

**CATCHMENT AREA TREATMENT PLAN FOR
SORANG HYDRO ELECTRIC POWER
(1C2 X 50 MW) PROJECT
SORANG, 15/20
DISTRICT KINNAUR (H. P)**



PROJECT PERIOD: 2007 – 08 To 2016 – 17

TOTAL PROJECT COST Rs. 647.02 LACS

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**DIVISIONAL FOREST OFFICER
WILD LIFE DIVISION,
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CHAPTER – 1

GENERAL DESCRIPTION OF THE TRACT

1.1 Introduction

India is endowed with a vast Hydro Power potential, assessed at 1,50,000 MW (corresponding to 84,044 MW at 60% load factor). Out of this about 26900 MW amounting to 18% of the total potential has been harnessed. The 16th Electric Power survey carried out by Central Electricity Authority (CEA) has projected a peak demand of 1,15,700 MW and an energy requirement of 7,19,100 mu by the end of 10th five year plan, while the requirement by the end of 11th five year plan has been projected as 1,51,100 MW and 97,25,200 mu respectively.

Himachal Pradesh has five river basins, which provide an ample scope for development of Hydro power potential. Out of these five basins, Satluj basin has the highest potential of about 9,227 MW of electricity. The Sorang Hydro Electric Project is a run of the river scheme on Sorang Khad a tributary of Satluj river in Kinnaur Distt. of Himachal Pradesh. Sorang Khad has its origin in south-eastern slopes of Great Himalayan ranges at an altitude of 5625 m and passes through dense forest areas between Dumti & Barakhamba. The average bed slope of the stream in the initial reaches is about 1 in 9 up to village Sorang Dogri and beyond this, the streambed has a steep fall of 1 in 3.3. Total catchment area of Sorang Khad is about 138 sq. km.

A large portion of catchment is under snow. A portion is covered with dense forests and major portion is steep mountainous region with rocky outcrops & contains many glaciers, which provide the stream with perennial water flow. There is no human habitation in the catchment area except Sorang Dogri. Toposheets Survey of India No 53 E/13 & 53 E/14 covers the catchment area. Around 80% of the catchment area above the diversion site falls in the Rupi Bhaba Wild life Sanctuary. The Rupi-Bhaba wild life Sanctuary is located/situated between 31° – 45' – 50" to 31° – 45' – 33" north latitude and 77° – 45' – 00" to 78° – 07' – 06" East longitude. The area is rich in bio diversity. Therefore, while device the CAT plan for the area a

special attention is required to be made keeping in view of the Apex court order dated 25.11.2005 and under section 33 read with Sec. 29 of the Wild Life (P) Act, 1972. The Hon'ble Supreme Court of India in CWP No. 202/95 dated 14.02.2000, prohibited the removal of dead, deceased drying and fallen trees, drift wood and grasses from National Park and Sanctuary. And now order dated 25th November 2005, the order dated 14.02.2000 will not be applicable to the following activities provided that they :-

1. are undertaken as per the Management Plan approved by the competent authority.
2. are Consistent with the provision of the Wild Life (P) Act, 1972.
3. are undertaken consistent with National Wild Life Action Plan.
4. are in conformity with the guidelines issued for the Management of the PA's from time to time, and
5. The construction and related activities are designed to merge with the natural surrounding and as far as possible use forest friendly material.

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

dependent on the natural resources of Rupi-Bhaba wild life Sanctuary because of which greater emphasis has been laid to undertake afforestation, pasture development, bio-diversity conservation with soil and moisture conservation works in the catchment area including eco-development activities in Chhota Kamba and Rupi Panchayat area with the provision of alternative sources of domestic energy on a subsidized basis (50% cost to be given by the beneficiaries) to reduce pressure on the existing forest areas.

1.2 Topography and Drainage:

The terrain of the catchment area is mainly mountainous, which can be described as moderate to steep with precipitous slopes. The whole area drains into river Satluj.

1.3 Geology:

The rock formations in the area belong to the Pre-cambrian age. The region is characterized by following structured units:

- Jutogh Group
- Rampur Group (Manikaran Quartzite)
- Jeori – Wangtu Gneissic Complex

Sorang Khad is a right bank tributary of Satluj river flowing from NW to SE through torturous bouldery pebbles and rapids, of highly feldspathic granitic gneissies. Generally the area is rocky and terrain is massive granitic gneissies.

