

**CATCHMENT AREA TREATMENT PLAN
FOR
UPPER NANTI
(12.00 MW)**

DISTRICT SHIMLA, HIMACHAL PRADESH



PROJECT PERIOD: 2011-12 TO 2020-21

TOTAL PROJECT COST RS. 2,10,69,184/-

PROMOTER: -M/S NANTI HYDRO POWER (P) LTD.

**DIVISIONAL FOREST OFFICER
RAMPUR FOREST DIVISION RAMPUR**

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CHAPTER-I
General Description of the Tract

1. INTRODUCTION :

Himachal Pradesh is endowed with about 21000 MW of exploitable hydro potential, excluding about 750 MW in small/mini/micro hydel potential, in its five river basins. It also provides excellent opportunities for power generation to bridge the gap between demand and supply of power in the state. The electric power being a vital and essential infrastructure has a significant role to play in economic development and upliftment of people.

It has five river basins, which provide an ample scope for development of Hydro power potential. Out of these five basins, Sutlej basin has the highest potential of about 9,227 MW of electricity. The life of a hydro electric project primarily depends on the rate of soil erosion in the catchments area of the project, its transportation and deposition in the reservoir. Soil erosion occurs due to number of abiotic and biotic factors like, topography of the catchments, soil characteristics, meteorological conditions such as precipitation and its intensity in the form of rainfall and snow fall and its types. It is therefore imperative to control one or more of the most crucial contributes of the factors triggering soil erosion, which will enhance the life of a reservoir. Being environment friendly source of energy, Govt. of India / Govt. of Himachal Pradesh has encouraged participation of private sector in a big way, with renewed set of incentives for its exploitation.

The Govt. of Himachal Pradesh has entrusted the task of implementation of self identified Upper Nanti hydro Electric project to **M/S. Nanti Hydro Power Private Ltd.** in the private sector on Build, Own, Operate and Maintain (BOOM) basis.

The Upper Nanti Hydro Electric Project is a run of river scheme on Nanti Khad, a tributary of Sutlej River in Distt. Shimla

(H.P.) It is a perennial snow fed / glacier fed nallah which emanates at an elevation of $\pm 4689\text{m}$ and flows mostly in south westerly to westerly direction before it joins Sutlej river at an El. $\pm 1000\text{m}$. The total catchment up to proposed diversion site is 57.94 Sq. Km . The gradient of khad is very steep in the entire length. The catchments area above weir site comprises dense forests and some parts are under permanent snow.

The proposed Upper Nanti Small Hydro Electric Project (12MW) is located on the right bank of Nanti Khad near Nanti village, a tributary of Sutlej river. The project envisages the construction of trench weir across Nanti khad, a water conductor system comprising of conveyance channel, desilting tank, Power channel/Head race tunnel, surface forebay tank, surface pen stock and a surface power house having 12 MW installed capacity on the right bank of Nanti khad at El 2210 m. Power house shall have two generating units of 6000 KW each along with auxiliary facilities such as cooling water / potable water supply system, fire fighting system, compressed air supply, oil system, ventilation and air conditioning system.

Power house is located near village Rungcha at a distance of about 30 km from Jeori, which is situated on NH-22 at a distance of 175 km from Shimla (H.P.)

Harnessing of the vast potential of Hydroelectric Projects in the Sutlej catchments has already been started in good pace. But the locality factors in general are not very conducive for such fast development. The hills are generally steep and covered with pines forest.

Keeping in view the number of hydroelectric projects coming up in Shimla district and the condition of the catchments & hydel potential it is imperative to invest in these projects to preserve and improve the catchments area.

1.1 Name and location:

The Project is situated near village Upper Nanti on Nanti Khad a right bank tributary of Sutlej River and joins the latter near Jeori, which is at a distance of 155 km from Shimla. It is a perennial snow fed/glacier fed nallah which emanates at an Elevation of $\pm 4600\text{m}$ and flows mostly in south-westerly to westerly direction before it joins Sutlej river at an EI of $\pm 1350\text{m}$. The scheme is located between latitude $31^{\circ}\text{-}40'$ N and longitude $77^{\circ}\text{-}40'$ E.

1.2 Topography and Drainage:

The terrain of the catchments area is mainly mountainous which can be described as moderate to steep and covered with pine forests. The hill slopes are covered with boulders and mostly not suitable for cultivation. Rock outcrops and exposures are frequently encountered on both the banks. The whole area drains into Nanti khad and ultimately drains into river Sutlej. Topo sheet 53E/10 and 53E/14 covers the project area as well as catchments area of the project.

1.3 Geology and Rock:

The geological formation in the catchments area is as follows:

- i) Pre Cambrian – Schist, gneises, grains, quartzite.
- ii) Late Pre-Cambrian Himanta System – Phylites, quartzite, conglomerates, shale and slate.

The stratum of the area is rocky supported with sporadic natural vegetation. However, in the lower portion of the project area there is a possibility of soil erosion which can be checked by vegetative measures.

1.4 Climate & Rainfall:

The year may be divided into four seasons determined by the broad climate conditions prevailing in the region. The seasons are the winter season from December to March the summer or pre-monsoon season from April to June the monsoon season from July to September and the post-monsoon season October and November.

In the winter season the higher regions of the Himalayas receive precipitation as snow while moderate rainfall occurs in the foothills and adjoining plains. The climate of the project area is generally temperate, it is warm in summer, humid during monsoon and cold in the winter. The precipitation is mostly in the form of snow during winter months which can be described as moderate temperate to heavy depending on the altitude.

1.5 Temperature:

There is no temperature recording station inside the catchments area, however the temperature recorded in the nearby station at Rampur (El 940m) town varies from 0°C to 35°C. The lowest and highest temperature is 0°C and 25°C respectively. The lowest temperature is recorded in the area in the month of December and January. Highest temperature is recorded in the month of June.

1.6 Water Supply:

Nanti Khad is a perennial tributary of Sutlej River. Water in the stream is free from any kind of pollution during winter and is also suitable for drinking purpose as well as for construction activities. However it is muddy and contaminated during monsoon.

1.7 Land Use Pattern:

No specific land use survey has been carried out in the catchments area. However the land use pattern of the catchments area is summarized in Table-1.

Table -1

S. No.	Category	Total Area in Sqr. Km.
1	DPF/UPF Land	12.50
2	Agricultural Land	0
3	Rocky/barren Land	6.25
4	Pasture Land	27.79
5	Area under permanent snow	11.40
	Total	57.94

1.8 Demographic Profile of the Catchments

The human population of the catchments area is as under:-

Sr. No.	District	Tehsil	Name of Panchayat	Name of Village	Human Population		G. Total
					General	SC	
1	Shimla	Rampur	Phancha	Phancha	231	106	337
			--do--	Nanti	391	15	406
			Jaghori	Tikkar	60	-	60
			Total		682	121	803

Live stock population of the catchments

The live stock population of the catchments is as under:-

Sr. No.	Panchayat	Village	Cattle Population						Total
			Cow	Ox	Sheep	Goat	Horse	Donkey	
1	Phancha	Phancha	140	80	664	336	-	-	1220
	-do-	Nanti	143	67	840	469	15	10	1544
	Jaghori	Tikkar	56	20	403	289	5	-	773
	Total		339	167	1907	1094	20	10	3537

1.9 Socio-Economic Profile:

There is one Gram Panchayat namely: - Phancha is having 3 villages in an around the project area having a human population of 803. The animal population is 3537 mostly Cow, Ox, goat and Sheep are kept by the local people for ploughing and milk, meat purpose & the society of the project area comprises mostly of poor people and their main vacation is agriculture, horticulture, animal rearing etc. Horticultural activity is not encouraging due to non accessibility of motor able road despite of the fact that area is considered to be most suited for horticulture crops. The livestock and livelihood of the people depends upon rich natural sources of the area.

1.10 Flora

The forest of Kail (*Pinus Wallachana*), Deodar (*Cedrus deodara*), Fir, Spruce, *Alinu nitida* (Kosh), *Juglans regia* (Akhrot), *Picea smothinia* (Rai), *Pinus coxburgnil* (Chil), *Pyrus Pashia* (Shagal), *Quercus dilatata* (Ban), *Quercus Semecarpifolia* (Kharsu), with mixed broad leaved patches provide vegetational diversity. The broad leaved species mainly include Oaks, Walnut, Horse chestnut, Maples, Bird cherry, Wild popular and *Pyrus* species.

Forest Types

According to the classification done by Champion and Seth, the following types are met within the catchments area as follows:-

1.10.1 Sub-Group 9/c Himalayan Sub-tropical pine forests:-

This type of forest occurs between 1000m to 2000m elevation, overlapping the tropical dry mixed deciduous forest and lower elevations and giving way to temperate forest above. The principal specie is *Pinus roxburghii* (Chil) which occurs remarkably in pure and gregarious form and constitutes stable sub climax due to biotic factors. The crop is generally irregular and mature trees are few and widely scattered. *Pinus wallichiana* (Kail) makes its appearance in the upper most reaches. Higher up and under a more regular canopy bush growth is lesser in extent and here *Desmodium* species, *Berberis* species, *Myrsine Africana*, *Indigofera pulchella* are found with *plectranthus lespedeza* and other species of composite family as the common herbs such as *Frageria vesica* etc.

1.10.2 Group 12-Himalayan Moist Temperate Forests:

This type extends the wet zone tract between the Chil pine forests below and the alpine formation higher up in the Division. The altitude range of this type is generally between 1550 to 3300m, these limits varying distinctly according to the aspect, configuration of the ground and the drainage. The chief characteristic of this type is the extensive development of the coniferous forests with relatively little admixture with broad leaved species. The number of dominant species is small, the species being dependent mainly on altitude and aspect for their distribution.

1.10.3 Sub-group 12/C 1 a Ban Oak Forest (*Quercus incana*):-

The Ban oak is the common low level oak of the moist zone and is the major specie over considerable area which varies from 150 to 2100m. It thus, overlaps the altitudinal zones of all the lower coniferous and is the common companion of the blue pine, deodar, spruce. The chief associates are *Rhododendron arboretum*, *Lyonia ovalifolia* with some *Machilus odoratissima*, *Litsea umbrosa*, *Cedrela serrate*, *Carpinus viminea* etc., in damp ravines. There is generally good deal of shrubby undergrowth chiefly of *Berberis lyceum*, *Indigofera gerardiana*, *Sarcococca saigana*, *Daphane*, *Prinsepia utilis*, *Lonicera*, *Viburnum* species and *Rubus* species etc.

1.10.4 Sub-group 12/C 1 b Mohru Oak Forest (*Quercus dilata*):-

These forests occur in small patches above the ban forests between 2100 to 2500m and are definitely of more mesophytic type than the ban oak which displaces it on dry ridges and hot Southern aspects. There is great admixture of secondary species in the top storey consisting mainly of deciduous trees such as *Cedrela serrata*, *Acer pictum*, *Rhus semialata*, *Aesculus indica*, *Prunus cornata*, *Pyrus pashia* and *Juglans regia* etc.

1.10.5 Sub-group 12 DSI / I c Moist Deodar forest (*Cedrus deodara*):

This type of forests are found between 1800 m to 2400 m but may be found a little lower down in depressions or nallahs and cooler aspects and higher up on the hot Southern aspects and sunny ridges with better drainage. The under growth consists of *Viburnum foetens* and *Indigofera pulchella*, *Rosa Sp.*, etc.

1.10.6 12 DSI / I d Western mixed coniferous forests:

This type of forests is commonly called as mixed conifer and it includes pure Spruce, Spruce and silver Fir types and mixed

Deodar, Kail and Spruce forests. These forests are found above the pure Deodar forests mixed with low level blue pine and deodar forests at altitudes of about 2400 m to 3000m or more. High level blue pine is found both in and above it and the fir- oak mixture above it. These forests are commercially important. In the moist mixture of coniferous trees often of very fine growth, such as spruce, deodar, blue pine and silver fir with a varying amount of evergreen and deciduous broad leaved undergrowth like *Aesculus indica*, *Juglans regia*, *Corylus columna* and *Prunus cornata* etc.

1.10.7 12 DSI / I e Moist temperate deciduous forest:

The coldest aspects and all re- entrants and ravine bottoms of spruce belt between 2100m to 3000m are entirely occupied by a rich mixture of broad leaved species to the exclusion of coniferous species except scattered spruce and very occasional deodar.

The oaks are only occasional members of this type, which is commonly known in Bushahr as Thatch (grazing land) owing to the richness of the shrubby growth and the quantity of loppings, which the mixed broad leaved species provide. The common trees are *Acer pictum*, *A. caesium*, *Pyrus pashia*, *Lyonia ovalifolia*, *Rhododendron arboretum*, *Rhus cotinus*, *R. punjabensis*, *Celtis australis*, *Aesculus indica*, Birdcherry, *Populus ciliata* etc. The shrubby growth consists of *Skimmia laureola*, *Cotonestor bacillaris*, *Viburnum foetens* etc. Herb growth is poorly developed except in few rather specialized types of canopy e.g. a dense growth of *Chaerophyllus reflexum* under a pure strand of *Pyrus pashia*, *Galium* species, *Rubia* species, *Salvia* species *Voila* species, *Adiantum* fern under a pure strand of Horsechestnut and under very dense growth *Corylus* and *Pyrus* stands a herb growth of *Viola* species and *Ainlina* species instead of shrubs.

1.10.8 Sub-group 12 DSI / 1 f Low level blue pine forest:

The blue pine is a very important commercial timber species. It is second to only deodar in its commercial value. It is found interspersed with deodar in the tract. The blue pine has two altitudinal zones which are well defined although the species is quite common on intermediate grounds between these two habitats. The low level form, depending on a moderately good monsoon rainfall and northern aspect is well developed. The high level type is dependant on a heavy and long lying winter snow fall and is confined to upper forest limits in the inner hills.

This species has established itself over large areas in the catchments.

1.10.9 Sub-group 12/C 2 Upper west Himalyan temperate forests:**(i) 12/C 2 a Kharsu oak forests (*Quercus semicarpifolia*):**

These forests are found between the elevations of 2400m to 3400m. These forests generally regenerate easily as compared to other varieties of Oak. This is a commercially important species used for various commercial purposes. It finds good expression on the Southern aspects at the top of ridges in a belt of pure forests and its presence end abruptly at the edge of alpine pastures, the other second storey bein *Betula utilis*, *B. alnoides* and *Taxus baccata*. This mixture advances towards the higher regions rather than the pure Kharsu. The herbaceous cover of this type of forests is usually coarse and consists of mainly *Anaphalis* species, *Fragaria vesca*, *Primula denticulate*, *Caultheria trichophylla*, *Saxifraga ligulata* etc.

(ii) 12/C -West Himalyan upper oak/ fir forests:

This type of forest is found between 2500m to 3400m elevation especially on the Northern aspects and sheltered sites. The forests are covered with snow for several months in the winters. *Abies pindrow* and *A spectabilis* the low and high level Silver fir together form a high level forest belt throughout the wet zone with much the same distribution as the spruce.

Kharsu oak, forms a belt of pure forest on the southern aspects in the main and side valleys in the wet zone between 2500m to 3400m to the complete exclusion of silver fir, the dense oak forest stopping abruptly at the edge of the alpine grass lands. On the exposures in the catchments area, this oak occurs as scattered trees or in large pure groups amongst the open silver fir stands, other trees of second storey being species of *Betula*, *Taxus baccata* etc. This mixture goes uphill much higher into the alpine pastures than pure kharsu does. In third types, silver fir, regenerates itself freely whenever the Oak and other broad leaved trees from a light understorey in the fir forests. Excellent examples of this may be observed in the fir forests along the upper ridges of the Catchments Area.

1.10.10 12/C 1/ DS 2 Himalyan temperate Secondary scrub etc.

This type is found mostly between 2400m to 3600m elevation for more in Mohru, Kharsu and Fir forests and is the result of heavy grazing, lopping and fires which have thinned out the forests to a varying degree, destroyed all the under growth except for the patches of inedible species and reduced the shrubby ground cover to a grass land. The thatch consists of an open park like land with scattered usually mature mis-shaped and after moribund trees standing over a grassy turf full of flowers in spring. The common trees at such places are of Birdcherry, Acer and Kharsu. These

thatches are heavily grazed year after year by flock of sheep and goats, brought to these places by migratory graziers.

Due to thick humus deposits and high weed growth, the regeneration of fir and other broad leaved is not coming up at all and the ground is being replaced by grassy turf. Examples of this may be seen in all over the wet zone less rarely in dry and arid tracts in the catchments area.

1.10.11 Group 14 Sub- alpine Forest:

Sub group 14/C 1 West Himalyan sub- alpine birch/ fir forests (Betula/ Abies):

This forest type is found in the elevation range of 3000m to 3400m. It comprises of mainly Undemarcated Protected Forests and upper fringes of DPFs. The principal species in this type are Kharsu oak mixed with scattered fir and Maple and occasional Betula utilis along upper limits. Amongst under growth, Viburnum foetens, Rosa serecia, Cotonestar acuminata are commonly found. Medicinal herbs like Aconitum heterophyllum (Patis) Gentiana kuroo (Karu) etc. occur in this type. Large flocks of sheep and goats graze in this area during summer months.

1.10.12 Group 15 Moist alpine scrub:

This type is found between elevations of 3300m to 3900m. It consists of evergreen scrubby growth, usually upto 1m high forming a dense cover over big patches broken by grass. Outlying patches of alpine forests, the colonies of the larger Rhodendron campanulatum some times occur in this zone. The shrub species are Salix elegans, Lonicera parviflora, Polygonum vacciniifolium. Herbs are Aconitum heterophyllum (Dhoop) and Gentiana Karoo (Karu).

1.10.13 15/C 1 Birch/ Rhododendron Scrub forests:

This forms the upper limit of alpine forest and occurs as patches of varied size in these sheltered sites and usually on the Northern and Western aspects. The Rhododendrons with its various species occur as a dense mat in which *Betula utilis*, *Salix elegans* etc. occur in varying proportions. The whole mass of vegetation is well adapted to stand heavy snow fall. The common shrubs are *Salix elegans*, *Cotonestor microphylla*, *Lonicera parviflora* & herbs are *Poton tilla* species, *Primula denticulata*,

Broadly, the vegetation types of the State can be divided into tropical, sub-tropical, temperate and alpine vegetation and the vegetation of stony desert. The main forests in the State are dominated by oak, deodar and pine and in some areas the formations are of mixed type. *The Hon'ble Supreme Court of India in CWP No. 202/95 dated 28.03.2008 in T.N. Godavarman Thirumulpad versus Union of India & Others* held that 16 major forest types have been classified by Champion and Seth further grouped into 6 ecological classes depending upon their ecological functions as follows:-

- Eco-Class I— Consisting of Tropical Wet Evergreen Forests, Tropical Semi Evergreen Forests and Tropical Moist Deciduous Forests.
- Eco-Class II— Consisting of Littoral and Swamp Forests.
- Eco-Class III— Consisting of Tropical Thorn Forests and Tropical Dry Evergreen Forests.
- Eco-Class IV— Consisting of Tropical Thorn Forests and Tropical Dry Evergreen Forests.
- Eco-Class V— Consisting of Sub-Tropical Broad Leaved Hill Forests, Sub-Tropical Pine Forests and Sub Tropical Dry Evergreen Forests.
- Eco Class VI— Consisting of Montane West Temperate Forests, Himalayan Moist Temperate

Forests, Himalayan Dry Temperate Forests,
Sub Alpine Forest, Moist Alpine Scrub and
Dry Alpine Scrub.

Keeping in view of the above classification of forests the only eco-class V & VI are falls in the catchments of the forest in and outside the protected area.

1.11 Fauna

Mammals	Herbivores	Carnivores
	Musk Deer	Snow leopard
	Himalayan Thar	Leopard
	Goral	Himalayan Black Bear
	Serow	Himalayan Brown Bear
	Bharal etc.	
Pheasants		Koklass
		Western Tragopan
		Himalayan Monal
		Cheer Pheasant
		Kaleej

1.12 Scope of the Study:-

The main objective of the present study is to plan measures for checking soil erosion thus decrease the silt load in the river channels and the reservoir of the proposed Upper Nanti Hydel Project on Nanti Khad a tributary of Sutlej river. Catchments area treatment (CAT) plan is an important document, which portrays the ecological health of the catchments area, suggests various soil conservation measures and watershed management programmes required to arrest soil erosion. This is crucial for improving the soil and habitat conditions of free drainage area and to rejuvenate the degraded ecosystems in the catchments. The scope of this study is

not only to address all those factors which are directly responsible for soil erosion in the catchments but also to address areas of concern that are indirectly responsible for soil erosion. These issues include fuel and fodder requirements of the local people in the project area. We have suggested a number of indirect and direct methods for the treatment of catchments to arrest soil erosion. The direct measures include engineering and biological method, while the indirect methods include gradual reduction of dependency of local people from natural resources for their daily needs.

1.13 Rights of the people

i) Grazing:

In almost all the forests, rights 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 a special concession or through the payment of 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. The right of grazing also comes in the way of taking up more closure for raising plants of different species as the consent of local people is to be obtained before the plantation work is to be undertaken and required closer notification under the Indian Forest Act, 1927.

