have been stopped in the state

for last 10 years. But still the activities are carried clandestinely and also the increased grazing of domestic cattle has caused great loss of vegetation.

2.3 WATERSHEDS AND SOIL EROSION ESTIMATION

Various factors affecting erosions in the region are soil characteristics, meteorological conditions such as annual precipitation, snow fall, intensity of precipitation, wind velocity etc. Sedimentation of reservoir is a function of soil erosion rate of river catchment area. It reduces the water storage capacity of reservoir and availability of water for its designated use. It could therefore be concluded that useful life of a hydroelectric project is directly related to the soil erosion rates of catchment area. To reduce and overcome this problem a thorough study of sub watersheds of catchment area is a pre-requisite to devise a comprehensive CAT Plan.

Pabbar catchment above Romai powerhouse site is divided in four sub watersheds (ym - 3p, 3q, 3r, 3s, See Map - 04) which were assigned weight age values of Runoff Potential implying likely run off percentage. All pro and anti run-off characters were taken into account. The donor mapping units need effective soil and water conservation measures such as terracing, afforestation, engineering works etc. to check excess runoff while recipients need internal and external drainage improvement.

The run-off product was divided by total area of the sub-watersheds which furnishes the average run-off potential index for the

whole sub watershed. The calculation is represented by the following formula:

$$RPI = \Sigma AR \times WR/AS$$

Whereas RPI = Run-off potential index for the sub-watershed. AR - Area of Run-off Potential Mapping units. WR = Weightage value of Runoff Potential

Unit AS = Total area of the subwatershed.

Higher the runoff potential indices, higher will be the priority.

c. Priority categorization:

RPI for various watershed areas have been calculated. The intense gradation of priority within sub water sheds is based on the Average Potential run-off range as given in Table below:

Priority Categorization

S.No.	Priority Category	Average Potential Runoff Range
1	Very high	75 & Above
2.	High	65 - 74
3.	Medium	55 - 64

4.	Low	50 - 54
5.	Very low	Below 50

d. Priority sub-watersheds

The data showing sub watershed-wise distribution of erosion intensity their run-off potential index have been arrived at and grading of sub-watersheds under very high and medium priority categories is given in Table

Grading of sub-watersheds

S.No.	Sub water shed code	Area in ha	Category	Runoff potential
1.	Ym3p	2700	High	69
2.	Ym3q	4850	High	69
3.	Ym3r	4100	High	69
4.	Ym3s	4050	Medium	64
	Total	15700		

2.4 WATER SHED MANAGEMENT - AVAILABLE TECHNIQUES:

Watershed management is the optimal use of soil and water resources within a given geographical area so as to enable sustainable production. It implies changes in land use, vegetative cover, and other structural and non-structural action that are taken in a watershed to achieve specific watershed management objectives. The overall objectives of watershed management programme are to:

- Increase infiltration into soil;
- Control excessive runoff;
- Manage and utilize runoff for useful purpose

The **watershed management measures** have been classified under the following categories:

a. Biological measures

b. Engineering measures

a) Biological Measures

The various measures covered in this category are:-

- Afforestation
- Pasture Development

- Vegetative Measures

b) Engineering measures

The various erosion control measures in this category are:-

- Gully plugging
- Check dams
- Check walls
- Stabilization works

2.5 PRESSURE ON FOREST RESOURCES:

The current problems being faced in forest conservation arises directly from the natural resource dependence of the people inhabiting in forested region. These dependences are becoming intense because of eco-system is going down from the abuse and over use of natural resources. Man is responsible for degrading the forest eco-system. As his number increased and his culture and technology advanced, he modified the natural eco-system into an artificial. As a result many species of flora and fauna have endangered. It is said that if the present course of environmental degradation is continued, then it will destroy the capability of our natural environment to support a civilized human society. The depletion of our Wild life and also the hardships faced by people dependence on natural resources is due to: -

a) Reduction of Wild life habitats

b) Increasing biotic pressure

c) Increasing demand of forest resources as per Forest Settlement Report, 1921.

d) Illicit felling, poaching and encroachment on forest land.

e) Forest fire

f) Cultural transition

g) Collection of minor forest produce

h) Grant of Nature land

2.6 GRAZING:

The catchment area of Pabbar River has large portion cover under snow. During summer these act as the alpine pastures and migratory routes to the graziers towards the district Kinnaur of Himachal Pradesh and vice-versa. The Pabbar Valley has vast tracks under high altitude pastures. Discussion with the local people revealed that these pastures have badly degraded over a period of time. At many places weeds like rumex species have encroached upon this alpine pasture. The palatable grasses are not more than a few inches tall and the other related pasture species have also been started showing signs of stress. As a result that neither the animal get sufficient fodder nor the land protected from the subsequent onslaught of the range on account of over grazing. This result

in large scale deterioration of the ecology and environment of the Pabbar Valley. The age Old Forest Settlement Report, 1921 which recognizes several rights of the people has also become out dated with reference to the present context with passage of time. The problem of grazing becomes much graver in view of the Pabbar catchment being home to some medicinally important plants.

2.7 MAN - WILDLIFE CONFLICT:

Man - wildlife conflict is a result of gradual degradation of natural resources and the most sufferers are poor, marginalized communities living in and around the forest. The problem of animal damage in whether it is crop depredation, live stock depredation and human causalities is not as alarming as it is evident in other parts of the state or else where in the country. The problem of livestock predation and killing by Leopard and black bear is gradually escalating and to some extent Appropriate compensation is needed and also environmental awareness programmes for migratory graziers thus need to be developed. Concentrated efforts, education, awareness, research monitoring, policy, law and governance, habitat restoration and development of essentially needed infrastructure to tackle complex issues pertaining to the man-animal conflict are required to be implemented on a priority basis.

2.8 INADEQUATE SCIENTIFIC INFORMATION:

The area by virtue of its location is considered to be very rich in bio-diversity. However, systematic scientific studies to support

documentation are not available and whatever information is available has been gleaned from the secondary sources. Exhaustive inventory of the flora and fauna is yet to be prepared, whatever little information is there it is in the working plan of Rohru Forest Division. The status of important habitat types and that of the threatened flora and fauna is not known. No information is available in this division regarding the carrying capacity of the forests and alpine meadows in Rohru Forest Division. Therefore, in the absence of reliable primary data on various aspects, only general type of strategy and approach can be made as management and improvement of the area is concerned.

2.9 HARMFUL PRACTICES BY THE LOCAL PEOPLE

The trees near habitations are lopped ruthlessly for fuel wood and fodder. The grant of Nautor to landless people is also putting the forest in danger. The forest is experiencing tremendous pressure of human and livestock needs. The animals roam freely in the forest area tramping and eating the sapling in the forest area. This results in the increased rate of soil erosion. These factors have put following problems to the fore:

1. Excessive soil loss and increase in runoffs
2. Man and wildlife conflict
3. Fuelwood and fodder are becoming scarce

Moreover as the area has been experiencing growth in apple production and other cashcrops being cultivated in private lands. People of the area are putting extra pressure on forest resources by deriving the material for packaging of these items. The unscientific collection of NTPF is also harmful to the biodiversity of the catchment area. The people in the area own cow for milk and ghee. And is the major livestock in the area. But once after stopping milk production the owners set them free in the adjoining areas. This has become the major hazard in the area and the whole state.

2.10 ECO-TOURISM POTENTIAL:

The area being very interior and picturesque, there are very few income generation opportunities for the local people. The concept of community based ecotourism enshrined in the H.P. Eco-tourism policy 2005 seems to have good potential in the Pabbar Valley. The policy will be implemented through Eco-tourism society and for this purpose; Chanshal Eco-Tourism Society has been constituted and registered under the Registration of Societies Act, 2006 and Eco tourism activities will be execute through this society.

2.11 BUILDINGS, PATHS, BRIDGES AND COMMUNICATION NETWORK:

The existing buildings, I/Paths and B/Paths are in dilapidated conditions and some of existing bridges are in bad conditions. Their

abutments and wooden beams/planks are in worn-out conditions and needs replacement. In addition to these, there is need to construct and maintain new bridges and maintenance of existing I/paths, B/paths for effective patrolling/touring in the catchment area. Not only it will provide facilities to the field functionaries but it will also helpful to local people. It was also reported that the floods caused a major damage to the range office in which some record of the office also went missing. The area is highly remote and devoid of major facilities. Also for better management of the Division, ranges and beats the conditions of existing i/paths and B/paths are to be improved on the priority basis. For successful implementation of CAT Plan and better management the catchment area the infrastructure in the catchment should be upto date.

2.12 LACK OF TRAINED STAFF IN PA'S:

There is a lack of professional knowledge/skills of management especially habitat improvement, procedure for monitoring and evaluation in different event, vegetational charges overtime and its relationship to changes in prey base species, collection of evidences and biological material, symptoms of important diseases, preventive measures and treatment assessment, techniques and methodologies and bio-diversity impacts etc. The staff is therefore, left with no option but to undertake a protection job and implementation of various works in the traditional ways.

2.13 LACK OF CONCERN ABOUT CONSERVATION BY THE LOCAL PEOPLE:

As the local population in majority is backward it is apparent that the people have little or no knowledge about the environment conservation. The local people of the area do not seem to show any concern for the conservation of bio-diversity available in the area. There is no local concern voluntary organization willing to make conservation as a primary issue. Off late the government has realized that the effective implementation of various biodiversity conservation and environment related programmes cannot achieve their objectives without awareness and concerns of the local people. So, it is highly needed to initiate a dialogue with local people on the conservation of natural resources by formation of V.F.D.S./VFDC etc. at the village/Panchayat level.

2.14 MONITORING AND EVALUATION:

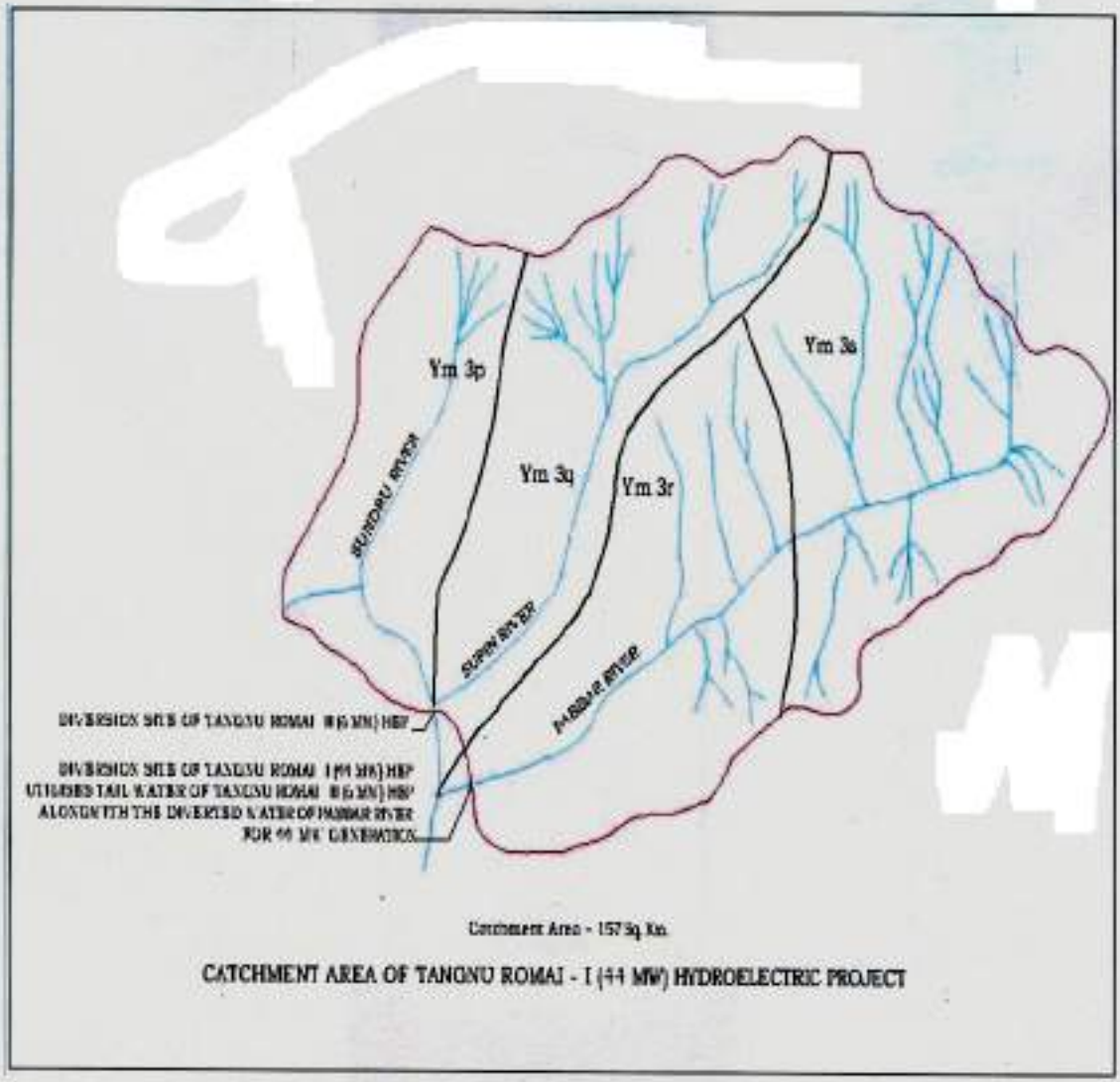
Monitoring is yet another important and integral component for effective conservation and management as it provides a ways to track the status of various components of biological diversity and forest eco system over time. The regular feed back through monitoring and evaluation allows better under standing, midway corrections and adoption of appropriate strategies. Mathur and Uniyal have provide details on the proposed long term ecological monitoring (LTEM) programme must be followed. The desired success could not be achieved in this direction in the absence of adequate man power, scientific and professional knowledge, financial constraint, support from local institutions and

participation of local communities. Regular review and evaluation meeting should be arranged to assess the results achieved and further course of action. All the agencies involved in the implementation of the CAT Plan should, in a coordinated effort regularly evaluate the achievement of desired results.

2.15 LACK OF APPROPRIATE INFRASTRUCTURAL SUPPORT:

The area is facing a lack of basic minimum infrastructure support in the field of housing, I/Hut, FRH, Office equipment i.e. Computer, GPS, Compass, Camping equipments, field equipment etc. In the absence of this infrastructural support, the information flow is very slow and erratic in management.

MAP - 05



CATCHMENT AREA OF TANGNU ROMAI - I (44 MW) HYDROELECTRIC PROJECT

CHAPTER - III

JOINT FOREST MANAGEMENT (JFM) IN THE CAT PLAN

Forests play a vital role in maintaining ecological balance and in the socio-economic development of the country. Forests are an important resource base for meeting subsistence needs of millions of rural poor, especially the tribals and forest dwellers. As per the State of Forest Report published by Forest Survey of India (FSI, 1997) the recorded forest area of the country is 76.52 million ha., whereas the actual forest cover is estimated to be 63.33 million ha., which constitutes 19.27% of the country's geographical area.

Dense forests (crown density above 40%) constitute only about 11.17% and forests with more than 70% crown density exist only over 6% of the country's land mass. Total forest cover in the tribal districts as per the 1997 assessment of Forest Survey of India is 41.72 million ha., which constitutes about 65.86% of the total forest cover of the country.

Loss of forest cover in tribal districts of the country as compared to 1995 assessment has been noted to be 0.4899 million ha. Growing stock has been tentatively estimated by the Forest Survey of India to be 4,740 million cu.mt., with an average volume of 74.42 cu.mt. per ha. India is one of the 12 mega biodiversity countries of the world and it supports 16 major forest types

India's human population constitutes about 16% of the world's population and its cattle population is about 18% of the world's population, whereas the geographical area is only 2.5%. Per capita forest area in India is only 0.08 ha. as against the world's per capita forest area of 0.64 ha. and an average of 0.5 ha. for the developing countries. The rural population is heavily dependent on the forest resources for meeting its livelihood needs. Per capita availability of forest biomass in the natural forests of the country is only about 6 ton as against an average of 82 ton in developing countries. As a result of this imbalance Indian forests are under tremendous biotic pressure. More than 50% of country's forest area is annually prone to fires causing a loss of **Rs.440 crore** (only replacement cost of seedlings).

These factors have led to severe degradation and depletion of our forest resources. This in turn is making the lives of rural poor very difficult besides threatening the environmental stability. The dense forests are loosing their productivity and more than 40% of country's forest cover has degraded. Main cause of degradation is use of the forest resource beyond its carrying capacity and without much consideration to its sustainability. The trend of degradation of forests can be reversed only if this precious resource is managed sustainably with the involvement of local communities in its protection and management. All the stake holders need to be involved in the protection and development of forest resources and Joint Forest Management Programme has come out as an important management intervention for sustainable forest management

3.1 JOINT FORESTRY MANAGEMENT IN HIMACHAL PRADESH

The Government of Himachal Pradesh its JFM Programme, *Sanjhi Van Yojana* in 1998, there are nearly. Joint Forest Management (JFM) programme in the present form can be traced to the Arabari experiment initiated by foresters in the state of West Bengal. This experiment provided a strong feedback for incorporation of the system in the National Forest Policy of 1988. In many locations people's voluntary groups were engaged in protection of forests without any initiative from the Government. Subsequently, based on the experience, the process of institutionalizing people's participation in forest protection and regeneration began. This type of collective endeavour in protection and management of forests through people's involvement was later termed as Joint Forest Management. At present there are nearly 700 Village Forest Committee constituted in Himachal Pradesh under this scheme. At present, the JFM committees are being registered under different names in various States as per the provisions contained in the resolutions. Memorandum of Understanding, with clearly defined roles and responsibilities for different work or areas should be separately assigned and signed between the State Governments and the committees. All adults of the village should be eligible to become members of the JFM Committees. It has following objectives

i.) Involvement of grass root level institutions such as gram panchayats, mahila mandals, yuvak mandals, ex-servicemen's bodies, schools, Village Forest Development Societies (VFDSs), User

groups, other Community Based Organisations (CBOs) and NGOs in sustainable management of forest resources;

ii.) Grant of 100 % income from plantations to the VFDSs and Panchayats;

iii.) Grant of total usufruct rights to the VFDSs;

iv.) Regeneration of degraded forest areas and conservation & sustainable use of better forests through community involvement.

v.) Involvement of local communities in the choice of species to be planted under the scheme;

vi.) Creation and enhancement of social, physical and financial capital of the participating communities for poverty reduction;

vii.) Special emphasis on involvement of women in the scheme;

viii.) Address problem of rural unemployment by utilising degraded forest land for large scale plantations;

ix.) Establish linkage between Food for Work Programme and the present scheme by making payments in the shape of food grains under the scheme;

x.) Increasing productivity of the Forest areas by improvement of nursery stock and adoption of mixed plantations.

xi.) Training of forest staff, VFDS members and CBOs/NGOs for facilitating and strengthening community participation.

xii.) Gradually empower local communities and local level institutions to become more pro-active in sustainable forest management.

xiii.) To help VFDSs achieve financial viability and sustainability by introducing proper mix of short and long duration cropping patterns as a short and long term objective to ensure their continued participation in the scheme.

xiv.) Gradually empower local communities and local level institutions to become more pro-active in sustainable forest management.

xv.) To help VFDSs achieve financial viability and sustainability by introducing proper mix of short and long duration cropping patterns as a short and long term objective to ensure their continued participation in the scheme.

3.2 PREPARATION OF MICRO PLAN:

The micro plans should be prepared by the Forest Officers and Village Forest Protection Committees after detailed PRA exercise and should reflect the consumption and livelihood needs of the local communities as well as provisions for meeting the same sustainably. It should utilize locally available knowledge as well as aim to strengthen the local institutions. It should also take into account marketing linkages for better return of NNTP's to the gatherers and should also reflect the needs of local industries/ markets. This should be done with due regards to the environmental functions and productive potentials of the forests and their carrying capacity as also their conservation and biodiversity values.

i.) If the existing working plans are in force (till their revision in future), for incorporation of micro plans in the working

xiii.) To help VFDSs achieve financial viability and sustainability by introducing proper mix of short and long duration cropping patterns as a short and long term objective to ensure their continued participation in the scheme.

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i.) If the existing working plans are in force (till their revision in future), for incorporation of micro plans in the working

plans, a special order may be issued by the PCCFs for implementation of the micro plan. In these areas, micro plan should aim at ensuring a multi product and more NTFP oriented approach. Without changing the basic principles of silviculture, deviations may be approved in the existing working plans if necessary. To ensure this, the concerned DFO and CF should dovetail the requirements of micro plans with the working plans.

ii.) The micro plan should also take into consideration and provide suitable advice for areas planted/ to be planted on community lands and other Government lands outside the notified forest areas including in the district council areas of North East.

iii.) Infrastructure/ Eco- development under micro plan should form a separate entity for funding it through concerned development agencies.

3.3 JFM AND TANGNU -ROMAI CAT PLAN

The works specified under the CAT plan will be executed based on this model of JFM. The various activities planned are in consonance with the JFM. Provisions have been kept for plantations in the degraded forest land, NTFP Plantations and Bamboo/shrubs plantations. Besides this the major thrust of the CAT Plan is on Income Generation Activities (IGA). So that people get their livelihood without entering in the forests. VFDC will be formed for this specific purpose besides this the active Mahila Mandals and Yuvak Mandals and NGOs will be approached to carry

out the various works of the CAT Plan. Considering the immense potential and genuine need for women's participation in JFM programme, following guidelines are suggested for ensuring meaningful participation of women in JFM. For plantations, however, the forest department shall continue to supply planting material to the VFDS on demand, free of cost for three years including the year of plantation. Thereafter, for any more supply of plants price shall be charged from the VFDS.

Atleast 50% members of the JFM general body should be women. For the general body meeting, the presence of atleast 50% women members should be a prerequisite for holding the general body meeting. Local people and committees will be engaged for the CAT Plan works such as plantation and maintenance etc. instead of hiring the labour. The wages will be met out from the provision incorporated in the norms.

CHAPTER - IV

OBJECTIVE AND PROJECT PROPOSAL

4.1 PROJECT OBJECTIVES: The objectives of the project are summarized as under:-

- To achieve in-situ and ex-situ conservation and also ecological rehabilitation in the project area leading to an all round eco-development activities on sustainable basis.
- To initiate measure to rehabilitate the degraded habitat through afforestation of native species and assisting of natural regeneration.
- To improve alpine pasture land for augmenting grass and fodder availability and to solve the problem of grazier.
- To carry out soil conservation measure in the Catchment to ensure longevity of the Hydel Project.
- To increase the potential/production of the bio - mass in the area and to ensure sustainable use of natural resources.
- To provide employment to the local people by engaging them in project activities such as afforestation, fire, rural infrastructure activities and other works except soil conservation works. As it has been stressed off late that the local people are involved in the CAT Plan activities.

- To strengthen the extension and follow up activities i.e. monitoring and evaluations of forestry development activities, publicity, motivation and extension programme to be given the desired focus.

4.2 PROJECT PERIOD

The project period would be for 10 years from 2008-09 to 2017-2018.

4.3 PROJECT COMPONENT:

The project has been design to develop the project area in an integrated manner by improving the vegetative cover over the degraded and blank areas and also to treat flood prone areas to stabilize nallah, and land slips by providing suitable bio-engineering structure and various soil conservation measures. Apart from that one of the most important part of successful habitat improvement & its manipulation as per the needs along with fire control measures with mitigation of Human Wild - Life conflict. The important steps to be undertaken in this regard during the project period are as under: -

4.4 MANAGEMENT OF CATCHMENT AREA -IN-SITU CONSERVATION.

4.4.1 Habitat Improvement:

- Biological works

- Afforestation of degraded Forest land
- Enrichment Plantation
- Assisted Natural Re-generation
- NTFP Plantation
- Nursery Development
    i) New Nurseries Development
    ii) Maintenance of Nurseries
- Treatment of Culturable Waste Land
- Treatment of Alpine Pasture
- Floristic Survey of the Area

4.5 SOIL AND MOISTURE CONSERVATION AND STABILIZATION WORKS

- Land slide/slips stabilization
- Nallah stabilization
- River bank stabilization
- Road side avenue plantation
- Establishment of Silt Observatory

4.6 PROTECTION OF FOREST

- Fire Protection
- Maintenance of Fire Lines and Controlled Burning

- Incentives to Mahila Mandals and Self Help Groups

4.7 MITIGATION OF HUMAN - WILD LIFE CONFLICT

4.7.1 Eco-Development Activities

a) Village support activities

- Construction of cattle Pond
- Vaccination of Domestic Cattle

b) Fuel Saving Devices

- Construction of Crematoria
- Distribution of Solar Lights
- Distribution of LPG Cylinders
- Installation of Solar Geysers

c) Income Generation Activities (IGA)

- Vermi Composting and Organic Farming
- Bee Keeping
- Animal Husbandry support and Dairy Development

4.8 SUSTAINABLE ECO - TOURISM DEVELOPMENT

i) Development of Camping sites

ii) Construction of trekking routes

iii) Maintenance of Mandli Log Cabin

4.9 DEVELOPMENT OF FOREST INFRASTRUCTURES

4.10 RESEARCH AND STUDIES

4.11 TRAINING OF FOREST OFFICERS/OFFICIALS IN INDIA AND ABROAD

4.12 PUBLICITY NATURE AWARENESS CAMP, EXPOSURE VISIT AND TRAINING OF CBO'S AND EXTENSION PROGRAMME/WORKSHOP.

4.13 MEETING AND EVALUATION

4.14 OPERATIONAL SUPPORT/ESTABLISHMENT

4.15 CONTINGENCIES

The detail of each component is as under:

4.4.1 HABITAT IMPROVEMENT

Biological Works

a) Afforestation of Degraded forest land:

The aim of the CAT Plan is to conserve in situ including flora and fauna along with the full range of eco-system they inhabit. Under this scheme blank area's devoid of tree growth, degraded forest areas and failure plantation areas shall be undertaken for plantations, while the choice of species will be mainly governed by the site/location, effort will be made to revise a mixture of conifers, broad leaved species and fruit bearing species, which are helpful to wild life so far as practical. The main species to be raised under this scheme are Deodar, Kail, Maple, Ban oak,

Salix, Populas ciliata, Aesculus indica, Prunus persica, Chestnut, Juglans regia, Pyrus spps. and other local fruit bearing spps etc. Plantation must use local and indigenous species since exotics have long term negative impacts on the environment. The preference of local communities as regards the choice of species will be ascertained and given due weightage as per the requirement of site, 1100 plants per hect. will be planted under this scheme. Since this is a mountainous tract, all afforestation works should be supported by anti erosion measures such as small check dams and gully plugging etc. Before starting the afforestation works bush cutting should be done and area will be cleared of obnoxious vegetation. Hoeing mulching weeding shall be attended regularly. The details are suggestive only and not binding. Divisional Forest Officer may make changes upon administrative exigencies. The plantation will be maintained for subsequent five years. A total of 45 ha. has been identified as available for planting under this scheme. The detail of areas identified to be planted is given below: -

Sr. No	Location/name of Forest	Area In ha
1.	UF-Janglikh - I	15
2.	UF-Janglikh - II	10
3.	UF-Janglikh - III	10
4.	DPF Maila 68 A	10
	Total	**45**

The afforestation norms have been worked out both for conifers and B/leaves species. Looking to the high incident of grazing during summer all the plantation areas will be fenced with B/wire in 3 - 4 strands.

Expenditure Detail:	Amount Rs. (Lac)
1. Afforestation cost with conifers/B/L over 45 hac. @ Rs. 32056/- per hac.	14.43
2. Maintenance cost for 5 years	
1st year maintenance cost for 45 hac @ Rs. 3689/- per ha.	1.66
2nd year maintenance cost for 45 hac @ Rs. 3142/- per ha.	1.413
3rd year maintenance cost for 45 hac @ Rs. 2611/- per ha.	1.174
4th year maintenance cost for 45 hac @ Rs. 2265/- per ha.	1.01
5th year maintenance cost for 45 hac @ Rs. 1717/- per ha.	0.772
Total	6.04
G. Total (New + Maint.)	**20.47**

b) Shrubs Plantation

Since all wildlife in nature live in complex web of linkage with other organisms, the proper evaluation of habitat of each species followed by

its proper managements is very essential. The plant life provides congenial home to wildlife and bio diversity therefore the habitat of wild life is to be improved by supplementing the Shrubs plantations and supported by minor soil conservation works.