1.4 Land Use Pattern:

No specific land use survey has been carried out in the catchment area. The land use as per the record available has been tabulated for Kinnaur District, which is as under:

Name of the area	Forest DPF(ha)	Non – cropped land (ha)	Alpine Pasture (in ha)	Fellow & Grass land (ha)	Culturable Wasteland (ha)	Misc. area (ha)	Total Geographic area (ha)
District Kinnaur	22,259	7871	254389	3753	9803	253825	640100

The Land use pattern of the catchment area is summarized in Table I

Table-I

Sl No	Category	Area (ha)
1.	DPF	28.33
2.	U PF	3267.00
3.	Agricultural Land	150.00
4.	Land with scrub	331.00
5.	Barren/ Waste land	7986.00
6.	Other land i.e. Rock Area, Rock Fall, Scree Material/Snow and Glaciers	2037.67
	Total	13800

1.5 Live Stock Population :

The live stock population of Nichar Sub Division of Kinnaur District census data 2001 is as under

Cattle	Buffalo	Sheep	Goat	Others	Total
9985	03	22207	10765	1478	44438

The live stock population of Sorang valley including Rupi Panchayat is as under :

Cow	Ox	Sheep	Goat	Others	Total
588	285	4194	1811	78	6956

1.6 Human Population :

According to the 2001 census of Kinnaur District the total population is 77007 with 40878 males and 36129 females and sex ratio is 851 females per 1000 males. The density per Sq. Km is 12 persons. The low density of population is on account of the difficult hills terrain and severe climatic condition in the district. The population of Sorang Valley including Rupi Panchayat is as under.

Male	Female	Total
1138	1154	2292

1.7 Flora:

The forest of the catchment comprises Kail, Deodar, Fir, Spruce, Betula utilis, Ban Oak, Mohru oak, Kharsu oak, Alders, Rhododendrons, Aesculus indica, Bird Cherry, Maple, Juglan regia, Pyrus species, wild poplar, Salix, Alnus nitida etc. The under growth is viola, Indigofera, Desmodium, Rubus spp. Sarcococca Saligna, Viburnum, Berberis spp, Prinsepia utilis, Prunus Cornuta, and medicinal herbs like Dhoop, Karu, Patish, Bankakri, Hathpanja, and mushaq bala etc. are also found. The forest lies between the elevation 2000 to 3900 mtr. above mean sea level. About 40% of the catchment area falls under the Alpine pasture. The Alpine pastures are great attraction to the migratory graziers as well as local people who have a right to graze the their domestic cattle under the provision of forest settlement report, 1921.

1.8 Forest Type :

According to the classification done by champion and Seth, the following types asre met within the Sanctuary.

1. Type 9/c – Ia Upper or Himalayan Chir pine Forests
2. Type 12/c – Ia Ban Oak Forests/
3. Type 12/c – Id Western mixed Coniferous Forests
4. Type 12/c – le Moist Temperate Deciduous Forest
5. Type 12/c – If Low level Blue Pine Forests: -
6. Type 12/c – Ila Kharsu Oak Forests
7. Type 12/ ISI Alder Forests
8. Type 14/c – I Western Himalayan sub Alpine Forest.
9. Type 15/c – 3 Alpine Pastures
10. Type 16/c – I Dry alpine scrub

1.9 Fauna :

Mammals

Herbivores

Musk Deer
Himalayan Tahr
Goral
Serow
Bharal

Carnivores

Snow Leopard
Leopard
Himalayan Black Beer
Himalayan Brown Beer

Pheasants

Western Tragopan

Himalayan monal

Cheer Pheasants

Koklass

White crested Kalij

Species believed to be locally threatened are Snow Leopard, Musk deer and Western Tragopan etc.