- ii) **Collection of fuel wood:**
People have the right to collect dry and fallen wood for their domestic use as per Forest Settlement Report. In the catchments area, people entirely depend upon fuel wood for their day to day use. Annual consumption of fuel wood per house hold has been assessed to be 6.5 tones during the field survey. Mainly this requirement is fulfilled by Kunish, ban, jamun, etc. species found near the river banks and nallah.
- iii) **Timber:**
People have the right to get timber at nominal rates for construction/ repair/ maintenance of their houses. The Confessional rates were fixed at the time of forest settlement. No limit on the nos. of tree to be sanctioned was placed. However, no TDs rights have been used by the right holders these days due to ban on any kind of felling of trees imposed by the Hon'ble H.P. High Court.
- iv) **Cutting of Grass and lopping of trees:**
People have 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 of Forests.
- v) **Minor Forest Produce:**
The local people have rights to collect medicinal plants, herbs, roots, shrubs and other forest produce for bonafide domestic use and for sale to the traders as enshrined in the Bushahr Sutlej valley Forest Settlement Report, 1921 by H.M. Glover. The system of issuance of export permit has

been made easier by delegating power on the Pradhan Gram Panchayat concerned.

1.14 General Condition and Density:

The composition and density of crop is very good in the upper part of the catchments of the project area. However, in the lower portion of the project area, the composition and condition of the forest is not good due to a lot of pressure of the right holders. The status of regeneration of Fir/ Spruce is deficient whereas the condition/ regeneration of Kail and Deodar is encouraging.

1.15 Plan Period (Project period):

The CAT plan has been formulated for a period of ten years with effect from 2011-12 to 2020-21. For the first two years of the plan not much of works have been prescribed and only establishment of nurseries 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 in the 7th year onwards and completed during the Plan period.

1.16 Cost of the Plan:

The total outlay envisaged for the implementation of this CAT Plan is Rs 21069184/- including contingencies, Eco-Tourism, Monitoring & Evaluation, Environmental services, Development of Eco-Task force, Payment for Environmental Services (PES), payment for Eco-Services to the Local Communities and other inflationary trends etc. The total cost of the CAT Plan would be deposited by the Use Agency in equal yearly installments spread over the duration from commencement to commissioning of the project, with the last installment payable at least 6 months before the commissioning of the Project as per the H.P. Govt. Notification dated 30-09-2009.

CHAPTER-II

PROBLEM ANALYSIS AND OBJECTIVES

The geology of the catchments area is not subjected to major land slides or high soil erosion intensity in the portion, but the lower portion is susceptible to soil erosion.

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 catchments area of a hilly area like that being considered from the proposed project, water erosion is a common phenomenon and the same has been studied as a part of the catchments 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 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 of 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 type of soil of the catchments, 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 that 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 catchments area used for the study are as under:

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

2.1.4 Data collection and compilation:

Ground maps, contour information were collected, scanned, digitalized as registered as per requirement. A computer programme was used to assess the soil loss. The grid size to be used was also decided to match the degree of accuracy required, the data availability and the software and time limitation.

2.1.5 Estimation of Soil loss:

Soil loss can be estimated using Silt Yield Index (SYI) method. The application of SYI method for prioritization of sub water sheds in catchments areas involves the evaluation of:

- Geomorphic factors comprising slope and drainage characteristics; landforms and physiographic.
- Surface covers factors governing the flow hydraulics.
- Climatic factors comprising total precipitation its frequency and intensity and
- Management factors

The area of each of the mapping units is arrived at and Silt Yield Index of individual sub-water sheds and computed using following equation: -

a) Silt Yield Index

$$SYI = \frac{\sum(A_i \times W_i) \times 100}{A_w}$$

Where

i	=	1 to n
A _i	=	Area of ith (EIMU)
W _i	=	Weightage value of ith unit
n	=	Number of mapping units
A _w	=	Total area of sub-water and

The SYI values for classification of various categories of erosion intensity rates are given in Table 2

TABLE—2

Sr. No.	Category	SYI values
1.	Very high	>1300
2.	High	1200-1299
3.	Medium	1100-1199
4.	Low	1000-1099
5.	Very Low	<1000

2.2 Water Shed Management.

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 programmes 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) Bio-Engineering Measures

a. Biological Measures

The various measures covered in this category are: -

- Afforestation of degraded forest land.

- Enrichment planting.
- Assisted Natural Regeneration.
- NTFPS Plantation.
- Treatment of Alpine Pasture.
- Nursery Development.

b. Bio-Engineering measures

- Stabilization of land slides/slips
- Nallah stabilization

2.3. 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 dependencies are becoming immense 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 culture and technology advanced, he modified the natural eco-system into an artificial. As a result, many species of flora and fauna have become 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 being faced by people dependence on natural resources is due to:-

- (a) Reduction of Biological diversity in forest Eco-System.
- (b) Increasing biotic pressure.
- (c) Increasing demand of forest resources as per Forest Settlement Report, 1921.
- (d) Illicit felling and poaching
- (e) Encroachment on forest land.
- (f) Forest fires.
- (g) Cultural transition
- (h) Collection of minor forest produces.

2.4 Grazing:

Live stock practices in the tract area rather primitive. Incidence of grazing in the high lying alpine pastures as well as in the low lying pasture village pasture lands is very high and fodder resources are fast decreasing. All most all the forests are burdened with the rights of local people to graze their cattle, without any ceiling to the number of cattle which may be allowed to be grazed under the provision of Forest Settlement Report, 1921. This open access to forests for grazing leads to great damage to vegetation, soil as well as to plantations etc.

2.5 Management of Wild Life in out side the Protected Area.

The scientific Wild Life management is based on the biological characteristic of a species. Other considerations such as economic, political, social, humanitarian and sentimental are equally important. Since the exact numbers of various animals found in the tract are not known the fundamental need is to carryout a detailed survey and population census of species in the area. The causes for the depletion of fauna can be described as under:-

- i) Poaching, hunting, trapping and killing of Wild animals by local inhabitants.
- ii) Biotic interference by man and his cattle especially near habitations coupled with clearing of forest land for agricultural purposes.
- iii) Depletion in the food of herbivorous animals because of lopping of fodder trees by the graziers and local people.
- iv) Natural calamities like drought, storms, heavy snow fall and repeated forest fires etc.
- v) Continuous predation has also caused the depletion of animals.

This affects both herbivorous and carnivores in the Catchments area.

2.6 Man- Wildlife Conflict

Man-Wild Life conflict is a result of gradual degradation of natural resources and the most sufferers are poor, marginalized communities living in an around the Forests of the Catchments area. The problems of animal damage whether it is crop depredation, live stock depredation and human casualties is not as alarming as it is prevalent in other parts of the States 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.

2.7 Inadequate Scientific Information:

Inventory of the flora and fauna of the catchments is yet to be prepared. The status of important habitat types and that of the threatened flora and fauna is not known. No information is available in this regard about the carrying capacity of the forests and alpine meadows in and around the Catchments area. 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 catchments area by carrying out detailed survey of the catchments area. Thus a well designed catchments area treatment plan (CAT) plan is essential to ameliorate the abovementioned adverse process of depletion of biological

diversity. An endeavor has been made in the present Plan to address the problem to some extent.

2.8 Harmful Practices by the Local People.

The trees near habitations are lopped ruthlessly for the fuel wood and fodder. The grant of Govt. land to landless people is also putting the forest in danger. The forest is experiencing tremendous pressure of human and livestock. The animals roam freely in the forest area tramping and grazing the forest. These results increased rate of soil erosion and degradation of forest manifolds. These factors have put following problems to the forests:

- i) Excessive soil loss and increase in runoffs.
- ii) Man and Wild Life conflict
- iii) Fuel wood and fodder are becoming scarce.
- iv) Unscientific collection of NTPF which is harmful to the Biodiversity of Catchments area.
- v) Excess grazing.

2.9 Eco-Tourism Potential:

The area being very interior and picturesque, there are very few income generation opportunities for the local people. The 15/20 area of Shimla district is having a good potential of Eco-Tourism and is still not explored for this purpose. There is overall deficiency of proper infrastructure for the growth of tourism in the area and basic facilities like FRH, I/Hut, Hospitals, boarding & lodging, proper paths, well developed camping sites & public utility services etc. which further affects eco-tourism in the area. The local people are not aware of the vast potential of eco-tourism. They need basic training about eco-tourism vis-a-vis wildlife conservation. It is one of the most important alternative income generation activities besides NTPF's etc.

2.10 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 catchments area. Not only it will provide facilities to the field functionaries but it will also helpful to local people. 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 catchments area, the basic infrastructure in the catchments area needed to be improved.

2.11 Lack of Trained Staff in Wild Life Management:

There is a lack of professional knowledge/skills of management especially habitat improvement of Wild Animals, procedure for monitoring and evaluation in different event, vegetational changes 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. The training in wild life management to the front line staff out side the Protected Area Network is essential.

2.12 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 environmental

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 environmental related programmes can not be achieved their objectives without awareness and concerns of the local people. So, there is a need to initiate a dialogue with local people on the conservation of natural resources by formation of VFDS etc. at the village/Panchayat level for conservation of bio-diversity.

2.13 Limited Employment and Income generation Activities:

The area was bereft of any road link till very recently, has been dependant only upon the subsistence economy. Most of the agriculture has been for internal consumption and no cash crops are grown in the Catchments area. The only cash crop has been the M.F.P. collection from the forests and sale to traders for supplementing their income under the provisions of the Settlement Report. Formation of society in each Panchayat of the catchments area for collection and sale of the NTFPs will certainly add in supplementing the income of the local people in an organized manner.

2.14 Lack of Appropriate Infrastructure 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/PDA, Compass, Camping equipment, field equipment and vehicle etc. In the absence of this infrastructural support, the information flow is very slow and erratic in management.

2.15 Monitoring and Evaluation:

Monitoring is an 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 a period of time. The regular feed back through monitoring and evaluation allows better under standing, midway corrections and adoption of appropriate strategies. Dr. Mathur and Uniyal from W.I.I. Dehradun have provided 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 future strategies. All the agencies involved in the implementation of the CAT Plan should work in a coordinated effort regularly to evaluate the achievement of desired results.

CHAPTER-III**WILDLIFE MANAGEMENT IN OUTSIDE THE PROTECTED AREA****3.1 Introduction**

The state of Himachal Pradesh is as its embodiment of heaven on earth, replete as it is with lush green forests, high snow covered peaks, beautiful valleys, gushing streams and unpolluted rivers and waters, which is probably why it is the abode of good and goddess. The mountains terrain of Himalayas Ranges from 300 meters to 7000 mtrs and support a variety of forests such as Sal, Pines, Rhododendrons, Oaks, Birch, Deodar, Kail, Fir and Spruce. These forests are home to variety of wild flora and fauna, occupying different habitats and ecological niches. Himachal has 12.6% of its geographical area of 55,673 Sqm. Under the protected area network, an extremely high figure when compared to the national average of hardly 45%. As result, these has been an increase in the number of wild flora and fauna not only within the protected areas but more so outside the protected area network.

Himachal Pradesh is rich in various faunal elements with reports of more than 107 species of mammals, 447 species of birds, 17 species of amphibian and 104 species of fishes. There are carnivore species like tiger (*Panthera tigris*), leopard (*Panthera pardus*), leopard cat (*Prionailurus benghalensis*), jungle cat (*Felis chaus*), Asiatic black bear (*Ursus thibetanus*) and brown bear (*Ursus arctos*) in the State. The State of Himachal Pradesh is also forms home for seven pheasant species out of the 17 found in the country (48 pheasant species found across the world). These seven species are Western tragopan (*Tragopan malenocephalus*) Himalayan monal (*Lophophorus impeyanus*), Kokias (*Pucrasia macrolopha*), White Crested Kalij (*Lophura leucomelanos*), Cheer (*Catreus wallichii*) and Red Jungle Fowl (*Gallus gallus*). The Western tragopan is state bird of Himachal Pradesh and during 1993-94 Sarahan pheasantry witnessed first ever breeding of Western Tragopan in captivity in the World.

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 Biodiversity. It is well known that the conservation of Biodiversity 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 of forests. These forests regulate the water balance in the lands around and influence the climate to considerable extent. Apart from their ecological functions, they serve as valuable gene pools.

The current problems being placed in wild life conservation arises directly from the natural resources dependence of the people in hebetating forested regions, impoverished population and Hydro-electric project in Sutlej basin. These dependencies are becoming intense because of Eco-System of Sutlej valley is declining at a very fast rate due to over use of natural resources. Therefore need for conservation preservation and management of biological diversity arises because of threats of natural terrestrial and due to various anthropogenic activities and also there are regular conflicts between humans and wild life in the region. These conflicts may further increase as a result of project activities unless proper management practices are not followed. The likely project activities include road construction, blasting, excavation for tunnels quarrying, dumping of excavated materials and human population pressure on land and biological resources. Looking into all these aspects a wildlife management plan has been prepared for the conservation and protection of biodiversity of the region.

3.2 Improvement and development of wild life: -

The improvement and development of wild life in the region various activities have been suggested in the plan. This will be achieved by way of plantation of trees, fodder species, fire protection measures, prevention of soil erosion and removal of exotic invasive plant species. Some patches of land

may be developed exclusively as "green islands" in the project catchment area. These areas should be out of bound for any human intervention both for local people and domestic animals under the provision of Indian Forest Act, 1927 and these areas should be developed as habitats or corridors for the wild life of the region. The following tasks are suggested.

- **Plantation of indigenous:** - Plant species to be carried out to cater to the needs of the fodder and fuel wood. Additionally it will provide much needed vegetation cover on the degraded and base land slopes.
- to increase the fodder and forage availability in the area
- to develop water bodies for wild animals to avoid their coming into human habitations and encounter with human.
- fruit bearing and bamboo plantation.
- to create the fire protection facilities by way of procuring modern fire fighting equipment like gloves, helmets, aprons, shovels, pick axes, beaters, extinguishers, chain saw etc.
- **Bio-engineering measures**—the detailed measures of soil conservation are given in the CAT Plan and the sufficient outlay has been proposed in the component of biological measures of CAT Plan.
- Construction of water pond.
- Anti poaching measures
- Sign and slogan boards
- Reward/Incentives to informers
- Vaccination of domestic cattle
- Field equipment and medicine for management of wild life— Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun, GPS, Compass, Sony handy Cam, altimeter, binoculars etc.
- Construction of watch tower.
- Construction of foot bridges for effective patrolling of the region by the field staff.

- Repair of inspection path for effective patrolling and protection of forest and wild life.
- Communication network—For improvement of the vigilance and anti-poaching measures.
- Vehicle for vigilance cum Rescue van.
- Veterinary & other staff—wild animal care.
- Publicity material for awareness.

3.3 Mitigation of Human Wildlife conflict

(i) Eco-Development Activities

(a) Village Support Activities

- (i) Repair of water bowaries.
- (ii) Strengthen village path.
- (iii) Construction of cattle pond.
- (iv) Compensation against wild life damages.
- (v) Publicity and awareness.

(b) Income Generation Activities

- (i) Vermi compost, Poly House & organic farming.
- (ii) Bee Keeping
- (iii) Animal Husbandry support and diary development.
- (iv) Agriculture and Horticulture support.

3.4 Management of Biodiversity

During the construction period, a large numbers of labourers and anticipated to come in the areas, which will exert additional pressure on the biotic resources of the catchment. Also, the noise and pollution levels will increase as a result of construction activities. To avoid and minimize the negative impacts during the construction period, project authorities are advised to prepare strict guidelines as follows.

- (i) Strict monitoring of labourers and associated workers for any activity related to endangering the life or habitat of wild animals and birds.
- (ii) Strict restrictions will be imposed on the workers at project sites to ensure that they do not harvest any produce from the natural forests and cause any danger or harm to the animals and birds in the wild.
- (iii) Minimum levels of noise during construction activities will be maintained and no activity will be carried out at night at a project site in the close vicinity of animals/ bird habitats especially in the vicinity of dense forests.
- (1) The fuel wood to the labourers will be provided from plantations meant for the purpose and/ore the provision be made for the supply of the free/ subsidized kerosene/LPG from the depots being set up for this purpose to avoid forest degradation and the loss of animal habitats.
- (v) The interference of human population wild be kept to a minimum and it would be ensured that the contractors do not set up labourer colonies in the vicinity of forests and wilderness areas.
- (1) A mix of incentives for the protection of wildlife and their habitats and strict regulatory framework will be put in place to implement the conservation effort.
- (vi) The project authorities will be bound by the rules and regulations of the Wildlife Protection Acts or any such regulation of the State, which may exist or will be promulgated from time to time for the preservation of habitats and protection of wild animals/biodiversity.
- (vii) It will be ensured that the noise levels in no case go above 80-100 dB in the project area. One of the measures that are proposed to be adopted is that the blasting is to be restricted during nights, early mornings and late afternoons, which are the feeding times of most of the fauna. Blasting will be resorted to only if extremely

necessary. For this strict blasting regime, i.e. controlled blasting under constant and strict surveillance is to be followed. Some of the suggested methodologies for reduction and mitigation of noise so as to cause as little disturbance to the animals as possible are given below:

- (a) Only well maintained/new equipment that produces lesser noise would be installed at the work sites.
- (b) The best way to control the noise is at source. Certain equipment that needs to be placed permanently at one place like generators, etc. would be housed in some enclosed structures to cut off the noise.
- (c) The heavy equipment like rotating or impacting machines will be based on anti-vibration mountings.
- (d) Wherever combustion engines are required they will be fitted with silencers.
- (e) The traffic (trucks, etc.) used by the project works will be managed to produce a smooth flow instead of a noise producing stop and start flow. Necessary training/orientation will be provided to the traffic operators/drivers. Sounding of loud horns, etc. in the forested areas will be banned.
- (f) While clearing the land of vegetation for any project work, the project authorities will ensure that the work area has sufficient tree cover around it. It will act as an effective noise absorber. It will be desirable not to cut down or lop big trees around the periphery of the work site. The tree layer will act as noise and air pollution buffer. The tree cover is known to cut off noise by about 3-12 dB at a site depending on the density of vegetation. These measures will be planned in advance and well before starting operation at any site.
- (g) The project authorities will monitor the noise at critical sites from time to time.

CHAPTER-IV

JOINT FOREST MANAGEMENT (JFM)

- 4.1** The state of Himachal Pradesh has traditionally been sensitive to the need of involving local people in the conservation and management of the forest resources. This is evident from the Forest Settlements carried out as early as the 19th Century when people were provided rights in the forests in lieu of their responsibilities and duties to the forests. The Co-operative Societies of Kangra District are another testimony to this resolve. The participatory approaches received a new impetus in the state with the launch of Social Forestry Umbrella project in mid 1980s as also with the adoption of the National Forest Policy 1988 which brought the people to the centre stage & the constitutional development of power to the PRIs through the 73rd amendment. This brought about a paradigm shift in the objectives and management practices for forestry in the state through participatory management modes.

Responding to these new developments, the Government of Himachal Pradesh has approved the new Forest Sector Policy on 02/05/2006. The Forest Sector Policy evolved through a dynamic and consultative process where an extensive evidence gathering process has been followed through primary and secondary sources through a range of stake holders consultations including the forest department, other line departments i.e. horticulture, agriculture, animal husbandry, rural development, research institutions, local communities, representatives of Panchayati Raj Institutions, Non Governmental Organisations, Community based Organisations as well as people's representatives. The new H.P. Forest Sector Policy, 2005 is remarkably different from the earlier State Forest Policy 1980 as it is a response to the emerging needs and aspirations of the people of the state. The new policy has a unique mountain area focus where livelihoods and decentralization through Panchayati Raj Institutions

in management of forests resources from the bedrock on which the policy stands.

4.2 Date of issue of Govt. Orders on JFM and its Modification

GOI resolution	1990
HP introduced JFM	1992
Date of issuance of 1 st JFM orders/ rules	12.05.1993
Date of amendment/ new orders/ rules	23.08.2001

4.3 JFM AT A GLANCE IN HP

No. of JFM Committees 1749 covering an area of about 4246 Sq. Km
 Gender representation in JFM Committees: Women 51.3%; Men 48.7%
 Benefit sharing in JFM areas
 Approximate value of grass, fodder, fuel wood: 08.00 Crores
 Employment Generation: 12.73 crores
 Assets created (cumulative): Rs. 62.37 crores

4.4 JFM and Upper Nanti Small HEP CAT Plan:

The works specified under the CAT Plan except Engineering/Technical works will be executed based on the 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 Plantation 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. VFDS will be formed for this specific purpose besides this the active Mahila Mandals and Yuvak Mandals and Local NGO's 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, also the women folk will be involved in the above activities. 30% of the plantation works in the CAT Plan and income generation activities will

be carried out through JFMC during the plan period. At least 50% members of the JFM general body should be women. For the general body meeting, the presence of at least 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-V

OBJECTIVE AND PROJECT PROPOSAL

5.1 Project Objectives:-

The objectives of the project are summarized as under:-

- ↪ To achieve Sustainable management of forests, bio-diversity conservation and also ecological rehabilitation in the project area leading to and 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 Upper Nanti Catchments to ensure longevity of Upper Nanti Hydel Project.
- ↪ To increase the potential/production of the bio-mass in the area and to ensure longevity of Upper Nanti Hydel Project.
- ↪ To provide employment to the local people by engaging them in project activities such as afforestation, fire, anti poaching, rural infrastructure and other works except soil conservation works.
- ↪ To built the capacity of the Field Frontline staff in Wildlife management skills by providing training in India to meet the challenges of 21st century.
- ↪ To strengthen the extension and follow up activities of the forestry development activities, publicity, motivation and extension programme to be given the desired attention.
- ↪ Initiation of research activities to use and protect natural resources in a scientific way.

In the present plan thrust has been given for sustainable development of the catchments area as well as to protect and conserve the local environment with the active involvement of local people. In the CAT

plan equal emphasis has been given to the economic needs of the local people, greening of the region and strengthening the local wildlife management and integrate these activities with a view to finally avoid soil erosion and decrease the silt load in Nanti Khad and Sutlej river. Various mechanical and biological measures have been suggested to treat the catchments area to meet the objectives of the CAT plan.