For this purpose bushy, shrubby and thick forests are to be maintained and no grass should be removed from the home range of the wild life so that habitat of wild life could be preserved and protected. In degraded forest area suitable species i.e. Shrubs species be carried out as per site location, the bank area in the forests in high reaches along ridge should be maintained as pasture land by sowing suitable local grasses for the need of wild herbivores which are pray base for the carnivores. The shrubs in the under story is very important for Himalayan Monal, Western Tragopan and other pheasants conservation. It is recommended that all such patches and other associate vegetation of under story such as cotoneasters spps., virbernum spps, Principia utilis and Berbris spp. etc. be protected and preserved.

An area of 15 hac has been identified as available for planting under this component. The detail of the areas identified is as under.

S. No.	Location/Name of Forest	Area in (Ha)
1.	UF - Diudi	10
2.	UF - Maila	5
	Total	**15**

Expenditure Detail	Amount in (Rs. Lacs)
1. Afforestation cost for Shrubs Plantation over 15 Ha area @ Rs. 25,583/- per Ha.	3.84
2. Maintenance cost of five years	
1st year maintenance cost of 15 ha @ Rs. 3687/- per Ha.	0.55
2nd year maintenance cost of 15 ha @ Rs. 3353/- per Ha.	0.50
3rd year maintenance cost of 15 ha @ Rs. 3019/- per Ha.	0.45
4th year maintenance cost of 15 ha @ Rs. 3019/- per Ha.	0.45
5th year maintenance cost of 15 ha @ Rs. 2685/- per Ha.	0.40
Total	**2.35**
G. Total (New + Maint.)	**6.20**

c) ENRICHMENT PLANTATION:

There are some forests in the catchment area where in patch density of crop is poor and devoid of overhead shade where planting could be done. In such areas planting of 800 seedlings per hectare is expected to result in full density forests. Extent to such areas is estimated to be 10 hectares. Thus, it is imperative that such forest areas are planted by artificial means to increase their stocking to the required level. The detail of the areas identified is as under:

Sr. No	Location/name of Forest	Area In hac.
1.	UF- Janglikh - II	10
2.	DPF Maila 68 A	5
	Total	15

Expenditure Detail:

		Amount in (Rs. Lacs)
1.	Afforestation cost with Conifer/B/leave over 15 Ha area @ Rs. 25,314/- per ha.	3.80
2.	Maintenance cost of five years	
	1st year maintenance cost of 15 ha @ Rs. 2638/- per ha.	0.40
	2nd year maintenance cost of 15 ha @ Rs. 2322/- per ha.	0.35
	3rd year maintenance cost of 15 ha @ Rs. 2005/- per ha.	0.30
	4th year maintenance cost of 15 ha @ Rs. 2005/- per ha.	0.30
	5th year maintenance cost of 15 ha @ Rs. 1689/- per ha.	0.25
	Total	**1.60**
	G. Total (New + Maint.)	**5.40**

d) Assisted Natural Regeneration:

In some forest area, conditions are conducive to natural regeneration provided some sort of assistance is provided. Such areas shall be taken up under this component. The areas shall be closed to exclude biotic interference. Forest floor will be cleared of slash, debris

and pruning to afford a clean seed bed to the falling seed. Where natural regeneration is found deficient, it will be supplemented by artificial planting/patch sowing may be done. Upto 250/200 plants/patches per hectare will be planted/patch sowing to take place the process of regenerating the area uniformly.

An area of 15 hac. has been identified for treatment under this component as detail is given below :

Sr. No.	Name of Forest	Area in ha.
1.	UF - Janglikh - I	15
	Grand Total	15

Expenditure Detail:		Amount in (Rs. lacs)
1.	Natural regeneration closure cost over 15 hac. @ Rs. 15,567/- per ha.	2.34
2.	Maintenance cost for 5 years	
	1st year Maint. 15 hac. @ Rs. 1,474/- per ha.	0.22
	2nd Year Maint. 15 hac. @ Rs.1,317/- per ha.	0.20
	3rd year Maint. 15 hac. @ Rs. 1,213/- per ha.	0.18
	4th year Maint. 15 hac. @ Rs. 1,213/- per ha.	0.18
	5th year Maint. 15 hac. @ Rs. 1,056/- per ha.	0.16
	Total	0.94

G. Total (New + Maint.) Rs. 3.28 lacs

e) N.T. F.P.'s Plantation (Medicinal Plants) :

A number of valuable medicinal plants have become endangered due to over exploitation and unscientific extraction and collection from their natural habitat without adequate replacement by way of artificial regeneration. Local people have a right to collect/extraction of Minor Forest Produce in and around the Forest Area under provision of Forest Settlement Report, 1921 for domestic use and their livelihood, thereby threatening the very existence of rare and endangered species of medicinal herbs. Therefore, it is needed to address the livelihood issue by encouraging forest based enterprises for development NTFP is required on the sustainable basis as it provides alternative income generation activities. Under this scheme medicinal herbs like Dhoop, Karu, Kuth, Salam Panja (Hath Panja), Ban Kakri, Chora, Patish, Guchhi and Discorea deltoidea etc. will be raised. About 5000 plants in 1000 patches shall be planted in 1 ha. area depending upon the site. The plants can also be raised as intercrop in the other plantation area taken for the tree plantation. The plantation area will be fenced with B/wire fence in four strands on wooden fence posts.

a) An area of 10 hac. has been identified as available for planting under this component. The details of the area identified are as under.

S.No	Name of Location	Area (Ha)
1.	UF-Maila	10
	Total	**10**

b) An area of 100ha has to be identified as available for Sanjha Van Sanjeevni Van Scheme for JFMCs. A provision of Rs.23.5 lac has been made for raising 100Ha of medicinal plant plantation under Sanjha Van Sanjeevni Van Scheme for JFMCs.

Expenditure Detail :

		Amount in (Rs. Lacs)
a)	Plantation cost of N.T.P.F over 55 ha @ Rs.	3.70
1.	36,950/- per ha.	
2.	Maintenance cost for 3 years	
	1st year maintenance of 10 ha @ Rs. 6188/- per ha.	0.62
	2nd year maintenance of 10 ha @ Rs. 5103/- per ha.	0.51
	3rd year maintenance of 10 ha @ Rs. 4018/- per ha.	0.40
b)	Medicinal Plant plantation under Sanjha Van Sanjeevni Van scheme	23.5
	G. Total (New + Maint.)	28.73

f) **Nursery Development:**

To raise successful plantations it is necessary to have a good planting stock. It is proposed to establish nursery at UF - Barsheel. The nursery shall be raised in the 1st year of the project and will be further maintained till the completion of the HEP project. Nursery should be

located in planting zone. Exposed windy ridges should be avoided. It should have adequate irrigation facility. For planting Deodar, the nursery should be located in low elevation in Deodar Zone. Seed is collected from healthy, middle aged, self pruned trees of good form and quality. Cones are collected during October November and dried in sun after these have opened. Seeds should be stored in sealed tins in cool dry place.

In addition to that it is also proposed to bring about effective closure of pasture area with the prior consent of the local people for raising of seed locally This would help collection of seed from the closed area. The local grass spps i.e. marchunang and parchunang is available and would be consulted from the Scientists of UHF Nauni, Solan for choice of local spps, collection of seed and planting techniques etc. during the 1st two years of the project period.

Expenditure Detail:

1.	Establishment of New Nursery at Barsheel	UF -	3,00,000
2.	Maintenance of Nursery during the project period		3,80,000
	Total		6,80,000

ii) Treatment of Culturable Waste Land:

The grass land, wetland and common waste land/grazing lands are extremely valuable for biodiversity conservation. Their productivity potential needs to be restored. Following measures are to be taken:

- Eradicate unwanted bushes, shrubs and grasses
- Sowing of suitable locally good palatable grasses
- Minor soil conservation measure
- Fertilizers for growth

Planting and grass sowing along contour is required. All the areas are to be fenced with wooden fence posts and three four strand barbed wire. The model for raising of culturable waste land over one hectare area is given in Annexure - VI. Under this component about 20 hac. area is proposed. Maintenance of these areas shall be done for five years. The list of various areas proposed to be treated is given below:-

S. No.	Name of area	Area in Ha.
1.	UF-Diudi	10
2.	UF-Janglikh - III	10
	Total	**20**

Expenditure Detail:

		Amount in (Rs. Lacs)
1.	Cost of treatment of culturable wasteland over 20 hac. @Rs. 18,731/- per ha.	3.75
2.	Maintenance cost for 5 years.	
	1st year maint. Of 20hac. @ Rs. 4484/- per ha.	0.90
	2nd year maint. Of 20 hac. @ Rs. 4000/- per ha.	0.80

3rd year maint. Of 20hac. @ Rs. 3633/- per ha.	0.73
4th year maint. Of 20 hac. @ Rs. 3633/- per ha.	0.73
5th year maint. Of 20 hac. @ Rs. 3498/- per ha.	0.70
Total	3.86
Grand Total (New + Maint.)	7.61

iii) **Treatment of Alpine Pasture :**

These are high lying areas situated in sub-alpine zone. The flora is Herbaceous and the pastures have the potential to support regulated grazing. These areas remain under snow from late October to late February. Therefore they get automatic rest for about six months. The restoration and management of degraded alpine pasture is a vital objective, both to provide sufficient habitat for spatial movement of spill over species outside CatchmentArea and to provide biological resources. The alpine pasture has their own significance in the geophysical, environmental and socio-economic conditions of the tract. They are the main source of herbage for the wild herbivores which are prey base for carnivores, cattle, sheep and goats. These pastures are extensively grazed during summers for 3 - 4 months and also by a large number of goats and sheep which are also brought in by the migratory graziers. Discussion with the local people revealed that these pastures have badly degraded over a period of time. The palatable grasses are no more than a few inches tall and the other related pasture species have also started

showing signs of stress. This apparently degraded status of these pastures seems to be due to very heavy grazing pressure in the area. As a result of continuous and heavy pressure of grazing, barren patches have developed over vast areas and soil erosion rampant in these alpine pastures. Till now no survey about the carrying capacity of pasture, grazing land and common waste lands has been specifically carried out for this purpose. No estimates for grazing incidence on forests land is available. The pressure is so much that even closed plantation and re-generation areas are raised for grazing. Owning to traditional rights of

the graziers, it is difficult to restrict the number of animals grazing there. Thus the only alternative left is to increase the productivity of these pastures to cope with the grazing pressures.

For regulation of local/migratory grazing dialogue/engagement with local communities through some CBOs is recommended. But first a proper survey & research study into the entire grazing issue(s) in needed to inform future course of action.

Management needs required are:-

- Survey to determine allowable size of livestock in the pastures as per their carrying capacity.

- There is need to check the size of the herds with the permits in the field to avoid misutilized by some permit holders.

- Education of needs.

- Closure of areas in pastures for the proliferation of seeds of desirable grass species.

- Rotational deferred grazing system be followed to give the advantage of early nutritive growth and rest period during the growing season.

- To dialogue with the local people and the migrating graziers so that a sort of social fencing could be achieved. No B/wire fencing is suggested.

- There is need to assessment of the carrying capacity of alpine pasture and grazing land in forests. Role of different categories of live stock and their grazing requirement needs to be investigated.

Expenditure for Treatment of Alpine pasture : Rs 9.02 Lac

Amount in (Rs. Lac)

1.	Cost of Treatment of Alpine pastures over 90 hac. @ Rs. 8,447/- per ha.	7.60
2.	Maintenance cost for 2 years	
	1st year maint. Of 90 hac. @ Rs. 829/- per ha.	0.74
	2nd year maint. Of 90 hac. @ Rs. 741/- per ha.`	0.66
	Total	**1.41**
	Grand Total (New + Maint.)	**9.02**

iv) Floristic Survey

Pabbar River basin has a rich biodiversity with various important floral species in the Catchment Area. The Catchment Area has rich species of medicinal and herbal plants. Due to heavy demand of medicinal and herbal plants in various related industries the danger of overexploitation is always there. The Knowledge of status of existing sources particularly their biosystematics and utilization potential are prerequisite for conservation to formulate a comprehensive strategy to cover identification, collection and preservation. The knowledge of natural resources, their enumeration alongwith evaluation of their resource potential are prerequisites to systemize their exploitation and conservation alike. For this there is a need of an in floristic survey in the Catchment Area. For this purpose a floristic survey will be carried out in

the Catchment Area for experts will be engaged from Himalayan Forest Research institute Shimla and Horticulture University Nauni Solan. An amount of **Rs. 5 Lacs** have been kept for this purpose in the CAT Plan outlay.

4.5 SOIL & MOISTURE, CONSERVATION, STABILIZATION WORKS

i) **Active Land slides/slips stabilization:**

Land slide are caused by the down hills movement of weathered rock mass, boulders, soil etc. There are various factors natural and man made, which contribute directly or indirectly in producing land slide. The identified areas as per the CAT Plan are to be stabilized through various control measure which would depend upon the size, extent and location of the slip of the area. However in general the following measure shall be applied depending upon the situation on the site/field. Construction of masonry check walls and undertaking of vegetative measure.

Planting of shrubs, grass and quick growing species and carryout soil conservation measures to treat the sliding/eroding slip areas. Choice of species will be depending upon the site/field.

The list of various land slip/land slide stabilization proposed for treatment is given below : -

Land slip stabilization

Sr. No.	Name of location	No.	Amount (Rs.)
1	Tangnu Slip	1	1236015.00
2	Janglikh Slip	1	560685.00
3	Diudi Slip	1	429700.00
	Total	3	2226400.00

The actual size and expenses may vary as per the site conditions.

ii) **Nallah Stabilization:**

The primary objective of this treatment has been to check the run offs and cutting of the banks of different nallahs. About 7 nallahs identified for treatment depending upon the sites/location not to treat total length in the catchment area. The identified areas are given in the CAT Plan shall be stabilized through control measure which will depend upon the size, extent and location of the Nallah/area. The following methods shall be applied depending upon the situation in the field.

- Construction of check dams with gabion wall, protection wall with crate wire to regulate and check/reduce the speed of flow.

- The eroded and effected Nallah will be channelized and protected by constructing crate wire of check wall/check dams and spurs.

- Live hedge vegetative spurs along the nallah shall be put up after one or two years, when the nallah will be filled by the silt. Local species, which are known as good soil binder like Salix, Alnus nitida, Ailanthus, Hippophae spps etc. will be planted.

The sites which are highly vulnerable to soil erosion are to be taken up on high priority and silt detention dams shall be constructed in order to reduce the silt load in the Pabbar River. These structures would break the velocity of the water and arrest the silt discharge in the river Sorang. Besides this construction of spurs where ever required will also be constructed. Planting of shrubs and quick growing species to treat the nallahs will also be carried out.

The details of Nallah's are given below alongwith financial implications.

S. No.	Name of Nalla	Amount (Rs.)
1	Khatru Thach Nalla	155469.00
2	Chasrol Nalla (Maila)	321374.00
3	Kattan Gad (Khad)	219409.00
4	Moti Gad (Khad)	207303.00
5	Poiri Gad (Khad)	157724.00

6	Sundru Nalla	201440.00
7	Dewar Gad	225353.00
	TOTAL	**1488072.00**

The name of nallah and cost estimate of the particular nallah is indicative only which may change as per the site condition and requirements.

iii) River bank stabilization

A large number of nallas in the catchment bring large quantity of sediments in to the Pabbar river with frequent cutting and resulting in slope failures. This phenomenon occurs all along the Pabbar River. The Janglikh Dam Site has been selected for the purpose.

The following options are proposed to be undertaken for river bank stabilization as per the studies and depending upon the situation in the field.

a) Construction of check dams and vegetative spurs

An outlay of Rs. 4.75 Lacs have been kept for this purpose.

iv) Road side avenue plantation

It is proposed to carry out road side plantation along the following roads:-

a) Tangnu to Diversion barrage

b) Bhatwari to Adit-II

c) Romai to Power House, Surge Shaft, Adit-III

This work will be carried out under this component to improve the visual aesthetics in and around the project site. **An outlay of Rs. 11.80 lacs have been kept for this purpose.**

v) Establishment of Silt Observatory

The study area designed for the catchment area treatment is experiencing all the classic vagaries of the nature on large scale. The terrain and geology of the area susceptible to incidence of land slides/slips/glaciers and water erosion. Bulk of soil erosion takes place due to scoring action of water running off the surface during melting of snow. The run off water first form localized channels which in turn form bigger gullies leading to serious Soil erosion problem. This increases the silt content in the rivers all across the rivers in Himachal Pradesh. The problem of silt is causing serious concerns in the various projects in the state. This has caused considerable damages to machinery and power generation in Nathpa Jhakri project. To avoid such eventuality in Tangnu Romai project establishment of silt observatory at upstream of reservoir near village Janglikh is proposed to have a constant watch on the silt contents of Pabbar River throughout the year. For which an expenditure of **Rs. 8.75** Lacs has been kept. In which one lac will be spent on setting up the observatory which includes lab, building etc. infrastructure. Rest of the amount will be spent on engaging laboratory incharge to collect the water sample throughout the year.

4.6 PROTECTION OF FOREST

a) Fire Protection

The Forest must be saved from forest fires. The forest fires do damage in Deodar - Kail forests during November to December and April to June. This problem has aggravated in last few years as the population has grown. Controlled burning of forest debris/disposal of slash is recommended in dry season in dried up nallahs/paths and along the cultivated private land/Govt. land in accordance with the working plan, rules, Acts and departmental instructions. The nallahs and paths will act as fire barriers. No new fire lines and green felling will be carried out incompliance of the Apex Court order in CWP 202/95 dated 12.12.1996 and 14.02.2000.

In order to protect the forests from fire, the following works are proposed to be undertaken along the plan period:

- Controlled burning of grass land and debris etc. to facilitate growth of fresh grass. Removal of vegetation, either slash and debris and early or cool controlled burning Clearance and maintenance of fire lines.
- The forest staff will be adequately equipped with the fire fighting Kits which will be purchased from out of the funds provided under this sub-head.
- Incentives to Mahila Mandals/self help groups.

<u>An outlay of Rs.23.70 lacs have been kept for this purpose.</u>

4.7 MITIGATION OF HUMAN - WILD LIFE CONFLICT

The People draw their sustenance largely from the forests for their day to day consumption and their livelihood. We cannot deny the needs as the people who live in harmony with the forests; environment and ecologically they cannot be disregarded. Safeguards are required to ensure that catchment area treatment and other works should be executed ecologically. The following important mitigative measures are to be undertaken in this regard are as under: -

4.7.1 Eco-Development Activities:

a) **Village support activities**

For the optimum conservation of natural resources it is essential to develop rural infrastructure development i.e. village paths, repair/construction of. Cattle pond. It is necessary to immunize the domestic cattle against contagious disease like foot and mouth etc. It will prevent disease from spreading from domestic cattle to Wild animals and vice-versa. Therefore, **an outlay for Rs. 1.20 lacs is proposed** for these purposes during the plan period. The component wise detail is given below.

1. Construction of Cattle Pounds
2. Vaccination of domestic cattle

b) **Fuel Saving Devices:**

In order to reduce the pressure from forest resources it is proposed to provide alternative sources construction of crematoria and distribution of solar lights, 400 LPG Cylinders with kits including pressure cookers to local people on a 50 : 50 cost sharing basis, Solar Geysers.

Therefore, an outlay of Rs. 13.68 lacs has been proposed for this purpose during the plan period. The component wise detail is given below.

c) **Income generation activities (IGA) :**

One of the major factors impacting on the effective bio-diversity conservation is the dependence of people on the natural resources for their livelihood. Local people have a right to collect/extraction of NTFP in and around area under the provision of Forest Settlement Report 1921. Although, a four year felling cycle has been prescribed by the H. P. Forest Deptt. and the Apex Court Order dated 14.02.2000, prohibited the removal of dead deceased, dying and fallen trees, drift wood and grasses, but they extracted NTFP for the their livelihood there by threatening the very existing of the rare and endangered species of medicinal herbs Vermi composting culture, bee keeping, are one of the alternative sources of income generation which is easy to adopt and can bring fast income returns to the local people ecologically. Forest Deptt. and Horticulturist in Rohru Tehsil will be a potential buyer of all such vermi composting and organic farming for its vast network of forest nurseries also. Women can adopt these activities as a part time without compromising with their day to day work. Therefore, an amount of Rs. 0.90 Lacs has been made for this purpose during the plan period.

Animal husbandry is an important occupation of the people of the area. Live stock practices are rather primitive in the project area. Mostly open grazing is practiced with little stall feeding and minimum fodder cultivation. A large number of unproductive cattle are trampling the grazing land, which results in severe damage to the vegetation and soil productivity. It is therefore required that need to keep large herds of

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unproductive cattle is reduced by demonstrating benefits of improved breeds cattle to the local people and strengthening the animal husbandry infrastructure support to such a change with the passage of time. Thus, **a provision for Rs. 3.0 lacs has been made** under this component to provide animal husbandry support and diary development in the project area with the consultation of animal husbandry department and public subject to the approval of A.P.O during the plan period.

4.8 SUSTAINABLE ECO-TOURISM DEVELOPMENT

The area is also known for its scenic beauty. The area has a very high potential for development of Ecotourism but poor infrastructure, low publicity, trained manpower and inadequate financial resources have been the main constraints in the proper development of eco-tourism. There is priority need to promote and develop eco-tourism, wilderness travel and adventure travel in the landscape. The Eco-tourism shall be implemented through various Eco-tourism registered societies. The local people are not aware of vast eco-tourism potential and they need training and awareness/importance of the conservation of wild life alongwith Eco-tourism. Therefore the following strategies shall be adopted to implement the sustainable eco-tourism in the project area: -

i) Construction of trekking Routes: New trekking routes will be constructed at a **cost of Rs.3.00 lacs.**

ii) Development of Camping Sites: New camping sites will be developed in the area the detail of which has been provided in the APO. An amount of Rs 8.50 lacs have been kept for this purpose.

iii) Maintenance of Log Cabin and Camping sites: an amount on Rs. 3.50 lacs have been kept for maintenance of Mandli Log Hut and for additional camping sites to be developed.

4.9 DEVELOPMENT OF FOREST INFRASTRUCTURES

For the optimum management of Forest resources of the track, it is essential that the field infrastructure of the forest department adequately developed. The Forest path/bridal path, bridges and buildings in the region are the important lines of communication in these difficult terrains and to keep them in serviceable condition is highly desirable but due to paucity of funds many existing paths are in a state of neglect Some paths have been identified for new construction to facilitate efficient Management in the Catchment area. Similarly in case of buildings, few existing buildings will need immediate repair.

The present infrastructure is not adequate. More over there is no scope for further development and extension in near future. Secondly, from the management point of view, it is very necessary to improve the forest infrastructure. For this a meeting hall at Rohru Division office will be constructed and maintenance of staff quarters and forest rest house at Rohru will be done. The range Quarters at Kashadhar Range will also be repaired. A provision of **Rs. 45.06 Lacs** has been made for this component. It is also proposed to set up Van Thana in Rohru Forest Division, the location of which will be decided by the Forest department. A provision of **Rs.25lacs** has been made specifically for the establishment

of this Van Thana. Year wise allocation shown in the schedule is only indicative and funds may be used as per actual requirement of the site/proposal during the plan period and extra expenditure will be met with the approval of the Government.

4.10 RESEARCH AND STUDIES

It is utmost important that a waste land information about the floral diversity, ecological studies and law and policy and composition is generated to guide future conservation action. Funds will be allotted to implementing agency, who will determine the study areas with focus on present scenario during the plan period. The implementing agency will contact most appropriate agency, institution to conduct their research activities from the institution HFRI Shimla, WII Dehradun, and any recognized University in India. Priority will be given to undertake research studies in the following subjects: -

a) Floristic studies.

b) A study on distribution, relative abundance and food habits of wildlife in the project area.

c) Ecological studies of Pabbar river Catchment

e) Socio - Economic studies of the villages in the project area

First preference will be given to the in-service candidate who having a knowledge and experiences on forestry management and

conservation. The research and studies will be conducted through the W.I.I Dehradun.

A provision of Rs. 10.00 lacs has been made for this component. Year wise and division wise allocation shown in the schedule is only indicative and funds may be used as per actual requirement of research activities proposal/plan, submitted by the candidate/institution, through implementing agency.

4.11 TRAINING OF FOREST OFFICERS/OFFICIALS IN INDIA AND ABROAD

The specialized training and study tours in India and abroad shall also be arranged for forest officials/officers who are implementing the plan. The objective of this training component would be to provide the officers and the staff working in the project area to augment their existing skills, professional knowledge, capacity building to share experiences and ideas on different fields. The basic components of capacity building include:

1. Developing human resources through training and education
2. Generate new information for better knowledge and understanding.
3. Providing an adequate institutional framework and material support to enable acquired skills to be fully utilized.

In order to achieve overall plan objectives by effective implementation of the CAT Plan, the training component under this plan period is given below:

i) **Wildlife Institute of India**

Wildlife Institute of India (WII) also conducts various short term training courses for the officers of the forest department. The calendar of the courses is released annually.

Therefore, it is imperative that the forest officers and frontline staff in wildlife should get the opportunity to learn various skills through these courses for better management of wildlife particularly endangered and threatened species.

ii) **Training in Soil and Moisture Conservation:**

The training programme for a group of field staff would be organized by Central Soil and Water Conservation Research Training Institute, Chandigarh and Dehradun and also by FTI, Chail. The trainees would be exposed to the Engineering and vegetative works by way of presentation, field demonstrations and hands an experience during training programmes. The trainees would be taken for visit to a nearby soil eroded area, nallahs and river bank area in Pabbar Valley and helped in identification of site problems and their solution/control method etc.

Training in JFM for field staff and exposure visit in JFM area within State and other states i.e. M. P., West Bengal, Karnataka and Kerala etc.

A provision for Rs. 25.50 Lacs has been made for this component during the plan period. However, this allocation is only indicative and actual funds required on this account will be sought for annually after finalization of activities with the approval of competent authority.

4.12 PUBLICITY, NATURE, AWARENESS CAMP, EXPOSURE VISIT, MOTIVATION AND EXTENSION PROGRAMME/WORKSHOP OF CAT PLAN WORKS:

The Catchment and the adjoining villages suffer from over exploitation of Forest resources, overgrazing and soil erosion etc. To check these soil erosion by vegetative measure including afforestation & rehabilitation of grass land, control of natural resources are immediate necessary. The biotic pressure on the forest resources is ever increasing day by day due to the increase dependence of the local people for their livelihood. In order to tackle the ecological problem, publicity, nature awareness camp, exposure visit and educational programme has to be evolved for the local populace and VFDS. Nature interpretation and awareness among all section of society living close must be aroused by systematically. The extension worker and field staff needs to be trained in JFM and extension. Methodology, Local populace/VFDS/VFDC has to be educated and trained regarding the programme incorporated with the project. VFDS/VFDC will be constituted in each village and VFDS workshop be organized to provide common forum for sharing of various experiences and for developing common understanding on the approach and strategy of participatory Joint Forest Management. The field functionary will organize the meeting of the farmers and the other

beneficiary of the village, panchayat and block level, where they will be providing information about various activities of the project. Development officer of Horticulture and Animal Husbandry must also be associated in these meetings to provide guidance and techniques to the farmers. The wild life (Protection) Act, is 1972 must be explained to them. They must be told about ban on hunting, rules regarding collection of MFP's and compensation to be given if wild animal damages of cattle etc. Special Nature Awareness camps/exposure visit must be organized in winter when people are relatively free to attend such camps /visits., painting, trekking and visit to nearly areas of PA's should be organized to attract the school going children to the cause of wild life and nature conservation.