1.10 Bio-Diversity :

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

Anthropogenic activities particularly economic activities influencing habitat and move particularly poaching induce and increase extinction of species loss of habitat need be controlled scientifically and poaching prevention must be stringently enforced. In this catchment area treatment of Sorang Khad, efforts should be made to develop strategies for the protection of ecosystems, species and genes, taking into consideration human population processes and futuristic developmental needs. The *in situ and ex situ* conservation of wild life strategies is to be supplemented using holistic and adaptable conservation of Bio-logical diversity strategies in Rupi-Bhaba Wild Life Sanctuary and Sarahan Pheasantry. Preservation of medical plant sites, cultivation of medicinal plants for health, development of a package for growing life supporting species, fast growing species

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

1.11 Rights of the peoples :

- i) **Grazing** : in almost all the forests, right for grazing exist for each demarcated and un-demarcated forests. The 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 concessions or through payment of a certain grazing fee. A large number of cattle graze in these forests leading to great damages to the vegetation as well as to the plantations. This right of grazing also comes in the way of taking up more closure for raising plantations of different species as the consent of the local people is to be obtained before plantation work can be undertaken.
- ii) **Collection of fuel wood**: people have the right to collect dry and fallen wood for their domestic use as per the forest settlement record. In the project area people depend entirely upon fuel wood for their day to day use.
- iii) **Timber**: People have the right to get timber at nominal rates for construction/repair/maintenance of their houses. The concessional rates

were fixed at the time of forest settlement. No limit on the number of trees to be sanctioned was placed. Because of very nominal fees charged from the right holders/ bartandars are externally wasteful in the use of timber. A stage has now been reached that not a single tree is available on silvicultural basis in some of the forests for the right holders.

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

1.12 General condition and Density:

The composition and condition of the forests is not so good and tends to vary considerably with the altitude and aspect. DPF's and UPF's which are in the entire and away from habitations are fairly well stocked. The forests nearby habitation area under a lot of pressure of the right holders for the T.D. requirement for building of houses. The status of regeneration is very poor. The present poor state of affairs is the cumulative result of heavy grazing lopping TD marking etc.

1.13 Socio-Economic Profile :

There are 12 villages/helmets in and around the catchment area of Chhota Kamba and Rupi Panchayat having a human population of 2292 and cattle population 6956. The society of catchment area comprises mostly poor tribal people. The main occupation of the people is rearing of the sheep and agriculture. The land holding much less and insufficient to sustain them. Horticulture development has not been encouraging due to adverse climatic factor in the valley. The people find it very difficult to export their agricultural product due to lack of motorable road. This is perhaps 15/20 area of Kinnaur District is the most neglected area in terms of socio-economic development after 58 years of independence. There is great dependence on the Sanctuary area for grazing, collection of fuel wood, fodder, timber and NTPF's etc. People are mostly illiterate and bound to old customs and traditions. Their life and livelihood, depends upon the rich bio-resources of the Sanctuary area. They have been living in harmony with the forest and wildlife since times immemorial. The

life of tribal is connected one way or other with the forests and wild life, right from the birth to death. The material existence of the people depend on forests to such an extent that they cannot visualize in the absence of bio diversity. Their folk lore and culture is full of references to the forests and wild life. Thus it appears that tribal and forests are ecologically and economically inseparable. They have co-existed since time immemorial and will continue Co-exist in a mutually re-inforcing relationship in future also. Having regard to the symbiotic relationship between the tribal people and forests a primary task of all agencies responsible for forests management and to associate the tribal people closely in the protection, regeneration and sustainable management of forests as well as to provide gainful employment to people living in and around the Sanctuary. While safeguarding the customary rights and interests of such people under the Integrated Tribal Sub Plan Development programmes the provision should also be made to meet the needs of the tribal economy in and around the forest areas, including the provision of alternative sources of domestic energy on a subsidized basis, to reduce pressure on the forests resources of the Sanctuary area.

1.14 Period of CAT Plan :

The CAT plan has been formulated for a period of ten years with effect from 2007-08 to 2016-17. For the first year of the plan not much of works have been prescribed and only establishment of nursery will be done besides minor works and purchase of some equipments. However, from the second year onwards works will be done in full swing and will gradually take off 6th year onwards and completed the work during the plan period.

1.15 Cost of the Plan :

The total outlay envisaged for the implementation of this CAT Plan is Rs 647.02 Lacs.