5.2 Project Period:

The project period would be for 10 years from 2011-12 to 2020-21

5.3 Plan Components:

This CAT Plan has been designed keeping in view the ecological as well as social conditions prevailing in both the project as well as catchments area. The treatment measures emphasize on conservation of catchments through afforestation in blank/ degraded areas, failure plantation areas and bio engineering works in soil eroded areas, river bank and Nallahs. It also envisages an active participation of local community as it will provide them employment to add to their economy. Apart from this, one of the most important parts of successful execution biological diversity and its management as per the needs of the wildlife along with habitat improvement, anti poaching, fire control coupled with bio engineering works in the catchments area. The important activities in this regard to be undertaken during the project period are as under:

5.4 Biological Measures—Improvement of tree covers.

- (a) Nursery development.
 - i. New Nursery development.
 - ii. Maintenance of existing nurseries
- (b) Afforestation of degraded forest land.
- (c) Enrichment plantation.
- (d) Assisted Natural Regeneration.
- (e) N.T.F.P's Plantation
- (f) Treatment of Alpine Pasture

5.5 Soil Conservation Works- Engineering and Bio-Engineering measures:

- ↓ Stabilization of land slides/slips.
- ↓ Stabilization of Nallahs
- ↓ Establishment of Silt Observatory.
- ↓ Soil & water harvesting structure-Construction of Van Sarovar

5.6. Protection of Forest**(a) Fire Protection.**

- ↓ Engagement of Fire Watchers
- ↓ Purchase of fire fighting equipments
- ↓ Maintenance of fire lines and control burning/debris disposal

(b) Energy saving devices

- ↓ Distribution of LPG Cylinders
- ↓ Distribution of Solar lights
- ↓ Construction of crematoria and store for fuel wood.

(c) Construction and repair of existing boundary**(d) Communication network****(e) Sign and slogan boards****(f) Reward/Incentive to informers****5.7 Forest Infrastructure Development**

- ↓ Maintenance of existing buildings
- ↓ Maintenance of FRH/Inspection Hut
- ↓ Special repair of forest path/bridal Path
- ↓ Compound development and maintenance of Compound development and maintenance of FRH/Gang Hut/Inspection hut and forest Colony

5.8 Management of Wildlife in outside the protected area**(a) Improvement and Development of Wildlife**

- i) Habitat improvement and development
- ii) Construction of water pound
- iii) Engagement of Anti-Poacher
- iv) Sign & Slogan Boards
- v) Vaccination of domestic cattle
- vi) Field equipment and medicine for management of wildlife--
Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, allimeter, Binoculars etc.

(b) Mitigation of Human-Wildlife Conflict**(i) Eco-Development activities:****(a) Village support activities.**

- ↓ Const./repair of water bawaries in Villages.
- ↓ Strengthening of village path.
- ↓ Construction of cattle pond.
- ↓ Compensation against wildlife damages
- ↓ Publicity and awareness

(b) Income Generation Activities.

- ↓ Vermin compost, Poly House & organic farming
- ↓ Bee Keeping
- ↓ Animal husbandry support and diary development
- ↓ Agriculture and Horticulture support.

(C) Extension of Sarahan Peasantry at Gopalpur**5.9 Eco-Tourism Development**

- Development of camping sites and public utility services.
- Training of local youths for Eco-Tourism activities.

- Maintenance/repair of path.
- Purchase of camping equipments.
- Sign and slogan boards

- 5.10 Research and studies
- 5.11 Training of Forest Officer/Official.
- 5.12 Nature Awareness Camp/Exposure visits and training of CBO's and extension programme/ workshops.
- 5.13 Micro Planning
- 5.14 Monitoring and Evaluation
- 5.13 Operational Support/Establishment.
- 5.14 Payment of Environmental Services (PES)
- 5.15 Deployment of Eco-Task Force.
- 5.16 Contingencies.

A brief description of each component is as under:

5.5.1. Biological Measures—Improvement of tree covers.

(a) Nursery development.

To raise successful plantation it is necessary to have a good & adequate planting stock. It is proposed to establish/Maintenance nursery at Daira & Phancha. The nursery shall be raised in the 1st year of the project period and will be further maintained till the completion of this Plan period. As far as possible the nursery should be located in planting zone.

Sr. No.	Expenditure Detail	Amount
1	Establishment of New Nursery at Daira & Phancha	250000.00
2	Maintenance of existing nursery at Diara & Phancha	50000.00
	G. Total	300000.00

(b) Afforestation of degraded forest land.

The aim of this CAT Plan is to conserve in-situ flora and fauna along with the full range of eco-system. Under this scheme blank areas devoid of tree growth, degraded forests 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 raise a mixture of conifers, broad leaved species and fruit bearing species etc. The plant life provides congenial home to wildlife and bio diversity therefore the habitat of wildlife is to be improved by supplementing the Bamboo/Shrubs/fruit bearing species and supported by minor soil engineering works. The nirgal/shrubs in the under story is very important for pheasant in the catchments area. The main species to be raised under this scheme are Deodar, Kail, Fir/Spruce, Nirgal, Maple, Ban, Oak, Aesculus indica, Prunus persica, Prunus cornuta, Prunus pashia, Chestnut, Juglans regia, pyrus spp. and other fruit bearing spp. etc. Plantation must use local and indigenous species since exotic species have long term negative impacts on the forest eco- system. The preference of local communities as regards the choice of species will be ascertained and given due weight age as per the requirement of site, 1500 plants per hectare 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 only indicative and open for amendment as per site needs with the passage of time. Divisional Forest Officer may make any changes as per requirement of field during the course of execution of the works. Plantation will be maintained for subsequent five years. A total of 20 ha. has been identified as

available for planting under the scheme. The detail of the areas identified to be planted is given below:-

Sr. No.	Name of Area/Forest	Area in Hac.
1	C-205 Katbari	5 Hac.
2.	C-205 Lajaya	5 Hac.
3.	C-203 Drobari	5 Hac.
4.	C-201 Barcha	5 Hac.
	G. Total	20 Hac.

The afforestation norms have been worked out both for conifers and B/Leaved species. Looking to the high incidence of grazing during summer, all the plantation areas will be fenced with B/wire in 3-4 strands. The model for raising of afforestation of degraded forest land over one hac. is given in Annexure-I & II.

Sr. No.	Expenditure Detail	Amount Per hac.
1.	Afforestation cost with conifers/B/L over 20 ha. @ 44000/-	880000.00
2.	Maintenance cost for 5 years	
	1 st year maintenance cost for 20ha. @ 7450/-	149000.00
	2 nd year maintenance cost for 20 ha. @ 5000/-	100000.00
	3 rd year maintenance cost for 20 ha. @ 2650/-	53000.00
	4 th year maintenance cost for 20 ha. @ 2650/-	53000.00
	5 th year maintenance cost for 20 ha. @ 2650/-	53000.00
	G. Total (New + Maintenance)	1288000.00

(c) **Enrichment plantation.**

There are some forests in the catchments 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 ha. 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.	Name of Area/Forest	Area in hac.
1	C-206 Sharan Gad	5 hac.
2	C-202 Sadali Gad	5 hac.
G. Total		10 hac.

The model for rising of enrichment plantation over one hac is given in Annexure-III & IV

Sr. No.	Expenditure Detail	Amount Per hac.
1.	Afforestation cost with coniferous species over 10 ha. @ 35500/-	355000.00
2.	Maintenance cost for 5 years	
	1 st year maintenance cost for 10 ha. @ 5550/-	55500.00
	2 nd year maintenance cost for 10 ha. @ 3100/-	31000.00
	3 rd year maintenance cost for 10 ha. @ 1650/-	16500.00
	4 th year maintenance cost for 10 ha. @ 1650/-	16500.00
	5 th year maintenance cost for 10 ha. @ 1650/-	16500.00
G. Total (New + Maintenance)		491000.00

(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 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. Up to 100/200 plants/patches per hectare will be planted/sown to ensure regenerating the area uniformly.

Total 10 hac area has been identified for this treatment under this component as per detail is given below:-

Sr. No.	Name of Area/Forest	Area in hac.
1.	C-207 Saran Gad	5 hac.
2.	Kupri	5 hac.
G. Total		10 hac.

The model for raising of Assisted Natural Regeneration over one hac is given in Annexure- V & VI

	Expenditure Detail	Amount Per hac.
1.	Afforestation cost with coniferous species over 10 ha. @ 19750/-	197500.00
2.	Maintenance cost for 5 years	0
	1 st year maintenance cost for 10 ha. @ 1150/-	11500.00
	2 nd year maintenance cost for 10 ha. @ 875/-	8750.00
	3 rd year maintenance cost for 10 ha. @ 520/-	5200.00
	4 th year maintenance cost for 10 ha. @ 520/-	5200.00
	5 th year maintenance cost for 10 ha. @ 520/-	5200.00
G. Total (New + Maintenance)		233350.00

(e) **N.T.F.P's Piantation:**

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 essential to address the livelihood issue by encouraging forest based enterprises for development of NTFPs on sustainable basis as it provides alternative income generation activities. Under this

scheme medicinal herbs like Dhoop, Karu, Kuth, Salam panja (Hat Panja), Ban kakri, Chora, Patish and Discorea deltoidea etc. will be raised. About 2200 plants will be planted shall be planted in 1 ha. area depending upon the site. The plants can also be raised as intercrop in the other plantation areas to be taken up for tree planting. The plantation areas will be fenced with B/wire fence in four strands on wooden fence posts. Total 10 hac area has been identified for planting under this component. The details of the area identified are as under: -

Sr. No.	Name of Area/Forest	Area in hac.
1	Modi Thach	5 Hac.
2	Masarvi	5 Hac.
	G. Total	10 Hac.

The model for raising of NTFPs plantation over one hac is given in Annexure- VII & VIII

Sr. No.	Expenditure Detail	Amount Per hac.
1.	Afforestation cost with medicinal plants/herbs over 10 ha. @ 37500/-	375000.00
2.	Maintenance cost for 3 years	
	1 st year maintenance cost for 10 ha. @ 6350/-	63500.00
	2 nd year maintenance cost for 10 ha. @ 4300/-	43000.00
	3 rd year maintenance cost for 10 ha. @ 2250/-	22500.00
	G. Total (New + Maintenance)	

(f) **Treatment of Alpine Pasture:**

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 catchments area and to provide biological resources. The alpine pasture has its 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 extensively grazed during summers for 3-4 months and also by a large number of goats and sheep. Discussion with the local people revealed that these pastures have badly degraded over a period of time. Till now no survey about the carrying capacity of pasture, grazing land and common waste lands has been specifically carried out for this purpose. Owing to traditional rights of the graziers, it is difficult to restrict the number of animal grazing there. Thus the only alternative left is to increase the productivity of these pastures to cope with the grazing pressures.

The treatment of these areas will consist of eradication of obnoxious weeds like Rumex spp. Patch sowing of local good variety of grasses. In one hectare area 1200 plants/patch strips of 100x30x50 cm shall be dug in a staggered manner along the contour at interval of 2 mt. and then sowing with suitable local grass species after consultation with scientists of UHF Nauni, Solan and HFR! Shimla. Plantation must use local and indigenous species since exotics have long term negative impacts on the environment. No fertilizer application and B/wire fencing is feasible in these areas, the droppings of sheep's and goats act as fertilizers, the best way to keep some areas closed on rotation basis to allow them to rejuvenate would be through dialogue with the local people and the migratory graziers so that a sort of social fencing could be worked out or the area will be protected with the help of thorny bushes available in the vicinity.

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 mis-utilized 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 N/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.

The list of various areas proposed to be treated is given below:

Sr. No.	Name of Area/Forest	Area in Hac.
1	Jau Thach	5 Hac.
2	Damni Thach	5 Hac.
3	Manjaban	5 Hac.
4	Bujati Thach	5 Hac.
	Total	20 Hac.

The model for raising of Treatment of Alpine Pasture plantation over one hac is given in Annexure-IX & X

Expenditure for treatment of Alpine pasture:

Sr. No.	Expenditure Detail	Amount Per hac.
1.	Cost of treatment of Alpine pastures over 20 ha. @ 12300/-	246000.00
2.	Maintenance cost for 2 years	
	1 st year maintenance cost for 20 ha. @ 3800/-	7600.00
	2 nd year maintenance cost for 20 ha. @ 2850/-	5700.00
	G. Total (New + Maintenance)	259300.00

5.5.2 Soil Conservation Works-Engineering and Bio-Engineering measures**a) Land slides/ slips stabilization:**

Land slides are caused by the down hills measurements 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 controlled measures 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 in the site/ field.

- i) Construction of check wall/ protection/retaining wall with crate wire to control land slips and toe cutting with brushwood check dams.
- ii) A mixture of soil conservation work with biological measures is required depending upon the site.

- iii) 25% out of the total outlay kept for engineering works shall be utilized for raising/planting of the bio-engineering species along with the engineering structure.

The various land slips/ land slides stabilization proposed for treatment is given below:

Sr. No.	Name of location/Area	Area in hac.
1	Kurmi Slip	3 Hac.
2	Kurmi Slip Part II	3 Hac.
3	Kupri Dhar	1 Hac.
4	Khanoru Thach	1 Hac.
	Total	8 Hac.

The expenditure of land slide and slips stabilization

S. No.	Name of work	Amount in Lacs
1	Cost of land slip/ stabilization over 7 ha. L/S Rs. 137500/-	1700000.00

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

b) Nallah Stabilization:

About 10 nallahs with a length of about 12 Kms. are required to be treated depending upon the sites/ location out of the length in the catchments area. The identified areas are given in the CAT Plan shall be stabilized through controlled measures which will depend upon the size, extent and location of the nallah of the field.

- a) Construction of check dams with gabian wall, protection wall with crate wire to regulate and check/ reduce the speed of flow.
- b) The eroded and effected Nallah will be channelized and protected by the crate wire of check wall and check dams.
- c) 25% out of the total outlay kept for engineering works shall be utilized for raising/planting of the bio-engineering species along with the engineering structure. 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 good soil binders like Salix, Alnus nitida, Alianthus, Agave, Nirgal, Kashmal, Bhekhali, Seabuckthorn, Rosa spp., Rubas spp. etc. will be planted.

The details of nallahs with length in Km are given below:

S. No.	Name of Nallah	Area (Kms)
1	Segta Nallah	1 Km.
2	Dubi Nallah	1 Km.
3	Kuma Choti	2 Km.
4	Sadali Gad	2 Km.
5	Daduma Gad	1 Km.
6	Garta Jacha	1 Km.
7	Marada Nallah	1 Km.
8	Shangrai	1 Km.
9	Khoi Nallah	1 Km.
10	Chota Shila	1 Km.
	Total	12 Km.

Financial Implications

S. No.	Name of Work	Amount
1	Cost of Nallah stabilization over 2 Kms. L/S Rs. 2,00,000/	2400000.00

c) Establishment of Silt Observatory

The study area designed for the catchments area treatment is experiencing all the classic vagaries of the nature on medium to large scale.

The main aim of this CAT Plan is to decrease the silt load in the Nanti Khad to ensure the longevity of the proposed hydro electric project and its components. This aim is proposed to be achieved by employing various methods and techniques such as increasing vegetative cover in the catchments area, stabilization of erosion prone areas and stabilization of land slide prone areas by vegetative as well as engineering methods.

To monitor the ultimate results of the measures proposed, a silt observatory is proposed to set up on Nanti Khad.

It is proposed to take the silt samples at the existing discharge site at Nanti set up to take the daily discharge and fortnightly silt samples at regular intervals. Purchase of laboratory equipments and hiring of lab technician is proposed, to carry out the silt level observation in the water samples collected from the stream by the user agency. A sum of Rs. 150000/- has been earmarked for this purpose.

(d) **Soil and water harvesting structure—Construction of Van Sarovar.**

The demand on the water resources of the state has been increasing with every passing year. The state is faced with a situation of water stress i.e. manifested by apparent moisture stress in vegetation and forest. Keeping in view of these facts the Hon'ble Forest Minister during the CF's Meeting on 7th & 8th July 2009 stressed upon the Forest Department to construct Van Sarovar in the forest area to conserve and augment water resources of the forest in the State of Himachal Pradesh. The basic idea of the Van Sarovar scheme is to trap rain water on hill sides, increase percolation and to build water retaining structures to store the excess water runoff in streams. The component and design of the scheme is to be followed as direction given by the department time to time as per availability and requirement of the site. Therefore, an amount of Rs. 700000/- has been proposed for this purpose during the plan period.

5.5.3. Protection of Forest

1. Fire Protection.

The catchments of the forests must be saved from forest fires. The forest fires do damage in Deodar and Kail forests during October to December and April to June. Control burning of forest debris/disposal of slash is recommended in dry season in dried up nallahs/path and along the cultivation in accordance with rules, Acts and departmental instructions. For this purpose one fire watchers in each beat must be provided during fire season. These fire watchers will especially clean up all existing nallahs and forests inspection path/bridal paths in the forests

and along the private cultivation. The nallahs and path act as fire barriers.

In order to protect the forests from fire, the following works are proposed to be undertaken during the plan period as under:-

- (a) Engagement of fire watchers during fire season.
- (b) Purchase of fire fighting equipment.
- (c) Maintenance of fire lines and control burning of grass land, debris and adjoining private gasni with the help of local people 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. An outlay for Rs. 100000/- is proposed to be incurred during the plan period.

(b) Energy Saving Devices :

In order to reduce the pressure from forest resources in and around the catchments of the project area, it is proposed to provide alternative sources like LPG cylinders on subsidized rate (50% cost to be given by the beneficiaries) to poor local people, construction of crematoria along with fuel wood store and distribution of solar lights etc. in Nanti & Tikkar villages. The component wise detail is given below: -

1. Distribution of LPG cylinders	65 Nos. families
2. Distribution of Solar lights	20 Nos.
3. Construction of crematoria	2 Nos.

(c) Construction/Repair of existing boundary pillars/chak pillars :

For protection of protected areas from encroachments near the cultivations, the existing boundary pillars are to be repaired and new intermediate pillar/chak pillars are to be constructed along the boundary of cultivated land and jurisdiction

of the protected forest areas. An outlay for Rs. 50000/- is proposed to be incurred during the plan period.

(d) Communication network:

For protection of wildlife from hunting, poaching, illegal trade and illicit felling the communication system has to be improved by providing mobile phones to each forest guards, Dy. Ranger and Range Officer etc. of Rampur Forest Range. An outlay for Rs. 35000/- is proposed to be incurred during the plan period.

(e) 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, aware them the importance of Wildlife conservation under the provision of Wildlife (Protection) Act, 1972, Indian Forest Act, 1927 & Forest Conservation Act, 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. 32000/- has been proposed for this purpose during the plan period.

(f) Reward/Incentives to Informers:

Reward/incentive to informers for control of illegal trade/illicit felling of trees is required for proper protection of forest and wildlife. Without help or association of the local people, forest guards alone are helpless to protect or detect the forest and wildlife offences. It is necessary to make people aware about the biological and ecological hardships which the fauna of the tract is

facing. The people should be encouraged by providing them suitable rewards/incentives for giving information about the offender/culprits. An outlay for Rs. 25000/- is proposed to be incurred during the plan period.

5.5.4 Forest Infrastructure Development:

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. A provision for Rs. 300000/- for construction and maintenance of existing buildings, bridal paths/inspection paths and bridges has been proposed under this component during the plan period.

5.5.5 Management of Wildlife in outside the Protected Area

(a) Improvement and Development of wildlife

The need for conservation, preservation and management of biological diversity arises because of threats to natural terrestrial and aquatic ecosystems due to various anthropogenic activities. The area heavily degraded will be closed with physical barriers and will be planted with bamboo, fruit trees, fruit bearing shrubs or shrubs with fodder values, herbs and grasses depending upon the site to be planted so far as practical. Increase biomass production especially on degraded common lands adjoining to villages by planting grass/B.L. trees. Plantation must use local and indigenous species since exotics species have long term negative impacts on the environment. For the improvement and development of wildlife the following activities shall be carried out during the plan period

- (i) Habitat improvement and development
- (ii) Construction of water pond

- (iii) Engagement of Anti-Poacher
- (iv) Sign & Slogan Boards
- (v) Vaccination of domestic cattle
- (vi) Field equipment and medicine for management of wildlife

(i) **Habitat improvement and development: -**

Since all wildlife in nature live in complex web of linkage with other organism, the proper evaluation of habitat of each species followed by the proper management is very essential. The plant life provides congenial home to wildlife therefore the habitat of wildlife in core zone area is to be improved by supplementing the Bamboo/fruit bearing shrubs or shrubs with fodder values, herbs and also supported by minor soil conservation works. For this purpose bushes, shrubs & herbs forests are to be maintained and no grass should be removed from the home range of the wildlife so that habitat of wildlife could be prescribed & protected. Nirgal Bamboo and fruit bearing shrubs or shrubs with fodder value and grasses will be planted as per site location, the blank area in the forests in high reaches along ridge should be maintained as pasture land by sowing suitable indigenous grasses for the need of wild herbivores which are prey base for the carnivores. The nirgal bamboo/shrubs/herbs in the under storey is very important for conservation of pheasants which are highly endangered species i.e. Western Tragopan and Cheer Pheasants etc. The detail plantation programme has already been given in the component of Biological Measures—Improvement of tree cover in order to achieve the objective and reduce the pressure from the forest area.