Various workshops and training for C.B.O's and VFDS/VFDC on project programme would be organized at range, division and circle level. In these workshops, professional/expert or resource person from HFR Shimla/WII Dehradun and NGO's will be invited to suggest measures to overcome various problems being faced by the field functionary.

Short term training for CBO's and VFDS/VFDC and farmers on agriculture, horticulture and forestry will be organized at the divisional level. Liaison with University of Horticulture and Forestry is to be maintained for this purpose after approval of the A.P.O. Latest technology on agriculture, horticulture, forestry and allied subject is to be imparted to the farmers from UHF Nauni and Palampur University etc. Active non Governmental organizations operating in the area and also outside (within the state) are also to be involved.

Meeting and evaluation of CAT Plan progress work is yet another important and integral component for effective management and governance. Therefore, the provision has been made in the plan for this purpose. Rs. 4.50 has been kept for this purpose.

4.13 MONITORING AND EVALUATION

The regular quarterly meeting/workshop will be conducted/organized with the approval of the competent authority during the plan period.

Strategy for Capacity Building of Project Team:

- To build in house capacity of the project team to take up this job a two pronged strategy needs to be developed.
- First part of the strategy would include training/workshop.
- Appreciation of the issues
- Developing Skills
- Developing appropriate and specific extension technologies
- Developing extension material for various target groups
- Implementing the extension Programme and.
- Programme assessment and impact
- The second part of the strategy would deal with actual execution of the extension programme, which would include :
- Identification of various target groups
- Sensitisation of the identified target groups to the problem

- Formation of village level programme participatory committee/ societies and their involvement in the programme
- Working outside specific solution with the participation of these committees/societies

As an interim arrangement a committee shall monitor the works of the CAT Plan on annual basis. The Monitoring committee would be constituted as below:-

1. Chairman, Conservator of Forest Shimla.
2. ACF Rohru
3. PRI Representatives
4. DFO Rohru - Member Secretary.

The committee would need to ensure the implementation and monitoring of the catchment area works and review progress from time to time. The implementing agency upon its approval will provide a copy of the approved APO giving the details such as list of areas along with the works to be taken up and their costs to each member of the committee. The committee shall strive to make the monitoring process transparent. Meeting of this committee shall be convened at least once in a year or as and when required in emergency with due approval from members and higher DF authorities. All non official members shall be entitles to TA/DA as per rates approved and being followed by DC Shimla. All the expenditure incurred on these meetings shall be met from this head of Monitoring and Evaluation.

In all **Rs. 14.76 Lacs** has been kept for this purpose.

4.14 OPERATIONAL SUPPORT/ESTABLISHMENT

The provision has been made in the CAT Plan to provide support to the implementing agency in the form of establishment charges, office expenses, computers etc.

Sr. No	Description of items	Qty	Amount (in Lacs)
1.	TA		3.20
2.	Amenities to staff and labour		2.05
3.	Books and periodicals (in kind)		0.60
4.	OE		3.90
5.	Purchase of Computer with accessories Printer, Modem, Scanner, UPS, CD Writer etc. (in kind)	4 nos. 3 for Div. HQ and 1 for Range Office	2.80
6.	Office Equipments, Storage Almirah, file cabinets, GPS, DLP, Digital Camera etc (in kind)		3.00
7.	Provision for two vehicles (In Kind)		15.00
	Total		**30.55**

A provision of Rs. 30.55 Lacs have been earmarked for this purpose.

4.15 CONTINGENCIES

Outlay in the CAT Plan for various components has been worked out on the wage rate of labour, market rate and as per H. P. Forest Department schedule rate. The lump sum provision has been made in the plan for engineering works for soil and moisture conservation. These works are to be undertaken after preparation of detail estimates and as per actual works depending upon the sites/location required to be worked. The model/design prescribed in the proposed plan is only suggestive although efforts have been made to restrict the expenditure but excess and deficit may occur as per the allocation of funds. Since the CAT Plan is

to be implemented over a period of ten years, hence in the eventuality of burden or in order to accommodate any future increase in the cost of the plan, on account of changed ground realities, exigiencies of unforeseen nature etc. an amount of **Rs. 49.37 Lacs** has been proposed for this purpose during the plan period. Similarly any unspent amount left during the plan period will be utilized by proposing the additional works in consonance with the project objectives which are not covered in the CAT Plan with the prior approval of the competent authority.

CHAPTER - V
Payments for Environment Services (PES)

Payments for Environmental Services (PES) is a new concept which is expected to galvanize all the stake holders including the Govt., local community living in the project area as well as the various local institutions which can be involved in providing the requisite service for environmental upkeep. In order that the concept is developed in an actionable plan it requires earmarking of funds for its evolution, planning and implementation and accordingly a **provision of 10% of the CAT Plan** funds is to be made in the CAT Plan to implement performance based PES. Accordingly a provision of Rs. 50 Lacs has been proposed in this CAT Plan for implementing this novel Concept.

Being a new concept, it is natural and necessary that a Pilot project is planned, designed and experimented by considering scopes and designs for various PES models.

Out of the total of Rs. 50 lacs under this head a provision of Rs. 10 lacs is being made to formulate innovative institutional and payment mechanism which would provide effective incentives to multiple stake - holders from the landed to the landless and community organizations to the State Govt. This is expected to complement regulation and help make large public investment sustainable in the fields of Forest plantation, local irrigation and joint community based forest management. This will also result in livelihood impacts besides providing the environmental service.

The balance Rs. 40 Lacs would be utilized to work the model, arrived at under the scoping work in the field. This is primarily to incentivize local communities to modify their land use practices. Major contribution of local stake holders is expected to control silt and help

grow and maintain a variety of plantations especially the Medicinal Plants. Another important aspect is in enhancing infiltration in forests which is likely to reduce the water stress due to climate change. Importance of activating local community institutions in these tasks of far reaching impact and significance can not be over emphasized. Local institutions are required to help manage local forest Eco-Systems and sign and implement PES agreements on the ground. They will naturally help reduce transaction cost and will be torch bearers for joint forest participatory management. In addition to these direct benefits the involvement of local community and institutions will provide continuity and help in not losing track of the past learning and experience.

Under PES there is need to create a relation and resource flow between environmental services providers and beneficiaries. Incentive based mechanisms can be in cash or kind, including tenures and local deals to optimize public investments and fiscal measures. The key is to identify effective practice and local distribution options.

CHAPTER - VI
Development of Dumping Sites

The Pressure of population growth is stressing the existing systems for solid waste management in most of the towns of our state. The Govt. of Himachal Pradesh have taken a conscious decision to cater to the need of funds for this activity by making suitable provisions in the CAT Plans of the Hydro electric projects being developed within the state. Accordingly a provision of Rs. 45 Lacs has been made in this CAT Plan which will enable investment for planning and implementing the solid waste management programs of some towns in the vicinity of the project area. Three dumping sites are proposed to be developed in the urban settlements of the state.

CHAPTER - VII

PROTECTION AND MANAGEMENT OF WILDLIFE

The influx of outside labourers and project people will increase in the area. This poses a serious danger to the wildlife in the catchment area. As the habitats of wild animals may get disturbed due to heavy influx of project people and the biggest threat is poaching of wildlife in the area. To avoid these circumstances following measures are proposed for wildlife protection in the CAT Plan.

7.1 CONSTRUCTION OF WATER HOLES:

The scarcity of drinking water in the catchment area prompts the wild animals and monkeys to venture towards the habitated area and water sources of local people, this sometimes result in human wildlife conflict and damages of crops in the fields. To avoid this water holes should be constructed wherever is required. Water holes needs to be constructed at various points as per management plan. The recommended size of water ponds is 7m x 6m x 2m (with stone masonry inside) it is strongly emphasized that all these water point must be kept under vigil of patrolling staff. This is to preempt any suspected poaching attempt at the water ponds/holes.

An outlay for Rs. 2.80 Lacs has been proposed to be incurred during the plan period.

7.2 SIGN AND SLOGAN BOARDS:

It is recommended that the sign and slogan boards must be put up at selected sites. All these sign and slogan boards must be in Hindi and English Languages in the form of an appeal to the local people, telling them the importance of Wildlife conservation under the provision of Wildlife (Protection) Act, 1972 and IFA, 1927 and FCA, 1980 etc. All such development works which are taking place in the project area must be properly displayed at the site of execution e.g. plantation work, nursery, pasture development, soil conservation works etc. Therefore, an amount of **Rs. 1.00 Lacs** has been proposed for this purpose during the plan period.

7.3 WILDLIFE CENSUS OPERATION:

It is proposed to carry out wild life census in the key areas to know the density of key species so that these can be further improved and developed from management point of view. During last four years no census has been carried out in the Sanctuary area due to non-availability of funds. The census should be carried out twice in an alternative year. Therefore, an amount of **Rs. 5.00 Lacs** is required for this purpose during the plan period.

For wild life census operation the whole tract is to be traversed for which camping has to be done in the forest and catchment area for which following camping equipments will be provided by the company in kind for which an amount of **Rs. 3.00 Lacs** has been kept.

Equipments	Amount
Camping Equipments : Alpine Tents 10 nos., Kitchen Tents 2 nos., Toilet Tents 10 nos., Dinning Tents 2 nos., Sleeping Bags 10 nos., Rucksacks 10 nos., Axe Hammer 10 nos., Jacket and lower 12 nos., Snow boots 12 nos., Trekking sticks 10 nos., Gloves 12 nos., Search lights 5 nos., Binoculars 6 no., Pedometer 1 no., Compass, altimeter, GPS (in kind)	3.00

7.4 PLANTATION OF FRUIT BEARING SPECIES FOR WILD ANIMALS SUCH AS RHESUS SPP.

The monkey menace is raising serious concerns all over the state. The Government and forest department are contemplating various measures to stop the monkeys and other wild animals to venture them out of their territories. The major reason for these wild animals to trespass into other areas is the scarcity of enough food in the forests. The aim of the CAT Plan is to conserve in situ including flora along with the full range of eco-system they inhabit. As it has been Under this scheme, blank area's devoid of tree growth, degraded forests area's and failure plantation area's shall be undertaken for plantations, while the choice of species will be mainly governed by the site/location, effort will be made fruit bearing species, which are helpful to wild life so far as practical. The main species to be raised under this scheme are wild chulli, Bird Cherry, Ban oak, Juglans regia, Pyrus spps. and other local edible fruit bearing spps. etc. Plantation must use local and indigenous species since exotics have long term negative impacts on the environment. The preference of local communities as regards the choice of species will be ascertained and given due weightage as per the requirement of site. For

this purpose an amount of Rs. 6.00 Lacs has been kept, which will be spent on growing of these items with due approval from the higher authorities.

7.5 ANIMAL RESCUE CENTER, ONE SMALL PICK-UP AND TRAINING TO FOREST STAFF.

It is proposed to set up Animal Rescue center for First Aid with equipment and one small pick-up vehicle to forest staff. There is also a provision for training to forest staff for animal rescue operation.

Therefore, an amount of Rs. 12.00 Lacs is required for this purpose during the plan period.

CHAPTER - VIII

ORGANIZATIONAL STRUCTURE AND IMPLEMENTATION STRATEGY

8.1 TIME PHASING :

The CAT Plan works will be implemented w.e.f. 2009 -10 to 2018 - 19. The implementation of CAT Plan will be done on society mode or CAMPA constituted by the MOEF, Govt. of India, New Delhi.

Afforestation work will be preferably completed during first 3 - 4 years and thereafter maintenance will be done upto five years and NTFP/Pasture development will be completed in first 3 - 4 years of project period. The soil conservation works and other forest infrastructure including Eco-development activities will be completed in first six years and will be further maintained till the completion of project period. Necessary infrastructure and establishment of nurseries at suitable places will be completed 1st year of the project period. All the works will be carried out after the approval of A. P. O. by the competent authority during the plan period.

8.2 ORGANIZATIONAL STRUCTURE AND IMPLEMENTATION:

The execution of CAT Plan is proposed to be carried out through H. P. Forest Department under the administrative/financial control of the Conservator of Forests Shimla. At the field level the actual implementation will be done by the D. F. O. Rohru, who have territorial

jurisdiction over the area covered under this CAT Plan. The area of CAT Plan will be divided into small watersheds. The A. P. O. will be prepared by DFO Rohru and it will be approved by P C C. F. on the recommendation of CF Shimla . He shall be empowered to modify the activities under this plan or the works which are not covered in this plan, if required during the implementation period to resolve the issue or to fulfill the objectives of the CAT Plan. Any major modification if required with the passage of time it shall be approved from executive body through Pr CCF H. P. during the plan period. For successful achievement of the CAT Plan objectives, a close liaison shall be maintained with the other Departments like Civil Administration, Agriculture, Horticulture, Animal Husbandry, Art and Culture, Social Welfare and Panchayati Raj etc. It has strongly been felt at the Government level that the CAT Plan should have more and more involvement of local people. In some activities where local people can be engaged should be engaged this shall provide them employment and awareness towards their environment.

8.3 PROJECT STAFF :

The existing staff of Rohru Division will be involved for the implementation of CAT Plan works in addition to their own duties, eco task force will also be involved in the implementation of the CAT Plan.

8.4 HEADQUARTERS OF THE PROJECT

As the CAT Plan is to be implemented through DFO Rohru, the headquarters of all allied staff will be as per the territorial jurisdiction

and the headquarter of the ECO Task Force will be fixed according to their jurisdiction of work. Wildlife & floristic surveys will be got done through CWLW, HP.

8.5 COST ESCALATION :

The present cost projections are based on the wage rates for the year of 2006-07. The cost of the project will escalate and when wage rates are hiked by the H. P. Government from time to time. In such an eventuality cost for proportionate increase in the cost of material and wages for funding will be submitted to the user agency by the implementing agency and differential amount will be met by the user agency during the plan period.

CHAPTER - IX

COST ESTIMATE

9.1 TOTAL PROJECT COST:

Cost of the various project components have been worked out on schedule rate for the year 2005 - 06 as applicable in Shimla Forest Circle H. P. Forest Deptt. The detail of expenditure for various components has been shown in the respective chapter. Total Project cost for 10 years will be as under: -

Year		Amount (Rs.)
2009-10	1st Year	98,56,000.00
2010 - 11	2nd Year	1,74,87,000.00
2011 - 12	3rd Year	1,34,44,000.00
2012 - 13	4th Year	66,46,000.00
2013 - 14	5th Year	29,78,000.00
2014 - 15	6th Year	15,00,000.00
2015 - 16	7th Year	12,37,000.00
2016 - 17	8th Year	6,05,000.00
2017 - 18	9th Year	3,55,000.00
2018 - 19	10th Year	2,05,000.00
	Total Rs.	5,43,13,000.00

9.2 ANNUAL PHASING:

Annual phasing of works to be carried out in Tangnu Romai HEP as per approved CAT Plan is as per article 9.2.1 to 9.2.10. The schematic planning is attached as Annexure VIII.

9.2.1

Details of works/expenditure of 1st year 2009 - 10

Sr No	Name of Work		Name of area	Phys. Target	Rate Rs.	Amount (Rs. in Lac)
1	**HABITAT IMPROVEMENT**					
	i) Nursery Development		UF - Barsheel	1 hac.	200000.00	2.00
			Total	**1 hac.**		**2.00**
	ii) Treatment of Alpine Pasture					
		New	UF Tangnu	10 hac.	8447.00	0.84
			UF 38 - Janglikh	10 hac.	8447.00	0.84
			Total	**20 hac.**		**1.69**
	Sub-Total (1)					**3.69**
2	**Soil & Moisture Conservation**					
	a) Nallah stabilization		Chasrol Nalla	Cost Estimate Enclosed Annex - IX		3.21
			Khatru Thach Nalla			1.55
	b) River bank stabilization		Janglikh Dam Site	Cost Estimate Enclosed Annex -XI		4.75
	c) Establishment of Silt Observatories		Diversion Site	(In Kind)		2.00
	Observation and measurement of soil/silt					0.75
	Sub-Total (2)		**Total**			**12.27**
3	**Protection of Forest**					
	i) Fire Protection					
	a) Maint. of Fire Lines & Controlled Burning		Kashadhar Range		L/s	1.50
	b) Incentives to Mahila Mandal, SHG		Kashadhar Range		L/s	0.15
	c) Fire fighting Kits to Forest Staff		Rohru Division		L/s	3.00
	Sub-Total (3)					**4.65**
4	**Protection and Management of WildLife**					
	i) C/O Water Holes			1 No.	0.40	0.40
	ii) Sign and Slogan Boards					0.10
	iii) Plantation of Wild Fruit bearing Plantations					1.50
	iv) Training to Forest staff in Animal Rescue		Rohru Division		L/s	1.00
	Sub-Total (4)					**3.00**
5	**Mitigation of Human-Wildlife Conflict**					
	a) Eco-development Activities					
	I) Vaccination of Domestic Cattle		Tangnu-Janglikh		L/s	0.30
	b) Energy saving devices					
	I) Supply of Solar Geysers					
	DFO Residence-200Ltrs			1 No.		0.43
	FRH-Rohru & Mandli-100Ltrs			2 No.		0.46
	ii) LPG cylinder to Local People				L/s	2.00
	Sub-total (5)					**3.19**

6	**Forest Infrastructure in PA's**					
	i) Maint. of Guard Quarters	Diudi	1	No	L/s	0.50
	ii) Maint. of FRH	Rohru FRH	1	No	L/s	0.50
	iii) Const. of Seminar/ meeting Hall	Rohru Division	1	No		5.00
	iv) Maint. Of Range Office cum residence	Chirgaon			L/S	1.73
	v) Const. of Van Thana	Rohru Division	1	No	L/s	15.00
	Sub-Total (6)					**22.73**
7	**Monitoring and Evaluation**				L/S	**2.27**
8	**Development of Dumping Site**	**Rohru**	**1**	**No**		**15.00**
9	**Research and Studies**	Rohru Division			L/S	**1.00**
10	**Payments of Environmental Services (PES)**				L/s	**10.00**
11	**Operational support**					
	i) O. E. (Colour printer,copier & Scanner)		2	No.		0.60
	ii) T. A.				L/s	0.20
	iii) Purchase of Vehicle (in kind)		1	No.		7.50
	iv) Purchase of Computer (in Kind)		2	No.	70000	1.40
	v) Office Equipments etc (in Kind)				L/s	1.50
	vi) Books & Periodicals (in kind)				L/s	0.10
	vii) Amenities to Staff and Labour				L/s	0.30
	Sub-Total (11)					**11.80**
		Grand Total				**89.60**
12	**Contigencies @ 10%of Grand Total**					**8.96**
		Gross Total				**98.56**

9.2.2

Details of works/expenditure of 2nd year 2010 - 11

Sr No	Name of Work		Name of area	Phys. Target		Rate Rs.	Amount (Rs. in Lac)
1	**HABITAT IMPROVEMENT**						
	I) Biological works						
	a) Bamboo Plantation	New	UF - Diudi	5	ha	25583.00	1.28
			UF - Maila	5	ha	25583.00	1.28
			Total	**10**			**2.56**
	b) Enrichment Plantation	New	UF Janglikh -II	10	ha	25314.00	2.53
			Total	10			**2.53**
	c) Assisted Natural	New	UF Janglikh -I	10	ha	15567.00	1.56
			Total	**10**	**ha**		**1.56**
	d) Nursery Development	New	UF - Barsheel	0.5	hac.	200000.00	1.00
		Maint.	UF - Barsheel	1	hac.	100000.00	1.00
			Total	**1.5**	**hac.**		**2.00**
	e) Treatment of Cultursble waste land	New	UF Diudi	10	hac.	18731.00	1.87
			UF Janglikh - III	10	hac.	18731.00	1.87
			Total	**20**	**hac.**		**3.75**
	II) Treatment of Alpine Pastures						
		New	UF Tangnu	10	hac.	8447.00	0.84
			UF 38 Janglikh	10	hac.	8447.00	0.84
			UF 37 Tangnu	15	hac.	8447.00	1.27
		1st year	UF Tangnu	10	hac.	829.00	0.08
		Maint.	UF 38 - Janglikh	10	hac.	829.00	0.08
			Total	**55**	**hac.**		**3.12**
	III) Floristic Survey of Project Area						**5.00**
	Sub-Total (1)						**20.51**
2	**Soil & Moisture Conservation**						
	a) Land slip/slide Stabilization		Tangnu Slip	Cost Estimate Enclosed Annex - X			12.36
	b) Nallah stabilization		Kattan Gad (Khad)	Cost Estimate Enclosed Annex - IX			2.19
			Moti Gad				2.07
	c) Observation and Measurment of Soil/Silt						0.75
	Sub-Total (2)						**17.38**
3	**Protection of Forest**						
	I) Fire Protection						
	a) Maint. of fire lines & controlled burning		Kashadhar Range			L/s	0.75

	b) Incentives to Mahila Mandal, SHG	Kashadhar Range			L/s	0.20
	c) Fire fighting kits to Forest Staff	Rohru Division			L/s	5.00
	Sub-Total (3)					**5.95**
4	**Protection and Management of WildLife**					
	i) C/O Water Holes		2	No.	0.40	0.80
	ii) Sign and Slogan Boards					0.10
	iii) Plantation of Wild Fruit bearing Plantations					1.50
	iv) Camping Equipments (In Kind)					3.00
	v) Wildlife Census					5.00
	vi) Training to Forest Staff In Animal Rescue				L/s	5.00
	Sub-Total (4)					**15.40**
5	**Mitigation of Human-Wildlife Conflict**					
	a) Eco-development activities					
	i) Village support activities					
	a) Const. of Cattle ponds	Tangnu-Janglikh Pekha	2	No	10000	0.20
	b) Vaccination of domestic Cattles	Bhatwari Maila			L/s	0.20
		Total				**0.40**
	b) Energy Saving devices					
	i) Distribution of Solar lights	Pekha & Janglikh	2	set	40000	0.80
	ii) Distribution of LPG Cylinders	Tangnu,Janglikh,Diudi, Malla& Romai			L/s	4.00
		Total				**4.80**
	c) Income generation activities Trainings					
	i) Vermi composting & organic farming	Bhatwari Maila			L/s	0.20
	ii) Bee Keeping	Pekha			L/s	0.50
	iii) Animal Husbandry & Dairy Development	Tangnu Janglikh Bhatwari Maila			L/s	2.00
		Total				**2.70**
	Sub-Total (5)					**7.90**
6	**Eco-Tourism Development**					
	i) Const. of Treking routes	Janglikh-Chandranahan	2	Km	50000	1.00
	ii) Training of local youths for Tourism activity	Pekha			L/s	1.50
	ii) Const of Eco-Tourism Circuits	Rohru	1	No	L/s	5.00
	Sub Total (6)					**7.50**

7	**Forest Infrastructure in PA's**						
	i) Maint. Of Range office & Qtrs etc.	Kashedhar Range	1	No	L/s		2.00
	ii) Maint. Of Guard Quarters	Thaldhar Beat	1	No	L/s		0.50
	iii) Boundary wall to Division Office Complex	Rohru	1	No	L/s		3.00
	iv) Repair of B/path	Tangnu-Janglikh Beat	5	Km	L/s		1.00
	v) Maint. Of Existing I/path	Thaldhar Beat	8	Km	L/s		2.00
	vi) Const. of Seminar/ meeting Hall	Rohru Division	1	No			3.00
	vii) Maint. Of Bosari FRH	Rohru Division			L/s		1.73
	viii) Fencing for DFO & ACF Residence complex	Rohru Division			L/s		2.00
	ix) Const. of Van Thana	Rohru	1	No	L/s		10.00
	Sub-Total (7)						**25.23**
8	**Develpoment of Dumping Sites**	Rohru	1	No	L/s		**15.00**
9	**Research & Studies**	Rohru Division			L/s		**1.00**
10	**Payments of Environmental Services (PES)**	Rohru Division			L/s		**10.00**
11	**Training of Forest Officers/Officials**				L/s		**15.00**
12	**Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses**				L/s		**1.50**
13	**Monitoring an Evaluation**				L/s		**5.01**
14	**Operational support**						
	i) O. E.				L/s		0.50
	ii) T. A.				L/s		0.30
	iii) Purchase of vehicle (in kind)		1	No.	L/s		7.50
	iv) Purchase of Computer (in kind)		2	No.		70000	1.40
	v) Books & Periodcals				L/s		0.10
	vi) Aminities to staff & labour				L/s		0.30
	vii) Office Equipments etc				L/s		1.50
	Sub-Total (14)						**11.60**
		Grand Total					**158.98**
15	**Contigencies @ 10%of Grand Total**						**15.90**
		Gross Total					**174.87**

9.2.3

Details of works/expenditure of 3rd year 2011 – 12

Sr No	Name of Work		Name of area	Phys. Target		Rate Rs.	Amount (Rs. In Lac)
1	**HABITAT IMPROVEMENT**						
	i) Biological works						
	a) Afforestation of	New	UF Janglikh – I	15	ha	32056.00	4.81
	Degraded forest land		UF Janglikh – II	10	ha	32056.00	3.21
			Total	**25**	**ha**		**8.01**
	b) Shrubs	New	UF – Diudi	5	ha	25583.00	1.28
	Plantation	1st year	UF – Diudi	5	ha	3687.00	0.18
		Maint.	UF – Maila	5	ha	3687.00	0.18
			Total	**15**			**1.65**
	c) Enrichment Plantation	New	DPF Maila 68 A	5	ha	25314.00	1.266
		1st year	UF Janglikh –II	10	ha	2638.00	0.26
		Maint	**Total**	**15**			**1.53**
	d) Assisted Natural Regeneration						
		New	UF Janglikh –I	5	ha	15567.00	0.78
		1st year	UF Janglikh –I	10	ha	1474.00	0.15
		Maint.					
			Total	**15**	**ha**		**0.93**
	e) NTFP i)	New	UF Maila	10	ha	36950.00	3.70
	ii)	Ist Year	Rohru Division	20	ha	23500	4.70
			Total	**30**	**ha**		**8.40**
	f) Nursery Development	Maint.	UF – Barsheel	0.5	hac.	100000.00	0.50
			UF – Barsheel	1	hac.	40000.00	0.40
			Total	**1.5**	**hac.**		**0.90**
	ii) Treatment of Culturable waste land						
		1st year	UF Diudi	10	hac.	4484.00	0.45
		Maint.	UF Janglikh – III	10	hac.	4484.00	0.45
			Total	**20**	**hac.**		**0.90**
	iii) Treatment of Alpine Pastures						
		New	UF Larote	20	ha	8447.00	1.69
			UF Bara Thach	15	ha	8447.00	1.27
		1st year	UF Tangnu	10	hac.	829.00	0.08
		Maint	UF 38 Janglikh	10	hac.	829.00	0.08
			UF 37 Tangnu	15	hac.	829.00	0.12
		2nd year	UF Tangnu	10	hac.	741.00	0.07
		Maint	UF 38 – Janglikh	10	hac.	741.00	0.07
				90	**hac.**		**3.39**
	Sub-Total (1)						**25.70**
2	**Soil & Moisture Conservation**						
	a) Land slip/slide Stabilization		Janglikh Slip	Cost Estimate Enclosed Annex – X			5.61