CHAPTER – II

PROBLEM ANALYSIS AND OBJECTIVES

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

2.1 Soil Erosion :

Soil erosion may be defined as the detachment and transportation of soil. Water is the major agent responsible for this erosion. In many locations, winds, glaciers, etc. also cause soil erosion. In the catchment area of a hilly area like that being considered for the proposed project, water erosion is a common phenomenon and the same has been studied as a part of the Catchment Area Treatment (CAT) plan.

2.1.1 Soil erosion leads to:

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

2.1.2 Methodology for the Study for soil erosion :

Main aim of study involves:

- To study erosion characteristics of the terrain.

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

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

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

2.1.3 Study of the Problem :

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

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

2.2 Data Collection and compilation :

Ground maps, contour information were collected, scanned, digitized 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 limitations.

2.2.1 Data Analysis :

Land use classification was finalized using Remote Sensing Techniques. Digested contours from Toposheets were used for preparation of Digital Elevation Model (DEM) of the catchment area and to prepare a slope map. Various layers thus prepared were used for modeling. Software was prepared to calculate the soil loss using input from all layers. The work was got executed through Remote Sensing Centre, Department of Science and Technology and Environment Himachal Pradesh (Shimla).

2.2.2 Slope Map Preparation :

A Digital Terrain Model (DTM) of the area was prepared, which was used to derive a slope map. The slope was further divided in various slope percentages.

2.3 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 catchment area involves the evaluation of:

1. Geomorphic factors comprising slope and drainage characteristics; landforms and physiography.
2. Surface covers factors governing the flow hydraulics.
3. Climatic factors comprising total precipitation its frequency and intensity and
4. Management factors

The area of each of the mapping units is arrived at and Silt Yield Index of individual sub-water sheds are 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 shed

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

Table 2

Erosion Intensity Rate

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

2.4 Water Shed Management – Available Techniques:

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

LANDUSE/LANDCOVER MAP-SORANG WATERSHEI DISTT. KINNAUR (H.P.)



	Agriculture Land		Barren/Stony Waste Area		Peri
	Forest (Outside P F)		Sheet Rock Area		Glar
	Protected Forest		Rock Fall		
	Land With Scrub		Scree Material		

5

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

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

- a. Biological measures
- b. Engineering measures

a) Biological Measures

The various measures covered in this category are:-

- Afforestation
- Pasture Development
- Vegetative Measures

b) Engineering measures

The various erosion control measures in this category are:-

- Gully plugging
- Contour cultivation
- Contour bunding
- Graded bunding

2.5 Pressure on Forest Resources :

The current problems being faced in Wild Life conservation arises directly from the natural resource dependence of the people inhabiting in forested region in Satluj Valley. These dependences are becoming intense because of eco-system of satluj valley is going down from the abuse and over use of natural resources. Man is responsible for degrading the forest eco-system. As his

number increased and his culture and technology advanced, he modified the natural eco-system into an artificial. As a result many species of flora and fauna have become to be endangered. It is said that if the present course of environmental degradation is continue, then it will destroy the capability of our natural environment to support a civilized human society. The depletion of our Wild life and also the hardships faced by people dependence on natural resources is due to : -

- a) Reduction of Wild life habitats
- b) Increasing biotic pressure
- c) Increasing demand of forest resources as per Forest Settlement Report, 1921.
- d) Illicit felling, poaching and encroachment on forest land.
- e) Forest fire
- f) Cultural transition
- g) Collection of minor forest produce
- h) Grant of Nature land

2.6 Grazing :

The Sorang Valley has vast tracks under high altitude pastures. Discussion with the local people revealed that these pastures have badly degraded over a period of time. At many places weeds like rumex species have encroached upon this alpine pasture. The palatable grasses are not more than a few inches tall and the other related pasture species have also been started showing signs of stress. As a result that neither the animal get sufficient fodder nor the land protected from the subsequent onslaught of the range on account of over grazing. This result in large scale deterioration of the ecology and environment of the Sorang Valley. The age Old Forest Settlement Report, 1921 which recognizes several rights of the people has also become out dated with reference to the present context with passage of time.

2.7 Man - Wildlife Conflict :

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

2.8 Inadequate scientific information :

The Sanctuary by virtue of its location, is considered to be very rich in bio-diversity. However, systematic scientific studies to support documentation are not available and whatever information is available has been gleaned from the secondary sources. Inventory of the flora and fauna of the Sanctuary 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 division regarding the carrying capacity of the forests and alpine meadows in and around the Sanctuary 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 Sanctuary area is concerned.