(ii) **Construction of water pond**

It is proposed to construct water pond in the forest to meet the scarcity of water on the slopes of the southern boundary of the catchment. The recommended size of water pond is 7 m x 6 m x 2mtrs with dry stone masonry inside

(iii) Engagement of Anti-Poacher:-

The forest area is required to be guarded against poaching throughout the year. In order to curb nefarious activities poachers, anti poaching measures like construction of check post/chowkies and joint patrolling is to be organized by engaging ex-serviceman and local unemployed youth. Local youth are to be trained and engaged them to give assistance to field staff and clues regarding poaching in a project/sanctuary area. A forest guard will have two wild life watchers while going on patrolling in the forests. These wild life watchers are to be engaged seasonally and for a short duration so that they will not claim regularization of their services. These wild life watchers will also act as local informers. Therefore, an amount of Rs. 45000/- is required to meet this purpose during the plan period.

(iv) Vaccination of domestic cattle: -

Due to use of water holes/ponds and grazing by the live stock in the forests and vice versa may lead the wild animals to health hazards. Therefore an effective vaccination programme is recommended for foot and mouth disease in sheep and goats and other cattle adjoining to the Sanctuary areas. The migratory grazer must also be vaccinated before entered to the Sanctuary area. The veterinary department must be associated for this purpose. The staff should be trained in pathological problems and collection of samples. Therefore, an amount of Rs. 85000/- is required to meet this purpose during the plan period.

(v) Field equipment and medicine for management of wildlife

The rich and unique bio-diversity of catchment area is under tremendous pressures and stress due to ever increasing demographic pressure. Increasing conflicts between Wildlife and local communities is a major factor that leads to antagonism among

the people and discourage the forest official to appropriately enforce the existing laws.

The state of Himachal Pradesh has experienced escalation in the human-wildlife conflict in the last one decade. Almost all PA's in the State are surrounded by private land or other man-modified habitats where the presence of several wild animals, particularly predators i.e. Leopard and Black Bear is intolerable. These species increasingly venture into human settlements and cultivated areas in search of food and cause loss of human lives or injuries, livestock predation or extensive damage to the horticulture/agriculture crops and other private properties. The escalation in the human-wild life conflict is an outcome of shrinkage, fragmentation and degradation of habitats. Special field training/workshop on wildlife damage control with emphasis on use and handling of animal repellants, deterrents, snares, traps, capture devices nets and accessories and power fencing etc. need to be organized. Besides above staff should be well equipped with all necessary capture traps and squeeze cages and immobilizing equipments required for capture and handling of problem of Leopard. The equipment will help in capturing of such animals and release them in their natural habitat or zoo under the provision of Wildlife (P) Act, 1972

The field equipment and medicine will be purchased by the project authority and made available to the Division in kind.

- (1) Physical capture cages, traps, immobilizing gun, darts, drugs.
- (2) Animal rescue, translocation/transportation.
- (3) Capture devices net and accessories etc.
- (4) Field measurement-GPS/PDA, altimeter, pedometer, compass, Sony handy cam, Tape Recorder, Census equipments.
- (5) Binoculars and spotting scope etc.
- (6) Medicines

(7) Protection Guns two nos.

Therefore, an amount of Rs. 300000/- is required to meet this purpose during the plan period.

(b) Mitigation of Human-Wildlife Conflict

The communities of this project area largely occupied forestry region where for a long period in their history, they have lived in isolation but in harmony with the nature. They draw their sustenance largely from the forests for their day to day consumption and their livelihood. Their life is connected one way or the other with forest and wildlife, right from birth to death. We cannot deny the needs of the society as the local people who live in harmony with the forests; environment and ecologically they cannot be disregarded. Mitigation of Wildlife problems in hilly area is very complicated and therefore there is urgent need for development of livelihood approach that can minimize or reduce the man Wildlife conflict to tolerable level. In order to achieve their objectives and reduce the pressure from forest and maintain ecological balance, the conservation of wild life along with eco-development activities in the adjoining Sanctuary area. The following important mitigative measures are to be undertaken in the regard area as under: -

(i) Village Support activities: -

In order to reduce the pressure from forests of catchments area, it is essential to develop village support activities i.e. repair/construction of path, repair of bawaries, construction of cattle pond, vaccination of domestic cattle etc. The local people have grazing rights in and around the Sanctuary area. It is therefore, 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. The component wise detail is given below: -

- i) Const./repair of water bawaries in Villages.
- ii) Strengthening of village path.
- iii) Construction of cattle pond.
- iv) Compensation against wildlife damages
- v) Publicity and awareness

Therefore, an amount of Rs. 640000/- is required to meet this purpose during the plan period.

a. Wildlife compensation against damages:

Wildlife damages on human life and property is a major cause of alienation of local communities from wildlife conservation. Timely payment of compensation against the depredation of wildlife goes a long way in eliciting local support. At present there is no policy of the State Govt. and provision for compensation for crop damages by Wild animals due to which the man—animal conflict is becoming acute in sanctuary area day by day. For instance damage to apple tree/crops, bee keeping farming, agricultural crops etc. whereas we are meeting the compensation for damage to domestic cattle and human loss/injury by wild animals only. Therefore, an amount of Rs. 150000/- has been proposed for this purpose during the plan period.

b. Income Generation Activities: -

One of the major factors impacting on the effective bio-diversity conservation is the dependence of local people on the natural resources of the Sanctuary for their livelihood. Local people have a right to collect/extraction of NTFP in and around the Sanctuary area under the provision of Forest Settlement Report, 1921. Although, a four year felling cycle has been prescribed by the H.P. Forest Department and the Apex Court Order dated

14.02.2000, prohibited the removal of dead decreased, dying and fallen trees, drift wood and grasses from National Park and Sanctuary but they extracted NTFP for their livelihood there by threatening a very existing of the rare and endangered species of medicinal herbs. The component wise detail is given below: -

- ↓ Vermin compost, Poly House & organic farming
- ↓ Bee Keeping
- ↓ Animal husbandry support and diary development
- ↓ Agriculture and Horticulture support.

Therefore, it is need to address the livelihood issue by encouraging forest based enterprises for development of NTFP along with bee keeping, vermi composting, poly house and organic farming are required to sustainable basis as it provides alternative income generation activities. Under this scheme NTFP like Dhoop, Kuth, Karu, Hath Panja, Ban Kakri, Patish and Banaksha etc. will be raised in nursery and plants will be distributed to local people free of cost. Medicinal plants will be planted in private land depending upon the site and choice of species.

Agriculture and horticulture are the main occupation of the people in the project area. The productivity of such land is mostly poor and traditional. It is thus imperative that appropriate technological interventions are made in agriculture, horticulture and vegetative farming sector to have a hammonious effect on the environment and bio-diversity of the catchments area. The development must take into account the ecological and social conditions of mountain environments. As such, there is need of using and improving the indigenous methods of agriculture's. Use of toxic chemicals such as pesticides/ weedicides must be highly restricted or not done at all. This will help in maintaining quality of Bio-diversity, water, soil and atmosphere as a whole. Mitigative works should be carried out with

the consent of the public through District Administration i.e. line department subject to the approval of A.P.O by the competent authority. The detail estimate as per the site condition will be prepared at the time of actual execution of work and funds utilized accordingly. Therefore total outlay for Rs.1162500/- is proposed to be incurred for income generation activities component during the plan period.

c. **Extension of Sarahan Pheasantry at Gopalpur**

The Sarahan Pheasantry was established during the year 1987-88 comprising total area of Phasantry about 11-12-37 hac. and is located near the Nalati Stadium about half km. from the famous "MAA BHIMAKALI" Temple at Sarahan. It was initially setup as rescue and rehabilitation centre for the Wild Western Himalayan fauna driven from the habitations for food due to snow fall at higher reaches. It was only where the captive breeding of Western red listed Pheasants was added during the year 1990-91 and construction of enclosure was taken up with special attention to pen, hygiene and feed etc. During the year 1993-94 Sarahan Pheasantry witnessed the first ever breeding of Western Tragopan in captivity in the World. It is the only Sarahan Pheasantry in the World where this rare endangered species kept in captivity at Sarahan Pheasantry. And now the presents Sarahan Pheasantry proposed to be established conservation breeding project of Western Tragopan will lead the World in Pheasants re-introduction programme under the guidelines of IUCN besides to standardize techniques for the conservation breeding of red listed pheasant of the western Himalayas. The Sutlej valley has, over the years, come to be recognized as having large scale potential for generation of Hydro Electric Power Project. The Project authorities are under obligation to fund available in lieu of disturbance and maintenance of ecological balance cause during the project activities in the Sutlej catchment. Keeping in view of this facts

and reason the development and management of ex-situ conservation of breeding centre for endangered species will therefore be made during the plan period.

The Hon'ble Chief Minister of Himachal Pradesh has decided in the meeting held on 10.08.2007 that an alternative site for conservation breeding of Western Tragapon at Gopalpur may be setup to avoid any outbreaking disease etc. Accordingly the transfer an area of 6.3 hac. from DFO Rampur to DFO Wildlife Sarahan has already been made by the order of Pr. CCF H.P. along with all assets and infrastructure to establish the alternative site of Sarahan Pheasantry at Gopalpur. The fencing works of alternative sites of Sarahan Pheasantry had already been commenced and it was decided in the meeting that funds will be met from the CAT Plan of each Hydro Power Project in Sutlej Valley so that the objective of the conservation breeding at alternative site at Gopalpur could be achieved.

Therefore a provision of Rs. 20.00 lac has been made for this purpose during the plan period and funds will be utilized with the approval of the competent authority under the supervision of the CZA New Delhi.

5.5.6 Eco-Tourism Development:

The area is also known for its scenic beauty. The area has a very high potential for development of Eco-tourism 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 society and they need training and awareness/importance of the conservation of wildlife along with eco-tourism and 1.5% of the cost of CAT Plan amounting to Rs. 119598/-

has been kept reserved for these activities. The activities which can be undertaken under this component have been identified as under:-

- Development of camping sites and public utility services.
- Training of local youths for Eco-Tourism activities.
- Maintenance/repair of path.
- Purchase of camping equipments.
- Sign and slogan boards

The above works will be carried out in consultation with CCF Eco-tourism by D.F.O. Rampur in accordance with the provision of H.P. Eco-Tourism Policy, 2005 against 1% of the cost of the CAT Plan as per H.P. Govt. notification dated 30-09-2009.

5.5.7 Research and studies:

15/20 forest area is unique rich in Bio-diversity due to diverse physiographic and climatic condition. Whereas the prominent indigenous woody component includes Deodar, Kail, Fir, Spruce Betula utilis, the grassland are mainly composed of a large variety of grass and herbaceous plants which have immense medicinal values. However, not much is known about the floral diversity, ecological and environmental impact of the area, as no comprehensive work on the subject has been conducted and published as yet. It is utmost important that a base line information about the floral diversity, ecological studies 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 subject:-

- (a) A study on distribution, relative abundance and food habitats of the Himalayan Tahr and leopard.

- (b) Environmental impact Assessment of biotic pressure in higher alpine zone.

A provision of Rs. 500000/- 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, which is duly approved by the component authority. First preference will be given to the in service candidate who having a knowledge and experiences on forestry and wildlife management and conservation.

5.5.8 Training of Forest Officer/Official:

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 people and the staff working in the project area too augments their existing skill, professional knowledge, capacity building to share experiences and ideas on different fields. In order to achieve overall plan objectives by effective implementation of the plan the training component under this plan is given below:-

- i) Training in soil and moisture conservation and exposure visit in Swan Project area.
- ii) Forest law enforcement and governance.
- iii) Training in wildlife management and conservation.

Therefore, an outlay for Rs. 100000/- is proposed to be incurred during the plan period.

5.5.9 Nature Awareness Camp/Exposure visit and training of CBO's and extension programme/workshop:

The catchments 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 and 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 education 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 population/VFDS has to be educated and trained regarding the programme incorporated with the project. VFDS/VFDC constituted in each village and JFM workshop is organized to provide common forum for sharing of various experiences and for developing common understanding on the 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 technique to the farmers. The Wildlife (Protection) Act 1972, FC Act 1980 and Indian Forest Act 1927 must be explained to them. They must be told about ban on hunting rules regarding collection of MFPs and compensation to be given if wildlife animal damages cattle etc. Special Nature Awareness camps/exposure visit must be organized in winter when people are relatively free to attend such camps/visits. Wildlife quizzes, planting, tracking and visit to nearby areas of PA's should be organized to attract the school going children to the cause of wildlife 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 HFRI

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 APO latest technology on agriculture, forestry and allied subject is to be imparted to the farmers from UHF Nauni and Palampur University etc. active non Governmental Organization operating in the area and also outside (within the state) are also to be involved.

Therefore, an outlay for Rs. 300000/- is proposed to be incurred during the plan period.

5.5.10 Monitoring and Evaluation:

The regular quarterly meeting/workshop will be conducted/ organized with the approval of the competent authority during the plan period. The Monitoring Committee would be constituted as below:-

1. Chairman, Conservator of Forests Rampur
2. A.C.F. Rampur, Member
3. Representative of PRI. Member
4. Representative of user agency, Member
5. Range Officer Rampur, Member
6. D.F.O. Rampur Member Secretary

The committee would need to ensure the implementation and monitoring of the catchments area works and review progress from time to time. The implementing agency upon its approval will provide a copy of the approved APO giving 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 thrice in a year or as and when required in emergency with due approval from members and

higher competent authorities. All non official members shall be entitles to TA/DA as per rates approved and being followed by D.C. Shimla. All the expenditure incurred on these meetings shall be met from this head of Monitoring and Evaluation. 5% of the cost of CAT Plan has been kept reserved for this purpose. Therefore an outlay for Rs. 826242/- is proposed to be incurred under the scheme during the plan period.

5.5.11 JFMC & Micro Planning: -

In the proposed CAT Plan management of plan is given component wise and area specific. Further Micro Planning will be required at the time of execution of CAT Plan with the consultation of JFMC's especially in afforestation and income generation activities. Moreover, if a certain new techniques/innovative occur in due course of time these can be taken up as per requirement of site and particular location. Therefore an outlay Rs. 200000/- is proposed for this purpose during the plan period.

5.5.12 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, vehicle for better implementation of CAT Plan, Computers and equipments etc.

Sr. No.	Description of items	Qty.	Amount (in lacs)
1.	Purchase of Dual core computer with all accessories including printer (in kind)	1 No.	40000.00
	Purchase of vehicle (Tippar) in kind	L/s	1200000.00
2.	T.A.	L/S	75000.00
3.	O.E.	L/S	50000.00
4.	Maintenance of motor vehicle including fuel expenses	L/S	50000.00
5.	Amenities to staff and labours	L/S	50000.00
	G. Total		1465000.00

5.5.13 Payment of Environmental Services (PES):

It is a new concept as a reward for good conservation behavior by upstream community living in the catchments area of the project. The PES will be based on the result of monitoring of the following aspects and effectiveness of conservation measures between communities.

- Silt load (total, seasonal and average assessment)
- Planting survival rate in social forestry.
- Freezing land use.
- Better Agriculture, Horticulture and Animal Husbandry practices in the catchments area.

A Committee would decide the quantum PES to be paid to the upstream considering the above. 5% of the cost of CAT Plan has been earmarked for this purpose. The payment will be made VFDS/Panchayat. The monitoring committee has been suggested, comprising one member from each i.e. User Agency, Forest Deptt., PCB and Horticulture/Animal Husbandry Department etc.

5.5.14 Deployment of Eco Task Force:

Ecological Task Force Scheme was initiated by the Ministry of Defense in 1980 with a view to involve ex-servicemen in afforestation and eco-development schemes in remote and difficult areas to undertake restoration of degraded eco-systems through afforestation, soil conservation and water resources management techniques.

The scheme of Eco-Development Forces is based on two objectives of ecological restoration and employment generation for able bodied ex-servicemen. Under this scheme, the establishment and operational expenditure on Eco-Task Force (ETF) Battalion raised by Ministry of Defence (MOD) is reimbursed by Ministry while the input like sapling fencing etc. as also the professional and managerial guidance provided by the State Forest Departments (Source-<http://envfor/nic.in/naep/sch/etf.pdf>)

(15.07.2008) & <http://india.gov.in/sectors/environment/nationalboard.php> (15.07.2008). The scheme is in operation for last five years plans.

The H.P. State has already raised a Territorial Army (TA) infantry battalion 133 infantry battalion Dogra Ecological Force in March 2006 in Sutlej Basin. The Himachal Pradesh Government has made a proposal to the Defense Ministry for raising two more Territorial Army Battalions of Eco Taskforce for Ravi and Beas catchments areas with a view to preserve the flora and fauna of the state. All CAT Plans of the Hydel projects of the basin are supposed to pool in resources to support the ETF. The reimbursed expenditure by Ministry should be reinvested in ecological restoration works in the basin. 1.5% of the cost of CAT Plan has been earmarked for this purpose.

5.5.15 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 suggested although efforts has been made to restrict the expenditure but access and deficit may occur as per the allocation of funds and escalation of wage rate and cost of material etc. since the CAT Plan to be implemented over a period of ten years, hence in the eventuality of burned or in order to accommodate any future increase in the cost of the plan, on account of increase in wages, cost of material etc. an amount of Rs. 1652485/- has been proposed for this purpose during the plan period which is about 10% of the cost of CAT Plan. This provision could also be utilized to meet any unforeseen expenses, arising in future, and necessary for the achievement of the objectives of the CAT Plan. Similarly any unspent

amount left during the plan period it will be utilized by proposing the additional works in consonance with project objectives which are not covered in the CAT Plan with the prior approval of the competent authority.

CHAPTER-VI

ORGANIZATION STRUCTURE AND IMPLEMENTATION

- 6.1 This CAT Plan will be implemented by the H.P. Forest Department through the Conservator of Forests, Rampur Circle-cum-Project Director. At the field level the actual implementation will be done by D.F.O. Rampur having territorial jurisdiction over the areas covered under this Plan. The DFO Rampur will be assisted by the regular staff posted under them and may also hire local consultants on short term basis for implementation of the CAT Plan.

In compliance of Hon'ble Supreme Court of India, an agency called "CAMPA" compensatory afforestation fund management and planning authority has been created on the recommendations of the Central Empowered Committee (CEC) for examining the issues pertaining to compensatory afforestation net present value of diverted forest land, other monies recoverable received to be utilized for carrying out the above works.

In compliance of Hon'ble Supreme Court of India, an agency called "CAMPA" compensatory afforestation fund management and planning authority has been created on the recommendations of the Central Empowered Committee (CEC) for examining the issues pertaining to compensatory afforestation net present value of diverted forest land, other monies recoverable received to be utilized for carrying out the above works.

The Govt. of India, Ministry of Environment and Forests, have notified Governing Body and Executive Body for function of the CAMPA. Mean a while a bill has been introduced in the Lok Sabha (Parliament) to lay down the CAMPA (Compensatory afforestation Forest management and Planning Authority) Rules. The monies on account of the CA, NPV and

CAT Plan are now to be deposited in the above fund and spent in the manner provided by the MOEF. In compliance to the instructions contained in Ministry of Environment and Forests, Government of India's letter No. 1-58/09-MoS(l/c)-E&F dated 15th July 2009, the Governor of Himachal Pradesh is pleased to reconstitute "State Compensatory Afforestation Fund Management and Planning Authority (hereinafter referred to as State CAMPA) vide H.P. Govt. Notification no FFE-B-F(2)-72/2004-Pt-II intended as an instrument to accelerate activities for Compensatory afforestation, forest resource management, preservation of natural forests, management of wildlife, infrastructure development in the sector and allied works.

State CAMPA would provide and integrated framework for utilizing multiple sources of funding and activities relating to protection and management of forests and wildlife. Its prime task would be regenerating natural forests and building up the instruction engaged in this work. The State Forest Department would be modernized to protect and regenerate the forests and wildlife habitat.

The functions of State CAMPA shall be include funding, overseeing and promoting Compensatory afforestation done in lieu of diversion of forest land for non-forestry use under the Forest (Conservation) Act, 1980 and also the execution of Catchment Area Treatment plans. The State CAMPA shall function through a Governing Body, as Steering Committee and an Executive Committee. The Governing Body shall lay down the board policy framework for the functioning of State level CAMPA and review its working from time to time. The Steering Committee shall monitor the progress of the utilization of funds released by the State CAMPA and approved the Annual Plan of Operation (APO) prepared by the Executive Committee. The State level executive Committee shall take all steps for giving effect to the State CAMPA and overarching objectives and core principles, in accordance with the rules and procedures approved by the

Steering Committee and the approved APO. The State level Executive Committee shall supervise the works being implemented in the State out of the funds released from the State CAMPA and be responsible for proper auditing of both receipt and expenditure of funds. An independent system for concurrent monitoring and evaluation of the works implemented from the State CAMPA funds shall be evolved and implemented to ensure effective and proper utilization of funds.

The works will be executed strictly in accordance with the State CAMPA Notification dated 03.08.2009 through the Conservator of Forests-cum-Project Director. The implementation will be at field level by the DFO Rampur having jurisdiction over the area under the plan in Rampur Forest Division. The limit of execution of work will be Forest Beat, Forest Block and Sarahan territorial Forest Range.

The works will be carried out as per the annual plan operations to be prepared on the basis of year wise phasing out of the physical & financial targets. The APOs will be got approved from the State CAMPA through the Pr. CCF as envisaged in the CAMPA Notification.

As multi disciplinary approach is to be adopted in this project, as such involvement of local communities with close liaison with Agriculture, Rural Development, Panchayati Raj, PWD and Animal Husbandry Departments, Upper Nanti Small HEP (P) Ltd. Authorities will be associated for implementation of this Plan and during the monitoring and evaluation process.