		Diudi Slip					4.30
	b) Nallah stabilization	Poiri Gad (Khad)	Cost Estimate Enclosed Annex – IX				1.58
	c) Observation and Measurment of Soil/Silt						0.75
	Sub-Total (2)						**12.23**
3	**Protection of Forest**						
	I) Fire Protection						
	a) Maint. Of fire lines & controlled burning	Kashadhar Range			L/s		0.75
	b) Incentives to Mahila Mandal, SHG	Kashadhar Range			L/s		0.20
	c) Fire Fighting kits to Forest Staff	Rohru Division			L/s		5.00
	Sub-Total (3)						**5.95**
4	**Protection and Management of Wild Life**						
	I) C/O Water Holes		2	No.		0.40	0.80
	ii) Sign and Slogan Boards						0.10
	iii) Plantation of Wild Fruit bearing Plantations						0.50
	iv) Equipment and small pick-up vehicle (In Kind)		1	No	L/s		6.00
	Sub-Total (4)						**7.40**
5	**Mitigation of Human-Wildlife Conflict**						
	a) Eco-development activities						
	i) Village support activities						
	a) Vaccination of domestic Cattles	Pekha			L/s		0.50
		Total					**0.50**
	b) Energy Saving devices						
	i) Const. of Crematoria	Pekha	1	No.	L/s		2.00
	ii) LPG Cylinder to local people				L/s		2.00
		Total					**4.00**
	c) Income generation activities						
	i) Vermi composting & Organic farming	Pekha			L/s		0.50
	ii) Bee Keeping	Tangnu Janglikh Bhatwari Maila			L/s		0.50
	iii) Animal Husbandry and Dairy Development	Pekha			L/s		1.00
		Total					**2.00**
	Sub-Total (5)						**6.50**
6	**Eco-Tourism Development**						
	I) Maint. Of Mandli Log Cabin & Camping Site				L/s		1.55
	ii) Const of Eco-Tourism Hub	Rohru			L/s		5.00
	Sub-Total (6)	**TOTAL**					**6.55**

7	**Forest Infrastructure in PA's**					
	i) Maint. Of Range office & Qtrs	Kashadhar Range	1	No	L/s	1.00
	ii) Maint. Of Staff Quarters	Rohru Division	1	No	L/s	3.00
	iii) Maint. Of Guard Quarters	Kashadhar Range	1	No	L/s	0.50
	iv) Maint. Of I/path	Kashadhar Range	5	Km	L/s	1.00
	vi) Const. of Bridges	Pekha	1	No	L/s	5.00
	vii) Maint. Of Exst. Bridges on Bridal Paths	Kashadhar Range	1	Nos.	L/s	2.00
	viii) Maint. Of Chajpur FRH	Rohru Division			L/s	1.40
	Sub-Total (7)					**13.90**
8	**Development of Dumping Site**	Rohru	1	No	L/s	**15.00**
9	**Research & Studies**	Rohru Division			L/s	**1.00**
10	**Payments for Environmental Services**	Rohru			L/s	**10.00**
11	**Training of Forest Officers/Officials in India & Abroad**	Rohru			L/s	**10.50**
12	**Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses**				L/s	**2.00**
13	**Monitoring and Evaluation**					**3.68**
14	**Operational support**					
	i) O. E.				L/s	0.60
	ii) T. A.				L/s	0.40
	iv) Books & Periodcals (in kind)				L/s	0.10
	v) Amenities to staff & labour				L/s	0.70
	Sub-Total (14)					**1.80**
		Grand Total				**122.21**
15	**Contigencies @ 10%of Grand Total**					**12.22**
		Gross Total				**134.44**

9.2.4

Details of works/expenditure of 4th year 2012 - 13

Sr No	Name of Work		Name of area	Phys. Target		Rate Rs.	Amount (Rs. in Lac)
1	**HABITAT IMPROVEMENT**						
	i) Biological works						
	a) Afforestation of Degraded forest land	New	UF Janglikh - III	10	ha	32056.00	3.21
			DPFMaila 68 A	10	ha	32056.00	3.21
		1st year	UF Janglikh - I	15	ha	3689.00	0.55
		Maint	UF Janglikh - II	10	ha	3689.00	0.37
			Total	**45**	**ha**		**7.33**
	b) Shrubs Plantation	1st year Maint.	UF - Diudi	5	ha	3687.00	0.18
		2nd year	UF - Diudi	5	ha	3353.00	0.17
		Maint.	UF - Maila	5	ha	3353.00	0.17
			Total	**15**			**0.52**
	c) Enrichment Plantation						
		1st year Maint	DPFMaila 68 A	5	ha	2638.00	0.13
		2nd year	UF Janglikh -II	10	ha	2322.00	0.23
		Maint	**Total**	**15**			**0.36**
	d) Assisted Natural Regeneration						
		1st year Maint.	UF Janglikh -I	5	ha	1474.00	0.07
		2nd year Maint.	UF Janglikh -I	10	ha	1317.00	0.13
			Total	**15**			**0.21**
	NTFP i)	1st year	UF Maila	10	ha	6188.00	0.62
	ii)	2nd Year	Rohru Division	20	ha	23500.00	4.70
		Maint	Total				**5.32**
	f) Nursery Development	Maint.	UF - Barsheel	0.5	hac.	40000.00	0.20
			UF - Barsheel	1	hac.	30000.00	0.30
			Total	**1.5**	**hac.**		**0.50**
	ii) Treatment of Culturable waste land						
		2nd year	UF Diudi	10	hac.	4000.00	0.40
		Maint.	UF Janglikh - III	10	hac.	4000.00	0.40
			Total	**20**	**hac.**		**0.80**
	iii) Treatment of Alpine Pastures						
		1st year	UF Larote	20	ha	829.00	0.17
		Maint	UF Bara Thach	15	ha	829.00	0.12
		2nd year	UF Tangnu	10	hac.	741.00	0.07
		Maint	UF 38 Janglikh	10	hac.	741.00	0.07
			UF 37 Tangnu	15	hac.	741.00	0.11
			Total	**70**	**hac.**		**0.55**
	Sub-Total (1)						**15.59**

2	**Soil & Moisture Conservation**						
	a) Nalla Stabilization	Sundru Nalla	Cost Estimate Enclosed Annex - IX				2.01
		Dewar Gad					2.25
	b) Road side avenue plantation (New)	Project Area/Roads			L/s		10.00
	c) Observation and Measurment of Soil/Silt						0.75
	Sub-Total (2)						**15.02**
3	**Protection of Forest**						
	i) Fire Protection						
	a) Maint. of fire lines & controlled burning	Kashadhar Range			L/s		0.75
	b) Incentives to Mahila Mandal, SHG	Kashdhar Range			L/s		0.20
	c) Fire Fighting kits to Forest Office Staff	Rohru Division			L/s		5.00
	Sub-Total (3)						**5.95**
4	**Protection and Management of WildLife**						
	i) C/O Water Holes		1	No.		0.40	0.40
	ii) Sign and Slogan Boards						0.10
	iii) Plantation of Wild Fruit bearing Plantations						0.50
	Sub-Total (4)						**1.00**
5	**Mitigation of Man-Wildlife Conflict**						
	a) Income generation activities						
	i) Vermi composting & Organic farming	Tangnu Janglikh			L/s		0.20
	b) Energy Saving Devices						2.00
	Sub-Total (5)						**2.20**
6	**Eco-Tourism Development**						
	i) Const. of Treking routes	Janglikh-chandunahan	1	Km	L/s		1.00
	Sub-Total (6)						**1.00**
7	**Forest Infrastructure in PA's**						
	i) Special repair of B/path	Kashdhar Range	8	Km	L/s		1.50
	ii) Maint. of I/path	Kashdhar Range	5	Km	L/s		1.50
	iii) Maint. Of Exst. Bridges on Bridal Paths	Kashdhar Range	1	Nos.	L/s		0.50
	Sub-Total (7)						**3.50**
8	**Research & Studies**	Rohru Division			L/s		**1.00**
9	**Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses**				L/s		**1.00**

10	**Payments for Environmental Services**	Rohru	L/s	**10.00**
11	**Monitoring and Evaluation**			**2.11**
12	**Operational support**			
	i) O. E.		L/s	0.40
	ii) T. A.		L/s	0.70
	iv) Books & Periodcals (in kind)		L/s	0.20
	v) Amenities to staff & labour		L/s	0.75
	Sub-Total (12)			**2.05**
		Grand Total		**60.42**
13	**Contigencies @ 10%of Grand Total**			**6.04**
		Gross Total		**66.46**

9.2.5

Details of works/expenditure of 5th year 2013 - 14

Sr No	Name of Work		Name of area	Phys. Target		Rate Rs.	Amount (Rs. in Lac)
1	**HABITAT IMPROVEMENT**						
	i) Biological works						
	a) Afforestation of	1st year	UF Janglikh - III	10	ha	3689.00	0.37
	Degraded forest land	Maint.	DPFMaila 68 A	10	ha	3689.00	0.37
		2nd year	UF Janglikh - I	15	ha	3142.00	0.47
		Maint.	UF Janglikh - II	10	ha	3142.00	0.31
			Total	**45**	**ha**		**1.52**
	b) Shrubs	2nd year	UF - Diudi	5	ha	3353.00	0.17
	Plantation	Maint.					
		3rd year	UF - Diudi	5	ha	3019.00	0.15
		Maint.	UF - Maila	5	ha	3019.00	0.15
			Total	**15**			**0.47**
	c) Enrichment Plantation						
		2nd year	DPFMaila 68 A	5	ha	2322.00	0.12
		Maint.					
		3rd year	UF Janglikh -II	10	ha	2005.00	0.20
		Maint.	**Total**	15			**0.32**
	d) Assisted Natural Regeneration						
		2nd year	UF Janglikh -I	5	ha	1317.00	0.07
		Maint.					
		3rd year	UF Janglikh -I	10	ha	1213.00	0.12
		Maint.					
			Total	**15**			**0.19**
	e) NTFP	2nd year	UF Maila	10	ha	5103.00	0.51
		3rd Year	Rohru Division	20	ha	23500	4.70
			Total				**5.21**
	f) Nursery Development	Maint.	UF - Barsheel	0.5	hac.	30000.00	0.15
			UF - Barsheel	1	hac.	30000.00	0.30
			Total	**1.5**	**hac.**		**0.45**
	ii) Treatment of Culturable waste land						
		3rd year	UF Diudi	10	hac.	3633.00	0.36
		Maint.	UF Janglikh - III	10	hac.	3633.00	0.36
			Total	**20**	**hac.**		**0.73**
	iii) Treatment of Alpine Pastures						
		2nd year	UF Larote	20	ha	741.00	0.15
		Maint.	UF Bara Thach	15	ha	741.00	0.11
			Total	**35**			**0.26**
	Sub-Total (1)						**9.14**
2	**Soil & Moisture Conservation**						
	a) Road side avenue plantation (Maint)		Project Area/Roads			L/s	1.00

	b) Observation and Measurement of Soil/Silt					0.75
	Sub-Total (2)					**1.75**
3	**Protection of Forest**					
	a) Incentives to Mahila Mandal, SHG	Kashadhar Range			L/s	0.20
	Sub-Total (3)					**0.20**
4	**Protection and Management of WildLife**					
	i) C/O Water Holes		1	No.	0.40	0.40
	ii) Sign and Slogan Boards					0.10
	iii) Plantation of Wild Fruit bearing Plantations					0.50
	Sub-Total (4)					**1.00**
5	**Forest Infrastructure in PA's**					
	i) Special repair of B/path	Tangnu Janglikh Beat Larot Beat	8	Km	L/s	1.50
	ii) Maint. of I/path	Jakhmati Beat Kharshali Beat	6	Km	L/s	1.20
	Sub-Total (5)					**2.70**
6	**Monitoring and Evaluation**					**0.63**
7	**Research and Studies**	**Rohru Division**				**1.00**
8	**Operational support**					
	i) O. E.				L/s	0.30
	ii) T. A.				L/s	0.30
	iii) Books & Periodcals (in kind)				L/s	0.05
	Sub-Total (8)					**0.65**
9	**Payments for Environmental Services**	Rohru			L/s	**10.00**
		Grand Total				**27.07**
10	**Contigencies @ 10%of Grand Total**					**2.71**
		Gross Total				**29.78**

9.2.6

Details of works/expenditure of 6th year 2014 - 15

Sr No	Name of Work		Name of area	Phys. Target		Rate Rs.	Amount (Rs. In Lac)
1	**HABITAT IMPROVEMENT**						
	I) Biological works						
	a) Afforestation of	2nd year	UF Janglikh - III	10	ha	3142.00	0.31
	Degraded forest land	Maint.	DPFMalla 68 A	10	ha	3142.00	0.31
		3rd year	UF Janglikh - I	15	ha	2611.00	0.39
		Maint.	UF Janglikh - II	10	ha	2611.00	0.26
			Total	**45**	**ha**		**1.28**
	b) Shrubs	3rd year	UF - Diudi	5	ha	3019.00	0.15
	Plantation	Maint.					
		4th year	UF Janglikh -I	5	ha	3019.00	0.15
		Maint.	UF - Malla	5	ha	3019.00	0.15
			Total	**15**			**0.45**
	c) Enrichment Plantation						
		3rd year	DPFMalla 68 A	5	ha	2005.00	0.10
		Maint.					
		4th year	UF Janglikh -II	10	ha	2005.00	0.20
		Maint.	**Total**	**15**			**0.30**
	d) Assisted Natural Regeneration						
		3rd year	UF Janglikh -I	5	ha	1213.00	0.06
		Maint.					
		4th year	UF Janglikh -I	10	ha	1213.00	0.12
		Maint.					
			Total	**15**			**0.18**
	e) NTFP	3rd year	UF Malla	10	ha	4018.00	0.40
		4th Year	Rohru Division	20	ha	23500	4.70
			Total				**5.10**
	f) Nursery Development	Maint.	UF - Barsheel	0.5	hac.	30000.00	0.15
			UF - Barsheel	1	hac.	30000.00	0.30
			Total	**1.5**	**hac.**		**0.45**
	ii) Treatment of Culturable waste land						
		4th year	UF Diudi	10	hac.	3633.00	0.36
		Maint.	UF Janglikh - III	10	hac.	3633.00	0.36
			Total	**20**	**hac.**		**0.73**
	Sub-Total (1)						**6.49**
2	**Soil & Moisture Conservation**						
	a) Road side avenue plantation (Maint)		Project Area/Roads			L/s	0.50
	b) Observation and Measurement of Silt/Silt						0.75
	Sub-Total (2)						**1.25**

3	**Protection of Forest**					
	i) Fire Protection					
	a) Incentives to Mahila Mandal, SHG	Kashadhar Range			L/s	0.20
	Sub-Total (3)					**0.20**
4	**Protection and Management of WildLife**					
	i) Sign and Slogan Boards					0.10
	ii) Plantation of Wild Fruit bearing Plantations					0.50
	Sub-Total (4)					**0.60**
5	**Forest Infrastructure in PA's**					
	i) Maint. of Guard Qtrs	Diudi			L/s	0.50
	ii) Special repair of B/path	Tangnu Janglikh Beat	3	Km	L/s	0.50
	Sub-Total (5)					**1.00**
6	**Monitoring and Evaluation**					**0.44**
7	**Research and Studies**	Ruhru Division			L/s	**1.00**
8	**Operational support**					
	i) O. E.				L/s	0.30
	ii) T. A.				L/s	0.30
	iii) Books & Periodcals (in kind)				L/s	0.05
	Sub-Total (8)					**0.65**
		Grand Total				**13.63**
9	**Contigencies @ 10%of Grand Total**					**1.36**
		Gross Total				**15.00**

9.2.7

Details of works/expenditure of 7th year 2015 - 16

Sr No	Name of Work		Name of area	Phys. Target		Rate Rs.	Amount (Rs. in Lac)
1	**HABITAT IMPROVEMENT**						
	I) Biological works						
	a) Afforestation of	3rd year	UF Janglikh - III	10	ha	2611.00	0.26
	Degraded forest land	Maint.	DPFMalla 68 A	10	ha	2611.00	0.26
		4th year	UF Janglikh - I	15	ha	2265.00	0.34
		Maint.	UF Janglikh - II	10	ha	2265.00	0.23
			Total	**45**	**ha**		**1.09**
	b) Shrubs	4th year	UF - Diudi	5	ha	3019.00	0.15
	Plantation	Maint.					
		5th year	UF - Diudi	5	ha	2685.00	0.13
		Maint.	UF - Malla	5	ha	2685.00	0.13
			Total	**15**			**0.42**
	c) Enrichment Plantation						
		4th year	DPFMalla 68 A	5	ha	2005.00	0.10
		Maint.					
		5th year	UF Janglikh -II	10	ha	1689.00	0.17
		Maint.	**Total**	15			**0.27**
	d) Assisted Natural Regeneration						
		4th year	UF Janglikh -I	5	ha	1213.00	0.06
		Maint.					
		5th year	UF Janglikh -I	10	ha	1056.00	0.11
		Maint.					
			Total	**15**			**0.17**
	e) NTFP	5th Year	Rohru Division	20	ha	23500	**4.70**
	f) Nursery Development	Maint.	UF - Barsheel	0.5	hac.	30000.00	0.15
			UF - Barsheel	1	hac.	10000.00	0.10
			Total	**1.5**	**hac.**		**0.25**
	II) Treatment of Culturable waste land						
		5th year	UF Diudi	10	hac.	3498.00	0.35
		Maint.	UF Janglikh - III	10	hac.	3498.00	0.35
			Total	**20**	**hac.**		**0.70**
	Sub-Total (1)						**7.59**
2	**Soil & Moisture Conservation**						
	a) Road side avenue plantation (Maint)		Project Area/Roads			L/s	0.30
	b) Observation and measurement of Soil/Silt		Project Area/Roads			L/s	0.75
	Sub-Total (2)						**1.05**
3	**Protection of Forest**						
	I) Fire Protection						
	a) Incentives to Mahila Mandal, SHG		Kashadhar Range			L/s	0.20

	Sub-Total (3)			0.20
4	**Protection and Management of WildLife**			
	i) Sign and Slogan Boards			0.10
	ii) Plantation of Wild Fruit bearing Plantations			0.40
	Sub-Total (4)			**0.50**
5	**Operational support**			
	i) O. E.		L/s	0.30
	ii) T. A.		L/s	0.30
	Sub-Total (5)			**0.60**
6	**Monitoring and Evaluation**			**0.31**
7	**Research and Studies**	Ruhiru Division	L/s	**1.00**
		Grand Total		**11.25**
8	**Contigencies @ 10%of Grand Total**			**1.12**
		Gross Total		**12.37**

9.2.8

Details of works/expenditure of 8th year 2016 - 17

Sr No	Name of Work		Name of area	Phys. Target		Rate Rs.	Amount (Rs. in Lac)
1	**HABITAT IMPROVEMENT**						
	i) Biological works						
	a) Afforestation of	4th year	UF Janglikh - III	10	ha	2265.00	0.23
	Degraded forest land	Maint.	DPFMaila 68 A	10	ha	2265.00	0.23
		5th year	UF Janglikh - I	15	ha	1718.00	0.26
		Maint.	UF Janglikh - II	10	ha	1718.00	0.17
			Total	**45**	**ha**		**0.88**
	b) Shrubs	5th year	UF - Diudi	5	ha	2665.00	0.13
	Plantation	Maint.					
			Total				**0.13**
	c) Enrichment Plantation						
		5th year	DPFMaila 68 A	5	ha	1689.00	0.08
		Maint.	**Total**				**0.08**
	d) Assisted Natural Regeneration						
		5th year	UF Janglikh -I	5	ha	1056.00	0.05
		Maint.					
			Total				**0.053**
	f) Nursery Development	Maint.	UF - Barsheel	0.5	hac.	10000.00	0.05
			UF - Barsheel	1	hac.	10000.00	0.10
			Total	**1.5**	**hac.**		**0.15**
	Sub-Total (1)						**1.30**
2	**Soil & Moisture Conservation**						
	b) Observation and measurement of Soil/Silt		Project Area/Roads			L/s	0.75
	Sub-Total (2)						**0.75**
3	**Protection of Forest**						
	i) Fire Protection						
	a) Incentives to Mahila Mandal, SHG		Kashadhar Range			L/s	0.20
	Sub-Total (3)						**0.20**
4	**Protection and Management of WildLife**						
	i) Sign and Slogan Boards						0.10
	ii) Plantation of Wild Fruit bearing Plantations						0.30
	Sub-Total (4)						**0.40**
5	**Forest Infrastructure in PA's**						
	i) Maint. of existing I/path		Thaldhar Beat	6	Km	L/s	1.00
	Sub-Total (5)						**1.00**

6	**Operational support**			
	i) O. E.		L/s	0.30
	ii) T. A.		L/s	0.30
	Sub-Total (6)			**0.60**
7	**Monitoring and Evaluation**			**0.25**
8	**Research and Studies**	Ruhru Division	L/s	**1.00**
		Grand Total		**5.50**
9	**Contigencies @ 10%of Grand Total**			**0.55**
		Gross Total		**6.05**

9.2.9

Details of works/expenditure of 9th year 2017 - 18

Sr No	Name of Work		Name of area	Phys. Target		Rate Rs.	Amount (Rs. in Lac)
1	**HABITAT IMPROVEMENT**						
	I) Biological works						
	a) Afforestation of	5th year	UF Janglikh - III	10	ha	1718.00	0.172
	Degraded forest land	Maint.	DPFMaila 68 A	10	ha	1718.00	0.172
			Total	**20**	**ha**		**0.34**
	b) Nursery Development	Maint.	UF - Barsheel	1	hac.	10000.00	0.10
			Total	**1**	**hac.**		**0.10**
	Sub-Total (1)						**0.44**
2	**Soil & Moisture Conservation**						
	b) Observation and measurement of Soil/Silt		Project Area/Roads			L/s	0.75
	Sub-Total (2)						**0.75**
3	**Protection of Forest**						
	I) Fire Protection						
	a) Incentives to Mahila Mandal, SHG		Kashadhar Range			L/s	0.20
	Sub-Total (3)						**0.20**
4	**Protection and Management of WildLife**						
	i) Sign and Slogan Boards						0.10
	ii) Plantation of Wild Fruit bearing Plantations						0.20
	Sub-Total (4)						**0.30**
5	**Operational support**						
	i) O. E.					L/s	0.20
	ii) T. A.					L/s	0.20
	Sub-Total (5)						**0.40**
6	**Monitoring and Evaluation**						**0.13**
7	**Research and Studies**		Ruhru Division			L/s	**1.00**
			Grand Total				**3.22**
8	**Contigencies @ 10%of Grand Total**						**0.32**
			Gross Total				**3.55**

9.2.10

Details of works/expenditure of 10th year 2018 - 19

Sr No	Name of Work	Name of area	Phys. Target	Rate Rs.	Amount (Rs. in Lac)
1	**Protection of Forest & Wildlife**				
	i) Fire Protection				
	b) Incentives to Mahila Mandal, SHG	Kashadhar Range		L/s	0.20
	Sub-Total (1)				**0.20**
2	**Protection and Management of WildLife**				
	i) Sign and Slogan Boards				0.10
	ii) Plantation of Wild Fruit bearing Plantations				0.10
	Sub-Total (2)				**0.20**
3	**Operational support**				
	i) O. E.			L/s	0.20
	ii) T. A.			L/s	0.20
	Sub-Total (3)				**0.40**
4	**Monitoring and Evaluation**				**0.07**
5	**Research and Studies**	Ruhru Division		L/s	**1.00**
		Grand Total			**1.87**
6	**Contigencies @ 10%of Grand Total**				**0.19**
		Gross Total			**2.06**

YEAR WISE EXPENDITURE DETAIL

		Rs. In Lacs
1	Detail of expenditure of 1st Year 2009-2010	98.56
2	Detail of expenditure of 2nd Year 2010-2011	174.87
3	Detail of expenditure of 3rd Year 2011-2012	147.55
4	Detail of expenditure of 4th Year 2012-2013	64.36
5	Detail of expenditure of 5th Year 2013-2014	27.14
6	Detail of expenditure of 6th Year 2014-2015	11.83
7	Detail of expenditure of 7th Year 2015-2016	7.21
8	Detail of expenditure of 8th Year 2016-2017	6.05
9	Detail of expenditure of 9th Year 2017-2018	3.55
10	Detail of expenditure of 10th Year 2018-2019	2.05
		543.13

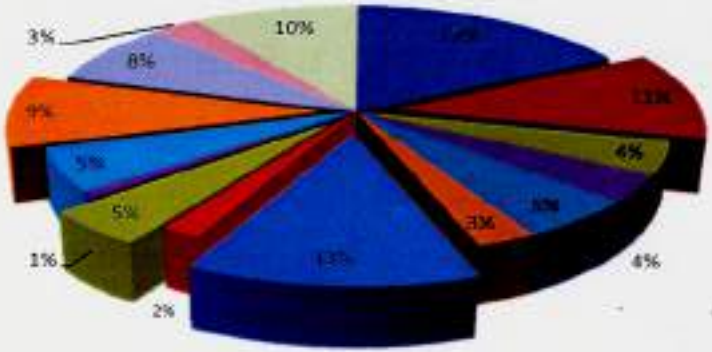
9.3 **Activitywise Percentage of Financial Outlay of CAT Plan of TANGNU RUMAI - I HEP (44 MW)**

Sr. No.	Components	Percentage
Management of Protected Areas - In-situ Conservation		
1	**HABITAT IMPROVEMENT**	
	i) Biological Works	
	a) Afforestation of Degaraded forest land	3.77 %
	b) Bamboo/Shrubs Plantation	1.14 %
	c) Enrichment Plantation	0.99 %
	d) Natural Regeneration	0.61 %
	e) NTFP Plantation	5.29 %
	f) Nursery Development	1.25 %
	ii) Treatment of Culturable Waste land	1.40 %
	iii) Treatment of Alpine Pastures	1.66 %
	iv) Floristic Survey of Project Area	0.92 %
	Sub Total	**17.03 %**
2	**Soil & Moisture Conservation**	
	i) Land slide/slips stabilization	4.10 %
	ii) Nallah Stabilization	2.74 %
	iii) River bank stabilization	0.87 %
	iv) Road side avenue plantation	2.17 %
	v) Observation of Soil/Silt	1.61 %
	Sub-Total	**11.49 %**
3	**Protection of Forests**	
	i) Fire Protection	
	a) Maintinance of Fire lines & Contolled burnning	0.69 %
	b) Incentives to Mahila Madal & Self Help Groups	0.36 %
	c) Fire Fighting Kits	3.31 %
	Sub-Total	**4.36 %**
4	**Protection ans Management of wildlife**	
	i) C/O Water holes	0.52 %
	ii) Sign and Slogan boards	0.18 %
	iii) Camping Equipments(in kind)	0.55 %
	iv) Wildlife census Operation	0.92 %
	v) Plantation of wild Fruit bearing plantation	1.10 %
	vi) Training to Forest staff in Animal rescue	2.21 %
	Sub-Total	**5.49 %**
5	**Mitigation of Human-Wild Life Conflict**	
	a) Village support activities	
	i) Const. of Cattle Ponds	0.04 %
	ii) Vaccination of domestic cattle	0.18 %
	Sub-Total (a)	**0.22 %**
	b) Fuel saving devices	
	ii Cost. of crematoria	0.37 %
	ii) Distribution of Solar Lights	0.15 %
	iii) Distibution of LPG Cylinders	1.84 %