2.9 Limited Employment and Income Generation Activities :

The area bereft of any road link till very recently, has been dependent only upon the subsistence economy. Most of the agriculture has been far internal consumption and no cash crops have available in the catchment area. The only cash crop has been the NTFPs collected from the forests and sell it to traders for money under the provisions of the Settlement report, not sufficient even to compensate the labour cost gone into the collection of these forest produce. But now under Section 29 of the wild life (Protection) Act, 1972 provided that where the forest produce is removed from a Sanctuary the same may be used for meeting the personal bonafide needs of the living in and around the PA's and shall not be used for any commercial purposes. Thus, by this amendment and the Apex Court order dated 14.02.2000 it effects on the right to livelihood of the local people who are dependents on forests produce. Another cash income has been by way of selling Pease, Potato, Wool and Woollen products etc.

2.10 Eco-Tourism Potential :

The area being very interiors and lack of road/communication, there are very few income generation opportunities for the local people. The concept of community based ecotourism enshrined in the H.P. Eco-tourism policy 2001 seems to have good application in the Sorang Valley of Rupi-Bhaba Wildlife Sanctuary. The policy will be implemented through Eco-tourism society and for this purpose, Eco-Tourism Society will be constituted and registered under the Registration of Societies Act, 1860 in due course of time. The local people are not aware of the vast potential of eco-tourism in 15/20 area of Kinnaur District. They need basic training about eco-tourism vis-à-vis wild life conservation. It is one of the most important alternative income generation activities besides NTPF's etc.

2.11 Demarcation of Boundaries and Construction of boundary Pillars/Check Pillars :

The boundaries of Rupi-Bhaba Sanctuary has finally notified under Section 26 A of the Wildlife (P) Act, 1972 by the H.P. Government Notification dt. 07-09-2001. However, these boundaries are yet to be marked on the ground as required by the Wildlife (Protection) Act 1972 read with H.P. Land Revenue Act 1954, for the benefit of the local people and management of the Sanctuary. By construction of the B/Pillars and check pillars it will not only facilitate to prevent illegal activities i.e. encroachment on forest land, illicit felling, poaching etc. within the Sanctuary but also benefit to the local people to know the boundaries of their cultivated land in PA's.

2.12 Buildings, Paths, Bridges and Communication Network :

The existing buildings, I/Paths and B/Paths are almost in depleted conditions and existing bridges i.e. Shorang, Rupi are now in highly dangerous conditions. Their abutments and wooden beams/planks are not in workable conditions and needs replacement. In addition to these, there is need to construct new bridges, I/paths, B/paths for effective patrolling/touring in the Sanctuary area. Not only it will provide facilities to the field functionaries but it will also helpful to local people and as well as tourist.

The equipments supplied by the Punwire Company, Chandigarh during the year 1992-93 has also become non-functional which need immediate replacement by new one. As a result getting of vital clues of poaching, timely information, apprehending of poachers and illicit smugglers/encroachers and even management of wildlife Sanctuary is becoming difficult. Moreover, in winter due to snow fall and non-availability of communication rescue operation of endangered species have become difficult and impossible in and around the Sanctuary area. Therefore, it is proposed that the proponents of the project will

set up communication network in Rupi-Bhaba Wild life Sanctuary to Sarahan Division in kind at the cost of CAT Plan during the plan period.

2.13 Lack of Trained Staff in PA's :

Wildlife Sanctuary is being managed by the untrained staff, There is a lack of professional knowledge/skills of wild life management especially habitat improvement, procedure for monitoring and evaluation in different events, 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, epidemics or diseases out break in wild life and its relationships with the domestic stock 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. Moreover, there is no departmental standing order to undertake various works under Sec. 33 read with Sec. 29 of the Wild Life (Protection) Act, 1972 in compliance of the Supreme Court order dated 25.11.2005.

2.14 Lack of Concern about Conservation by the Local People :

The local people of the Sanctuary area do not seem to show any apparent concern for the conservation of bio-diversity available in the Sanctuary even as they have been enjoying their rights since times immemorial. There is no local concern voluntary organization willing to make conservation as a primary issue. Need to initiate a dialogue with local people on the conservation of natural resources and wild life management by formation of V.F.D.S./VFDC etc. at the village/Panchayat level.