6.2 Implementation Staff:

The existing staff of Rampur Forest Division will be involved for the implementation of CAT Plan works in addition to their own duties. However, for proper execution of works and utilization of the money for the treatment of the catchments area DFO will be authorized to engage staff on contract basis with the approval of Project Director-cum-C.F. Rampur.

6.3 Cost Escalation:

The present cost projections are based on the prevailing wage rates. 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-VII

COST ESTIMATE

7.1 Total Project Cost:

Cost of the various component have been worked out on schedule rate for the year 2008-09 as applicable in Rampur Forest Circle H.P. Forest Department. 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.)
2011-12	6186000.00
2012-13	3103500.00
2013-14	3649250.00
2014-15	1927000.00
2015-16	747625.00
2016-17	398475.00
2017-18	295950.00
2018-19	179700.00
2019-20	37350.00
2020-21	0.00
Total	16524850.00
Eco-Tourism @ 1% of CAT Plan outlay	165248.50
Monitoring & Evaluation @ 5% of the CAT Plan Outlay	826242.50
Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay	1652485.00
Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay	247872.75
Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay	1652485.00
G. Total Cost of CAT Plan	21069183.75
Or Say	

7.2 Annual Phasing:

Annual phasing of works to be carried out in Lower Nanti HEP as per approved CAT Plan is as per article 7.2.1 to 7.2.10. The Cost model, schematic planning and Activity wise Percentage of Financial Outlay of CAT Plan is attached as Annexure – I to XII.

7.2.1 Details of works/expenditure of 1st year 2011-12

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(i) Nursery Development				
	Establishment of Nursery (New)	Daira	0.50 hac.	L/s	150000
		Pancha	0.25 hac.	L/s	100000
	Sub-Total (1)				250000
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips	Kurmi Slip	3 hac.	L/s	600000
		Total			600000
	(ii) Stabilization of Nallahs	Segta Nallah	1 Km.	L/s	400000
		Dubi Nallah	1 Km.	L/s	200000
		Kuwa Choti	2 Km.	L/s	400000
		Total			1000000
	(iii) Establishment of Silt Observatory		1 No.	L/s	150000
	(iv) Soil & water Harvesting Structure--Const. of Van Sarovar	Lauri	1 No.	L/s	700000
		Total			850000
	Sub-Total (2)				2450000
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers	Phancha & Jaghori Beat	4 Months	L/s	11250
	(ii) Purchase of fire fighting equipments	Sarahan Range		L/s	25000
	(iii) Maintenance of fire lines and control burning	C-203 Nanti Pat, C-202 Sadholi Gad, C-201 Kunda Kiu		L/s	15000
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylinders	Nanti Village	35 No.		35000
	(ii) Distribution of Solar Lughts	Nanti Village	10 No.	L/s	100000
	(iii) Construction of Crematoria & store for fuel wood	Nanti Village	1 No.	L/s	150000
	(c) Construction & Repair of Existing Boundary	Jaghori Beat		L/s	25000
	(d) Communication network	Mobile recharge for 4 No. Guards and 1 No. B.O.	5 No.	L/s	5000
	(e) Sign & Slogan Boards		2 No.	L/s	16000
	(f) Reward/insentive to Informers			L/s	5000
	Sub-Total (3)				387250
4	Forest Infrastructure Development				0
	(i) Repair of existing forest path	Phancha to Dovda	6 Km.	L/s	200000
	Sub-Total (4)				200000

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
5	Management of Wildlife in outside the Protected Area				
(a)	Improvement and Development of wildlife				
	(i) Engagement of Anti-Poacher		4 No.	L/s	11250
	(ii) Vaccination of domestic cattle			L/s	15000
	(iii) Field equipment and medicine for management of wildlife- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind				0
(b)	Mitigation of Human Wildlife Conflict				
(i)	Eco-Development Activities				
(a)	Village Support Activities				
	(i) Construction/repair of water bowaries	Tela Bawari, Uttam Singh Bawari & Dedda Bawari		3 No.	90000
	(ii) Strengthening of village path	Bah to Nanti Middle School, Tadau to Kwuti	6 Km.	L/s	200000
	(iii) Construction of cattle pond	Oddi	1 No.	L/s	80000
	(iv) Compensation against wildlife damages			L/s	30000
(b)	Income Generation Activities				
	(i) Vermi compost, Poly House & organic farming	Nanti Village	1 No.	L/s	150000
	(ii) Bee Keeping	Nanti Village	35 No.	L/s	87500
	(iii) Animal husbandry support and diary development			L/s	250000
	(iv) Agriculture and Horticulture support			L/s	300000
(c)	Extension of Sarahan Pheasanry at Gopalpur	Sarahan	1 No.	L/s	300000
	Sub-Total (5)				1513750
6	Research and Studies			L/s	0
7	Training of Forest Officer/Officials				0
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension poogramme/Workshop				0
9	JFM and Micro Planing			L/s	100000
10	Operational Support				
(i)	Purchase of Dual Core Computer with all accessories including printer in kind	Range Office Sarahan		L/s	40000
(ii)	Purchase of Vehicle (Tippar) in kind			L/s	1200000
(iii)	T.A.			L/s	15000
(iv)	O.E.			L/s	10000
(v)	Maintenance of motor vehicle including fuel expences			L/s	10000
(v)	Aminities to staff & labour			L/s	10000
	Sub-Total (10)				1285000
	G. Total (1 to 10)				6186000

CAT PLAN UPPER NANTI HEP

Developer: - Nanti Hydro Power (P) Ltd.

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
	Eco-Tourism @ 1% of CAT Plan outlay				61860.00
	Monitoring & Evaluation @ 5% of the CAT Plan Outlay				309300.00
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				618600.00
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				92790.00
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				618600.00
	Total Cost of CAT Plan				7887150.00
	Or Say				

7.2.2 Details of works/expenditure of 2nd year 2012-13

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(i) Nursery Development				
	Establishment of Nursery (Maint.)	Daira	0.50 hac.	L/s	25000
		Pancha	0.25 hac.	L/s	25000
	Sub-Total (1)				50000
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips	Kurmi Slip Part II	3 hac.	L/s	600000
		Total			600000
	(ii) Stabilization of Nallahs	Sadali Gad	2 Km.	L/s	400000
		Daduwa Gad	1 Km.	L/s	200000
		Garta Jacha	1 Km.	L/s	100000
		Total			700000
	Sub-Total (2)				1300000
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers	Pancha, Jaghori	4 Months	L/s	11250
	(ii) Maintenance of fire lines and controll burning	C-204a Saghori Gad C-204b Segta Dhar, C- 205 Ketbri		L/s	15000
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylenders	Tikkar Village	30 No.		30000
	(ii) Distribution of Solar Loghts	Tikkar Village	10 No.	L/s	100000
	(iii) Construction of Crematoria & store for fuel wood	Tikkar Village	1 No.	L/s	150000
	(c) Construction & Repair of Existing Boundary Pillars /Chak Pillars	Jaghori & Pancha Beat		L/s	25000
	(d) Communication network	Mobile recharge for 4 No. Guards and 1 No. B.O.	5 No.	L/s	5000
	(e) Sign & Slogan Boards		2 No.	L/s	16000
	(f) Reward/Insentive to Informers			L/s	5000
	Sub-Total (3)				357250
4	Forest Infrastructure Development				
	(i) Repair of Forest Path	Nanti to Laudi	7 Km.	L/s	100000
	Sub-Total (4)				100000
5	Management of Wildlife in outside the Protected Area				
	(a) Improvement and Development of wildlife				
	(i) Engagement of Anti-Poacher		4 No.	L/s	11250
	(ii) Vaccination of domestic cattle			L/s	15000
	(iii) Field equipment and medicine for management of wildlife-- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind			L/s	150000
	(b) Mitigation of Human Wildlife Conflict				
	(i) Eco-Development Activities				

CAT PLAN UPPER NANTI HEP

Developer: - Nanti Hydro Power (P) Ltd.

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
	(a) Village Support Activities				
	(i) Construction/repair of water bowaries	Chandi, Branda Upper, Branda Lower		3 No.	90000
	(ii) Strengthening of village path	Nanti to Tikkar	3 Km.	L/s	100000
	(iii) Construction of Cattle Pond	Bawi	1 No.	L/s	80000
	(iv) Compensation against wildlife damages			L/s	30000
	(b) Income Generation Activities				
	(i) Vermi compost, Poly House & organic farming	Tikkar Village		1	150000
	(ii) Bee Keeping	Tikkar Village		30 No.	75000
(c)	Extension of Sarahan Pheasantry at Gopalpur		1 No.	L/s	300000
	Sub-Total (5)				1001250
6	Research and Studies			L/s	0
7	Training of Forest Officer/Officials				50000
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension programme/Workshop				150000
9	JFM and Micro Planing			L/s	50000
10	Operational Support				
	(i) T.A.			L/s	15000
	(ii) O.E.			L/s	10000
	(iii) Maintenance of motor vehicle including fuel expences			L/s	10000
	(iv) Aminities to staff & labour			L/s	10000
	Sub-Total (10)				45000
	G. Total (1 to 10)				3103500
	Eco-Tourism @ 1% of CAT Plan outlay				31035.00
	Monitoring & Evaluation @ 5% of the CAT Plan Outlay				155175.00
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				310350.00
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				46552.50
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				310350.00
	Total Cost of CAT Plan				3956962.50
	Or Say				

7.2.3 Details of works/expenditure of 3rd year 2013-14

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(a) Nursery Development				
	(i) New				
	(ii) Maintenance				
	(b) Afforestation of degraded forest land				
	(i) New	C-205 Katbari	5 hac.	44000	220000
		C-205 Lajaya	5 hac.	44000	220000
	Total		10		440000
	(c) Enrichment planting				
	(i) New	C-206 Sharan Gad	5 hac.	35500	177500
	(d) Assisted Natural Regeneration				
	(i) New	C-207 Saran Gad	5 hac.	19750	98750
	Total				98750
	(e) NTFP Plantation				
	(i) New	Modi Thach	5 hac.	37500	187500
	(f) Treatment Alpine Pasture				
	(i) New	Jau Thach	5 hac.	12300	61500
		Damni Thach	5 hac.	12300	61500
	Sub-Total (1)				1026750
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips	Kupri Dhar	1 hac.	L/s	250000
		Khanonj Thach	1 hac.	L/s	250000
	Total				500000
	(ii) Stabilization of Nallahs	Marada Nallah	1 Km.	L/s	200000
		Shangrai	1 Km.	L/s	200000
		Khoi Nallah	1 Km.	L/s	150000
		Chota Shila	1 Km.	L/s	150000
	Total				700000
	Sub-Total (2)				1200000
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers	Phancha & Jaghori Beat	4 Months	L/s	11250
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylinders				0
	(ii) Distribution of Solar Lights			L/s	0
	(iii) Construction of Crematoria & store for fuel wood			L/s	0
	(c) Construction & Repair of Existing Boundary Pillars				
	(d) Communication network	Mobile recharge for 4 No. Guards and 1 No. B.O.	5 No.	L/s	5000
	(e) Sign & Slogan Boards				0
	(f) Reward/Incentive to Informers			L/s	5000
	Sub-Total (3)				21250

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
4	Forest Infrastructure Development			L/s	0
(i)	Const. of Fgd. Hut				0
(ii)	Maint. of B.O. Quarter				0
(iii)	Maint. of Fgd. Hut				0
(iv)	Repair of Existing Forest Path				0
	Sub-Total (4)				0
5	Management of Wildlife in outside the Protected Area				
(a)	Improvement and Development of wildlife				
(i)	Engagement of Anti-Poacher		4	L/s	11250
(ii)	Vaccination of domestic cattle			L/s	20000
(iii)	Field equipment and medicine for management of wildlife-- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind			L/s	150000
(b)	Mitigation of Human Wildlife Conflict				
(i)	Eco-Development Activities				
(a)	Village Support Activities				0
(i)	Construction/repair of water bowaries			L/s	0
(ii)	Strengthening of village path			L/s	0
(iii)	Construction of cattle pond			L/s	30000
(iv)	Compensation against wildlife damages				
(b)	Income Generation Activities				0
(i)	Vermi compost, Poly House & organic farming			0	0
(ii)	Bee Keeping			L/s	250000
(iii)	Animal husbandry support and diary development			L/s	200000
(iv)	Agriculture and Horticulture support				300000
(c)	Extenssion of Sarahan Pheasantry at Gopalpur	Sarahan	1 No.	L/s	300000
	Sub-Total (5)			L/s	961250
6	Research and Studies				300000
7	Training of Forest Officer/Officials				50000
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension poogramme/Workshop				0
9	JFM and Micro Planing			L/s	50000
10	Operational Support				
(i)	Purchase of Dual core computer with accessories including printer in Kind	Range Office Rampur		L/s	0
(ii)	T.A.			L/s	15000
(iii)	O.E.			L/s	10000
(iv)	Maintenance of motor vehicle including fuel expenses			L/s	10000
(v)	Aminities to staff & labour			L/s	5000
	Sub-Total (10)				40000
	G. Total (1 to 10)				3849250

CAT PLAN UPPER NANTI HEP

Developer: - Nanti Hydro Power (P) Ltd.

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
	Eco-Tourism @ 1% of CAT Plan outlay				36492.50
	Monitoring & Evaluation @ 5% of the CAT Plan Outlay				182462.50
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				364925.00
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				54738.75
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				364925.00
	Total Cost of CAT Plan				4652793.75
	Or Say				

7.2.4 Details of works/expenditure of 4th year 2014-15

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(a) Nursery Development				
	(i) New				
	(ii) Maintenance				
	(b) Afforestation of degraded forest land				
	(i) New	C-203 Drobari	5 hac.	44000	220000
		C-201 Barcha	5 hac.	44000	220000
			10 hac.		440000
	(ii) Maintenance 1st Year	C-205 Katbari	5 hac.	7450	37250
		C-205 Lajaya	5 hac.	7450	37250
			10 hac.		74500
	(c) Enrichment planting				
	(i) New	C-202 Sadali Gad	5 hac.	35500	177500
	(ii) Maintenance 1st Year	C-206 Sharan Gad	5 hac.	5550	27750
	(d) Assisted Natural Regeneration				
	(i) New	Kupri	5 hac.	19750	98750
			5 hac.		98750
	(ii) Maintenance	C-207 Saran Gad	5 hac.	1150	5750
			10 hac.		5750
	(e) NTFP Plantation				
	(i) New	Masharvi	5 hac.	37500	187500
	(ii) Maintenance	Modi Thach	5 hac.	6350	31750
					219250
	(f) Treatment Alpine Pasture				
	(i) New	Manjaban	5 hac.	12300	61500
		Bujati Thach	5 hac.	12300	61500
	(ii) Maintenance	Jau Thach	5 hac.	3800	19000
		Damni Thach	5 hac.	3800	19000
					161000
	Sub-Total (1)				1204500
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips				
		Total			0
	(ii) Stabilization of Nallahs				
		Total			0
	(iii) Establishment of Silt Observatory				0
	(iv) Soil & water Harvesting Structure-Const. of Van Sarovar				0
	Sub-Total (2)				0
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers	Jaghori & Phancha Beat	4 Months	L/s	11250
	(ii) Purchase of fire fighting equipments				0
	(iii) Maintenance of fire lines and controll burning			L/s	0

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylinders				0
	(ii) Distribution of Solar Loghts			L/s	0
	(iii) Construction of Crematoria & store for fuel wood			L/s	0
	(c) Construction & Repair of Existing Boundary Pillars /Chak Pillars			L/s	0
	(d) Communication network	Mobile recharge for 4 No. Guards and 1 No. B.O.	5 No.	L/s	5000
	(e) Sign & Slogan Boards				0
	(f) Reward/insentive to Informers			L/s	5000
	Sub-Total (3)				21250
4	Forest Infrastructure Development				
	(i) Const. of Fgd. Hut			L/s	0
	(ii) Maint. of B.O. Quarter				0
	(iii) Maint. of Fgd. Hut				0
	(iv) Repair of Existing Forest Path				0
	Sub-Total (4)				0
5	Management of Wildlife in outside the Protected Area				
	(a) Improvement and Development of wildlife				
	(i) Engagement of Anti-Poacher		4	L/s	11250
	(ii) Vaccination of domestic cattle			L/s	20000
	(iii) Field equipment and medicine for management of wildlife- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind			L/s	0
	(b) Mitigation of Human Wildlife Conflict				
	(i) Eco-Development Activities				
	(a) Village Support Activities				
	(i) Construction/repair of water bowaries				0
	(ii) Strengthening of village path			L/s	0
	(iii) Construction of cattle pond			L/s	0
	(iv) Compensation against wildlife damages			L/s	30000
	(b) Income Generation Activities				
	(i) Vermi compost, Poly House & organic farming				0
	(ii) Bee Keeping			0	0
	(iii) Animal husbandry support and diary development			L/s	0
	(iv) Agriculture and Horticulture support			L/s	0
	(c) Extenssion of Sarahan Pheasantry at Gopalpur		1 No.	L/s	300000
	Sub-Total (5)				361250
6	Research and Studies			L/s	200000
7	Training of Forest Officer/Officials				0

CAT PLAN UPPER NANTI HEP

Developer: - Nanti Hydro Power (P) Ltd.

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension programme/Workshop				100000
9	JFM and Micro Planing			L/s	0
10	Operational Support				
(i)	Purchase of Dual core computer with accessories including printer in Kind	Range Office Rampur		L/s	0
(ii)	T.A.			L/s	15000
(iii)	O.E.			L/s	10000
(iv)	Maintenance of motor vehicle including fuel expences			L/s	10000
(v)	Aminities to staff & labour			L/s	5000
	Sub-Total (10)				40000
	G. Total (1 to 10)				1927000
	Eco-Tourism @ 1% of CAT Plan outlay				19270.00
	Monitoring & Evaluation @ 5% of the CAT Plan Outlay				96350.00
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				192700.00
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				28905.00
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				192700.00
	Total Cost of CAT Plan				2456925.00
	Or Say				

7.2.5 Details of works/expenditure of 5th year 2015-16

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(a) Nursery Development				
	(i) New				
	(ii) Maintenance				
	(b) Afforestation of degraded forest land				
	(i) Maint. 1st Year	C-203 Drobari	5 hac.	7450	37250
		C-201 Barcha	5 hac.	7450	37250
			10 hac.		74500
	(ii) Maint. 2nd Year	C-205 Kalbari	5 hac.	5000	25000
		C-205 Lajaya	5 hac.	5000	25000
			10 hac.		50000
	(c) Enrichment planting				
	(i) Maint. 1st Year	C-202 Sadali Gad	5 hac.	5550	27750
	(ii) Maint. 2nd Year	C-206 Sharan Gad	5 hac.	3100	15500
	(d) Assisted Natural Regeneration				
	(i) Maint. 1st Year	Kupri	5 hac.	1150	5750
			5 hac.		5750
	(ii) Maint. 2nd Year	C-207 Saran Gad	5 hac.	875	4375
			10 hac.		4375
	(e) NTFP Plantation				
	(i) Maint. 1st Year	Masharvi	5 hac.	6350	31750
	(ii) Maint. 2nd Year	Modi Thach	5 hac.	4300	21500
					53250
	(f) Treatment Alpine Pasture				
	(i) Maint. 1st Year	Manjaban	5 hac.	3800	19000
		Bujati Thach	5 hac.	3800	19000
	(ii) Maint. 2nd Year	Jau Thach	5 hac.	2850	14250
		Darni Thach	5 hac.	2850	14250
					66500
	Sub-Total (1)				297625
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips				
		Total			0
	(ii) Stabilization of Nallahs				
		Total			0
	(iii) Establishment of Silt Observatory				0
	(iv) Soil & water Harvesting Structure--Const. of Van Sarovar				0
	Sub-Total (2)				0
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers			L/s	0
	(ii) Purchase of fire fighting equipments				25000
	(iii) Maintenance of fire lines and controll burning			L/s	0

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
(b)	Energy Saving Devices				
(i)	Distribution of LPG Cylinders				0
(ii)	Distribution of Solar Loghts			L/s	0
(iii)	Construction of Crematoria & store for fuel wood			L/s	0
(c)	Construction & Repair of Existing Boundary Pillars /Chak Pillars			L/s	0
(d)	Communication network	Mobile recharge for 4 No. Guards and 1 No. B.O.	5 No.	L/s	5000
(e)	Sign & Slogan Boards				0
(f)	Reward/Insentive to Informers			L/s	0
	Sub-Total (3)				30000
4	Forest Infrastructure Development				
(i)	Const. of Fgd. Hut			L/s	0
(ii)	Maint. of B.O. Quarter				0
(iii)	Maint. of Fgd. Hut				0
(iv)	Repair of Existing Forest Path				0
	Sub-Total (4)				0
5	Management of Wildlife in outside the Protected Area				
(a)	Improvement and Development of wildlife				
(i)	Engagement of Anti-Poacher			L/s	0
(ii)	Vaccination of domestic cattle			L/s	0
(iii)	Field equipment and medicine for management of wildlife-- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind			L/s	0
(b)	Mitigation of Human Wildlife Conflict				
(i)	Eco-Development Activities				
(a)	Village Support Activities				
(i)	Construction/repair of water bowaries				0
(ii)	Strengthening of village path			L/s	0
(iii)	Construction of cattle pond			L/s	0
(iv)	Compensation against wildlife damages			L/s	30000
(b)	Income Generation Activities				
(i)	Vermi compost, Poly House & organic farming				0
(ii)	Bee Keeping			0	0
(iii)	Animal husbandry support and diary development			L/s	0
(iv)	Agriculture and Horticulture support			L/s	0
(c)	Extenssion of Sarahan Pheasantry at Gopalpur	Gopalpur	1 No.	L/s	300000
	Sub-Total (5)				330000
6	Research and Studies			L/s	0

CAT PLAN UPPER NANTI HEP

Developer: - Nanti Hydro Power (P) Ltd.