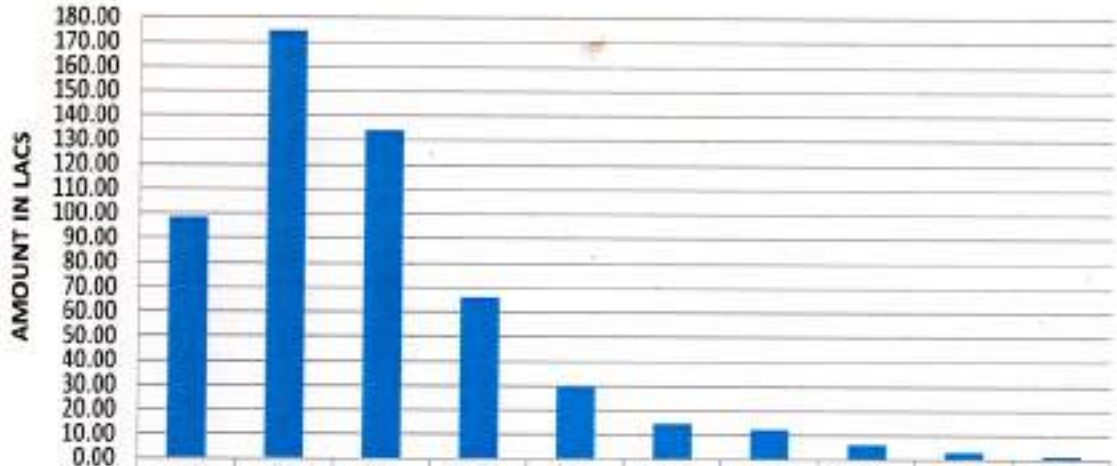
	iv) Solar Geyser 100Ltrs	0.08	%
	v) Solar Geyser 200Ltrs	0.08	%
	Sub-Total (b)	**2.52**	**%**
	c) Income Generation activities		
	i) Vermi composting & organic farming	0.17	%
	ii) Bee keeping activities	0.18	%
	iii) Animal Husbandry & Dairy Development	0.55	%
	Sub-Total (c)	**0.90**	**%**
	Sub-Total (5)	**3.64**	**%**
6	**Eco-Tourism development**		
	i) Construction of Trekking Routes	0.37	%
	ii) Maint. Of Mandli Log Cabin & Camping Site	0.56	%
	iii) Const. of Eco-Tourism circuits/Hub	1.84	%
	Sub-Total (6)	**2.77**	**%**
7	**Development of Forest Infrastructure in PA's**		
	a) Const./Maint. of existing buildings		
	i) Maint. of Range Office & Quarters	0.55	%
	ii) Maint of Staff Quarters	0.55	%
	iii) Maint. of Guard Quarters	0.37	%
	iv) Maint. of Forest Rest House	0.67	%
	v) Const. of Seminar/meeting Hall	1.47	%
	vi) Boundary wall to Division Office Complex	0.55	%
	vii) Maint. Of Range office cum residence	0.32	%
	viii) Const. of fencing wall for DFO & ACF residence complex	0.37	%
	b) Const./Maint. of B/Paths & I/Paths		
	i) Special Repair of Bridal Path	0.83	%
	ii) Maint. of Existing Inspection Path	1.23	%
	c) Const./Repair of Bridges		
	i) Const. of Bridges	0.92	%
	ii) Maint.of Existing Bridges on Bridal Path	0.46	%
	d) Const. of Van Thana	4.60	%
	Sub-Total	**12.90**	**%**
8	**Research & Studies**	**1.84**	**%**
9	**Payments for Environmental Services (PES)**	**9.21**	**%**
10	**Developments of Dumping Sites**	**8.29**	**%**
11	**Training of Forest Officers/Officials in India & abroad**	**4.70**	**%**
12	**Publicity, Nature awareness camp, exposure visit, training of CBO's & ext. Prog./workshop & meeting/evaluation expenses.**	**0.83**	**%**
13	**Monitoring & Evaluation Activities**	**2.74**	**%**
14	**Operational Support/Establishment**	**5.62**	**%**
	Grand Total	**90.91**	**%**
15	**Contigencies**	**9.09**	**%**
	G. Total	**100.00**	**%**

PERCENTAGEWISE SHARE OF VARIOUS ACTIVITIES

- 1 HABITAT IMPROVEMENT
- 2 SOIL AND MOISTURE CONSERVATION
- 3 PROTECTION OF FORESTS
- 4 MITIGATION OF HUMAN WILDLIFE CONFLICT
- 5 PROTECTION & MANAGEMENT OF WILD LIFE
- 6 ECO TOURISM DEVELOPMENT
- 7 DEVELOPMENT OF FOREST INFRASTRUCTURE IN PA'S
- 8 RESEARCH AND STUDIES
- 9 TRAINING OF FOREST OFFICERS/OFFICIAL IN INDIA AND ABOARD
- 10 PUBLICITY, NATURE, AWARENESS/ EXPOSURE, VISIT AND EXTENSION PROGRAMME
- 11 OPERATIONAL SUPPORT AND ESTABLISHMENT
- 12 PAYMENTS FOR ENVIRONMENTAL SERVICES
- 13 DEVELOPMENT OF DUMPING SITES
- 14 MONITORING & EVALUATION ACTIVITIES
- 15 CONTIGENCIES



YEAR WISE EXPENDITURE BREAKUP



	2009 - 10	2010 - 11	2011 - 12	2012 - 13	2013 - 14	2014 - 15	2015 - 16	2016 - 17	2017 - 18	2018 - 19
Series1	98.56	174.87	134.44	66.46	29.78	15.00	12.37	6.60	3.55	2.05

Annexure I

Per Ha. Cost model for Afforestation of Degraded Forests land

Calculated at Wage Rate of Rs.70/-

S. No.	Particulars of Works	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	44.36	Hac.	44.36
2	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	60	561.36	% Nos.	336.82
3	Carriage of F. posts over distance of 1 km	60	295.41	% Nos/Km	177.25
4	Digging of holes for F. posts for 45 cm deep	60	393.02	% Nos.	235.81
5	Fixing of F. posts including strutting	60	301.64	% Nos.	180.98
6	Carriage of B/wire over average distance of 1 Km up hills	1	73.93	Qtls/Km	73.93
7	Streching & fixing of B/wire with U/stapple in each strand (3 strands)	540	2.05	Rmt	1107.00
8	Bush Cutting in the plantation site	1	517.00	Hac.	517.00
9	Interlacing of thorny bushes in B/wire fence	180	1.78	Rmt.	320.40
10	Preparation of inspection path 60 cm wide	250	4.71	Rmt	1177.50
11	Layout of Pits over 1 hac.	1	73.82	Hac.	73.82
12	Digging of Pits 45x45x45cm (40 % of total)	440	413.60	% Nos.	1819.84
13	Digging of Pits 30x30x30cm (60 % of total)	660	206.85	% Nos.	1365.21
14	Filling of Pits 45x45x45 cm	440	118.51	% Nos.	521.44
15	Filling of Pits 30x30x30 cm	660	82.70	% Nos.	545.82
16	Carriage of naked root plants O/D 2 Kms (U/h side)	400	15.27	% Nos/Km	122.16
17	Carriage of Plants in P/Bags O/D 2 Km (U/h side)	700	94.51	%Nos/Km	1323.14
18	Planting of entire plants raised in P/Bags	700	94.57	% Nos.	661.99
19	Planting of naked root plants	400	79.73	% Nos.	318.92
20	Nursery cost of plants	1100	4.00	per plant	4400.00
21	**TOTAL**				**15323.39**
22	Soil and moisture conservation works (up to 25% of initial planting cost at serial no 21)	1	25.00	%	3830.85
23	**TOTAL**				**19154.24**
24	Add 15.38% increase				2945.92
25	**Total**				**22100.16**
	Material Cost				
26	Cost of B/wire	1	3900	Per Qtls	3900.00
27	Cost of U. Nails	1.25	45	Kg	56.25
28	Cost of Fense Posts	60	100	Nos	6000.00
29	**Total (Material)**				**9956.25**
30	**G. Total (25 + 29)**				**32056.41**
	Or Say Rs.				**32056.00**

Per Ha. Cost model for Afforestation of Degraded Forests land

Maintenance Norms of First year (25% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cms	110	206.85	% Nos.	227.54
2	Re-digging of failure pits 30x30x30 cms	165	103.4	% Nos.	170.61
3	Filling of Pits 45x45x45 cm	110	118.51	% Nos.	130.36
4	Filling of Pits 30x30x30 cm	165	82.7	% Nos.	136.46
5	Planting of plants raised in P/bags i/c ramming	175	94.57	% Nos	165.50
6	Planting of naked root plants of (O.B.L) I/cramming	100	79.73	% Nos	79.73
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	175	94.51	% Nos/Km	330.79
6	Carriage of naked root plants O/D 2 Km (uphill side)	100	15.27	% Nos/Km	30.54
7	Nursery cost of plants	275	4	per plant	1100.00
8	Repair of B/wire fence	180	0.7	Rmt	126.00
9	Repair of Inspection Path		L/S		300.00
10	Repair of soil and moisture conservation works		L/S		400.00
	Total				**3197.51**
	Add 15.38% increase				491.78
	Total				**3689.29**
	Or Say Rs.				**3689.00**

Per Ha. Cost model for Afforestation of Degraded Forests land

Maintenance Norms of second year (20% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cms	88	206.85	% Nos.	182.03
2	Re-digging of failure pits 30x30x30 cms	132	103.4	% Nos.	136.49
3	Filling of Pits 45x45x45 cm	88	118.51	% Nos.	104.29
4	Filling of Pits 30x30x30 cm	132	82.7	% Nos.	109.16
5	Planting of plants raised in P/bags i/c ramming	140	94.57	% Nos	132.40
6	Planting of naked root plants of (O.B.L) I/cramming	80	79.73	% Nos	63.78
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	140	94.51	% Nos/Km	264.63
6	Carriage of naked root plants O/D 2 Km (uphill side)	80	15.27	% Nos/Km	24.43
7	Nursery cost of plants	220	4	per plant	880.00
8	Repair of B/wire fence	180	0.7	Rmt	126.00
9	Repair of Inspection Path		L/S		300.00
10	Repair of soil and moisture conservation works		L/S		400.00
	Total				**2723.21**
	Add 15.38% increase				418.83
	Total				**3142.04**
	Or Say Rs.				**3142.00**

Per Ha. Cost model for Afforestation of Degraded Forests land

Maintenance Norms of Third year (15% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cms	66	206.85	% Nos.	136.52
2	Re-digging of failure pits 30x30x30 cms	99	103.4	% Nos.	102.37
3	Filling of Pits 45x45x45 cm	66	118.51	% Nos.	78.22
4	Filling of Pits 30x30x30 cm	99	82.7	% Nos.	81.87
5	Planting of plants raised in P/bags i/c ramming	105	94.57	% Nos	99.30
6	Planting of naked root plants of (O.B.L) I/cramming	60	79.73	% Nos	47.84
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	105	94.51	% Nos/Km	198.47
6	Carriage of naked root plants O/D 2 Km (uphill side)	60	15.27	% Nos/Km	18.32
7	Nursery cost of plants	165	4	per plant	660.00
8	Repair of B/wire fence	200	0.7	Rmt	140.00
9	Repair of Inspection Path		L/S		300.00
10	Repair of soil and moisture conservation works		L/S		400.00
	Total				**2262.91**
	Add 15.38% increase				348.04
	Total				**2610.94**
	Or Say Rs.				**2611.00**

Per Ha. Cost model for Afforestation of Degraded Forests land

Maintenance Norms of Fourth year (15% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cms	66	206.85	% Nos.	136.52
2	Re-digging of failure pits 30x30x30 cms	99	103.4	% Nos.	102.37
3	Filling of Pits 45x45x45 cm	66	118.51	% Nos.	78.22
4	Filling of Pits 30x30x30 cm	99	82.7	% Nos.	81.87
5	Planting of plants raisedin P/bags i/c ramming	105	94.57	% Nos	99.30
6	Planting of naked root plants of (O.B.L) I/cramming	60	79.73	% Nos	47.84
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	105	94.51	% Nos/Km	198.47
6	Carriage of naked root plants O/D 2 Km (uphill side)	60	15.27	% Nos/Km	18.32
7	Nursery cost of plants	165	4	per plant	660.00
8	Repair of B/wire fence	200	0.7	Rmt	140.00
9	Repair of Inspection Path		L/S		200.00
10	Repair of soil and moisture conservation works		L/S		200.00
	Total				**1962.91**
	Add 15.38% increase				301.90
	Total				**2264.80**
	Or Say Rs.				**2265.00**

Per Ha. Cost model for Afforestation of Degraded Forests land

Maintenance Norms of Fifth year (10% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cms	44	206.85	% Nos.	91.01
2	Re-digging of failure pits 30x30x30 cms	66	103.4	% Nos.	68.24
3	Filling of Pits 45x45x45 cm	44	118.51	% Nos.	52.14
4	Filling of Pits 30x30x30 cm	66	82.7	% Nos.	54.58
5	Planting of plants raised in P/bags i/c ramming	70	94.57	% Nos	66.20
6	Planting of naked root plants of (O.B.L) I/cramming	40	79.73	% Nos	31.89
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	70	94.51	% Nos/Km	132.31
6	Carriage of naked root plants O/D 2 Km (uphill side)	40	15.27	% Nos/Km	12.22
7	Nursery cost of plants	110	4	per plant	440.00
8	Repair of B/wire fence	200	0.7	Rmt	140.00
9	Repair of Inspection Path		L/S		200.00
10	Repair of soil and moisture conservation works		L/S		200.00
	Total				**1488.61**
	Add 15.38% increase				228.95
	Total				**1717.55**
	Or Say Rs.				**1718.00**

	New Norm for Plantation	**32056.00**
1	**Maintenance norm for 1st year plantation (25% mortality)**	**3689.00**
2	**Maintenance norm for 2nd year plantation (20% mortality)**	**3142.00**
3	**Maintenance norm for 3rd year plantation (15% mortality)**	**2611.00**
4	**Maintenance norm for 4th year plantation (15% mortality)**	**2265.00**
5	**Maintenance norm for 5th year plantation (10% mortality)**	**1718.00**
	TOTAL	**45481.00**

Annexure II

Per Ha. Cost model for Shrubs Plantation

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Layout of Pits over 1 hac.	1	68.15	Hac.	68.15
3	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	70	518.2	% Nos.	362.74
4	Charring & Coaltarring of the ends of F. Posts 45 cm bottom & 15cm conical top	70	111.8	% Nos.	78.26
5	Carriage of F. posts over distance of 5 km	70	272.7	% Nos/Km	954.45
6	Digging of holes for F. posts for 45 cm deep	70	362.8	% Nos.	253.96
7	Fixing of F. posts including strutting	70	278.45	% Nos.	194.915
8	Carriage of B/wire from depot to site O/D 10 Km U/H side	1	68.25	Qtls/Km	682.5
9	Streching & fixing of B/wire with U/stapple in 180x4 strand	0.72	1.9	Rmt	1368
10	Preparation of I/path 60cm wide	150	4.35	Rmt	652.5
11	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
12	Digging of Pits 45x45x45cm	800	381.8	% Nos.	3054.4
13	Filling of Pits 45x45x45 cm	800	109.4	% Nos.	875.2
14	Carriage of naked root plants O/D 5 Kms (U/h side)	800	14.1	% Nos/Km	564
15	Planting of naked root plants i/c ramming	800	73.6	% Nos.	588.8
16	Construction of stairs i/c cost of i/nails	2	L/S	Nos.	450
	Total				**10485.83**
	Add 15.38% increase				1740.65
	Total				**12226.47**
	Total (Works)				**12226.47**
	Material Cost				
1	Cost of B/wire	1	3900	Per Qtls	3900.00
2	Cost of U. Nails	1.25	45	Kg	56.25
3	Cost of Plants	800	3	Nos.	2400.00
4	Cost of Fense Posts	L/s		L/s	7000.00
	Total (Material)				**13356.25**
	G. Total				25582.72
	Or Say Rs.				**25583.00**

Per Ha. Cost model for Shrubs Plantation

Maintenance Norms of First year (25% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cm for B/L spps.	200	190.95	% Nos.	381.90
2	Filling of Pits 45x45x45 cm	200	109.4	% Nos.	218.80
3	Carriage of naked root plants (O.B.L) O/D 6 Km (uphill side)	200	14.1	% Nos/Km	169.2
4	Planting of naked root plants of (O.B.L) I/cramming	200	73.6	% Nos	147.20
5	Mulching/weeding of plants in P/area	900	23.9	% Nos.	215.10
6	Cutting & prep. of wooden fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	30	518.2	% Nos	155.46
7	Carriage of F. Posts O/D of 10 Km	30	272.7	% Nos.	818.10
8	Digging of Holes for fixing of F/posts	30	362.8	% Nos.	108.84
9	Fixing of fence Posts	30	278.45	% Nos.	83.54
10	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				**2628.14**
	Add 15.38% increase				436.27
	Total				**3064.41**
	Total (Works)				**3064.41**
	Material Cost				
	Cost of Plants	200	3	Nos.	600
	Cost of U/stapple	0.5	45	Kg	22.50
	Total (Material)				**622.50**
	G. Total				**3686.91**
	or Say (Rs.)				**3687.00**

Per Ha. Cost model for Shrubs Plantation

Maintenance Norms of second year (20% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cm for B/L spps.	160	190.95	% Nos.	305.52
2	Filling of Pits 45x45x45 cm	160	109.4	% Nos.	175.04
3	Carriage of naked root plants (O.B.L) O/D 6 Km (uphill side)	160	14.1	% Nos/Km	135.36
4	Planting of naked root plants of (O.B.L) I/cramming	160	73.6	% Nos	117.76
5	Mulching/weeding of plants in P/area	900	23.9	% Nos.	215.10
6	Cutting & prep. of wooden fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	30	518.2	% Nos	155.46
7	Carriage of F. Posts O/D of 10 Km	30	272.7	% Nos.	818.10
8	Digging of Holes for fixing of F/posts	30	362.8	% Nos.	108.84
9	Fixing of fence Posts	30	278.45	% Nos.	83.54
10	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				**2444.72**
	Add 15.38% increase				405.82
	Total				**2850.54**
	Total (Works)				**2850.54**
	Material Cost				
	Cost of Plants	160	3	Nos.	480
	Cost of U/stapple	0.5	45	Kg	22.50
	Total (Material)				**502.50**
	G. Total				**3353.04**
	or Say (Rs.)				**3353.00**

Per Ha. Cost model for Shrubs Plantation

Maintenance Norms of third & fourth year (15% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cm for B/L spps.	120	190.95	% Nos.	229.14
2	Filling of Pits 45x45x45 cm	120	109.4	% Nos.	131.28
3	Carriage of naked root plants (O.B.L) O/D 6 Km (uphill side)	120	14.1	% Nos/Km	101.52
4	Planting of naked root plants of (O.B.L) I/cramming	120	73.6	% Nos	88.32
5	Mulching/weeding of plants in P/area	900	23.9	% Nos.	215.10
6	Cutting & prep. of wooden fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	30	518.2	% Nos	155.46
7	Carriage of F. Posts O/D of 10 Km	30	272.7	% Nos.	818.10
8	Digging of Holes for fixing of F/posts	30	362.8	% Nos.	108.84
9	Fixing of fence Posts	30	278.45	% Nos.	83.54
10	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				**2261.30**
	Add 15.38% increase				375.37
	Total				**2636.67**
	Total (Works)				**2636.67**
	Material Cost				
	Cost of Plants	120	3	Nos.	360
	Cost of U/stapple	0.5	45	Kg	22.50
	Total (Material)				**382.50**
	G. Total				**3019.17**
	or Say (Rs.)				**3019.00**

Per Ha. Cost model for Shrubs Plantation

Maintenance Norms of fifth year (10% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cm for B/L spps.	80	190.95	% Nos.	152.76
2	Filling of Pits 45x45x45 cm	80	109.4	% Nos.	87.52
3	Carriage of naked root plants (O.B.L) O/D 6 Km (uphill side)	80	14.1	% Nos/Km	67.68
4	Planting of naked root plants of (O.B.L) I/cramming	80	73.6	% Nos	58.88
5	Mulching/weeding of plants in P/area	900	23.9	% Nos.	215.10
6	Cutting & prep. of wooden fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	30	518.2	% Nos	155.46
7	Carriage of F. Posts O/D of 10 Km	30	272.7	% Nos.	818.10
8	Digging of Holes for fixing of F/posts	30	362.8	% Nos.	108.84
9	Fixing of fence Posts	30	278.45	% Nos.	83.54
10	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				**2077.88**
	Add 15.38% increase				344.93
	Total				**2422.80**
	Total (Works)				**2422.80**
	Material Cost				
	Cost of Plants	80	3	Nos.	240
	Cost of U/stapple	0.5	45	Kg	22.50
	Total (Material)				**262.50**
	G. Total				**2685.30**
	or Say (Rs.)				**2685.00**

	New Norm for Plantation		
1	**Maintenance norm for 1st year plantation (30% mortality)**	L/s	**25583.00**
2	**Maintenance norm for 2nd year plantation (20% mortality)**	L/s	**3687.00**
3	**Maintenance norm for 3rd year plantation (15% mortality)**	L/s	**3353.00**
4	**Maintenance norm for 4th year plantation (10% mortality)**	L/s	**3019.00**
5	**Maintenance norm for 5th year plantation (10% mortality)**	L/s	**3019.00**
	G. Total for Enrichment Plantation	L/s	**2685.00**
			41346

Annexure - III

Per Ha. Cost model for Enrichment Plantation

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Layout of Pits over 1 hac.	1	68.15	Hac.	68.15
3	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	60	518.2	% Nos.	310.92
4	Charring & Coaltarring of the ends of F. Posts 45 cm bottom & 15cm conical top	60	111.8	% Nos.	67.08
5	Carriage of F. posts over distance of 5 km	60	272.7	% Nos/Km	818.1
6	Digging of holes for F. posts for 45 cm deep	60	362.8	% Nos.	217.68
7	Fixing of F. posts including strutting	60	278.45	% Nos.	167.07
8	Carriage of B/wire from depot to site O/D 10 Km U/H side	1	68.25	Qtls/Km	682.5
9	Streching & fixing of B/wire with U/stapple in 180x4 strand	0.72	1.9	Rmt	1368
10	Preparation of I/path 60cm wide	150	4.35	Rmt	652.5
11	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
12	Digging of Pits 45x45x45cm	320	381.8	% Nos.	1221.76
13	Digging of Pits 30x30x30cm	480	190.95	% Nos.	916.56
14	Filling of Pits 45x45x45 cm	320	109.4	% Nos.	350.08
15	Filling of Pits 30x30x30 cm	480	76.35	% Nos.	366.48
16	Carriage of naked root plants O/D 5 Kms (U/h side)	320	14.1	% Nos/Km	225.6
17	Carriage of Plants in P/Bags O/D 5 Km (U/h side)	480	87.25	%Nos/Km	2094
18	Planting of naked root plants i/c ramming	320	73.6	% Nos.	235.52
19	Planting of Plants raised in P/bags i/c ramming	480	87.3	% Nos.	419.04
20	Moisture retention intervention i/c V. ditches (MRI)	1	900	Hac.	900
21	Construction of stairs i/c cost of I/nails	2	L/S	Nos.	200
22	Preparation/Digging of Patches 30x30x25 cm	100	259.05	% Nos.	259.05
23	Patch sowing	100	75.3	% Nos.	75.3
	Total				**11953.34**
	Add 15.38% increase				1984.25
	Total				**13937.59**
	Total (Works)				**13937.59**
	Material Cost				
1	Cost of B/wire	1	3900	Per Qtls	3900.00
2	Cost of U. Nails	1.25	45	Kg	56.25
3	Cost of Seeds	1	120	Kg	120.00
4	Cost of Plants	800	3	Nos.	2400.00
5	Cost of Fense Posts	L/s		L/s	4900.00
	Total (Material)				**11376.25**
	G. Total				25313.84
	Or Say Rs.				**25314.00**

Per Ha. Cost model for Enrichment Plantation
Maintenance Norms of First year (25% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 30x30x30 cm for P/bags	120	95.45	% Nos.	114.54
2	Re-digging of failure pits 45x45x45 cm for B/L spps.	80	190.95	% Nos.	152.76
3	Filling of Pits 30x30x30 cm	120	76.38	% Nos.	91.66
4	Filling of Pits 45x45x45 cm	80	109.4	% Nos.	87.52
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	120	87.25	% Nos/Km	209.40
6	Carriage of naked root plants (O.B.L) O/D 2 Km (uphill side)	80	14.1	% Nos/Km	22.56
7	Planting of plants raised in P/bags i/c ramming	120	87.3	% Nos	104.76
8	Planting of naked root plants of (O.B.L) i/cramming	80	73.6	% Nos	58.88
9	Mulching/weeding of plants in P/area	800	23.9	% Nos.	191.20
10	Cutting & prep. of wooden fence posts 1.80 mtr long 7 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
11	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
12	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
13	Fixing of fence Posts	15	278.45	% Nos.	41.77
14	Repair of B/wire fence	200	0.65	Rmt	130.00
15	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				**1728.55**
	Add 15.38% increase				286.94
	Total				**2015.49**
	Total (Works)				**2015.49**
	Material Cost				
	Cost of Plants	200	3	Nos.	600
	Cost of U/stapple	0.5	45	Kg	22.50
	Total (Material)				**622.50**
	G. Total				**2637.99**
	or Say (Rs.)				**2638.00**

Per Ha. Cost model for Enrichment Plantation
Maintenance Norms of second year (20% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 30x30x30 cm for P/bags	96	95.45	% Nos.	91.632
2	Re-digging of failure pits 45x45x45 cm for B/L spps.	64	190.95	% Nos.	122.21
3	Filling of Pits 30x30x30 cm	96	76.38	% Nos.	73.32
4	Filling of Pits 45x45x45 cm	64	109.4	% Nos.	70.02
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	96	87.25	% Nos/Km	167.52
6	Carriage of naked root plants (O.B.L) O/D 2 Km (uphill side)	64	14.1	% Nos/Km	18.048
7	Planting of plants raised in P/bags i/c ramming	96	87.3	% Nos	83.808
8	Planting of naked root plants of (O.B.L) i/cramming	64	73.6	% Nos	47.10
9	Mulching/weeding of plants in P/area	800	23.9	% Nos.	191.20
10	Cutting & prep. of wooden fence posts 1.80 mtr long 7 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
11	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
12	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
13	Fixing of fence Posts	15	278.45	% Nos.	41.77
14	Repair of B/wire fence	200	0.65	Rmt	130.00
15	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				**1560.14**
	Add 15.38% increase				258.98
	Total				**1819.12**
	Total (Works)				**1819.12**
	Material Cost				
	Cost of Plants	160	3	Nos.	480
	Cost of U/stapple	0.5	45	Kg	22.50
	Total (Material)				**502.50**
	G. Total				**2321.62**
	or Say (Rs.)				**2322.00**

Per Ha. Cost model for Enrichment Plantation

Maintenance Norms of third & fourth year (15% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 30x30x30 cm for P/bags	72	95.45	% Nos.	68.724
2	Re-digging of failure pits 45x45x45 cm for B/L spps.	48	190.95	% Nos.	91.66
3	Filling of Pits 30x30x30 cm	72	76.38	% Nos.	54.99
4	Filling of Pits 45x45x45 cm	48	109.4	% Nos.	52.51
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	72	87.25	% Nos/Km	125.64
6	Carriage of naked root plants (O.B.L) O/D 2 Km (uphill side)	48	14.1	% Nos/Km	13.536
7	Planting of plants raised in P/bags i/c ramming	72	87.3	% Nos	62.856
8	Planting of naked root plants of (O.B.L) I/cramming	48	73.6	% Nos	35.33
9	Mulching/weeding of plants in P/area	800	23.9	% Nos.	191.20
10	Cutting & prep. of wooden fence posts 1.80 mtr long 7 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
11	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
12	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
13	Fixing of fence Posts	15	278.45	% Nos.	41.77
14	Repair of B/wire fence	200	0.65	Rmt	130.00
15	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				**1391.72**
	Add 15.38% increase				231.03
	Total				**1622.75**
	Total (Works)				**1622.75**
	Material Cost				
	Cost of Plants	120	3	Nos.	360
	Cost of U/stapple	0.5	45	Kg	22.50
	Total (Material)				**382.50**
	G. Total				**2005.25**
	or Say (Rs.)				**2005.00**