2.15 Monitoring and Evaluation :

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

2.16 Lack of appropriate infrastructural support :

The Sanctuary is being facing a lack of basic minimum infrastructure support in the field of housing, I/Hut, FRH, Office equipment i.e. Computer, Photocopier Machine, Laptop, Handy Video Camera, GPS, Compass, Camping equipments, field equipment for Wild Life management and communication network etc. In the absence of these infrastructural support, the information flow is very slow and erratic in management of wild life Sanctuary.

CHAPTER – III

OBJECTIVE AND PROJECT PROPOSAL

3.1 PROJECT OBJECTIVES: The objectives of the project are summarised as under:-

1. To achieve in-situ and ex-situ conservation and also ecological rehabilitation in the project area leading to an all round eco-development activities on sustainable basis.
2. To initiate measure to rehabilitate the degraded habitat through afforestation of native species and assisting of natural regeneration.
3. To improve alpine pasture land for augmenting grass and fodder availability and to solve the problem of grazier.
4. To carry out soil conservation measure in the Sorang Catchment to ensure longevity of Sorang Hydel Project.
5. To increase the potential/production of the bio – mass in the area and to ensure sustainable use of natural resources.
6. To provide employment to the local people by engaging them in project activities such as afforestation, fire, anti-poaching, rural infrastructure activities and other works except soil conservation works.
7. To built capacity of the PA's staff in wild life management skills by providing training in India and abroad to meet the challenges of 21st century.
8. To strengthen the extension and follow up activities i.e. monitoring and evaluations of Wildlife management and forestry development activities. publicity, motivation and extension programme to be given the desired focus.

3.2 PROJECT PERIOD

The project period would be for 10 years from 2007–08 to 2016–2017.

3.3 PROJECT COMPONENT :

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

3.4 Management of Protected Areas ----- In-situ conservation.

3.4.1 Habitat Improvement :

i) Biological works

- a) Afforestation of degraded Forest land
- b) Enrichment Plantation
- c) Assisted Natural Re-generation
- d) NTFP Plantation
- e) Nursery Development
 - i) New Nurseries Development
 - ii) Maintenance of Nurseries
- ii) Treatment of Culturable Waste Land
- iii) Treatment of Alpine Pasture
- iv) Construction of Water Holes

3.4.2 Development of Sarahan Pheasantry-----Ex-situ Conservation Breeding of Western Tragopan

3.5 Soil and Moisture Conservation

- i) Land slide/slips stabilization
- ii) Nallah stabilization
- iii) River Bank stabilization

3.6 Protection of Forest and Wild life

- i) Fire Protection
- ii) Anti – Poaching Measure
- iii) Demarcation of boundaries and construction of boundary Pillars/Check Pillars
- iv) Construction of Forest Barriers/Check Post
- v) Communication Network in PA's
- vi) Sign and slogan Boards
- vii) Reward/Incentives to Informers
- viii) Wild life Census Operation
- ix) Compensation against Wild life Depredation

3.7 Mitigation of Human - Wild Life Conflict

3.7.1 Eco-Development Activities

3.7.1.1 a) Village support activities

- i) Distribution of CGI Sheets
- ii) Distributions of GI Pipes for installation of religious flag
- iii) Construction of Sulabh Shochalaya
- iv) Construction of cattle Pond
- v) Const./Repair of Spring Water Bowaries
- vi) Vaccination of Domestic Cattle

3.7.1.2 b) Fuel Saving Devices

- i) Distribution of LPG Cylinders
- ii) Construction of Crematoria
- iii) Distribution of Solar Lights

3.7.1.3 c) Income Generation Activities (IGA)

- i) Vermi Composting and Organic Farming
- ii) Raising of Nursery and Cultivation and sale of NTPF
- iii) Bee Keeping
- iv) Floriculture

- v) Extraction and sale of Oil from stone fruits
- vi) Agriculture Improvement, horticulture and vegetable farming
- vii) Animal Husbandry support and Dairy Development