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
7	Training of Forest Officer/Officials				0
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension programme/Workshop				50000
9	JFM and Micro Planing			L/s	0
10	Operational Support				
(i)	Purchase of Dual core computer with accessories including printer in Kind	Range Office Rampur		L/s	0
(ii)	T.A.			L/s	15000
(iii)	O.E.			L/s	10000
(iv)	Maintenance of motor vehicle including fuel expenses			L/s	10000
(v)	Aminities to staff & labour			L/s	5000
	Sub-Total (10)				40000
	G. Total (1 to 10)				747625
	Eco-Tourism @ 1% of CAT Plan outlay				7476.25
	Monitoring & Evaluation @ 5% of the CAT Plan Outlay				37381.25
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				74762.50
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				11214.38
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				74762.50
	Total Cost of CAT Plan				953221.88
	Or Say				

7.2.6 Details of works/expenditure of 6th year 2016-17

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(a) Nursery Development				
	(i) New				
	(ii) Maintenance				
	(b) Afforestation of degraded forest land				
	(i) Maint. 2nd Year	C-203 Drobani	5 hac.	5000	25000
		C-201 Barcha	5 hac.	5000	25000
			10 hac.		50000
	(ii) Maint. 3rd Year	C-205 Katbari	5 hac.	2650	13250
		C-205 Lajaya	5 hac.	2650	13250
			10 hac.		26500
	(c) Enrichment planting				
	(i) Maint. 2nd Year	C-202 Sadail Gad	5 hac.	3100	15500
	(ii) Maint. 3rd Year	C-206 Sharan Gad	5 hac.	1650	8250
		Gad			
	(d) Assisted Natural Regeneration				
	(i) Maint. 2nd Year	Kupri	5 hac.	875	4375
			5 hac.		4375
	(ii) Maint. 3rd Year	C-207 Saran Gad	5 hac.	520	2600
			10 hac.		2600
	(e) NTFP Plantation				
	(i) Maint. 2nd Year	Masharvi	5 hac.	4300	21500
	(ii) Maint. 3rd Year	Modi Thach	5 hac.	2250	11250
					32750
	(f) Treatment Alpine Pasture				
	(i) Maint. 2nd Year	Manjaban	5 hac.	2850	14250
		Bujati Thach	5 hac.	2850	14250
					28500
					168475
	Sub-Total (1)				
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips				
			Total		0
	(ii) Stabilization of Nallahs			L/s	
			Total		0
	(iii) Establishment of Silt Observatory				0
	(iv) Soil & water Harvesting Structure--Const. of Van Sarovar				0
					0
	Sub-Total (2)				0
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers			L/s	0
	(ii) Purchase of fire fighting equipments				0
	(iii) Maintenance of fire lines and control burning			L/s	0
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylinders				0
	(ii) Distribution of Solar Loghts			L/s	0
	(iii) Construction of Crematoria & store for fuel wood			L/s	0

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
	(c) Construction & Repair of Existing Boundary Pillars /Chak Pillars			L/s	0
	(d) Communication network			L/s	5000
	(e) Sign & Slogan Boards				0
	(f) Reward/Incentive to Informers			L/s	5000
	Sub-Total (3)				10000
4	Forest Infrastructure Development				
	(i) Const. of Fgd. Hut			L/s	0
	(ii) Maint. of B.O. Quarter				0
	(iii) Maint. of Fgd. Hut				0
	(iv) Repair of Existing Forest Path				0
	Sub-Total (4)				0
5	Management of Wildlife in outside the Protected Area				
	(a) Improvement and Development of wildlife				
	(i) Engagement of Anti-Poacher			L/s	0
	(ii) Vaccination of domestic cattle			L/s	15000
	(iii) Field equipment and medicine for management of wildlife-- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind			L/s	0
	(b) Mitigation of Human Wildlife Conflict				
	(i) Eco-Development Activities				
	(a) Village Support Activities				
	(i) Construction/repair of water bowaries				0
	(ii) Strengthening of village path			L/s	0
	(iii) Construction of cattle pond			L/s	0
	(iv) Compensation against wildlife damages			L/s	0
	(b) Income Generation Activities				
	(i) Vermi compost, Poly House & organic farming				0
	(ii) Bee Keeping			0	0
	(iii) Animal husbandry support and diary development			L/s	0
	(iv) Agriculture and Horticulture support			L/s	0
	(c) Extension of Sarahan Pheasantry at Gopalpur	Gopalpur	1 No.	L/s	200000
	Sub-Total (5)				215000
6	Research and Studies			L/s	0
7	Training of Forest Officer/Officials				0
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension poogramme/Workshop				0
9	JFM and Micro Planing			L/s	0

CAT PLAN UPPER NANTI HEP

Developer: -Nanti Hydro Power (P) Ltd.

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
10	Operational Support				
(i)	Purchase of Dual core computer with accessories including printer in Kind	Range Office Rampur		L/s	0
(ii)	T.A.			L/s	0
(iii)	O.E.			L/s	0
(iv)	Maintenance of motor vehicle including fuel expences			L/s	0
(v)	Aminities to staff & labour			L/s	5000
	Sub-Total (10)				5000
	G. Total (1 to 10)				398475
	Eco-Tourism @ 1% of CAT Plan outlay				3984.75
	Monitoring & Evalution @ 5% of the CAT Plan Outlay				19923.75
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				39847.50
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				5977.13
	inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				39847.50
	Total Cost of CAT Plan				508055.63
	Or Say				

7.2.7 Details of works/expenditure of 7th year 2017-18

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(a) Nursery Development				
	(i) New				
	(ii) Maintenance				
	(b) Afforestation of degraded forest land				
	(i) Maint. 3rd Year	C-203 Drohani	5 hac.	2650	13250
		C-201 Barcha	5 hac.	2650	13250
			10 hac.		26500
	(ii) Maint. 4th Year	C-205 Katbari	5 hac.	2650	13250
		C-205 Lajaya	5 hac.	2650	13250
			10 hac.		26500
	(c) Enrichment planting				
	(i) Maint. 3rd Year	C-202 Sadali Gad	5 hac.	1650	8250
	(ii) Maint. 4th Year	C-206 Sharan Gad	5 hac.	1650	8250
	(d) Assisted Natural Regeneration				
	(i) Maint. 3rd Year	Kupri	5 hac.	520	2600
			5 hac.		2600
	(ii) Maint. 4th Year	C-207 Saran Gad	5 hac.	520	2600
			10 hac.		2600
	(e) NTFP Plantation				
	(i) Maint. 3rd Year	Masharvi	5 hac.	2250	11250
					11250
	(f) Treatment Alpine Pasture				
					0
	Sub-Total (1)				85950
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips				
					0
	(ii) Stabilization of Nallahs			L/s	
				L/s	
			Total		0
	(iii) Establishment of Silt Observatory				0
	(iv) Soil & water Harvesting Structure--Const. of Van Sarovar				0
	Sub-Total (2)				0
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers			L/s	0
	(ii) Purchase of fire fighting equipments				0
	(iii) Maintenance of fire lines and controll burning			L/s	0
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylenders				0
	(ii) Distribution of Solar Loghts			L/s	0
	(iii) Construction of Crematoria & store for fuel wood			L/s	0

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
	(c) Construction & Repair of Existing Boundary Pillars /Chak Pillars			L/s	0
	(d) Communication network			L/s	5000
	(e) Sign & Slogan Boards				0
	(f) Reward/Incentive to Informers			L/s	0
	Sub-Total (3)				5000
4	Forest Infrastructure Development				
	(i) Const. of Fgd. Hut			L/s	0
	(ii) Maint. of B.O. Quarter				0
	(iii) Maint. of Fgd. Hut				0
	(iv) Repair of Existing Forest Path				0
	Sub-Total (4)				0
5	Management of Wildlife in outside the Protected Area				
	(a) Improvement and Development of wildlife				
	(i) Engagement of Anti-Poacher			L/s	0
	(ii) Vaccination of domestic cattle			L/s	0
	(iii) Field equipment and medicine for management of wildlife- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind			L/s	0
	(b) Mitigation of Human Wildlife Conflict				
	(i) Eco-Development Activities				
	(a) Village Support Activities				
	(i) Construction/repair of water bowaries				0
	(ii) Strengthening of village path			L/s	0
	(iii) Construction of cattle pond			L/s	0
	(iv) Compensation against wildlife damages			L/s	0
	(b) Income Generation Activities				
	(i) Vermi compost, Poly House & organic farming				0
	(ii) Bee Keeping			0	0
	(iii) Animal husbandry support and diary development			L/s	0
	(iv) Agriculture and Horticulture support			L/s	0
	(c) Extension of Sarahan Pheasantry at Gopalpur		1 No.	L/s	200000
	Sub-Total (5)				200000
6	Research and Studies			L/s	0
7	Training of Forest Officer/Officials				0
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension programme/Workshop				0

CAT PLAN UPPER NANTI HEP

Developer: - Nanti Hydro Power (P) Ltd.

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
9	JFM and Micro Planing			L/s	0
10	Operational Support				
(i)	Purchase of Dual core computer with accessories including printer in Kind	Range Office Rampur		L/s	0
(ii)	T.A.			L/s	0
(iii)	O.E.			L/s	0
(iv)	Maintenance of motor vehicle including fuel expences			L/s	0
(v)	Aminities to staff & labour			L/s	5000
	Sub-Total (10)				5000
	G. Total (1 to 10)				295950
	Eco-Tourism @ 1% of CAT Plan outlay				2959.50
	Monitoring & Evaluation @ 5% of the CAT Plan Outlay				14797.50
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				29595.00
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				4439.25
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				29595.00
	Total Cost of CAT Plan				377336.25
	Or Say				

7.2.8 Details of works/expenditure of 8th year 2018-19

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(a) Nursery Development				
	(i) New				
	(ii) Maintenance				
	(b) Afforestation of degraded forest land				
	(i) Maint. 4th Year	C-203 Drobari	5 hac.	2650	13250
		C-201 Barcha	5 hac.	2650	13250
			10 hac.		26500
	(ii) Maint. 5th Year	C-205 Kalbari	5 hac.	2650	13250
		C-205 Lajaya	5 hac.	2650	13250
			10 hac.		26500
	(c) Enrichment planting				
	(i) Maint. 4th Year	C-202 Sadali Gad	5 hac.	1650	8250
	(ii) Maint. 5th Year	C-206 Sharan Gad	5 hac.	1650	8250
	(d) Assisted Natural Regeneration				
	(i) Maint. 4th Year	Kupri	5 hac.	520	2600
			5 hac.		2600
	(ii) Maint. 5th Year	C-207 Saran Gad	5 hac.	520	2600
			10 hac.		2600
	(e) NTFP Plantation				0
	(f) Treatment Alpine Pasture				0
					0
					74700
	Sub-Total (1)				
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips				
					0
	(ii) Stabilization of Nallahs			L/s	
				L/s	
					0
	(iii) Establishment of Silt Observatory				0
	(iv) Soil & water Harvesting Structure--Const. of Van Sarovar				0
					0
	Sub-Total (2)				
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers			L/s	0
	(ii) Purchase of fire fighting equipments				0
	(iii) Maintenance of fire lines and controll burning			L/s	0
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylenders				0
	(ii) Distribution of Solar Loghts			L/s	0
	(iii) Construction of Crematoria & store for fuel wood			L/s	0

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
	(c) Construction & Repair of Existing Boundary Pillars /Chak Pillars			L/s	0
	(d) Communication network			L/s	0
	(e) Sign & Slogan Boards				0
	(f) Reward/Incentive to Informers			L/s	0
	Sub-Total (3)				0
4	Forest Infrastructure Development				
	(i) Const. of Fgd. Hut			L/s	0
	(ii) Maint. of B.O. Quarter				0
	(iii) Maint. of Fgd. Hut				0
	(iv) Repair of Existing Forest Path				0
	Sub-Total (4)				0
5	Management of Wildlife in outside the Protected Area				
	(a) Improvement and Development of wildlife				
	(i) Engagement of Anti-Poacher			L/s	0
	(ii) Vaccination of domestic cattle			L/s	0
	(iii) Field equipment and medicine for management of wildlife-- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind			L/s	0
	(b) Mitigation of Human Wildlife Conflict				
	(i) Eco-Development Activities				
	(a) Village Support Activities				
	(i) Construction/repair of water bowaries				0
	(ii) Strengthening of village path			L/s	0
	(iii) Construction of cattle pond			L/s	0
	(iv) Compensation against wildlife damages			L/s	0
	(b) Income Generation Activities				
	(i) Vermi compost, Poly House & organic farming				0
	(ii) Bee Keeping			0	0
	(iii) Animal husbandry support and diary development			L/s	0
	(iv) Agriculture and Horticulture support			L/s	0
	(c) Extension of Sarahan Pheasantry at Gopalpur	Sarahan	1 No.	L/s	100000
	Sub-Total (5)				100000
6	Research and Studies			L/s	0
7	Training of Forest Officer/Officials				0
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension programme/Workshop				0

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
9	JFM and Micro Planning			L/s	0
10	Operational Support				
(i)	Purchase of Dual core computer with accessories including printer in Kind	Range Office Rampur		L/s	0
(ii)	T.A.			L/s	0
(iii)	O.E.			L/s	0
(iv)	Maintenance of motor vehicle including fuel expences			L/s	0
(v)	Aminities to staff & labour			L/s	5000
	Sub-Total (10)				5000
	G. Total (1 to 10)				179700
	Eco-Tourism @ 1% of CAT Plan outlay				1797.00
	Monitoring & Evaluation @ 5% of the CAT Plan Outlay				8985.00
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				17970.00
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				2695.50
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				17970.00
	Total Cost of CAT Plan				229117.50
	Or Say				

7.2.9 Details of works/expenditure of 9th year 2019-20

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(a) Nursery Development				
	(i) New				
	(ii) Maintenance				
	(b) Afforestation of degraded forest land				
	(i) Maint. 5th Year	C-203 Drobani	5 hac.	2650	13250
		C-201 Barcha	5 hac.	2650	13250
			10 hac.		26500
	(c) Enrichment planting				
	(i) Maint. 5th Year	C-202 Sadali Gad	5 hac.	1650	8250
	(d) Assisted Natural Regeneration				
	(i) Maint. 5th Year	Kupri	5 hac.	520	2600
	Total		5 hac.		2600
	(e) NTFP Plantation				0
	(f) Treatment Alpine Pasture				0
	Sub-Total (1)				37350
2	Soil Conservation Works-Engineering & Bio-Engineering measures				
	(i) Stabilization of land slides/slips				
		Total			0
	(ii) Stabilization of Nallahs			L/s	
		Total		L/s	0
	(iii) Establishment of Silt Observatory				0
	(iv) Soil & water Harvesting Structure-Const. of Van Sarovar				0
	Sub-Total (2)				0
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers			L/s	0
	(ii) Purchase of fire fighting equipments				0
	(iii) Maintenance of fire lines and controll burning			L/s	0
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylenders				0
	(ii) Distribution of Solar Loghts			L/s	0
	(iii) Construction of Crematoria & store for fuel wood			L/s	0
	(c) Construction & Repair of Existing Boundary Pillars /Chak Pillars			L/s	0
	(d) Communication network			L/s	0
	(e) Sign & Slogan Boards				0
	(f) Reward/insentive to Informers			L/s	0
	Sub-Total (3)				0

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
4	Forest Infrastructure Development				
	(i) Const. of Fgd. Hut			L/s	0
	(ii) Maint. of B.O. Quarter				0
	(iii) Maint. of Fgd. Hut				0
	(iv) Repair of Existing Forest Path				0
	Sub-Total (4)				0
5	Management of Wildlife in outside the Protected Area				
	(a) Improvement and Development of wildlife				
	(i) Engagement of Anti-Poacher			L/s	0
	(ii) Vaccination of domestic cattle			L/s	0
	(iii) Field equipment and medicine for management of wildlife-- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind			L/s	0
	(b) Mitigation of Human Wildlife Conflict				
	(i) Eco-Development Activities				
	(a) Village Support Activities				
	(i) Construction/repair of water bowaries				0
	(ii) Strengthening of village path			L/s	0
	(iii) Construction of cattle pond			L/s	0
	(iv) Compensation against wildlife damages			L/s	0
	(b) Income Generation Activities				
	(i) Vermi compost, Poly House & organic farming				0
	(ii) Bee Keeping			0	0
	(iii) Animal husbandry support and diary development			L/s	0
	(iv) Agriculture and Horticulture support			L/s	0
	(c) Extension of Sarahan Pheasantry at Gopalpur				
	Sub-Total (5)				0
6	Research and Studies			L/s	0
7	Training of Forest Officer/Officials				0
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension poogramme/Workshop				0
9	JFM and Micro Planing			L/s	0
10	Operational Support				

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
(i)	Purchase of Dual core computer with accessories including printer in Kind	Range Office Rampur		L/s	0
(ii)	T.A.			L/s	0
(iii)	O.E.			L/s	0
(iv)	Maintenance of motor vehicle including fuel expences			L/s	0
(v)	Aminities to staff & labour			L/s	0
	Sub-Total (10)				0
	G. Total (1 to 10)				37350
	Eco-Tourism @ 1% of CAT Plan outlay				373.50
	Monitoring & Evalution @ 5% of the CAT Plan Outlay				1867.50
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				3735.00
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				560.25
	inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				3735.00
	Total Cost of CAT Plan				47621.25
	Or Say				

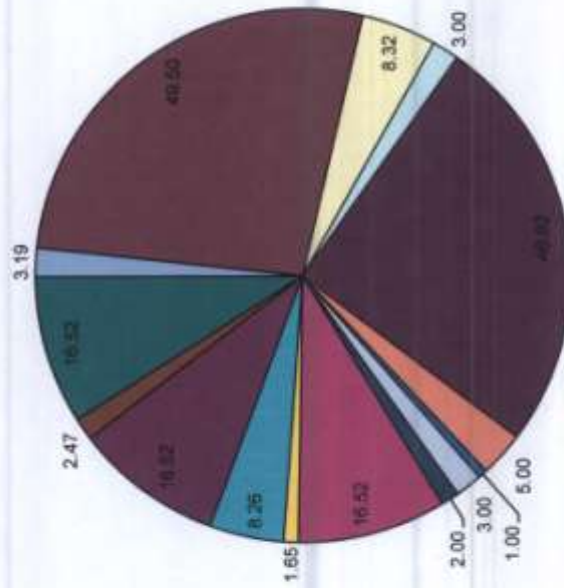
7.2.10 Details of works/expenditure of 10th year 2020-21

Sr. No.	Name of Work	Name of area	Phys. Targets	Rate	Amount (in lac)
1	Biological Measures-Improvement of tree cover				
	(a) Nursery Development				0
	(b) Afforestation of degraded forest land				0
	(c) Enrichment planting				0
	(d) Assisted Natural Regeneration				0
	(e) NTFP Plantation				0
	(f) Treatment Alpine Pasture				0
2	Soil Conservation Works-Engineering & Bio-Engineering measures				0
	(i) Stabilization of land slides/slips				
		Total			0
	(ii) Stabilization of Nallahs			L/s	
		Total		L/s	0
	(iii) Establishment of Silt Observatory				0
	(iv) Soil & water Harvesting Structure-Const. of Van Sarovar				0
	Sub-Total (2)				0
3	Protection of Forest				
	(a) Fire Protection				
	(i) Engagement of Fire Watchers			L/s	0
	(ii) Purchase of fire fighting equipments				0
	(iii) Maintenance of fire lines and control burning			L/s	0
	(b) Energy Saving Devices				
	(i) Distribution of LPG Cylinders				0
	(ii) Distribution of Solar Lights			L/s	0
	(iii) Construction of Crematoria & store for fuel wood			L/s	0
	(c) Construction & Repair of Existing Boundary Pillars /Chak Pillars			L/s	0
	(d) Communication network			L/s	0
	(e) Sign & Slogan Boards				0
	(f) Reward/Incentive to Informers			L/s	0
	Sub-Total (3)				0
4	Forest Infrastructure Development				
	(i) Const. of Fgd. Hut			L/s	0
	(ii) Maint. of B.O. Quarter				0
	(iii) Maint. of Fgd. Hut				0
	(iv) Repair of Existing Forest Path				0
	Sub-Total (4)				0