Per Ha. Cost model for Enrichment Plantation

Maintenance Norms of fifth year (10% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 30x30x30 cm for P/bags	48	95.45	% Nos.	45.816
2	Re-digging of failure pits 45x45x45 cm for B/L spps.	32	190.95	% Nos.	61.10
3	Filling of Pits 30x30x30 cm	48	76.38	% Nos.	36.66
4	Filling of Pits 45x45x45 cm	32	109.4	% Nos.	35.01
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	48	87.25	% Nos/Km	83.76
6	Carriage of naked root plants (O.B.L) O/D 2 Km (uphill side)	32	14.1	% Nos/Km	9.024
7	Planting of plants raised in P/bags i/c ramming	48	87.3	% Nos	41.904
8	Planting of naked root plants of (O.B.L) I/cramming	32	73.6	% Nos	23.55
9	Mulching/weeding of plants in P/area	800	23.9	% Nos.	191.20
10	Cutting & prep. of wooden fence posts 1.80 mtr long 7 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
11	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
12	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
13	Fixing of fence Posts	15	278.45	% Nos.	41.77
14	Repair of B/wire fence	200	0.65	Rmt	130.00
15	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				**1223.31**
	Add 15.38% increase				203.07
	Total				**1426.37**
	Total (Works)				**1426.37**
	Material Cost				
	Cost of Plants	80	3	Nos.	240
	Cost of U/stapple	0.5	45	Kg	22.50
	Total (Material)				**262.50**
	G. Total				**1688.87**
	or Say (Rs.)				**1689.00**

	New Norm for Plantation	L/s	25314.00
1	Maintenance norm for 1st year plantation (30% mortality)	L/s	2638.00
2	Maintenance norm for 2nd year plantation (20% mortality)	L/s	2322.00
3	Maintenance norm for 3rd year plantation (15% mortality)	L/s	2005.00
4	Maintenance norm for 4th year plantation (10% mortality)	L/s	2005.00
5	Maintenance norm for 5th year plantation (10% mortality)	L/s	1689.00
	G. Total for Enrichment Plantation		35973

Annexure - IV

Per Ha. Cost model for Assisted Natural Regeneration

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	60	518.2	% Nos.	310.92
3	Charring & Coaltarring of the ends of F. Posts 45 cm bottom & 15cm conical top	60	111.8	% Nos.	67.08
4	Carriage of F. posts over distance of 1.5 km	60	272.7	% Nos/Km	245.43
5	Digging of holes for F. posts for 45 cm deep	60	362.8	% Nos.	217.68
6	Fixing of F. posts including strutting	60	278.45	% Nos.	167.07
7	Carriage of B/wire from depot to site O/D 1.5 Km U/H side	1	68.25	Qtls/Km	102.38
8	Streching & fixing of B/wire with U/stapple in 180x4 strand	0.72	1.9	Rmt	1368
9	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
10	Prep. & Digging of Patches 60x60x25 cm	250	259.05	% Nos.	647.63
11	Sowing of seeds in Patches	250	75.3	% Nos.	188.3
12	Digging of Pits 30x30x30 cm for P/bags Planting	250	190.95	% Nos.	477.38
13	Carriage of Plants in P/Bags O/D 2 Km (U/h side)	250	87.25	%Nos/Km	436.25
14	Planting of Plants raised in P/bags i/c ramming	250	87.3	% Nos.	218.25
15	Filling of Pits 30x30x30 cm	250	76.35	% Nos.	190.875
	Total				**4975.13**
	Add 15.38% increase				825.87
	Total				**5801.00**
	Total (Works)				**5801.00**
	Material Cost				
1	**Cost of Plants**	250	3	each	750.00
2	Cost of B/wire	1	3900	Per Qtls	3900.00
3	Cost of U. Nails	1.25	45	Kg	56.25
4	Cost of Seeds	0.5	120	Kg	60.00
5	Cost of Fense Posts	L/s		L/s	5000.00
	Total (Material)				**9766.25**
	G. Total				15567.25
	Or Say Rs.				**15567.00**

Per Ha. Cost model for Natural Regeneration
Maintenance Norms of First year (25% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 60x60x25 cm	65	129.52	% Nos.	84.188
2	Re-digging of Pits 30x30x30 cm	65	95.45	% Nos.	62.04
3	Filling of Pits 30x30x30 cm	65	76.38	% Nos.	49.65
4	Carriage of plants with P/bags O/D 2 Km (uphill side)	65	87.25	% Nos/Km	113.43
5	Planting of plants raised in P/bags	65	87.3	% Nos	56.745
6	Sowing of seeds in Patches	65	75.3	% Nos	48.95
7	Repair of B/wire fence	200	0.65	Rmt	130.00
8	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
9	Carriage of F. Posts O/D of 1 Km	15	272.7	% Nos.	40.91
10	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
11	Fixing of fence Posts	15	278.45	% Nos.	41.77
12	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				**1056.82**
	Add 15.38% increase				175.43
	Total				**1232.25**
	Total (Works)				**1232.25**
	Material Cost				
	Cost of Plants	65	3	Nos.	195
	Cost of seeds	0.2	120	Kg	24
	Cost of U/nails	0.5	45	Kg	22.50
	Total (Material)				**241.50**
	G. Total				**1473.75**
	or Say (Rs.)				**1474.00**

Per Ha. Cost model for Natural Regeneration
Maintenance Norms of second year (20% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 60x60x25 cm	50	129.52	% Nos.	64.76
2	Re-digging of Pits 30x30x30 cm	50	95.45	% Nos.	47.73
3	Filling of Pits 30x30x30 cm	50	76.38	% Nos.	38.19
4	Carriage of plants with P/bags O/D 2 Km (uphill side)	50	87.25	% Nos/Km	87.25
5	Planting of plants raised in P/bags	50	87.3	% Nos	43.65
6	Sowing of seeds in Patches	50	75.3	% Nos	37.65
7	Repair of B/wire fence	200	0.65	Rmt	130.00
8	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
9	Carriage of F. Posts O/D of 1 Km	15	272.7	% Nos.	40.91
10	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
11	Fixing of fence Posts	15	278.45	% Nos.	41.77
12	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				**961.05**
	Add 15.38% increase				159.53
	Total				**1120.58**
	Total (Works)				**1120.58**
	Material Cost				
	Cost of Plants	50	3	Nos.	150
	Cost of seeds	0.2	120	Kg	24
	Cost of U/nails	0.5	45	Kg	22.50
	Total (Material)				**196.50**
	G. Total				**1317.08**
	or Say (Rs.)				**1317.00**

Per Ha. Cost model for Natural Regeneration
Maintenance Norms of third & fourth year (15% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 60x60x25 cm	40	129.52	% Nos.	51.808
2	Re-digging of Pits 30x30x30 cm	40	95.45	% Nos.	38.18
3	Filling of Pits 30x30x30 cm	40	76.38	% Nos.	30.55
4	Carriage of plants with P/bags O/D 2 Km (uphill side)	40	87.25	% Nos/Km	69.80
5	Planting of plants raised in P/bags	40	87.3	% Nos	34.92
6	Sowing of seeds in Patches	40	75.3	% Nos	30.12
7	Repair of B/wire fence	200	0.65	Rmt	130.00
8	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
9	Carriage of F. Posts O/D of 1 Km	15	272.7	% Nos.	40.91
10	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
11	Fixing of fence Posts	15	278.45	% Nos.	41.77
12	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				**897.20**
	Add 15.38% increase				148.94
	Total				**1046.14**
	Total (Works)				**1046.14**
	Material Cost				
	Cost of Plants	40	3	Nos.	120
	Cost of seeds	0.2	120	Kg	24
	Cost of U/nails	0.5	45	Kg	22.50
	Total (Material)				**166.50**
	G. Total				**1212.64**
	or Say (Rs.)				**1213.00**

Per Ha. Cost model for Natural Regeneration
Maintenance Norms of fifth year (10% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 60x60x25 cm	25	129.52	% Nos.	32.38
2	Re-digging of Pits 30x30x30 cm	25	95.45	% Nos.	23.86
3	Filling of Pits 30x30x30 cm	25	76.38	% Nos.	19.10
4	Carriage of plants with P/bags O/D 2 Km (uphill side)	25	87.25	% Nos/Km	43.63
5	Planting of plants raised in P/bags	25	87.3	% Nos	21.825
6	Sowing of seeds in Patches	25	75.3	% Nos	18.83
7	Repair of B/wire fence	200	0.65	Rmt	130.00
8	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
9	Carriage of F. Posts O/D of 1 Km	15	272.7	% Nos.	40.91
10	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
11	Fixing of fence Posts	15	278.45	% Nos.	41.77
12	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				**801.44**
	Add 15.38% increase				133.04
	Total				**934.47**
	Total (Works)				**934.47**
	Material Cost				
	Cost of Plants	25	3	Nos.	75
	Cost of seeds	0.2	120	Kg	24
	Cost of U/nails	0.5	45	Kg	22.50
	Total (Material)				**121.50**
	G. Total				**1055.97**
	or Say (Rs.)				**1056.00**

	New Norm for Plantation	L/s	15567.00
1	Maintenance norm for 1st year plantation (25% mortality)	L/s	1474.00
2	Maintenance norm for 2nd year plantation (20% mortality)	L/s	1317.00
3	Maintenance norm for 3rd year plantation (15% mortality)	L/s	1213.00
4	Maintenance norm for 4th year plantation (15% mortality)	L/s	1213.00
5	Maintenance norm for 5th year plantation (10% mortality)	L/s	1056.00
	Grand total for Natural Regeneration		21840

Annexure - V

Per Ha. Cost model for Raising NTFP Plantation

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Layout of Patches over 1 Hac.	1	68.15	Hac.	68.15
3	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	60	518.2	% Nos.	310.92
4	Carriage of F. posts over distance of 1.5 km	60	272.7	% Nos/Km	245.43
5	Digging of holes for F. posts for 45 cm deep	60	362.8	% Nos.	217.68
6	Fixing of F. posts including strutting	60	278.45	% Nos.	167.07
7	Charring & Coaltarring ends of F/Posts 45 cm bottom, 15cm conical top	60	111.8	% Nos.	67.08
8	Carriage of B/wire from depot to site O/D 1.5 Km U/H side	1	68.25	Qtls/Km	102.38
9	Streching & fixing of B/wire with U/stapple in 180x4 strand	0.72	1.9	Rmt	1368
10	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
11	Prep. of I/path 60 cm wide	150	4.35	Rmt	652.5
12	Prep. of Patches 30x30x25 cm	1000	130.9	% Nos.	1309.00
13	Rod Planting of Medicinal Plants in Patches (Naked roots)	5000	68.25	% Nos.	3412.5
14	Carriage of Naked root medicinal plants O/D 2 Km (U/h side)	5000	14.1	%Nos/Km	1410
	Total				**9668.66**
	Add 15.38% increase				1605.00
	Total				**11273.65**
	Total (Works)				**11273.65**
	Material Cost				
1	**Cost of Medicinal Plants**	5000	3	each	15000.00
2	Cost of B/wire	1	3900	Per Qtls	3900.00
3	Cost of U. Nails	1.25	45	Kg	56.25
4	Cost of Fense Posts	L/s		L/s	6720.00
	Total (Material)				**25676.25**
	G. Total				36949.90
	Or Say Rs.				**36950.00**

Note Operation of Fencing will be carried out only when an area is closed exclusively for NTFP Plantation if NTFP plants are grown in already fenced area the saving thereof will be utilised in additional areas

Per Ha. Cost model for Raising NTFP Plantation

Maintenance Norms of First year (25% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 30x30x25 cm	250	65.45	% Nos.	163.625
2	Planting of Medicinal plants in 600 patches each	1250	73.6	% Nos.	920.00
3	Carriage of plants with P/bags O/D 2 Km (uphill side)	1250	14.1	% Nos/Km	352.50
4	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
5	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
6	Re-Digging of Holes for fixing of F/posts	15	181.4	% Nos.	27.21
7	Fixing of fence Posts	15	278.45	% Nos.	41.77
8	Repair of B/wire fence	200	0.65	Rmt	130.00
9	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				**2071.19**
	Add 15.38% increase				343.82
	Total				**2415.01**
	Total (Works)				**2415.01**
	Material Cost				
	Cost of Plants	1250	3	Nos.	3750
	Cost of U/nails	0.5	45	Kg	22.50
	Total (Material)				**3772.50**
	G. Total				**6187.51**
	or Say (Rs.)				**6188.00**

Per Ha. Cost model for Raising NTFP Plantation

Maintenance Norms of second year (20% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 30x30x25 cm	200	65.45	% Nos.	130.9
2	Planting of Medicinal plants in 600 patches each	1000	73.6	% Nos.	736.00
3	Carriage of plants with P/bags O/D 2 Km (uphill side)	1000	14.1	% Nos/Km	282.00
4	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
5	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
6	Re-Digging of Holes for fixing of F/posts	15	181.4	% Nos.	27.21
7	Fixing of fence Posts	15	278.45	% Nos.	41.77
8	Repair of B/wire fence	200	0.65	Rmt	130.00
9	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				**1783.97**
	Add 15.38% increase				296.14
	Total				**2080.10**
	Total (Works)				**2080.10**
	Material Cost				
	Cost of Plants	1000	3	Nos.	3000
	Cost of U/nails	0.5	45	Kg	22.50
	Total (Material)				**3022.50**
	G. Total				**5102.60**
	or Say (Rs.)				**5103.00**

Per Ha. Cost model for Raising NTFP Plantation

Maintenance Norms of third year (15% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 30x30x25 cm	150	65.45	% Nos.	98.175
2	Planting of Medicinal plants in 600 patches each	750	73.6	% Nos.	552.00
3	Carriage of plants with P/bags O/D 2 Km (uphill side)	750	14.1	% Nos/Km	211.50
4	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
5	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
6	Re-Digging of Holes for fixing of F/posts	15	181.4	% Nos.	27.21
7	Fixing of fence Posts	15	278.45	% Nos.	41.77
8	Repair of B/wire fence	200	0.65	Rmt	130.00
9	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				**1496.74**
	Add 15.38% increase				248.46
	Total				**1745.20**
	Total (Works)				**1745.20**
	Material Cost				
	Cost of Plants	750	3	Nos.	2250
	Cost of U/nails	0.5	45	Kg	22.50
	Total (Material)				**2272.50**
	G. Total				**4017.70**
	or Say (Rs.)				**4018.00**

1	**New Norm for Plantation**	**L/s**	**36950.00**
2	**Maintenance norm for 1st year plantation (25% mortality)**	**L/s**	**6188.00**
3	**Maintenance norm for 2nd year plantation (20% mortality)**	**L/s**	**5103.00**
4	**Maintenance norm for 3rd year plantation (15% mortality)**	**L/s**	**4018.00**
	Grand total for Raising for NTFP Plantation		**52259.00**

Financial Norms for treatment of Culturable waste land 1 hactare area

1	Context and conversion of F/Post 70 nos. @ 518.20		362.74
2	Carriage of F/post 70 nos. over distance 1 km @ 272.70		190.61
3	Digging of holes 70 nos. @ 362.80		253.96
4	Fixing of fence post 70 nos. @ 278.45		194.91
5	Survey and demarcation over 1 hac. Area @ 40.95		40.95
6	Barbed wire fencing 840 Rm @ 1.90		1596.00
7	Insertion of bushes 210 RM @ 1.65		346.00
8	Carriage of barbed wire in bundles 1.20quintals over distance 2 km @ 68.25		163.80
9	Digging of pits 45x45x45 cms 300 nos. @ 381.80		1145.40
10	Filling of pits -do- 300 nos. @ 109.40		328.20
11	Planting of plants 300 nos. @ 261.75		785.25
12	Carriage of plants 300 nos. over distance 1 km @ 14.10 per hundred per km.		42.30
13	Preparation of strip 100x0.30x5 cm for sowing of grass seed @ 368.10 per hundred = 300 nos.		1104.30
		Total	**6554.42**
	Add 15.38% lab. Increase		1088.03
		Total	**7642.45**
14	Soil Conservation works on 1 hac. Area @ L/s		5000.00
			12642.45
15	Cost of barbed wire 1.20 quintals @ 5000/- per quintal		6000.00
16	Cost of U nails etc. @ 80 L/s		89.00
		Grand Total	**18731.45**
		or say	**18731.00**

Financial Norms for treatment of culturable wasteland over 1 hactare area

Maintenance norms of 1st year (25% mortality)

1	Re-digging of Pits 45x45x45 cm 75 nos @ 381.80 per hundred	286.35
2	filling of pits 45x45x45-75 nos @109.40 per hundred	82.05
3	Carriage of plants 75 nos. over distance 1 km @ 14.10 per hundred per Km.	10.58
4	Planting of plants 75 nos. broad leaved species @ 261.75	196.31
5	Cutting and preparation of fence post 40 nos. @Rs 518/- per hundred	207.20
6	carriage of 40 Nos. of fence post over distance 2 Km. 272.30 per hundred per Km	217.84
7	Digging of holes 40 nos. @ 362.80 per hundred	145.12
8	Fixing of fence post 40 nos. @ 40.95 per hundred	16.28
9	Repair of barbed wire 500 RM @ 0.65 RMM	325.00
10	Repair of strips for grass for sowing 100x30x5 cms along contour at interval of 2 mts = 100 nos.@ 368.10 per hundred	368.10
11	Insertion of bushes along the barbed wire fence 200 RM @ 1.65 per RM	330.00
12	Repair of soil conservation works LS	1000.00
	Total	**3184.83**
	Or say	**3185.00**
	Add 15.38% increase	528.71
		3713.71
13	cost of material i. e. seeds U-Nails etc. LS	770.00
	Grand Total	**4483.71**
	Or Say	**4484.00**

Financial Norms for treatment of culturable wasteland over 1 hactare area

Maintenance norms of 2nd year (20% mortality)

1	Re-digging of Pits 45x45x45 cm 60 nos @ 381.80 per hundred	229.08
2	filling of pits 45x45x45-60 nos @109.40 per hundred	65.64
3	Carriage of plants 60 nos. over distance 1 km @ 14.10 per hundred per Km.	8.46
4	Planting of plants 60 nos. broad leaved species @ 261.75	157.05
5	Cutting and preparation of fence post 40 nos. @Rs 518/- per hundred	207.20
6	carriage of 40 Nos. of fence post over distance 2 Km. 272.30 per hundred per Km	217.84
7	Digging of holes 40 nos. @ 362.80 per hundred	145.12
8	Fixing of fence post 40 nos. @ 40.95 per hundred	16.28
9	Repair of barbed wire 500 RM @ 0.65 RMM	325.00
10	Repair of strips for grass for sowing 100x30x5 cms along contour at interval of 2 mts = 100 nos.@ 368.10 per hundred	368.10
11	Insertion of bushes along the barbed wire fence 200 RM @ 1.65 per RM	330.00
12	Repair of soil conservation works LS	700.00
	Total	**2769.77**
	Or say	**2770.00**
	Add 15.38% increase	459.82
		3229.82
13	cost of material i. e. seeds U-Nails etc. LS	770.00
	Grand Total	**3999.82**
	Or say	**4000.00**

Financial Norms for treatment of culturable wasteland over 1 hactare area

Maintenance norms of 3rd & 4th year (15% mortality)

1	Re-digging of Pits 45x45x45 cm 45 nos @ 381.80 per hundred	171.81
2	filling of pits 45x45x45-45 nos @109.40 per hundred	49.23
3	Carriage of plants 45 nos. over distance 1 km @ 14.10 per hundred per Km.	6.35
4	Planting of plants 45 nos. broad leaved species @ 261.75	117.79
5	Cutting and preparation of fence post 40 nos. @Rs 518/- per hundred	207.20
6	carriage of 40 Nos. of fence post over distance 2 Km. 272.30 per hundred per Km	217.84
7	Digging of holes 40 nos. @ 362.80 per hundred	145.12
8	Fixing of fence post 40 nos. @ 40.95 per hundred	16.28
9	Repair of barbed wire 500 RM @ 0.65 RMM	325.00
10	Repair of strips for grass for sowing 100x30x5 cms along contour at interval of 2 mts = 100 nos.@ 368.10 per hundred	368.10
11	Insertion of bushes along the barbed wire fence 200 RM @ 1.65 per RM	330.00
12	Repair of soil conservation works LS	500.00
	Total	**2454.71**
	Or say	**2455.00**
	Add 15.38% increase	407.53
		2862.53
13	cost of material i. e. seeds U-Nails etc. LS	770.00
	Grand Total	**3632.53**
	Or say	**3633.00**

Financial Norms for treatment of culturable wasteland over 1 hactare area

Maintenance norms of 5th year (10% mortality)

1	Re-digging of Pits 45x45x45 cm 30 nos @ 381.80 per hundred		114.54
2	filling of pits 45x45x45-30 nos @109.40 per hundred		32.82
3	Carriage of plants 30 nos. over distance 1 km @ 14.10 per hundred per Km.		4.23
4	Planting of plants 30 nos. broad leaved species @ 261.75		78.53
5	Cutting and preparation of fence post 40 nos. @Rs 518/- per hundred		207.20
6	carriage of 40 Nos. of fence post over distance 2 Km. 272.30 per hundred per Km		217.84
7	Digging of holes 40 nos. @ 362.80 per hundred		145.12
8	Fixing of fence post 40 nos. @ 40.95 per hundred		16.28
9	Repair of barbed wire 500 RM @ 0.65 RMM		325.00
10	Repair of strips for grass for sowing 100x30x5 cms along contour at interval of 2 mts = 100 nos.@ 368.10 per hundred		368.10
11	Insertion of bushes along the barbed wire fence 200 RM @ 1.65 per RM		330.00
12	Repair of soil conservation works LS		500.00
		Total	**2339.66**
		Or say	**2340.00**
	Add 15.38% increase		388.44
			2728.44
13	cost of material i. e. seeds U-Nails etc. LS		770.00
		Grand Total	**3498.44**
		Or say	**3498.00**

1	**New Norm for Plantation**	**L/s**	**18731.00**
2	**Maintenance norm for 1st year plantation (25% mortality)**	**L/s**	**4484.00**
3	**Maintenance norm for 2nd year plantation (20% mortality)**	**L/s**	**4000.00**
4	**Maintenance norm for 3rd year plantation (15% mortality)**	**L/s**	**3633.00**
4	**Maintenance norm for 4th year plantation (15% mortality)**	**L/s**	**3633.00**
4	**Maintenance norm for 5th year plantation (10% mortality)**	**L/s**	**3498.00**
	Grand total for Raising for NTFP Plantation		**37979.00**

Per Ha. Cost model for Treatment of Alpine Pastures

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Pasture land i/c making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Weeding of obnoxious weeds	1	L/s	Hac.	1875
3	Preparation of strips i/c sowing along contour at 100x30x5 cm interval of 2 m for grass sowing	800	368.1	% Nos.	2944.8
4	Application of vermi compost/organic fertilizers(twice over 1 hac @ 25Kg/Tin)	1	L/s	Hac.	300
5	Carriage of Feertilizers to work site o/d of 5 Km by mannual labour	0.5	33.4	Qtls/Km	83.5
6	Moisture retention intervention i/c V. ditches (MRI)	1	1500	Hac.	1500
7	Cost of fertilizer and seed	L/s	L/s		500
	Total				**7244.25**
	Add 15.38% increase				1202.55
	Total				**8446.80**
	Total (Works)				**8446.80**
	Or Say Rs.				**8447.00**

Per Ha. Cost model for Treatment of Alpine Pastures
Maintenance norms for 1st year (25%)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-preparation of strips 100x.30x.5 cm	200	190	% Nos.	380
	Total				**380**
	Add 15.38% increase				63.08
	Total				**443.08**
	Total (Works)				**443.08**
	Material Cost				
1	**Cost of Seed**	1	386.25 Kg		386.25
	G. Total				**829.33**
	Or Say Rs.				**829.00**

Per Ha. Cost model for Treatment of Alpine Pastures
Maintenance norms for 2nd year (20%)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-preparation of strips 100x.30x.5 cm	160	190	% Nos.	304
	Total				304
	Add 15.38% increase				50.46
	Total				354.46
	Total (Works)				354.46
	Material Cost				
1	**Cost of Seed**	1	386.25 Kg		386.25
	G. Total				740.71
	Or Say Rs.				**741.00**

New Plantation	**8447.00**
1st year Maintenance	**829.00**
2nd year Maintenance	**741.00**
Grand Total	**10017.00**

Scheme		1st Year 2009 - 10		2nd Year 2010-11		3rd year 2011-12		4th year 2012-13		5th Year 2013-14		6th Year 2014-15		7th Year 2015-16		8th year 2016-17		9th year 2017-18		10th year 2018-19		Gross Total		% age of Total outlay
Sr No.	Name of Component	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
1	Habitat Improvement																							
	Biological Works																							
	i) Afforestation of Degraded Forest Land																							
	New					25	8.01	20	6.41													45	14.43	2.66
	Maint.							25	0.92	45	1.52	45	1.28	45	1.09	45	0.88	20	0.34			45	6.04	1.11
	TOTAL																						20.47	3.77
	ii) Bamboo/Shrubs Plantation																							
	New			10	2.58	5	1.28															15	3.84	0.7
	Maint.					10	0.37	15	0.52	15	0.47	15	0.45	15	0.42	5	0.13					15	2.36	0.43
	TOTAL																						6.20	1.14
	iii) Enrichment Plantation																							
	New			10	2.53	5	1.27															15	3.80	0.7
	Maint.					10	0.26	15	0.38	15	0.32	15	0.30	15	0.27	5	0.08					15	1.60	0.29
																							5.40	0.99
	iv) Assisted Natural Re-generation																							
	New			10	1.56	5	0.78															15	2.34	0.44
	Maint.					10	0.15	15	0.21	15	0.19	15	0.16	15	0.17	5	0.05					15	0.94	0.17
																							3.28	0.61
	v) NTFP																							
	a) New					10	3.70															10	3.70	0.68
	Maint.							10	0.62	10	0.51	10	0.40									10	1.53	0.28
	b) Medicinal Plantation under Sanjha Van Sanjivani Van scheme					20	4.7	20	4.70	20	4.70	20	4.70	20	4.7							100	23.50	4.33
																							28.73	5.29
	vi) Nursery Development																							
	New	1	2.00	0.5	1.00																	1.50	3.00	0.55
	Maint.			1	1.00	1.5	0.90	1.5	0.50	1.5	0.45	1.5	0.45	1.5	0.25	1.5	0.15	1	0.10			1.50	3.80	0.70
																							6.80	1.25
	vii) Treatment of Culturable waste land																							
	New			20	3.75																	20	3.75	0.69
	Maint.					20	0.90	20	0.80	20	0.73	20	0.73	20	0.70							20	3.85	0.71
																							7.60	1.40
	viii) Treatment of Alpine Pasture																							
	New	20	1.69	35	2.96	35	2.96															90	7.60	1.40
	Maint.			20	0.17	55	0.44	70	0.55	35	0.26											90	1.41	0.26
	Sub -Total (viii)																						9.02	1.66
	ix) Floristic survey of project area				5.00																		5.00	0.92
	G.Total (1)		3.69		20.51		25.70		15.59		9.14		6.50		7.59		1.30		0.44		0.00		92.49	17.03