3.7.1.4 d) Sustainable Eco – Tourism Development

- i) Construction of Trekking Routes
- ii) Development of Camping sites
- iii) Training of Local Youths for Tourism Activities
- iv) Maintenance of Local Temples as local cultural Heritage and Hill Architectures

3.8 Field Equipment and Medicines for Management of Wild Life Sanctuary

3.9 Development of Forest Infrastructures in PA's

- i) Construction/Maint. of B/Paths and I/Paths
- ii) Construction of I/hut
- iii) Maintenance of Existing Buildings
- iv) Construction of Building/Transit Camp
- v) Construction of Information Hall/Training – Hall
- vi) Construction/Repair of Bridges

3.10 Research and Studies

3.11 Training of Forest Officers/Officials in India and Abroad

3.12 Publicity Nature Awareness Camp, Exposure visit and Training of CBO's and Extension Programme/workshop/meeting and evaluation etc.

13 Operational Support/Establishment

The detail of each component is as under :

3.4.1 HABITAT IMPROVEMENT

i) Biological Works

a) Afforestation of Degraded forest land:

The aim of the CAT Plan is to conserve in situ including flora and fauna along with the full range of eco-system they inhabit. Under this scheme blank area's devoid of tree growth, degraded forests area's and failure plantation area's shall be undertaken for plantations, while the choice of species will be mainly governed by the site/location, effort will be made to revise a mixture of conifers, broad leaved species and fruit bearing species, which are helpful to wild life so far as practical. The main species to be raised under this scheme are Deodar, Kail, Rai, Maple, Bird Cherry, Ban oak, Salix, Populus ciliata, Aesculus indica, Prunus persica, Chestnut, Juglans regia, Pyrus spp. and other local fruit bearing spp etc. Plantation must use local and indigenous species since exotics have long term negative impacts on the environment. The preference of local communities as regards the choice of species will be ascertained and given due weightage as per the requirement of site, 1100 plants per hect. will be planted under this scheme. The plantation will be maintained for subsequent five years. A total of 25 has been identified as available for planting under this scheme. The detail of area's identified to be planted is given below: -

Sr. No	Location/name of Forest	Area In hac.
1.	UF-15	10
2.	UF-14	5
3.	UF-13	5
4.	C - 96	5
	Total	25

The afforestation norms has been worked out both for conifers and B/leaves species. Looking to the high incident of grazing during summer all the plantation areas will be fenced with B/wire in 3 – 4 strands and irrigated by Kuhls or by A/pipe whereas possible.

Expenditure Detail :

	Amount (Lacs)
1. Afforestation cost with conifers/B/L over 25 hac. @ 30,600/- per hac.	7.65
2. Maintenance cost for 5 years	
1 st year maintenance cost for 25 hac @ 4300/-	1.07
2 nd year maintenance cost for 25 hac @ 3700/-	0.92
3 rd year maintenance cost for 25 hac @ 2500/-	0.62
4 th year maintenance cost for 25 hac @ 1700/-	0.42
5 th year maintenance cost for 25 hac @ 1700/-	0.42
Total	3.45
G. Total (New + Maint.)	11.20

i) **Bamboo/Shrubs Plantation**

Since all wildlife in nature live in complex web of linkage with other organisms, the proper evaluation of habitat of each species followed by its proper managements is very essential. The plant life provides congenial home to wildlife and bio diversity therefore the habitat of wild life is to be improved by supplementing the Bamboo/Shrubs plantations and supported by minor soil conservation works.

For this purpose bushy, shrubby and thick forests are to be maintained and no grass should be removed from the home range of the wild life so that habitat of wild life could be preserved and protected. In degraded forest area suitable species i.e. nirgal bamboo and Shrubs species be carried out per site location, the bank area in the forests in high reaches along ridge should be maintained as pasture land by sowing suitable local grasses for the need.

wild herbivores which are pray base for the carnivores. The nirgal bamboo/shrubs in the under story is very important for Himalayan Monal and Western Tragopan conservation. It is recommended that all such patches and other associate vegetation of under story such as cotoneasters spps., virbernum spps, Principia utilis and Berbris spp. etc. be protected and preserved.