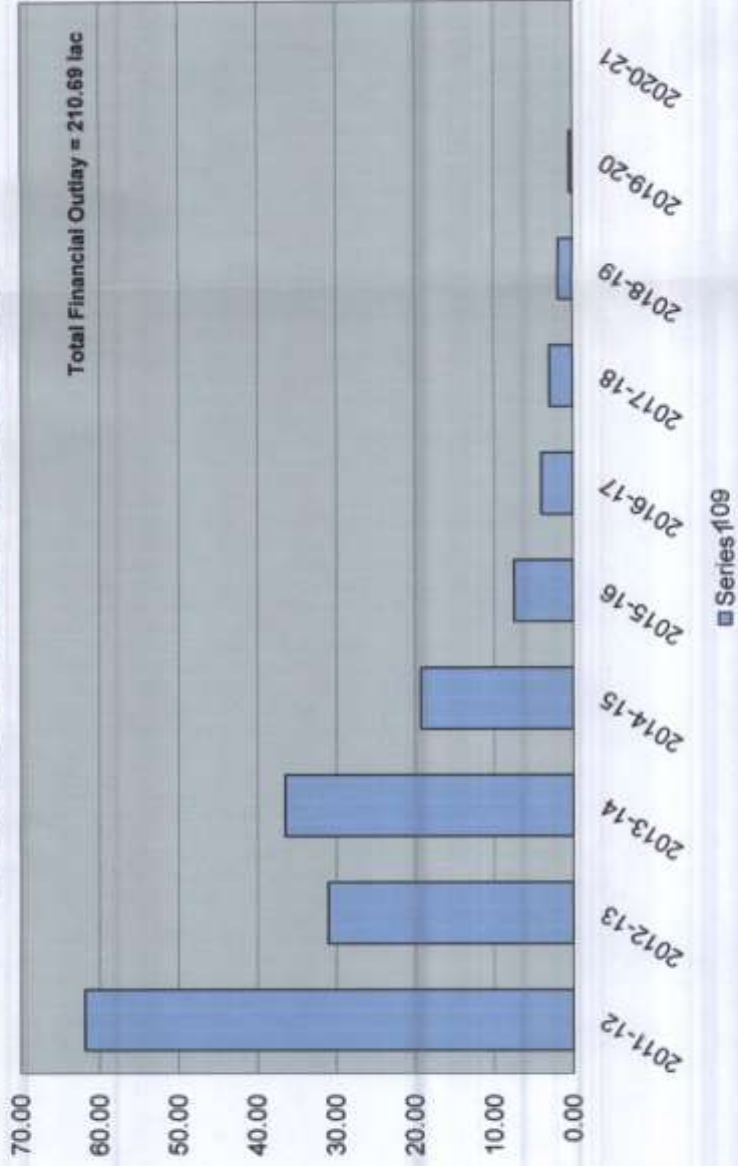
5	Management of Wildlife in outside the Protected Area				
(a)	Improvement and Development of wildlife				
(i)	Engagement of Anti-Poacher		L/s		0
(ii)	Vaccination of domestic cattle		L/s		0
(iii)	Field equipment and medicine for management of wildlife- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind		L/s		0
(b)	Mitigation of Human Wildlife Conflict				
(i)	Eco-Development Activities				
(a)	Village Support Activities				
(i)	Construction/repair of water bowaries				0
(ii)	Strengthening of village path		L/s		0
(iii)	Construction of cattle pond		L/s		0
(iv)	Compensation against wildlife damages		L/s		0
(b)	Income Generation Activities				
(i)	Vermi compost, Poly House & organic farming				0
(ii)	Bee Keeping		0		0
(iii)	Animal husbandry support and diary development		L/s		0
(iv)	Agriculture and Horticulture support		L/s		0
(c)	Extension of Sarahan Pheasantry at Gopalpur				
	Sub-Total (5)				0
6	Research and Studies		L/s		0
7	Training of Forest Officer/Officials				0
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension programme/Workshop				0
9	JFM and Micro Planing		L/s		0
10	Operational Support				
(i)	Purchase of Dual core computer with accessories including printer in Kind	Range Office Rampur	L/s		0
(ii)	T.A.		L/s		0
(iii)	O.E.		L/s		0
(iv)	Maintenance of motor vehicle including fuel expences		L/s		0
(v)	Aminities to staff & labour		L/s		0
	Sub-Total (10)				0
	G. Total (1 to 10)				0

Eco-Tourism @ 1% of CAT Plan outlay				0.00
Monitoring & Evaluation @ 5% of the CAT Plan Outlay				0.00
Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay				0.00
Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay				0.00
Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay				0.00
Total Cost of CAT Plan				0.00
Or Say				

%AGE WISE SHARE OF VARIOUS ACTIVITIES



YEAR WISE EXPENDITURE BREAKUP



Series109

PER HA. COST MODEL FOR AFFORESTATION OF DEGRADED FOREST LAND

Sr. No.	Particulars of works	Quantity	Rate	Amount
Fencing				
1	Survey and demarcation of plantation area including marking of sections, path and preparation of map	1 ha.	75.05	75.05
2	Preparation of wooden fence post	60 Nos	949.90%	569.94
3	Carriage of wooden fence post up to 2 m long over distance 2 km	60 Nos	499.95%	299.97
4	Charring and coal tarring of the ends of the fence post	60 Nos	204.80%	122.88
5	Preparation /digging of holes 20-30 cm dia and 50 cm deep	60nos	665.10%	399.06
6	Fixing of wooden fence post including strutting	60 Nos	510.45%	306.27
7	Carriage of barbed wire over distance 2km	0.90 QTL	125/10 per Qt/Kms	225.18
8	Stretching and fixing of barbed wire in 4 strands	720 mmt	3.45/mt	2484.00
9	Preparation of inspection path 60cm width	250m	7.95/mt	1987.50
10	Preparation of water retention mounds /benches	L.S		2000.00
11	Interfacing of thorny bushes along the fence	160mt	2.71 per m 3/-	540.00
12	Bush cutting in strips	1 ha.	767.80%	767.80
Total fencing cost				9777.65
Planting				
1	Digging of pits 45X45x45 cm	600 Nos	699.90%	4199.40
2	Digging of pits 30X30X30 cm	900 Nos.	350.00%	3150.00
3	Filling of pits 45X 45 x45 cm	600 Nos	200.50%	1203.00
4	Filling of pits 30X30X30 cm	900 Nos.	139.95%	1259.55
5	Carriage of naked roots plants over distance 2km up hill	900 Nos	25.85%	310.20
6	Carriage of plants in p/bags over distance 2 km up hill	900 Nos.	159.95%	2879.10
7	Planting of entire plant raised in p bags	900 Nos.	160.05%	1440.45
8	Planting of naked roots plants	900 Nos	134.80%	808.80
9	Planting of grass tufts/preparation of strips including sowing in strips- 100 X 30 x 5 cm for grass sowing along contour	500 Strips	674.75%	0.00
10	M.R.I.	L/s	L/s	0.00
Total planting cost				15250.50
G. Total				25028.15

Material				
	Cost of barbed wire	0.90 qt	7000 Per Qt	6300.00
	Nursery cost of plants			
1	Naked root bags	600 Nos	6 per plant	3600.00
2	Polythene bags plants	900 Nos.	10 per plant	9000.00
	Total cost of plants			43928.15
	Or Say			44000

7.5.2

Annexure-II

PER HA. COST MODEL FOR MAINTENANCE OF AFFORESTATION OF DEGRADED FOREST LAND

Maintenance Norms of 1st year (30% Mortality)				
Sr. No.	Particulars of works	Quantity	Rate	Amount
1	Re-digging of pits 45X45x45 cm	180 Nos.	350.00%	630.00
2	Re-digging of pits 30X30X30 cm	270 Nos.	174.95%	472.36
3	Filling of pits 45X 45 x45 cm	180 Nos.	200.50%	360.90
4	Filling of pits 30X30X30 cm	270 Nos.	139.95%	377.96
5	Planting of entire plant raised in p bags	270 Nos.	160.05%	432.13
6	Planting of naked roots plants	180 Nos.	134.90%	242.82
7	Planting of grass tufts/preparation of strips including sowing in strips- 100 X 30 x 5 cm for grass sowing along contour	200 Strips	074.75%	0.00
8	Carrage of naked roots plants over distance 2km up hill	180 Nos.	26%	93.06
9	Carrage of plants in p/bags over distance 2 km up hill	270 Nos.	159.95%	863.73
10	Nursery cost of plants	375 Nos.	10 \$ 6 per plant	3750.00
11	Repair of fence	180	1.15 prmt	207.00
12	Repair of inspection path	L.S		0.00
13	Moisture conservation works	L.S		0.00
	Total			7499.88
	Or say			7450
2nd year maintenance - 20% mortality				
1	Re-digging of pits 45X45x45 cm	120 Nos.	350.00%	420.00
2	Re-digging of pits 30X30X30 cm	180 Nos.	174.95%	314.91
3	Filling of pits 45X 45 x45 cm	120 Nos.	200.50%	240.06
4	Filling of pits 30X30X30 cm	180 Nos.	139.95%	251.91
5	Planting of entire plant raised in p bags	180 nos	160.05%	288.09
6	Planting of naked root plants	120 Nos.	134.90%	161.88
7	Carrage of plants in p/bags over distance 2 km up hill	180 nos	159.95%	575.82
8	Carrage of naked roots plants over distance 2 KM uphil	120 Nos.	25.85 km	62.04
9	Nursery cost of plants	300 Nos.	10 \$ 6 per plant	2520.00
10	Repair of fence	180 rmt.	1.15 rmt.	207.00
11	Repair of inspection path	LB		0.00
	Moisture conservation works			0.00
	Total			5041.71
	Or say			5000

3rd year maintenance - 10% mortality				
1	Re-digging of pits 45X45x45 cm	60 Nos.	350.00%	210.00
2	Re-digging of pits 30X30X30 cm	90 Nos.	174.95%	157.45
3	Filling of pits 45X 45 x45 cm	60 Nos.	200.50%	120.30
4	Filling of pits 30X30X30 cm	90 Nos.	139.95%	125.95
5	Planting of entire plant raised in p bags	90 Nos.	160.05%	144.04
6	Planting of naked roots plants	60 Nos.	134.90%	80.94
7	Carriage P. bags plants distance 2 Km. uphill	90 Nos.	159.95	287.91
8	Carriage of naked roots plants over distance 2 Km. uphill	60 Nos.	25.65%	31.02
9	Nursery cost of plants	150 Nos.	10 & 6 per plant	1260.00
10	Repair of fence	200 mt.	1.15	230.00
11	Repair of inspection path	L.S.		0.00
12	Moisture conservation works			2647.61
	Total			2650
	Or say			

4th year maintenance - 10% mortality				
1	Redigging of pits 45X45x45 cm	60 Nos.	350.00%	210.00
2	Redigging of pits 30X30X30 cm	90 Nos.	174.95%	157.45
3	Filling of pits 45X 45 x45 cm	60 Nos.	200.50%	120.30
4	Filling of pits 30X30X30 cm	90 Nos.	139.95%	125.95
5	Planting of entire plant raised in p bags	90 Nos.	160.05%	144.04
6	Planting of naked roots plants	60 Nos.	134.90%	80.94
7	Carriage P. bags plants distance 2 Km. uphill	90 Nos.	159.95	287.91
8	Carriage of naked roots plants over distance 2 Km. uphill	60 Nos.	25.65%	31.02
9	Nursery cost of plants	150 Nos.	10 & 6 per plant	1260.00
10	Repair of fence	200 mt.	1.15	230.00
11	Repair of inspection path	L.S.		0.00
12	Moisture conservation works			2647.61
	Total			2650
	Or say			

5th year maintenance - 10% mortality				
1	Re-digging of pits 45X45x45 cm	60 Nos.	350.00%	210.00
2	Re-digging of pits 30X30X30 cm	90 Nos.	174.00%	157.45
3	Filling of pits 45X 45 x45 cm	60 Nos.	200.50%	120.30
4	Filling of pits 30X30X30 cm	90 Nos.	139.95%	125.95
5	Planting of entire plant raised in p bags	90 Nos.	160.05%	144.04
6	Planting of naked roots plants	60 Nos.	134.90%	80.94
7	Carriage P. bags plants distance 2 Km. uphill	90 Nos.	159.95	287.91
8	Carriage of naked roots plants over distance 2 Km. uphill	60 Nos.	25.65%	31.02
9	Nursery cost of plants	150 Nos.	10 & 6 per plant	1260.00
10	Repair of fence	200 mt.	1.15	230.00
11	Repair of inspection path	L.S.		0.00
12	Moisture conservation works			2647.61
	Total			2650
	Or say			

7.5.3

PER HA. COST MODEL FOR ENRICHMENT PLANTATION

Annexure-III

S. No.	Particulars of works	Quantity	Rate	Amount
Fencing				
1	Survey and demarcation of plantation area including marking of sections, path and preparation of map	1 ha.	75.05	75.05
2	Preparation of wooden fence post	60 Nos	949.90%	569.94
3	Carriage of wooden fence post up to 2 m long over distance 2 km	60 Nos	499.95%	599.94
4	Charring and coal tarring of the ends of the fence post	60 Nos	204.90%	122.94
5	Preparation /digging of holes 20-30 cm dia and 50 cm deep	60nos	665.10%	399.06
6	Fixing of wooden fence post including strutting	60 Nos	510.45%	306.27
7	Carriage of barbed wire over distance 2km	0.90 QTL	125.10 per Qtl Per Km	225.18
8	Stretching and fixing of barbed wire in 4 strands	720 rmt	3.45/rmt%	2484.00
9	Preparation of inspection path 60cm width	250m	7.95/rmt%	1987.50
10	Preparation of water retention mounds /trenches	L.S		2000.00
11	Interlacing of thorny bushes along the fence	180rmt	3 per rmt%	540.00
12	Bush Cutting in strips	1 ha	767.80%	767.80
Total fencing cost				10077.88
Planting				
1	Digging of pits 30X30X30 cm	800 nos	350.00%	2800.00
2	Filling of pits 30X30X30 cm	800 nos	139.95%	1119.60
3	Carriage of plants in p/bags over distance 2 km up hill	800 nos	158.95%	2559.20
4	Planting of entire plant raised in p bags	800 nos	160.05%	1280.40
5	Planting of grass tufts/preparation of strips including sowing in strips- 100 X 30 x 5 cm for grass sowing along contour	500	674.75%	3373.75
	M.R.I	L/s	L/s	0.00
Total planting cost				11132.95
Total Fencing + Planting cost				21210.63
Total				21210.63
Material				
	Cost of barbed wire	0.90 qtl	7000 Per Qtl	6300.00
	Nursery cost of plants			
	Polythene bags plants	800 nos	10 per plant	8000.00
Total cost of plants				35510.63
Or Say				35500

7.5.4

Annexure-IV

PER HA. COST MODEL FOR MAINTENANCE OF ENRICHMENT PLANTATION				
Maintenance Norms of 1st year (30% Mortality)				
S. No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 30X30X30 cm	240 Nos	174.95%	419.88
2	Filling of pits 30X30X30 cm	240 Nos	139.95%	335.81
3	Planting of entire plant raised in p bags	240 Nos	160.05%	384.12
3	Planting of grass tufts/preparation of strips including sowing in strips- 100 X 30 x 5 cm for grass sowing along contour	150 Nos	674.75%	1012.12
4	Carriage of plants in p/bags over distance 2 km up hill	240 Nos	159.95%	767.76
5	Nursery cost of polythene bags plants	240 Nos	10	2400.00
6	Repair of fence	180	1.15 rmt	207.00
7	Repair of inspection path	L.S		0.00
8	Moisture conservation works	L.S		0.00
	Total			5528.69
	Or say			5550
2nd Year Maintenance				
S. No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 30X30X30 cm	160 Nos	174.95%	279.92
2	Filling of pits 30X30X30 cm	160 Nos.	139.95%	223.92
3	Planting of entire plant raised in p bags	160 Nos.	160.05%	256.06
4	Carriage of plants in p/bags over distance 2 km up hill	160 Nos.	159.95%	511.84
5	Nursery cost of polythene bags plants	160 Nos.	10	1600.00
6	Repair of fence	180	0.07 rmt	207.00
6	Repair of inspection path	L.S		0.00
7	Moisture conservation works	L.S		0.00
	Total			3078.76
	Or say			3100
3rd Year Maintenance				
S. No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 30X30X30 cm	80 Nos	174.95%	139.96
2	Filling of pits 30X30X30 cm	80 Nos.	139.95%	111.96
3	Planting of entire plant raised in p bags	80 Nos	160.05%	128.04
4	Carriage of plants in p/bags over distance 2 km up hill	80 Nos	159.95%	265.92
5	Nursery cost of polythene bags plants	80 Nos	10	800.00
6	Repair of fence	180	1.07 rmt	207.00
7	Repair of inspection path	L.S		0.00
8	Moisture conservation works	L.S		0.00
	Total			1642.88
	Or say			1650

4th Year Maintenance				
S. No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 30X30X30 cm	80 Nos	174.95%	139.96
2	Filling of pits 30X30X30 cm	80 Nos.	139.95%	111.96
3	Planting of entire plant raised in p bags	80 Nos	160.05%	128.04
4	Carriage of plants in p/bags over distance 2 km up hill	80 Nos	159.95%	255.92
5	Nursery cost of polythene bags plants	80 Nos	10	800.00
6	Repair of fence	180	1.15 rmt	207.00
7	Repair of inspection path	L.S		0.00
8	Moisture conservation works	L.S		0.00
	Total			1642.88
	Or say			1650

5th Year Maintenance				
S. No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 30X30X30 cm	80 Nos	174.95%	139.96
2	Filling of pits 30X30X30 cm	80 Nos.	139.95%	111.96
3	Planting of entire plant raised in p bags	80 Nos	160.05%	128.04
4	Carriage of plants in p/bags over distance 2 km up hill	80 Nos	159.95%	255.92
5	Nursery cost of polythene bags plants	80 Nos	10	800.00
6	Repair of fence	180	1.115 rmt	207.00
7	Repair of inspection path	L.S		0.00
8	Moisture conservation works	L.S		0.00
	Total			1642.88
	Or say			1650

7.5.5

Annexure-V

PER HA COST MODEL FOR ASSISTED NATURAL REGENERATION

Sr. No.	Particulars of works	Quantity	Rate	Amount
Fencing				
1	Survey and demarcation of plantation area including marking of sections, path and preparation of map	1 ha.	75.05	75.05
2	Preparation of wooden fence post	60 Nos	949.90%	569.94
3	Carriage of wooden fence post up to 2 m long over distance 2 km	60 Nos	499.95%	299.97
4	Charring and coal tarring of the ends of the fence post	60 Nos	204.90%	122.94
5	Preparation/digging of holes 20-30 cm dia and 60 cm deep	60nos	665.10%	399.06
6	Fixing of wooden fence post including strutting	60 Nos	510.45%	306.27
7	Carriage of barbed wire over distance 2km	0.90 QTL	126.10 per Q89cm	225.18
8	Stretching and fixing of barbed wire in 4 strands	720 mt	3.45mt%	2484.00
9	Preparation of inspection path 60cm width	250m	7.95mt%	1987.50
10	Preparation of water retention mounds Branches	L.S		2000.00
11	Interlacing of thorny bushes along the fence	180mt	3 per mt%	540.00
12	Bush Cutting in strips	1 ha.	767.80%	767.80
Total fencing cost				9777.71
Planting				
1	Digging of pits 45X45x45 cm	100 nos	695.90%	695.90
2	Digging of pits 30X30X30 cm	100 nos	350.00%	350.00
3	Filling of pits 45X 45 x45 cm	100 nos	200.50%	200.50
4	Filling of pits 30X30X30 cm	100 nos	138.95%	138.95
5	Carriage of naked roots plants over distance 2km up hill	100 nos	25.05/km	57.70
6	Carriage of plants in p/bags over distance 2 km up hill	100 nos	158.95%	318.90
7	Planting of entire plant raised in p bags	100 nos	160.00%	160.00
8	Planting of naked roots plants	90 nos	134.90%	134.90
9	Planting of grass tufts/preparation of strips including sowing in strips- 100 X 30 x 5 cm for grass sowing along contour	200	674.75%	0.00
Total planting cost				2062.90
Total Fencing + Planting Cost				11840.61
Material				
Cost of barbed wire		0.90 qt	7000 Per Qt	6300.00
Nursery cost of plants				
1	Naked root bags	100	6 per plant	600.00
2	Polythene bags plants	100	10 per plant	1000.00
				1600.00
Total cost of plants				19740.61
Or Say				19750

7.5.6 **Annexure-VI**

PER HA. COST MODEL FOR MAINTENANCE OF ASSESTED NATURAL REGENERATION

Maintenance Norms of 1st year (30% Mortality)

S.No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 45X45x45 cm	30	350.00%	105.00
2	Re-digging of pits 30X30X30 cm	30	174.12%	52.48
3	Filling of pits 45X 45 x45 cm	30	200.50%	60.15
4	Filling of pits 30X30X30 cm	30	139.95%	41.98
5	Planting of entire plant raised in p bags	30	160.01%	48.01
6	Planting of naked roots plants	30	134.90%	40.47
7	Planting of grass tufts/preparation of strips including sowing in strips- 100 X 30 x 5 cm for grass sowing along contour	150	674.75%	0.00
8	Carriage of naked roots plants over distance 2km up hill	30	25.88%/km	15.51
9	Carriage of plants in p/bags over distance 2 km up hill	30	199.88%	95.97
10	Nursery cost of plants	60	10 & 6 per Plant	480.00
11	Repair of fence	180	1.15 mt	207.00
12	Repair of inspection path	L.S		0.00
13	Moisture conservation works	L.S		0.00
	Total			1146.57
	Or say			1150

2nd Year Maintenance

S.No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 45X45x45 cm	20	350.00%	70.00
2	Re-digging of pits 30X30X30 cm	20	174.95%	34.99
3	Filling of pits 45X 45 x45 cm	20	200.50%	40.01
4	Filling of pits 30X30X30 cm	20	139.95%	27.99
5	Planting of entire plant raised in p bags	20	160.01%	32.01
6	Planting of naked roots plants	20	134.90%	26.98
7	Carriage of naked roots plants over distance 2km up hill	20	25.88%/km	10.34
8	Carriage of plants in p/bags over distance 2 km	20	199.95%	63.98
9	Nursery cost of plants	40	10 & 6 per Plant	360.00
10	Repair of fence	180	1.115 mt	207.00
11	Repair of inspection path	L.S		0.00
12	Moisture conservation works	L.S		0.00
	Total			873.30
	Or say			875