Scheme P		1st Year 2009 - 10		2nd Year 2010-11		3rd year 2011-12		4th year 2012-13		5th Year 2013-14		6th Year 2014-15		7th Year 2015-16		8th year 2016-17		9th year 2017-18		10th year 2018-19		Gross Total		% age of Total outlay
Sr No.	Name of Component	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
2	Soil and Moisture Conservation																							
	a) Land Slide/Slip stabilization																							
	New				12.36		9.90															0	22.26	4.10
	b) Nallah Stabilization		4.77		4.27		1.58		4.27													0	14.89	2.74
	c) River Bank Stabilization		4.75																				4.75	0.87
	d) Road side avenue plantation								10.00		1.00		0.50		0.30								11.80	2.17
	e) Establishment of silt observatories		2.00																				2.00	0.37
	Observation and Measurement of soil/silt		0.75		0.75		0.75		0.75		0.75		0.75		0.75		0.75		0.75				6.75	1.24
	G. Total (2)		12.27		17.38		12.23		15.02		1.75		1.25		1.05		0.75		0.75		0		62.44	11.49
3	Protection of Forests																							
	Fire Protection																							
	a) Maintinance of Fire lines & Controlled burning		1.50		0.75		0.75		0.75														3.75	0.69
	b) Incentives to Mahila Madal & Self Help Groups		0.15		0.20		0.20		0.20		0.20		0.20		0.20		0.20		0.20		0.20		1.95	0.36
	c) Fire Fighting Kits		3.00		5.00		5.00		5.00														18.00	3.31
	Sub-Total (3)		4.65		5.95		5.95		5.95		0.20		0.20		0.20		0.20		0.20		0.20		23.70	4.36
4	Protection ans Management of wildlife																							
	i) C/O Water holes	1	0.40	2.00	0.80	2.00	0.80	1.00	0.40	1.00	0.40												2.80	0.52
	ii) Sign and Slogan boards		0.10		0.10		0.10		0.10		0.10		0.10		0.10		0.10		0.10		0.10		1.00	0.18
	iii) Camping Equipments(in kind)				3.00																		3.00	0.55
	iv) Wildlife census Operation				5.00																		5.00	0.92
	v) Plantation of wild Fruit bearing plantation		1.50		1.50		0.50		0.50		0.50		0.50		0.40		0.30		0.20		0.10		6.00	1.10
	vi) Training to Forest staff in Animal rescue		1.00		5.00		6.30																12.00	2.21
	Sub-Total (4)		3.00		15.40		7.40		1.00		1.00		0.60		0.50		0.40		0.30		0.20		29.80	5.48
5	Mitigation of Human-Wild life Conflict																							
	i) Eco-Development Activities																							
	a) Village support activities																							
	i) Construction of Cattle Ponds			2	0.20																	2	0.20	0.04
	ii) Vaccination of Domestic Cattle		0.30		0.20		0.50																1.00	0.18
	Sub-Total (a)		0.3		0.40		0.50								0		0		0		0		1.20	0.22
	b) Fuel saving devices																							
	i) Construction of Crematoria					1	2.00															1	2.00	0.37
	ii) Distribution of Solar Lights			2	0.80																	2	0.80	0.15
	iii) Distibution of LPG Cylinders	100	2.00	200	4.00	100	2.00		2.00													400	10.00	1.84
	iv) Solar Geyser 100Ltrs	2	0.46																			2	0.46	0.08
	v) Solar Geyser 200Ltrs	1	0.42																			1	0.42	0.08
	Sub-Total (b)		2.88		4.80		4.50		2.00		0				0		0		0		0		13.68	2.52

Scheme		1st Year 2009 - 10		2nd Year 2010-11		3rd year 2011-12		4th year 2012-13		5th Year 2013-14		6th Year 2014-15		7th Year 2015-16		8th year 2016-17		9th year 2017-18		10th year 2018-19		Gross Total		% age of Total outlay
Sr No.	Name of Component	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
	c) Income Generation Activities (IGA)																							
	i) Vermicomposting & Organic Farming				0.20		0.50		0.20														0.90	0.17
	ii) Bee Keeping				0.50		0.50																1.00	0.18
	iii) Animal Husbandry & Dairy Development				2.00		1.00																3.00	0.55
	Sub-Total (c)				2.70		2.00		0.2		0				0		0		0		0		4.90	0.90
	G. Total (5)		3.18		7.90		6.50		2.2		0				0		0		0		0		19.78	3.64
6	Eco-Tourism Development																							
	i) Const. of Trekking Routes			1	1.00			1	1.00													2	2.00	0.37
	ii) Development of camping Site				1.50																		1.50	0.28
	iii) Maint. Of Mandli Log Cabin & Camping Site						1.55																1.55	0.29
	iv) Const. of Eco-Tourism Circuit/Hub				5.00		5.00																10.00	1.84
	G.Total (6)				7.50		6.55		1.00		0.00				0		0		0		0		15.05	2.78
7	Forest Infrastructure in PA's																							
	a) Const./Maint. of building																							
	i) Maint. of Range Office & Quarters				2.00		1.00																3.00	0.55
	ii) Maint. Of Staff Quarters					1	3.00															1	3.00	0.55
	iii) Maint. of Guard Quarters	1	0.50	1	0.50	1	0.50					1	0.50									4	2.00	0.37
	iv) Maint. of Forest Rest House	1	0.50		1.73		1.4																3.63	0.67
	v) Const. of Seminar/meeting Hall		5.00		3.00																		8.00	1.47
	vi) Boundary wall to Division Office Complex				3.00																		3.00	0.55
	vii) Maint. Of Range Office cum Residence		1.73																				1.73	0.32
	viii) Const. Of fencing wall for DFO & ACF Residence complex				2.00																		2.00	0.37
	b) Const./Maint. of B/Paths & I/Paths																							
	i) Special Repair of Bridal Path			5	1.00			8	1.50	8	1.50	3	0.50									24	4.50	0.83
	ii) Maint. of Existing Inspection Path			8	2.00	1	1.00	5	1.50	6	1.20					6	1.00					26	6.70	1.23
	c) Const./Repair of Bridges																							
	i) Const. of Bridges					1	5.00															1	5.00	0.92
	ii) Maint.of Existing Bridges					1	2.00	1	0.50													2	2.50	0.46
	d) Const. of Van Thana		15		10																		25.00	4.60
	G. Total (7)		22.73		25.23		13.9		3.5		2.7		1				1		0		0		70.06	12.90
8	Research & Studies		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		10.00	1.84
9	Training of Forest Officers/Officials in India & Abroad				15.00		10.50																25.50	4.69

Scheme		1st Year 2009 - 10		2nd Year 2010-11		3rd year 2011-12		4th year 2012-13		5th Year 2013-14		6th Year 2014-15		7th Year 2015-16		8th year 2016-17		9th year 2017-18		10th year 2018-19		Gross Total		% age of Total outlay
Sr No.	Name of Component	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
10	Publicity, Nature Awareness Camp, Exposer Visit, Training of CBO's & Extension Programme/Workshop & Meeting/Evaluation Expenses				1.50		2.00		1.00														4.50	0.83
11	Payments for Environment Services (PES)		10.00		10.00		10.00		10.00		10.00												50.00	9.21
12	Development of Dumping Sites	1	15.00	1	15.00	1	15.00															3	45.00	8.29
13	Monitoring & Evaluation Activities		2.27		5.01		3.68		2.11		0.83		0.44		0.31		0.25		0.13		0.07		14.89	2.74
14	Operational support																							
	i) O. E		0.60		0.60		0.60		0.40		0.30		0.30		0.30		0.30		0.20		0.20		3.90	0.72
	ii) T. A		0.20		0.30		0.40		0.70		0.30		0.30		0.30		0.30		0.20		0.20		3.20	0.59
	iii) Purchase of Computers	2	1.40	2	1.40																	4	2.80	0.52
	iv) Purchase of Vehicles																							
	a) Esteem/Ambassador Car	1	7.50																			1	7.50	1.38
	b) Scorpio/Bolero Car			1	7.50																	1	7.50	1.38
	v) Books & Periodicals		0.10		0.10		0.10		0.20		0.05		0.05										0.60	0.11
	vi) Office Equipments etc		1.50		1.50																		3.00	0.55
	vii) Amenities to Staff &Labour		0.3		0.30		0.70		0.75														2.05	0.38
	G. Total (14)		11.80		11.6		1.8		2.05		0.65		0.65		0.6		0.6		0.4		0.4		30.55	5.62
	Grand Total (1 - 14)		89.59	1.00	158.98	1.00	122.21		60.42		27.07		13.64		11.25		5.50		3.22		1.87		493.75	90.91
15	Contigencies @ 10% of Total Outlay		8.96		15.90		12.22		6.04		2.71		1.36		1.13		0.55		0.32		0.19		49.37	9.09
	G. Total (1 - 15)		98.55		174.88		134.44		66.46		29.78		15.00		12.38		6.05		3.55		2.06		543.14	100.00

For Tangnu Ramai
Power Generation Pvt. Ltd.

Authorised Signatory

Divisional Forest Officer
Rohru Forest Division Rohru

Cost Estimate of Khartu Thach Nalla Stabilization

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Dry Stone Masonary Height - 1.0 mtr Length - 2.0 mtr	4	1217.00	4868.00
2	Dry Stone Masonary Height - 1.0 mtr Length - 2.5 mtr	3	1440.00	4320.00
3	Dry Stone Masonary Height - 1.0 mtr Length - 3.0 mtr	3	1666.00	4998.00
4	Dry Stone Masonary Height - 1.25 mtr Length - 2.0 mtr	4	1720.00	6880.00
5	Dry Stone Masonary Height - 1.25 mtr Length - 2.5 mtr	3	2034.00	6102.00
6	Dry Stone Masonary Height - 1.25 mtr Length - 3.0 mtr	3	2353.00	7059.00
7	Wire Crate Check dam Height - 1.0 mtr Length - 3.0 mtr	2	6813.00	13626.00
8	Wire Crate Check dam Height - 1.0 mtr Length - 2.5 mtr	3	5995.00	17985.00
9	Wire Crate Check dam Height - 1.0 mtr Length - 2.0 mtr	4	5161.00	20644.00
10	Wire Crate Check dam Height - 1.25 mtr Length - 2.5 mtr	2	8498.00	16996.00
11	Wire Crate Check dam Height - 1.25 mtr Length - 2.0 mtr	4	7352.00	29408.00
	TOTAL			**132886.00**
12	Shrubs/Bushes Plantation for Live Hedges along the bank of Nallas	1 Ha	22583.00	22583.00
	TOTAL			**155469.00**

Cost Estimate of Chasrol Nalla (Maila) Stabilization

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Dry Stone Masonary Height - 1.0 mtr Length - 2.0 mtr	5	1217.00	6085.00
2	Dry Stone Masonary Height - 1.0 mtr Length - 2.5 mtr	5	1440.00	7200.00
3	Dry Stone Masonary Height - 1.0 mtr Length - 3.0 mtr	5	1666.00	8330.00
4	Dry Stone Masonary Height - 1.25 mtr Length - 2.0 mtr	5	1720.00	8600.00
5	Dry Stone Masonary Height - 1.25 mtr Length - 2.5 mtr	5	2034.00	10170.00
6	Dry Stone Masonary Height - 1.25 mtr Length - 3.0 mtr	5	2353.00	11765.00
7	Wire Crate Check dam Height - 1.0 mtr Length - 2.0 mtr	5	5161.00	25805.00
8	Wire Crate Check dam Height - 1.0 mtr Length - 2.5 mtr	5	5995.00	29975.00
9	Wire Crate Check dam Height - 1.0 mtr Length - 3.0 mtr	5	6813.00	34065.00
10	Wire Crate Check dam Height - 1.0 mtr Length - 4.0 mtr	4	6813.00	27252.00
11	Wire Crate Check dam Height - 1.0 mtr Length - 5.0 mtr	2	6813.00	13626.00
12	Wire Crate Check dam Height - 1.25 mtr Length - 2.0 mtr	5	7352.00	36760.00
13	Wire Crate Check dam Height - 1.25 mtr Length - 2.5 mtr	4	8498.00	33992.00
14	Wire Crate Check dam Height - 1.25 mtr Length - 3.0 mtr	3	8498.00	25494.00
15	Wire Crate Check dam Height - 1.25 mtr Length - 4.0 mtr	2	8498.00	16996.00
16	Wire Crate Check dam Height - 1.25 mtr Length - 5.0 mtr	2	8498.00	16996.00
	TOTAL			**253625.00**
17	Shrubs/Bushes Plantation for Live Hedges along the bank of Nallas	3 Ha	22583.00	67749.00
	TOTAL			**321374.00**

Cost Estimate of Kattan Khad Stabilization

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Dry Stone Masonary Height - 1.0 mtr Length - 2.0 mtr	5	1217.00	6085.00
2	Dry Stone Masonary Height - 1.0 mtr Length - 2.5 mtr	4	1440.00	5760.00
3	Dry Stone Masonary Height - 1.0 mtr Length - 3.0 mtr	4	1666.00	6664.00
4	Dry Stone Masonary Height - 1.25 mtr Length - 2.0 mtr	5	1720.00	8600.00
5	Dry Stone Masonary Height - 1.25 mtr Length - 2.5 mtr	4	2034.00	8136.00
6	Dry Stone Masonary Height - 1.25 mtr Length - 3.0 mtr	3	2353.00	7059.00
7	Wire Crate Check dam Height - 1.0 mtr Length - 2.0 mtr	5	5161.00	25805.00
8	Wire Crate Check dam Height - 1.0 mtr Length - 2.5 mtr	4	5995.00	23980.00
9	Wire Crate Check dam Height - 1.0 mtr Length - 3.0 mtr	2	6813.00	13626.00
10	Wire Crate Check dam Height - 1.0 mtr Length - 4.0 mtr	2	6813.00	13626.00
11	Wire Crate Check dam Height - 1.25 mtr Length - 2.0 mtr	4	7352.00	29408.00
12	Wire Crate Check dam Height - 1.25 mtr Length - 2.5 mtr	3	8498.00	25494.00
13	Wire Crate Check dam Height - 1.25 mtr Length - 3.0 mtr	2	8498.00	16996.00
14	Wire Crate Check dam Height - 1.25 mtr Length - 4.0 mtr	2	8498.00	16996.00
	TOTAL			**174243.00**
15	Shrubs/Bushes Plantation for Live Hedges along the bank of Nallas	2 Ha	22583.00	45166.00
	TOTAL			**219409.00**

Cost Estimate of Moti Gad (Khad) Stabilization

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Dry Stone Masonary Height - 1.0 mtr Length - 2.0 mtr	5	1217.00	6085.00
2	Dry Stone Masonary Height - 1.0 mtr Length - 2.5 mtr	5	1440.00	7200.00
3	Dry Stone Masonary Height - 1.0 mtr Length - 3.0 mtr	4	1666.00	6664.00
4	Dry Stone Masonary Height - 1.25 mtr Length - 2.0 mtr	5	1720.00	8600.00
5	Dry Stone Masonary Height - 1.25 mtr Length - 2.5 mtr	4	2034.00	8136.00
6	Dry Stone Masonary Height - 1.25 mtr Length - 3.0 mtr	3	2353.00	7059.00
7	Wire Crate Check dam Height - 1.0 mtr Length - 2.0 mtr	5	5161.00	25805.00
8	Wire Crate Check dam Height - 1.0 mtr Length - 2.5 mtr	4	5995.00	23980.00
9	Wire Crate Check dam Height - 1.0 mtr Length - 3.0 mtr	3	6813.00	20439.00
10	Wire Crate Check dam Height - 1.25 mtr Length - 2.0 mtr	5	7352.00	36760.00
11	Wire Crate Check dam Height - 1.25 mtr Length - 2.5 mtr	4	8498.00	33992.00
12	Wire Crate Check dam Height - 1.25 mtr Length - 3.0 mtr	2	8498.00	16996.00
	TOTAL			**184720.00**
13	Shrubs/Bushes Plantation for Live Hedges along the bank of Nallas	1 Ha	22583.00	22583.00
	TOTAL			**207303.00**

Cost Estimate of Poiri Gad (Khad) Stabilization

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Dry Stone Masonary Height - 1.0 mtr Length - 2.0 mtr	4	1217.00	4868.00
2	Dry Stone Masonary Height - 1.0 mtr Length - 2.5 mtr	3	1440.00	4320.00
3	Dry Stone Masonary Height - 1.0 mtr Length - 3.0 mtr	2	1666.00	3332.00
4	Dry Stone Masonary Height - 1.25 mtr Length - 2.0 mtr	4	1720.00	6880.00
5	Dry Stone Masonary Height - 1.25 mtr Length - 2.5 mtr	3	2034.00	6102.00
6	Dry Stone Masonary Height - 1.25 mtr Length - 3.0 mtr	2	2353.00	4706.00
7	Wire Crate Check dam Height - 1.0 mtr Length - 2.0 mtr	4	5161.00	20644.00
8	Wire Crate Check dam Height - 1.0 mtr Length - 2.5 mtr	3	5995.00	17985.00
9	Wire Crate Check dam Height - 1.0 mtr Length - 3.0 mtr	2	6813.00	13626.00
10	Wire Crate Check dam Height - 1.0 mtr Length - 4.0 mtr	2	6813.00	13626.00
11	Wire Crate Check dam Height - 1.25 mtr Length - 2.0 mtr	3	7352.00	22056.00
12	Wire Crate Check dam Height - 1.25 mtr Length - 2.5 mtr	2	8498.00	16996.00
13	Wire Crate Check dam Height - 1.25 mtr Length - 3.0 mtr	2	8498.00	16996.00
	TOTAL			**135141.00**
14	Shrubs/Bushes Plantation for Live Hedges along the bank of Nallas	1 Ha	22583.00	22583.00
	TOTAL			**157724.00**

Cost Estimate of Sundru Nalla Stabilization

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Dry Stone Masonary Height - 1.0 mtr Length - 2.0 mtr	5	1217.00	6085.00
2	Dry Stone Masonary Height - 1.0 mtr Length - 2.5 mtr	4	1440.00	5760.00
3	Dry Stone Masonary Height - 1.0 mtr Length - 3.0 mtr	4	1666.00	6664.00
4	Dry Stone Masonary Height - 1.25 mtr Length - 2.0 mtr	5	1720.00	8600.00
5	Dry Stone Masonary Height - 1.25 mtr Length - 2.5 mtr	4	2034.00	8136.00
6	Dry Stone Masonary Height - 1.25 mtr Length - 3.0 mtr	3	2353.00	7059.00
7	Wire Crate Check dam Height - 1.0 mtr Length - 2.0 mtr	4	5161.00	20644.00
8	Wire Crate Check dam Height - 1.0 mtr Length - 2.5 mtr	3	5995.00	17985.00
9	Wire Crate Check dam Height - 1.0 mtr Length - 3.0 mtr	3	6813.00	20439.00
12	Wire Crate Check dam Height - 1.25 mtr Length - 2.0 mtr	4	7352.00	29408.00
13	Wire Crate Check dam Height - 1.25 mtr Length - 2.5 mtr	3	8498.00	25494.00
14	Wire Crate Check dam Height - 1.25 mtr Length - 3.0 mtr	2	8498.00	16996.00
	TOTAL			**156274.00**
17	Shrubs/Bushes Plantation for Live Hedges along the bank of Nallas	2 Ha	22583.00	45166.00
	TOTAL			**201440.00**

Cost Estimate of Dewar Gad Stabilization

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Dry Stone Masonary Height - 1.0 mtr Length - 2.0 mtr	5	1217.00	6085.00
2	Dry Stone Masonary Height - 1.0 mtr Length - 2.5 mtr	5	1440.00	7200.00
3	Dry Stone Masonary Height - 1.0 mtr Length - 3.0 mtr	4	1666.00	6664.00
4	Dry Stone Masonary Height - 1.25 mtr Length - 2.0 mtr	5	1720.00	8600.00
5	Dry Stone Masonary Height - 1.25 mtr Length - 2.5 mtr	5	2034.00	10170.00
6	Dry Stone Masonary Height - 1.25 mtr Length - 3.0 mtr	3	2353.00	7059.00
7	Wire Crate Check dam Height - 1.0 mtr Length - 2.0 mtr	4	5161.00	20644.00
8	Wire Crate Check dam Height - 1.0 mtr Length - 2.5 mtr	3	5995.00	17985.00
9	Wire Crate Check dam Height - 1.0 mtr Length - 3.0 mtr	3	6813.00	20439.00
10	Wire Crate Check dam Height - 1.0 mtr Length - 4.0 mtr	3	6813.00	20439.00
11	Wire Crate Check dam Height - 1.25 mtr Length - 2.0 mtr	4	7352.00	29408.00
12	Wire Crate Check dam Height - 1.25 mtr Length - 2.5 mtr	3	8498.00	25494.00
13	Wire Crate Check dam Height - 1.25 mtr Length - 3.0 mtr	3	8498.00	25494.00
14	Wire Crate Check dam Height - 1.25 mtr Length - 4.0 mtr	2	8498.00	16996.00
	TOTAL			**180187.00**
15	Shrubs/Bushes Plantation for Live Hedges along the bank of Nallas	2 Ha	22583.00	45166.00
	TOTAL			**225353.00**

Cost Estimate of Slip Stabilization

A TANGNU SLIP

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Wire Crate Protection Height - 1.25 mtr Length - 5.0 mtr	25	14324.00	358100.00
2	Wire Crate Protection Height - 1.25 mtr Length - 4.0 mtr	25	11873.00	296825.00
3	Wire Crate Protection Height - 1.25 mtr Length - 3.0 mtr	25	9611.00	240275.00
4	Wire Crate Protection Height - 1.25 mtr Length - 2.0 mtr	15	7352.00	110280.00
5	Wire Crate Protection Height - 1.0 mtr Length - 5.0 mtr	10	10288.00	102880.00
6	Wire Crate Protection Height - 1.0 mtr Length - 4.0 mtr	10	9359.00	93590.00
7	Wire Crate Protection Height - 1.0 mtr Length - 3.0 mtr	5	6813.00	34065.00
	TOTAL			**1236015.00**

B JANGHLIK SLIP

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Wire Crate Protection Height - 1.25 mtr Length - 5.0 mtr	20	14324.00	286480.00
2	Wire Crate Protection Height - 1.25 mtr Length - 4.0 mtr	15	11873.00	178095.00
3	Wire Crate Protection Height - 1.25 mtr Length - 3.0 mtr	10	9611.00	96110.00
	TOTAL			**560685.00**

C DUIDY SLIP

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Wire Crate Protection Height - 1.25 mtr Length - 5.0 mtr	15	14324.00	214860.00
2	Wire Crate Protection Height - 1.25 mtr Length - 4.0 mtr	10	11873.00	118730.00
3	Wire Crate Protection Height - 1.25 mtr Length - 3.0 mtr	10	9611.00	96110.00
	TOTAL			**429700.00**

Cost Estimate of River Bank Stabilization

Pabbar river at Janghlik Dam site

Sr. No.	Description	Nos	Rate	Amount
			Rs.	Rs.
1	Wire Crate Protection Height - 1.25 mtr Length - 5.0 mtr	10	14324.00	143240.00
2	Wire Crate Protection Height - 1.25 mtr Length - 4.0 mtr	10	11873.00	118730.00
3	Wire Crate Protection Height - 1.25 mtr Length - 3.0 mtr	10	9611.00	96110.00
4	Wire Crate Protection Height - 1.25 mtr Length - 2.5 mtr	10	8498.00	84980.00
5	Wire Crate Protection Height - 1.25 mtr Length - 2.0 mtr	10	3181.79	31817.93
	TOTAL			**474877.93**

COST MODEL FOR CONSTRUCTION OF DRY STONE CHECK DAM(HEIGHT = 1 Mtr. LENGTH =2.00 Mtr).									
S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B			Rs.	Rs.
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs., stacking the excavated soil not more than 3 meters clear from the edge of excavation and then returning the stacked soil in 15 cm layers where required into plinth sides of foundation etc. consolidating each deposited layer by ramming and watering and then disposal of excavated material within a lead of 20mtrs Pick and jumper work I) Foundation	1	2.5	1.55	0.4	1.55	Cum		
	II) Apron	1	2	1	0.3	0.6	Cum		
	Total					2.15	Cum	89.95	193.39
2	Coutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	0.5	1.55	1	1.55	Cum	36.00	55.80
3	Dry hand packed boulder stone filling in I) foundation	1	2.5	1.55	0.4	1.55	Cum		
	II) Apron	1	2	1	(0.30+0.40)/2	0.7	Cum		
	Total					2.25	Cum	57.70	129.83
4	Construction of check dam/Checkwalls in dry rough stone masonry i/c dressing in Super structure	1	(3.00+2.50)/2	(0.50+1.55)/2	1	2.82	Cum	111.00	313.02
5	Breaking of Boulder Stones @ 25% of the qty. of stone masonry in super structure					0.71	Cum	100.00	71.00
6	Carriage of B/STONES from local nallah to work site over distance 0.200 Km by Manual Labour					5.07	Cum	207.40	210.30
	Total								973.34
7	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								243.34
	Total								**1216.68**
	Or Say								**1217.00**

COST MODEL FOR CONSTRUCTION OF DRY STONE CHECK DAM(HEIGHT = 1 Mtr. LENGTH =2.50 Mtr).									
S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B			Rs.	Rs.
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs., stacking the excavated soil not more than 3 meters clear from the edge of excavation and then returning the stacked soil in 15 cm layers where required into plinth sides of foundation etc. consolidating each deposited layer by ramming and watering and then disposal of excavated material within a lead of 20mtrs Pick and jumper work I) Foundation	1	3	1.55	0.4	1.86	Cum		
	II) Apron	1	2.5	1	0.3	0.75	Cum		
	Total					2.61	Cum	89.95	234.77
2	Coutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	0.5	1.55	1	1.55	Cum	36.00	55.80
3	Dry hand packed boulder stone filling in I) foundation	1	3	1.55	0.4	1.86	Cum		
	II) Apron	1	2.5	1	(0.30+0.40)/2	0.87	Cum		
	Total					2.73	Cum	57.70	157.52
4	Construction of check dam/Checkwalls in dry rough stone masonry i/c dressing in Super structure	1	(3.50+3.00)/2	(0.50+1.55)/2	1	3.33	Cum	111.00	369.63
5	Breaking of Boulder Stones @ 25% of the qty. of stone masonry in super structure					0.83	Cum	100.00	83.00
6	Carriage of B/STONES from local nallah to work site over distance 0.200 Km by Manual Labour					6.06	Cum	207.40	251.37
	Total								**1152.09**
11	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								288.02
	Total								**1440.11**
	Or Say								**1440.00**

COST MODEL FOR CONSTRUCTION OF DRY STONE CHECK DAM(HEIGHT = 1 Mtr. LENGTH =3.00 Mtr).									
S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B			Rs.	Rs.
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs., stacking the excavated soil not more than 3 meters clear from the edge of excavation and then returning the stacked soil in 15 cm layers where required into plinth sides of foundation etc. consolidating each deposited layer by ramming and watering and then disposal of excavated material within a lead of 20mtrs Pick and jumper work I) Foundation	1	3.5	1.55	0.4	2.17	Cum		
	II) Apron	1	3	1	0.3	0.9	Cum		
	Total					3.07	Cum	89.95	276.15
2	Coutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	0.5	1.55	1	1.55	Cum	36.00	55.80
3	Dry hand packed boulder stone filling in I) foundation	1	3.5	1.55	0.4	2.17	Cum		
	II) Apron	1	3	1	(0.30+0.40)/2	1.05	Cum		
	Total					3.22	Cum	57.70	185.79
4	Construction of check dam/Checkwalls in dry rough stone masonry i/c dressing in Super structure	1	(3.50+4.00)/2	(0.50+1.55)/2	1	3.84	Cum	111.00	426.24
5	Breaking of Boulder Stones @ 25% of the qty. of stone masonry in super structure					0.96	Cum	100.00	96.00
6	Carriage of B/STONES from local nallah to work site over distance 0.200 Km by Manual Labour					7.06	Cum	207.40	292.85
	Total								**1332.83**
7	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								333.21
	Total								**1666.04**
	Or Say								**1666.00**

COST MODEL FOR CONSTRUCTION OF DRY STONE CHECK DAM(HEIGHT = 1.25 Mtr. LENGTH =3.00 Mtr).									
S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B			Rs.	Rs.
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs., stacking the excavated soil not more than 3 meters clear from the edge of excavation and then returning the stacked soil in 15 cm layers where required into plinth sides of foundation etc. consolidating each deposited layer by ramming and watering and then disposal of excavated material within a lead of 20mtrs Pick and jumper work I) Foundation	1	3.5	1.82	0.5	3.19	Cum		
	II) Apron	1	3	1.25	0.3	1.13	Cum		
	Total					4.32	Cum	89.95	388.58
2	Coutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	0.5	1.82	1.25	2.28	Cum	36.00	82.08
3	Dry hand packed boulder stone filling in I) foundation	1	3.5	1.82	0.5	3.19	Cum		
	II) Apron	1	3	1.25	(0.30+0.40)/2	1.31	Cum		
	Total					4.5	Cum	57.70	259.65
4	Construction of check dam/Checkwalls in dry rough stone masonry i/c dressing in Super structure	1	(3.50+4.00)/2	(0.50+1.82)/2	1.25	5.44	Cum	111.00	603.84
5	Breaking of Boulder Stones @ 25% of the qty. of stone masonry in super structure					1.36	Cum	100.00	136.00
6	Carriage of B/STONES from local nallah to work site over distance 0.200 Km by Manual Labour					9.94	Cum	207.40	412.31
	Total								**1882.47**
11	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								470.62
	Total								**2353.08**
	Or Say								**2353.00**