3rd Year Maintenance				
S.No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 45X45x45 cm	10	350.00%	35.00
2	Re-digging of pits 30X30X30 cm	10	174.95%	17.49
3	Filling of pits 45X 45 x45 cm	10	200.50%	20.05
4	Filling of pits 30X30X30 cm	10	139.95%	13.99
5	Planting of entire plant raised in p bags	10	160.05%	16.00
6	Planting of naked roots plants	10	134.90%	13.49
7	Cartage of naked roots plants over distance 2km up hill	10	25.85%km	5.17
8	Cartage of plants in pbags over distance 2 km	10	159.95%	31.99
9	Nursery cost of plants	20	10 & 6 per Plant	160.00
10	Repair of fence	180	1.15 mt	207.00
11	Repair of inspection path	L.S		0.00
12	Moisture conservation works	L.S		0.00
	Total			520.18
	G. Total			520
	Or say			
4th Year Maintenance				
S.No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 45X45x45 cm	10	350.00%	35.00
2	Re-digging of pits 30X30X30 cm	10	174.95%	17.49
3	Filling of pits 45X 45 x45 cm	10	200.50%	20.05
4	Filling of pits 30X30X30 cm	10	139.95%	13.99
5	Planting of entire plant raised in p bags	10	160.05%	16.00
6	Planting of naked roots plants	10	134.90%	13.49
7	Cartage of naked roots plants over distance 2km up hill	10	25.85%km	5.17
8	Cartage of plants in pbags over distance 2 km	10	159.95%	31.99
9	Nursery cost of plants	20	10 & 6 per Plant	160.00
10	Repair of fence	180	1.15 mt	207.00
11	Repair of inspection path	L.S		0.00
12	Moisture conservation works	L.S		0.00
	Total			520.18
	Or say			520
5th Year Maintenance				
S.No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 45X45x45 cm	10	350.00%	35.00
2	Re-digging of pits 30X30X30 cm	10	174.95%	17.49
3	Filling of pits 45X 45 x45 cm	10	200.50%	20.05
4	Filling of pits 30X30X30 cm	10	139.95%	13.99
5	Planting of entire plant raised in p bags	10	160.05%	16.00
6	Planting of naked roots plants	10	134.90%	13.49
7	Cartage of naked roots plants over distance 2km up hill	10	25.85%km	5.17
8	Cartage of plants in pbags over distance 2 km	10	159.95%	31.99
9	Nursery cost of plants	20	10 & 6 per Plant	160.00
10	Repair of fence	180	1.15 mt	207.00
11	Repair of inspection path	L.S		0.00
12	Moisture conservation works	L.S		0.00
	Total			520.18
	Or say			520

PER HA. COST MODEL FOR NTFP PLANTATION

S. No.	Particulars of works	Quantity	Rate	Amount
Fencing				
1	Survey and demarcation of plantation area including marking of sections, path and preparation of map	1 ha.	75.05	75.05
2	Preparation of wooden fence post	60 Nos	949.90%	569.94
3	Carriage of wooden fence post up to 2 m long over distance 2 km	60 Nos	499.95%	599.94
4	Charring and coal tarring of the ends of the fence post	60 Nos	204.90%	122.94
5	Preparation /digging of holes 20-30 cm dia and 50 cm deep	60nos	665.10%	399.06
6	Fixing of wooden fence post including strutting	60 Nos	510.45%	306.27
7	Carriage of barbed wire over distance 2km	0.90 QTL	125.10per Qtl/Km	225.18
8	Stretching and fixing of barbed wire in 4 strands	720 rmt	3.45/rmt	2484.00
9	Preparation of inspection path 60cm width	250m	7.95/rmt	1987.50
10	Preparation of water retention mounds /trenches	L.S		2000.00
11	Interlacing of thorny bushes along the fence	180rmt	3 per m	540.00
12	Bush Cutting in strips	1 ha.	767.80	767.80
Total fencing cost				10077.68
Planting				
1	Digging of pits 30X30X30 cm	400 Nos	350.00%	1400.00
2	Filling of pits 30X30X30 cm	400 Nos	139.95%	559.80
3	Carriage of naked root plants over distance 2 km up hill	2200 Nos.	25.85%km	1137.40
4	Planting of entire naked root plant	400 Nos.	134.90%	539.60
5	Preparation of patches/planting of plants in strips 30 x 30 x 25 cm	1800 Nos.	239.95	4319.10
Total planting cost				7955.90
Total fencing + Planting Cost				18033.58
Material				
	Cost of barbed wire	0.90 qtl	7000 Per Qtl	6300.00
	Nursery cost of plants	2200 Nos.	6 per plant	13200.00
Grand Total				37533.58
Or Say				37500

PER HA. COST MODEL FOR MAINTENANCE OF NTFPS PLANTATION				
S. No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 30X30X30 cm	120 Nos.	174.95%	209.94
2	Filling of pits 30X30X30 cm	120 Nos.	139.95%	167.94
3	Planting of naked roots plants	120 Nos.	134.90%	161.88
4	Preparation of patches/planting of plants in strips 30 x 30 x 25 cm	540 Nos.	239.95%	1295.73
5	Carriage of naked roots plants over distance 2km up hill	660 Nos.	25.85%	341.22
6	Nursery cost-naked roots plants	660 Nos.	6	3960.00
7	Repair of fence	180	1.15 rmt	207.00
8	Repair of inspection path	L S		0.00
9	Moisture conservation works	L S		0.00
	Total			6343.71
	Or say			6350
2nd year maintenance - 20% mortality				
S. No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 30X30X30 cm	80 Nos.	174.95%	139.96
2	Filling of pits 30X30X30 cm	80 Nos.	139.95%	111.96
3	Planting of naked roots plants	80 Nos.	134.90%	107.92
4	Preparation of patches/planting of plants in strips 30 x 30 x 25 cm	360 Nos.	239.95%	863.82
5	Carriage of naked roots plants over distance 2km up hill	440 Nos.	25.85%	227.48
6	Nursery cost-naked roots plants	440 Nos.	6	2640.00
7	Repair of fence	180	1.15 rmt	207.00
8	Repair of inspection path	L S		0.00
9	Moisture conservation works	L S		0.00
	Total			4298.14
	Or say			4300
3rd year maintenance - 20% mortality				
S. No	Particulars of works	Quantity	Rate (Rs.)	Amount
1	Re-digging of pits 30X30X30 cm	40 Nos.	174.95%	69.98
2	Filling of pits 30X30X30 cm	40 Nos.	139.95%	59.98
3	Planting of naked roots plants	40 Nos.	134.90%	53.98
4	Preparation of patches/planting of plants in strips 30 x 30 x 25 cm	180 Nos.	239.95%	431.91
5	Carriage of naked roots plants over distance 2km up hill	220 Nos.	25.05%	113.74
6	Nursery cost-naked roots plants	220 Nos.	6	1320.00
7	Repair of fence	180	1.15 rmt	207.00
8	Repair of inspection path	L S		0.00
9	Moisture conservation works	L S		0.00
	Total			2266.57
	Or say			2250

7.5.9

Annexure-IX

PER HA. COST MODEL FOR TREATMENT OF ALPINE PASTURES

S. N	PARTICULARS	QTY	RATE(RS.)	AMOUNT
1	Survey and Demarcation of Plantation Area	1 ha.	75.05/ha	75.05
2	Weeding of obnoxious weeds over	1 ha.	L/S	2000
3	Preparation of patches/planting of plants in strips 100 x 30 x 50 cm	1200 Nos.	767.80%	9213.6
	Total			11288.65
4	Cost of seeds		L/S	1000
	G. Total			12288.65
	Or Say			12300

7.5.10

Annexure-X

**PER HA. COST MODEL FOR MAINTENANCE OF ALPINE PASTURE
Maintenance Norms of 1st year (30% Mortality)**

S. N	PARTICULARS	QTY	RATE(RS.)	AMOUNT
1	Preparation of patches/planting of plants in strips 100 x 30 x 50 cm	360 Nos.	767.80%	2764.08
	Total			2764.08
2	Cost of seeds		L/S	1000.00
	G. Total			3764.08
	Or Say			3800
2nd year maintenance				
S. N	PARTICULARS	QTY	RATE(RS.)	AMOUNT
1	Preparation of patches/planting of	240 Nos.	767.80%	1842.72
	Total			1842.72
	Cost of Seeds			1000
	G. Total			2842.72
	Or Say			2850

S. No.	Name of Component	1st Year 2011-12		2nd Year 2012-13		3rd Year 2013-14		4th Year 2014-15		5th Year 2015-16		6th Year 2016-17		7th Year 2017-18		8th Year 2018-19		9th Year 2019-20		Total																													
		Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)	Phy. (in lac)	Fin. (in lac)																												
3	Protection of Forests																																																
																						(a) Fire Protection																											
																						(i) Equipment of Fire Machine	11250	11250																									
																						(ii) Purchase of fire fighting equipments	25000	25000																									
																						(iii) Maintenance of fire lines and control burning/abatis Hoopole	15000	15000																									
																						(b) Energy Saving Scheme																											
																						(i) Installation of LED Cylinders	30	30000	30	30000																							
																						(ii) Distribution of solar lights	10	100000	10	100000																							
																						(iii) Construction of demarcation and fuel wood stores																											
																						(iv) Construction and repair of existing boundary posts/chain posts																											
4	Forest Infrastructure Development																																																
																							(a) Communication Network																										
																							(i) Sign & Hoopole Network	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000					
																							(ii) Research/Incentive to informants	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000			
																							(iii) Research/Incentive to informants	307386	307386	45	45	387286	387286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286	21286		
																							(b) Forest Infrastructure Development																										
																							(i) Repair of existing forest path	200000	200000	7	7	100000	100000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
																							(ii) Repair of existing forest path	200000	200000	7	7	100000	100000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
																							(iii) Repair of existing forest path																										
																							5	Management of Wildlife in outside the Protected Area																									
(a) Management and Development of wildlife																																																	
(i) Equipment of Anti-Poacher	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250	11250																									11250		
(ii) Vaccination of Domestic cattle	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000																									15000	15000	
(iii) Field equipment and medicines for																																																	
(iv) 2000 traps, immobilizing gun, death traps, injection gun 2 Nos., GPS, compass, Siny Handy Cam, altimeter, Brocolian etc in kind																																																	
(b) Mitigation of Human Wildlife Conflict																																																	
(i) Eco-Development Activities																																																	
(ii) Village Support Activities																																																	
(iii) Construction of water bores	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000																									30000	30000	
(iv) Strengthening of village path	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000																									
(v) Construction of cattle post	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000																									
(vi) Compensation against wildlife damages	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000																									
(vii) Income Generation Activities																																																	
(i) Vermi compost, Pits House, 5 organic farming	1	100000	1	100000																																													
(ii) Bee Keeping	35	35000	35	35000																																													
(iii) Animal husbandry support and dairy	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000	250000																									
(iv) Agriculture and Horticulture Support	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000																									
(v) Extension of Barren Pressures at Gynelajar	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000																									
Total (A)	1312770.00	1312770.00	1001245.00	1001245.00	811250.00	811250.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00	320000.00																								
Total (B)																																																	
Total (C)																																																	
7	Training of Forest Officers/Officials																																																
Total (D)																																																	

S. No.	Name of Component	1st Year 2011-12		2nd Year 2012-13		3rd Year 2013-14		4th Year 2014-15		5th Year 2015-16		6th Year 2016-17		7th Year 2017-18		8th Year 2018-19		9th Year 2019-20		10th Year 2020-21		Total	
		Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)	Phy. (Qty) (in lot)	Fin. (in lot)
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension programme/Workshop	0	55000	0	100000	0	100000	0	50000	0	50000	0	0	0	0	0	0	0	0	0	0	0	301000.00
9	JPRMC and Micro Planning	0	50000	0	50000	0	50000	0	50000	0	50000	0	0	0	0	0	0	0	0	0	0	0	200000.00
10	Operational Budget	0	40000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40000.00
(i)	Purchase of Desktop computer with accessories including printer in lot	L/A	1200000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	1200000.00
(ii)	Purchased Vehicle (Tiguan) in lot	L/A	1200000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	1200000.00
(iii)	Operational Budget	L/A	1200000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	1200000.00
(iv)	Operational Budget	L/A	1200000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	15000	L/A	1200000.00
(v)	Maintenance of motor vehicle including fuel expenses	L/A	100000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	100000.00
(vi)	Attendance to staff & school	L/A	100000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	10000	L/A	100000.00
	Total (i to vi)	1384000	40000	1384000	40000	1384000	40000	1384000	40000	1384000	40000	1384000	40000	1384000	40000	1384000	40000	1384000	40000	1384000	40000	1384000	1384000.00
	Eco-Tank Force @ 1% of CAT Plan Outlay	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	818000.00
	Monitoring & Evaluation @ 5% of the CAT Plan Outlay	303500	141750	303500	141750	303500	141750	303500	141750	303500	141750	303500	141750	303500	141750	303500	141750	303500	141750	303500	141750	303500	303500.00
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	818000.00
	Eco-Tank Force (Battalion) @ 1.5% of the CAT Plan Outlay	1227000	465350	1227000	465350	1227000	465350	1227000	465350	1227000	465350	1227000	465350	1227000	465350	1227000	465350	1227000	465350	1227000	465350	1227000	1227000.00
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	393200	818000	818000.00
	Total Cost of CAT Plan	1387180.00	40000	1387180.00	40000	1387180.00	40000	1387180.00	40000	1387180.00	40000	1387180.00	40000	1387180.00	40000	1387180.00	40000	1387180.00	40000	1387180.00	40000	1387180.00	1387180.00
	Or See																						

[Signature]
 Divyanshu Kumar
 Sarabhai Wildlife Division
 Distt. Shimla (H. P.)

[Signature]
 Divyanshu Kumar
 Sarabhai Wildlife Division
 Distt. Shimla (H. P.)

M/S MANTI HYDRO POWER (P) LTD.
[Signature]
 Authorised Signatory

7.5.12

Annexure -XII

ACTIVITY WISE %AGE OF FINAL OUTLAY OF UPPER NANTI H.E.P. CAT PLAN

S. No.	Name of Component	Total		%age
		Phy. (hac)/ Km/Nos.	Fin. (in lac)	
1	Bio-logical Measures-Improvement of tree	0		
	(a) Nursery Development			
	(i) Estt. of New Nursery	2	250000.00	1.51
	(ii) Maintenance of existing Nurseries	2	50000.00	0.30
	(b) Afforestation of degraded forest land	0		0.00
	New	20	880000.00	5.33
	Maintenance	0		0.00
	1st year maintenance	20	149000.00	0.90
	2nd year maintenance	20	100000.00	0.61
	3rd year maintenance	20	53000.00	0.32
	4th year maintenance	20	53000.00	0.32
	5th year maintenance	20	53000.00	0.32
	(c) Enrichment planting			0.00
	New	10	355000.00	2.15
	Maintenance			0.00
	1st year maintenance	10	55500.00	0.34
	2nd year maintenance	10	31000.00	0.19
	3rd year maintenance	10	16500.00	0.10
	4th year maintenance	10	16500.00	0.10
	5th year maintenance	10	16500.00	0.10
	(d) Assisted Natural Regeneration			0.00
	New	10	197500.00	1.20
	Maintenance			0.00
	1st year maintenance	10	11500.00	0.07
	2nd year maintenance	10	8750.00	0.05
	3rd year maintenance	10	5200.00	0.03
	4th year maintenance	10	5200.00	0.03
	5th year maintenance	10	5200.00	0.03

S. No.	Name of Component	Total		%age
(e)	NTFPS Plantation			0.00
	New	10	375000.00	2.27
	Maintenance			0.00
	1st year maintenance	10	63500.00	0.38
	2nd year maintenance	10	43000.00	0.26
	3rd year maintenance	10	22500.00	0.14
(f)	Treatment of Alpine Pastures			0.00
	New	20	246000.00	1.49
	Maintenance			0.00
	1st year maintenance	20	76000.00	0.46
	2nd year maintenance	20	57000.00	0.34
	Total (1)	344	3195350	19.34
2	Soil Conservation works-Engineering and Bio-Engineering measures			0.00
(i)	Stabilization of land slides/Slips	8	1700000.00	10.29
(ii)	Stabilization of Nalla	0	2400000.00	14.52
(iii)	Establishment of silt observatory		150000.00	0.91
(iv)	Soil & water harvesting structure-Construction of Van Sarovar		700000.00	4.24
	Total (2)	8	4950000	29.95
3	Protection of Forests			0.00
(a)	Fire Protection			0.00
(i)	Engagement of Fire Watcher	0	45000.00	0.27
(ii)	Purchase of fire fighting equipments	0	50000.00	0.30
(iii)	Maintenance of fire lines and control burning/debris disposal	0	30000.00	0.18
(b)	Energy Saving devices		0.00	0.00
(i)	Distribution of LPG Cylenders		65000.00	0.39
(ii)	Distribution of Solar lights		200000.00	1.21
(iii)	Construction of crematoria and fuel wood store		300000.00	1.82
(c)	Construction and repair of existing boundary pillars/chak pillars		50000.00	0.30
(d)	Communication Network		35000.00	0.21
(e)	Sign & Slogan Boards		32000.00	0.19
(f)	Reward/Incentive to informers		25000.00	0.15
	Total (3)		832000	5.03
4	Forest Infrastructure Development		0.00	0.00
(i)	Repair of existing forest path	0	300000.00	1.82
	Total (4)	0	300000	1.82

S. No.	Name of Component	Total		%age
5	Management of Wildlife in outside the Protected Area		0.00	0.00
(a)	Improvement and Development of wildlife		0.00	0.00
	(i) Engagement of Anti-Poacher	0	45000.00	0.27
	(ii) Vaccination of domestic cattle		85000.00	0.51
	(iii) Field equipment and medicine for management of wildlife-- Purchase of capture cage, traps, immobilizing gun, drats, drug, protection gun 2 Nos., GPS, compass, Sony Handy Cam, altimeter, Binoculars etc. in kind		300000.00	1.82
(b)	Mitigation of Human Wildlife Conflict			
(i)	Eco-Development Activities	0	0.00	0.00
	(a) Village Support Activities	0	0.00	0.00
	(i) Construction/repair of water bowaries		180000.00	1.09
	(ii) Strengthening of village path		300000.00	1.82
	(iii) Construction of cattle pond		160000.00	0.97
	(iv) Compensation against wildlife damages		150000.00	0.91
	(b) Income Generation Activities	0	0.00	0.00
	(i) Vermi compost, Poly House & organic farming	2	300000.00	1.82
	(ii) Bee Keeping	65	162500.00	0.98
	(iii) Animal husbandry support and diary development	0	500000.00	3.03
	(iv) Agriculture and Horticulture support	0	500000.00	3.03
(c)	Extenssion of Sarahan Pheasantry at Gopalpur	0	2000000.00	12.10
	Total (5)	67	4682500.00	28.34
6	Research and Studies	0	500000.00	3.03
	Total (6)	0	500000	3.03
	102			0.00
7	Training of Forest Officer/Officials	0	100000.00	0.61
	Total (7)	0	100000	0.61
8	Nature Awareness Camp/Exposure visit and training of CBO's and extension pooqramme/Workshop	0	300000.00	1.82
	Total (8)	0	300000	1.82
9	JFMC and Micro Planing	0	200000.00	1.21
	Total (9)	0	200000	1.21

S. No.	Name of Component	Total	%age
10	Operational Support		0.00
(i)	Purchase of Dual core computer with accessories including printer in Kind	40000.00	0.24
(ii)	Purchase of Vehicle (Tippar) in kind	1200000.00	7.26
(iii)	T.A.	75000.00	0.45
(iv)	O.E.	50000.00	0.30
(v)	Maintenance of motor vehicle including fuel	50000.00	0.30
(v)	Aminities to staff & labour	50000.00	0.30
	Total(10)	1465000.00	8.87
	G. Total (1 to 10)	16524850	100.00
	Eco-Tourism @ 1% of CAT Plan outlay	165248.50	
	Monitoring & Evalution @ 5% of the CAT Plan	826242.50	
	Payment of Eco-Services to the local communities @ 10% of the CAT Plan Outlay	1652485.00	
	Eco-Task Force (Battalion) @ 1.5% of the CAT Plan Outlay	247872.75	
	Inflationary Trends (Contingencies) @ 10% of the CAT Plan Outlay	1652485.00	
	Total Cost of CAT Plan	21069183.75	
	Or Say		

UNDERTAKING

I, T. Suresh Kumar Varma Authorized signatory of M/S Nanti Hydro Power Private Limited Gamba House, South End, Lane IV Phase -1, New Shimla-171009 hereby confirm that CAT Plan of Upper Nanti HEP (12MW) with an outlay of Rs. 2,10,69,184/- has been prepared on the basis of the Total Project cost Rs.8065.78 lac. As per TEC (Techno Economic Clearance) dated 9/04/2010 and as per the Implementation Agreement with GoHP dated 12/11/2008. I hereby also confirm that in case the TEC (Techno Economic Clearance) is increased then the CAT Plan outlay shall be enhanced accordingly through revision of the CAT Plan and differential amount of the CAT Plan outlay will be paid by the user agency.

For: M/s Nanti Hydro Power Private Limited

M/s NANTI HYDRO POWER (P) LTD.

T. Suresh Kumar Varma

(T. Suresh Kumar Varma)
Authorized Signatory

Authorized Signatory

Gamba House, South End, Lane IV

Phase I, New Shimla 171009