COST MODEL FOR CONSTRUCTION OF DRY STONE CHECK DAM(HEIGHT = 1.25 Mtr. LENGTH =2.50 Mtr).									
S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B			Rs.	Rs.
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs., stacking the excavated soil not more than 3 meters clear from the edge of excavation and then returning the stacked soil in 15 cm layers where required into plinth sides of foundation etc. consolidating each deposited layer by ramming and watering and then disposal of excavated material within a lead of 20mtrs Pick and jumper work I) Foundation	1	3	1.82	0.5	2.73	Cum		
	II) Apron	1	2.5	1.25	0.3	0.94	Cum		
	Total					3.67	Cum	89.95	330.12
2	Coutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	0.5	1.82	1.25	2.28	Cum	36.00	82.08
3	Dry hand packed boulder stone filling in I) foundation	1	3	1.82	0.5	2.73	Cum		
	II) Apron	1	2.5	1.25	(0.30+0.40)/2	1.09	Cum		
	Total					3.82	Cum	57.70	220.41
4	Construction of check dam/Checkwalls in dry rough stone masonry i/c dressing in Super structure	1	(3.50+3.00)/2	(0.50+1.82)/2	1.25	4.71	Cum	111.00	522.81
5	Breaking of Boulder Stones @ 25% of the qty. of stone masonry in super structure					1.18	Cum	100.00	118.00
6	Carriage of B/STONES from local nallah to work site over distance 0.200 Km by Manual Labour					8.53	Cum	207.40	353.82
	Total								**1627.24**
7	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								406.81
	Total								**2034.06**
	Or Say								**2034.00**

COST MODEL FOR CONSTRUCTION OF DRY STONE CHECK DAM(HEIGHT = 1.25 Mtr. LENGTH =2.00 Mtr).									
S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B			Rs.	Rs.
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs., stacking the excavated soil not more than 3 meters clear from the edge of excavation and then returning the stacked soil in 15 cm layers where required into plinth sides of foundation etc. consolidating each deposited layer by ramming and watering and then disposal of excavated material within a lead of 20mtrs Pick and jumper work I) Foundation	1	2.5	1.82	0.5	2.28	Cum		
	II) Apron	1	2	1.25	0.3	0.75	Cum		
	Total					3.03	Cum	89.95	272.55
2	Coutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	0.5	1.82	1.25	2.28	Cum	36.00	82.08
3	Dry hand packed boulder stone filling in I) foundation	1	2.5	1.82	0.5	2.28	Cum		
	II) Apron	1	2	1.25	(0.30+0.40)/2	0.88	Cum		
	Total					3.16	Cum	57.70	182.33
4	Construction of check dam/Checkwalls in dry rough stone masonry i/c dressing in Super structure	1	(3.0+2.5)/2	(0.50+1.82)/2	1.25	3.99	Cum	111.00	442.89
5	Breaking of Boulder Stones @ 25% of the qty. of stone masonry in super structure					1	Cum	100.00	100.00
6	Carriage of B/STONES from local nallah to work site over distance 0.200 Km by Manual Labour					7.15	Cum	207.40	296.58
	Total								**1376.43**
7	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								344.11
	Total								**1720.54**
	Or Say								**1720.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1 Mtr. LENGTH = 5 Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1	5.77	0.9	0.4	2.08	CUM		
	Apron	1	3.75	1	0.3	1.13	CUM		
	Total					3.20	CUM	89.95	288.04
2	Cutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	(0.50+0.75)/2	0.9	1.4	1.58	CUM	36.00	56.88
3	Dry hand packed boulder stone filling in foundation	1	5.77	0.9	0.4	2.08	CUM		
	Apron	1	3.75	1	(0.30+0.40)/2	1.31	CUM		
	Total					3.39	CUM	57.70	195.44
4	Construction of super structure of check dam	1	6.34	0.75	1.4	6.66	CUM		
	Deduction of spillway	1	2.5	1	0.4	-0.75	CUM		
	Total					5.91	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					1.48	CUM	111	163.92
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					4.43	CUM	57.70	255.63
5	Spreading of wire cartes over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	5.77	0.9	0	5.19	SqM		
	Sides i/c 15cm top	2	5.77	0	0.95	10.96	SqM		
	Ends	2	0	0.9	0.4	1.08	SqM		
	ii) Apron Top/Bottom	2	3.75	1	0	7.50	SqM		
	D/S side	1	3.75	0	0.4	1.50	SqM		
	Ends	2	0	1	(0.30+0.40)/2	1.05	SqM		
	iii) Super Structure 2 Top / Bottom	2	6.34	0.75	0	9.51	SqM		
	Sides	2	6.34	0	1.4	17.75	SqM		
	Ends	3	0	0.75	1.4	3.15	SqM		
	Deduction of spillway Side	2	2.5	0	0.4	-2.00	SqM		
	Total					55.69	SqM	11.80	657.14
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	9.29	CUM	39.60	368.05
7	Breaking of Boulder Stones					5.91	CUM	100.00	590.70
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					9.29	CUM/Km	207.40	1541.40
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.16	Tonne/Km	258.00	103.20
	Total								**4220.39**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								1055.10
	Total								**5275.49**
11	Add cost of GI Wire upto road site					55.69		90.00	5012.10
	Grand Total								**10287.59**
	Or Say								**10288.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1 Mtr. LENGTH = 4 Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1	4.73	0.9	0.4	1.70	CUM		
	Apron	1	3.00	1	0.3	0.90	CUM		
	Total					2.60	CUM	89.95	234.12
2	Cutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	(0.50+0.75)/2	0.9	1.4	1.58	CUM	36.00	56.88
3	Dry hand packed boulder stone filling in foundation	1	4.73	0.9	0.4	1.70	CUM		
	Apron	1	3.75	1	(0.30+0.40)/2	1.05	CUM		
	Total					2.75	CUM	57.70	158.84
4	Construction of super structure of check dam	1	5.3	0.75	1.4	5.57	CUM		
	Deduction of spillway	1	2	0.75	0.4	-0.6	CUM		
	Total					4.97	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					1.24	CUM	111	137.78
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					3.72	CUM	57.70	214.86
5	Spreading of wire cartes over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	4.73	0.9	0	4.26	SqM		
	Sides i/c 15cm top	2	4.73	0	0.95	8.98	SqM		
	Ends	2	0	0.9	0.4	0.72	SqM		
	ii) Apron Top/Bottom	2	3	1	0	6.00	SqM		
	D/S side	1	3	0	0.4	1.20	SqM		
	Ends	2	0	1	(0.30+0.40)/2	0.7	SqM		
	iii) Super Structure 2 Top / Bottom	2	4.73	0.75	0	7.95	SqM		
	Sides	2	4.73	0	1.4	14.84	SqM		
	Ends	3	0	0.75	1.4	2.1	SqM		
	Deduction of spillway Side	2	2	0	0.4	-1.60	SqM		
	Total					45.74	SqM	11.80	539.73
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	7.72	CUM	39.60	305.62
7	Breaking of Boulder Stones					4.97	CUM	100.00	496.50
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					7.72	CUM/Km	207.40	1280.54
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.062	Tonne/Km	258.00	52.89
	Total								**3477.76**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								869.44
	Total								**4347.20**
11	Add cost of GI Wire upto road site					55.69		90.00	5012.10
	Grand Total								**9359.30**
	Or Say								**9359.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1 Mtr. LENGTH = 3 Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1	3.69	0.9	0.4	1.33	CUM		
	Apron	1	2.25	1	0.3	0.68	CUM		
	Total					2.00	CUM	89.95	180.21
2	Cutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	(0.50+0.75)/2	0.9	1.4	1.58	CUM	36.00	56.88
3	Dry hand packed boulder stone filling in foundation	1	3.69	0.9	0.4	1.33	CUM		
	Apron	1	2.25	1	(0.30+0.40)/2	0.79	CUM		
	Total					2.12	CUM	57.70	122.23
4	Construction of super structure of check dam	1	4.26	0.75	1.4	4.47	CUM		
	Deduction of spillway	1	1.5	0.75	0.4	-0.45	CUM		
	Total					4.02	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					1.01	CUM	111	111.64
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					3.02	CUM	57.70	174.10
5	Spreading of wire cartes over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	3.69	0.9	0	3.32	SqM		
	Sides i/c 15cm top	2	3.69	0	0.95	7.01	SqM		
	Ends	2	0	0.9	0.4	0.72	SqM		
	ii) Apron Top/Bottom	2	2.25	1	0	4.50	SqM		
	D/S side	1	2.25	0	0.4	0.90	SqM		
	Ends	2	0	1	(0.30+0.40)/2	0.7	SqM		
	iii) Super Structure 2 Top / Bottom	2	4.26	0.75	0	6.39	SqM		
	Sides	2	4.26	0	1.4	11.93	SqM		
	Ends	2	0	0.75	1.4	2.1	SqM		
	Deduction of spillway Side	2	1.5	0	0.4	-0.60	SqM		
	Total					36.97	SqM	11.80	436.25
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	6.14	CUM	39.60	243.20
7	Breaking of Boulder Stones					4.02	CUM	100.00	402.30
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					6.14	CUM/Km	207.40	1018.98
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.066	Tonne/Km	258.00	42.57
	Total								**2788.35**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								697.09
	Total								**3485.43**
11	Add cost of GI Wire upto road site					36.97		90.00	3327.30
	Grand Total								**6812.73**
	Or Say								**6813.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1 Mtr. LENGTH = 2.50 Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1	3.17	0.9	0.4	1.14	CUM		
	Apron	1	1.88	1	0.3	0.56	CUM		
	Total					1.71	CUM	89.95	153.38
2	Cutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	(0.50+0.75)/2	0.9	1.4	1.58	CUM	36.00	56.88
3	Dry hand packed boulder stone filling in foundation	1	3.17	0.9	0.4	1.14	CUM		
	Apron	1	1.88	1	(0.30+0.40)/2	0.66	CUM		
	Total					1.80	CUM	57.70	103.93
4	Construction of super structure of check dam	1	3.75	0.75	1.4	3.94	CUM		
	Deduction of spillway	1	1.25	0.75	0.4	-0.38	CUM		
	Total					3.56	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					0.89	CUM	111	98.72
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					2.67	CUM	57.70	153.95
5	Spreading of wire cartes over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	3.17	0.9	0	2.85	SqM		
	Sides i/c 15cm top	2	3.17	0	0.95	6.02	SqM		
	Ends	2	0	0.9	0.4	0.72	SqM		
	ii) Apron Top/Bottom	2	1.88	1	0	3.76	SqM		
	D/S side	1	1.88	0	0.4	0.75	SqM		
	Ends	2	0	1	(0.30+0.40)/2	0.7	SqM		
	iii) Super Structure 2 Top / Bottom	2	3.75	0.75	0	5.63	SqM		
	Sides	2	3.75	0	1.4	10.5	SqM		
	Ends	2	0	0.75	1.4	2.1	SqM		
	Deduction of spillway Side	2	1.25	0	0.4	-1.00	SqM		
	Total					32.63	SqM	11.80	385.03
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	5.36	CUM	39.60	212.20
7	Breaking of Boulder Stones					3.56	CUM	100.00	355.75
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					5.36	CUM/Km	207.40	889.12
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.058	Tonne/Km	258.00	37.41
	Total								**2446.38**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								611.59
	Total								**3057.97**
11	Add cost of GI Wire upto road site					32.63		90.00	2936.70
	Grand Total								**5994.67**
	Or Say								**5995.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1 Mtr. LENGTH = 2 Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1	2.65	0.9	0.4	0.95	CUM		
	Apron	1	1.50	1	0.3	0.45	CUM		
	Total					1.40	CUM	89.95	126.29
2	Cutting in earth work and disposal of excavated earthup to a lead of 20 mtrs	2	(0.50+0.75)/2	0.9	1.4	1.58	CUM	36.00	56.88
3	Dry hand packed boulder stone filling in foundation	1	2.65	0.9	0.4	0.95	CUM		
	Apron	1	1.5	1	(0.30+0.40)/2	0.53	CUM		
	Total					1.48	CUM	57.70	85.63
4	Construction of super structure of check dam	1	3.22	0.75	1.4	3.38	CUM		
	Deduction of spillway	1	1	0.75	0.4	-0.3	CUM		
	Total					3.08	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					0.77	CUM	111	85.50
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					2.31	CUM	57.70	133.33
5	Spreading of wire cartes over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	2.65	0.9	0	2.39	SqM		
	Sides i/c 15cm top	2	2.65	0	0.95	5.03	SqM		
	Ends	2	0	0.9	0.4	0.72	SqM		
	ii) Apron Top/Bottom	2	1.5	1	0	3.00	SqM		
	D/S side	1	1.5	0	0.4	0.60	SqM		
	Ends	2	0	1	(0.30+0.40)/2	0.7	SqM		
	iii) Super Structure 2 Top / Bottom	2	3.22	0.75	0	4.83	SqM		
	Sides	2	3.22	0	1.4	9.02	SqM		
	Ends	2	0	0.75	1.4	2.1	SqM		
	Deduction of spillway Side	2	1	0	0.4	-0.80	SqM		
	Total					28.18	SqM	11.80	332.52
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	4.57	CUM	39.60	180.77
7	Breaking of Boulder Stones					3.08	CUM	100.00	308.10
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					4.57	CUM/Km	207.40	758.25
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.05	Tonne/Km	258.00	32.25
	Total								**2099.53**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								524.88
	Total								**2624.41**
11	Add cost of GI Wire upto road site					28.18		90.00	2536.20
	Grand Total								**5160.61**
	Or Say								**5161.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1.25 Mtr. LENGTH = 5 Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1							
			5.77	1.15	0.45	2.99	CUM		
	Apron	1	3.75	1.25	0.3	1.41	CUM		
	Total					4.39	CUM	89.95	395.08
2	Cutting in earth work and disposal of excavated earth upto a lead of 20 mtrs in anchorage	2	(0.50+0.75)/2	1.15	1.85	2.37	CUM	36.00	85.32
3	Dry hand packed boulder stone filling in i) foundation	1	5.77	1.15	0.45	2.99	CUM		
	ii)Apron	1	3.75	1.25	(0.30+0.40)/2	1.84	CUM		
	Total					4.83	CUM	57.70	266.92
4	Construction of super structure of check dam Ist	1	6.34	1.15	0.625	4.56	CUM		
	2nd Block	1	6.34	0.95	0.625	3.76			
	3rd Block	2	1.92	0.75	0.4	1.15			
	Total					9.47	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					2.37	CUM	111	262.88
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					7.10	CUM	57.70	409.95
5	Spreading of wire cartes over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	5.77	1.15	0	6.64	SqM		
	Sides i/c 15cm top	2	5.77	0	0.45	5.19	SqM		
	Ends	3	0	1.15	0.45	1.55	SqM		
	Apron Top/Bottom	2	3.75	1.25	0	9.38	SqM		
	D/S side	1	3.75	0	0.4	1.50	SqM		
	Ends	2	0	1.25	(0.30+0.40)/2	0.88	SqM		
	Super Structure 1st Block Top / Bottom	2	6.34	1.15	0	14.58	SqM		
	Sides	2	6.34	0	0.625	7.93	SqM		
	Ends	3	0	1.15	0.625	2.15	SqM		
	Super Structure 2nd Block Top / Bottom	1	6.34	0.95	0	6.02	SqM		
	Sides	2	6.34	0	0.925	7.93	SqM		
	Ends	3	0	0.95	0.925	1.76	SqM		
	Super Structure 3rd Block Top / Bottom	2	1.92	0.75	0	2.88	SqM		
	Sides	2X2	1.92	0	0.4	3.07	SqM		
	Ends	4	0	0.75	0.4	1.2	SqM		
	TOTAL					72.66		11.8	857.57
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	14.10	CUM	39.60	558.33
7	Breaking of Boulder Stones					9.47	CUM	100.00	947.33
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					14.10	CUM/Km	207.40	2339.34
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.16	Tonne/Km	258.00	103.20
	Total								**6225.93**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								1556.48
	Total								**7782.41**
11	Add cost of GI Wire upto road site					72.66		90.00	6541.20
	Grand Total								**14323.61**
	Or Say								**14324.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1.25 Mtr. LENGTH = 4 Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1	4.73	1.15	0.45	2.45	CUM		
	Apron	1	3	1.25	0.3	1.13	CUM		
	Total					3.57	CUM	89.95	321.37
2	Cutting in earth work and disposal of excavated earth upto a lead of 20 mtrs in anchorage	2	(0.50+0.75)/2	1.15	1.65	2.37	CUM	36.00	85.32
3	Dry hand packed boulder stone filling in i) foundation	1	4.73	1.15	0.45	2.45	CUM		
	ii)Apron	1	3	1.25	(0.30+0.40)/2	1.31	CUM		
	Total					3.76	CUM	57.70	216.82
4	Construction of super structure of check dam 1st	1	5.3	1.15	0.625	3.81	CUM		
	2nd Block	1	5.3	0.95	0.625	3.15			
	3rd Block	2	1.65	0.75	0.4	0.99			
	Total					7.95	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					1.99	CUM	111	220.61
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					5.96	CUM	57.70	343.87
5	Spreading of wire cartes over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	4.73	1.15	0	5.44	SqM		
	Sides i/c 15cm top	2	4.73	0	0.45	4.25	SqM		
	Ends	3		1.15	0.45	1.04	SqM		
	Apron Top/Bottom	2	3	1.25	0	7.50	SqM		
	D/S side	1	3	0	0.4	1.20	SqM		
	Ends	2	0	1.25	(0.30+0.40)/2	0.88	SqM		
	Super Structure 1st Block Top / Bottom	2	5.3	1.15	0	12.19	SqM		
	Sides	2	5.3	0	0.625	6.63	SqM		
	Ends	3	0	1.15	0.625	1.44	SqM		
	Super Structure 2nd Block Top / Bottom	1	5.3	0.95	0	5.04	SqM		
	Sides	2	5.3	0	0.925	6.63	SqM		
	Ends	3	0	0.95	0.925	1.19	SqM		
	Super Structure 3rd Block Top / Bottom	2	1.65	0.75	0	2.48	SqM		
	Sides	2X2	1.65	0	0.4	2.64	SqM		
	Ends	4	0	0.75	0.4	1.2	SqM		
	TOTAL					59.75		11.8	705.04
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	11.70	CUM	39.60	463.48
7	Breaking of Boulder Stones					7.95	CUM	100.00	794.63
8	Carriage of B/STONES from local nalah to work site over distance 0.800 Km by Manual Labour					11.70	CUM/Km	207.40	1941.93
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.16	Tonne/Km	258.00	103.20
	Total								**5196.18**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								1299.04
	Total								**6495.22**
11	Add cost of GI Wire upto road site					59.75		90.00	5377.50
	Grand Total								**11872.72**
	Or Say								**11873.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1.25 Mtr. LENGTH = 2 Mtr).									
S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1							
	Apron	1	2.65	1.15	0.45	1.37	CUM		
	Total		1.5	1.25	0.3	0.56	CUM		
						1.93	CUM	89.95	173.95
2	Cutting in earth work and disposal of excavated earth upto a lead of 20 mtrs in anchorage	2	(0.50+0.75)/2	1.15	1.65	2.37	CUM	36.00	85.32
3	Dry hand packed boulder stone filling in i) foundation	1	2.65	1.15	0.45	1.37	CUM		
	ii)Apron	1	1.5	1.25	(0.30+0.40)/2	0.66	CUM		
	Total					2.03	CUM	57.70	117.21
4	Construction of super structure of check dam 1st	1	3.22	1.15	0.625	2.31	CUM		
	2nd Block	1	3.22	0.95	0.625	1.91			
	3rd Block	2	1.11	0.75	0.4	0.67			
	Total					4.89	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					1.22	CUM	111	135.78
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					3.67	CUM	57.70	211.71
5	Spreading of wire cartes over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	2.65	1.15	0	3.05	SqM		
	Sides i/c 15cm top	2	2.65	0	0.45	2.38	SqM		
	Ends	3	0	1.15	0.45	1.04	SqM		
	Apron Top/Bottom	2	1.5	1.25	0	3.75	SqM		
	D/S side	1	1.5	0	0.4	0.60	SqM		
	Ends	2	0	1.25	(0.30+0.40)/2	0.88	SqM		
	Super Structure 1st Block Top / Bottom	2	3.22	1.15	0	7.41	SqM		
	Sides	2	3.22	0	0.625	4.02	SqM		
	Ends	3	0	1.15	0.625	1.44	SqM		
	Super Structure 2nd Block Top / Bottom	1	3.22	0.95	0	3.06	SqM		
	Sides	2	3.22	0	0.925	4.03	SqM		
	Ends	3	0	0.95	0.925	1.19	SqM		
	Super Structure 3rd Block Top / Bottom	2	1.11	0.75	0	1.67	SqM		
	Sides	2X2	1.11	0	0.4	1.78	SqM		
	Ends	4	0	0.75	0.4	1.2	SqM		
	TOTAL					37.50		11.8	442.47
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	6.92	CUM	39.60	274.18
7	Breaking of Boulder Stones					4.89	CUM	100.00	489.23
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					6.92	CUM/Km	207.40	1148.77
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.78	Tonne/Km	256.00	199.20
	Total								3161.79
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								796.45
	Total								3977.24
11	Add cost of GI Wire upto road site					37.5		90.00	3375.00
	Grand Total								7352.24
	Or Say								7352.00

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1.25 Mtr. LENGTH = 2.50 Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1							
	Apron	1	3.17	1.15	0.45	1.64	CUM		
	Total	1	1.88	1.25	0.3	0.71	CUM		
2	Cutting in earth work and disposal of excavated earth upto a lead of 20 mtrs in anchorage	2	(0.56+0.75)/2	1.15	1.65	2.35	CUM	89.95	210.98
3	Dry hand pecked boulder stone filling in i) foundation	1	3.17	1.15	0.45	2.37	CUM	36.00	85.32
	ii)Apron	1	1.88	1.25	(0.30+0.40)/2	1.64	CUM		
	Total					0.82	CUM		
4	Construction of super structure of check dam 1st	1	3.75	1.15	0.625	2.46	CUM	57.70	141.97
	2nd Block	1	3.75	0.95	0.625	2.7	CUM		
	3rd Block	2	1.25	0.75	0.4	2.23			
						0.75			
	Total								
	i) Dry Random Rubble Stone masonry@ 25%					5.67	CUM		
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					1.42	CUM	111	157.39
5	Spreading of wire carles over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	3.17	1.15	0	4.25	CUM	57.70	245.45
	Sides i/c 15cm lap	2	3.17	0	0.45	3.65	SqM		
	Ends	3	0	1.15	0.45	2.85	SqM		
	Apron Top/Bottom	2	1.88	1.25	0	1.04	SqM		
	D/S side	1	1.88	0	0.4	4.70	SqM		
	Ends	2	0	1.25	(0.30+0.40)/2	0.75	SqM		
	Super Structure 1st Block Top / Bottom	2	3.75	1.15	0	0.88	SqM		
	Sides	2	3.75	0	0.625	8.63	SqM		
	Ends	3	0	1.15	0.625	4.69	SqM		
	Super Structure 2nd Block Top / Bottom	1	3.75	0.95	0	1.44	SqM		
	Sides	2	3.75	0	0.925	3.56	SqM		
	Ends	3	0	0.95	0.925	4.69	SqM		
	Super Structure 3rd Block Top / Bottom	2	1.25	0.75	0	1.19	SqM		
	Sides	2X2	1.25	0	0.4	1.88	SqM		
	Ends	4	0	0.75	0.4	2	SqM		
	TOTAL					1.2	SqM		
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	43.15		11.8	509.12
7	Breaking of Boulder Stones					8.13	CUM	39.60	322.04
						5.67	CUM	100.00	567.19
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					8.13	CUM/Km	207.40	1349.32
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.16	Tonne/Km	258.00	103.20
	Total								**3691.97**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								922.99
	Total								**4614.97**
11	Add cost of GI Wire upto road site					43.15		90.00	3883.50
	Grand Total								**8498.47**
	Or Say								**8498.00**

COST MODEL FOR CONSTRUCTION OF WIRE CRATE CHECK DAM(HEIGHT = 1.25 Mtr, LENGTH = 3.00Mtr).

S.No.	Particulars	Nos.	Measurements			Qty.	Unit	Rate	Amount
			L	B	H/B				
1	Excavation in foundation trenches in earth work, lift up to 1.50 mtrs. and then disposal of excavated material within a lead of 20mtrs Pick and jumper work foundation	1	3.69	1.15	0.45	1.91	CUM		
	Apron	1	2.25	1.25	0.3	0.84	CUM		
	Total					2.75	CUM	89.95	247.66
2	Cutting in earth work and disposal of excavated earth upto a lead of 20 mtrs in anchorage	2	(0.50+0.75)/2	1.15	1.65	2.37	CUM	36.00	85.32
3	Dry hand packed boulder stone filling in i) foundation	1	3.69	1.15	0.45	1.91	CUM		
	ii)Apron	1	2.25	1.25	(0.30+0.40)/2	0.98	CUM		
	Total					2.89	CUM	57.70	166.73
4	Construction of super structure of check dam 1st	1	4.26	1.15	0.625	3.06	CUM		
	2nd Block	1	4.26	0.95	0.625	2.53			
	3rd Block	2	1.38	0.75	0.4	0.83			
	Total					6.42	CUM		
	i) Dry Random Rubble Stone masonry@ 25%					1.60	CUM	111	178.13
	ii) Boulder filling dry hand packed tightly in wire crate @ 75%					4.81	CUM	57.70	277.79
5	Spreading of wire caries over pitching, stone masonry, boulder filling etc i) Foundation Bottom	1	3.69	1.15	0	4.24	SqM		
	Sides i/c 15cm top	2	3.69	0	0.45	3.32	SqM		
	Ends	3	0	1.15	0.45	1.04	SqM		
	Apron Top/Bottom	2	2.25	1.25	0	5.63	SqM		
	D/S side	1	2.25	0	0.4	0.90	SqM		
	Ends	2	0	1.25	(0.30+0.40)/2	0.88	SqM		
	Super Structure 1st Block Top / Bottom	2	4.26	1.15	0	9.8	SqM		
	Sides	2	4.26	0	0.625	5.33	SqM		
	Ends	3	0	1.15	0.625	1.44	SqM		
	Super Structure 2nd Block Top / Bottom	1	4.26	0.95	0	4.05	SqM		
	Sides	2	4.26	0	0.925	5.33	SqM		
	Ends	3	0	0.95	0.925	1.19	SqM		
	Super Structure 3rd Block Top / Bottom	2	1.38	0.75	0	2.07	SqM		
	Sides	2X2	1.38	0	0.4	2.21	SqM		
	Ends	4		0.75	0.4	1.2	SqM		
	TOTAL					48.63		11.8	573.88
6	Tipping of wire crate i/c equipment Qty. same as per item no. 3+4	0	0	0	0	9.31	CUM	39.60	368.63
7	Breaking of Boulder Stones					6.42	CUM	100.00	641.93
8	Carriage of B/STONES from local nallah to work site over distance 0.800 Km by Manual Labour					9.31	CUM/Km	207.40	1544.62
9	Carriage of GI wire from raod to work site over distance 2.5 Km by Manual Labour					0.16	Tonne/Km	258.00	103.20
	Total								**4187.79**
10	Add 25% increase (on acount of enhancement of labour basic rates and on schedule of labour and works rates)								1046.95
	Total								**5234.73**
11	Add cost of GI Wire upto road site					48.63		90.00	4376.70
	Grand Total								**9611.43**
	Or Say								**9611.00**

For Tangnu Ramai
Power Generation Pvt. Ltd.

Authorised Signatory

Divisional Forest Officer
Rohru Forest Division Rohru