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

S. No.	Location/Name of Forest	area in (Ha)
1.	UF – 12	5
2.	UF – 13	5
3.	UF – 11	5
	Total	15

Expenditure Detail		Amount in (Lacs)
1.	Afforestation cost for Bamboo/Shrubs Plantation over 15 Ha area @ 28.650/-	4.30
2.	Maintenance cost of five years	
	1 st year maintenance cost of 15 ha @ 4500	0.67
	2 nd year maintenance cost of 15 ha @ 3900/-	0.58
	3 rd year maintenance cost of 15 ha @ 3400/-	0.51
	4 th year maintenance cost of 15 ha @ 2250/-	0.33
	5 th year maintenance cost of 15 ha @ 2250/-	0.33
	Total	2.44
	G. Total (New + Maint.)	6.74

b) ENRICHMENT PLANTATION :

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

Sr. No	Location/name of Forest	Area In hac.
1.	UF-13	5
2.	C - 97	5
	Total	10

Expenditure Detail:	Amount in (Lacs)
1. Afforestation cost with Conifer/B/leave over 10 Ha area @ 28,650/- per hac.	2.86
2. Maintenance cost of five years	
1 st year maintenance cost of 10 ha @ 4500	0.45
2 nd year maintenance cost of 10 ha @ 3900/-	0.39
3 rd year maintenance cost of 10 ha @ 3400/-	0.34
4 th year maintenance cost of 10 ha @ 2250/-	0.22
5 th year maintenance cost of 10 ha @ 2250/-	0.22
Total	1.63
G. Total (New + Maint.)	4.49

c) **Assisted Natural Regeneration :**

In some forest area, conditions are conducive to natural regeneration provided some sort of assistance is provided. Such areas shall be taken up under this component. The areas shall be closed to exclude biotic interference. Forest floor will be cleared of slash, debris and purning to afford a clean seed bed to the falling seed. Where natural regeneration is found deficient, it will be supplemented by artificial planting/patch sowing may be done. Upto 250/200 plants/patches per hactare will be planted/patch sowing to take place the process of regenerating the area uniformly.

An area of 25 hac. Has been identified for treatment under this component as detail is given below :

Sr. No.	Name of Forest	Area in
1.	UF - 8	5
2.	UF - 11	10
3.	UF - 7	10
Grand Total		25

Expenditure Detail :	Amount in (lacs)
1. Natural regeneration closure cost over 25 hac. @ Rs. 17,000/- per ha.	Rs. 4.25
2. Maintenance cost for 5 years	
1 st year Maint. @ Rs. 1,900/-	Rs. 0.47
2 nd Year Maint. @ Rs.1,100/-	Rs. 0.27
3 rd year Maint. @ Rs. 900/-	Rs. 0.22
4 th year Maint. @ Rs. 600/-	Rs. 0.15
5 th year Maint. @ Rs. 600/-	Rs. 0.15
Total	Rs. 1.27
G. Total (New + Maint.)	Rs. 5.52

d) **N.T. F.P.'s Plantation :**

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 PA's under provision of Forest Settlement Report, 1921 for domestic use and their livelihood, thereby threatening the very existing of rare and endangered species of medicinal herbs. Therefore, it is need to address the livelihood issue by encouraging forest based enterprises for development NTFP is required on the sustainable basis as it provides alternative income generation activities. Under this scheme medicinal herbs like Dhoop, Karu, Kuth, Salam Panja (Hath Panja), Ban Kakri, Chora, Patish, Guchhi and Discorea deltoidea etc. will be raised. About 5000 plants in 1000 patches shall be planted in 1 ha. area depending upon the site. The plants can also be raised as intercrop in the other plantation area taken for the tree plantation. The plantation area will be fenced with B/wire fence in four strands on wooden fence posts. An area of 30 hac. has been identified as available for planting under this component. The details of the area identified is as under.

S. No.	Name of Location	Area in (Ha)
1.	UF - 10	10
2.	UF - 11	10
3.	UF - 13	10
	Total	30

Expenditure Detail :

	Amount in (Lacs)
1. Plantation cost of N.T.P.F over 30 ha @ 38,000/-	11.40
2. Maintenance cost for 3 years	
1 st year maintenance of 30 ha @ 7950/-	2.38
2 nd year maintenance of 30 ha @ 2600/-	0.78
3 rd year maintenance of 30 ha @ 1300/-	0.39
G. Total (New + Maint.)	3.55

e) **Nursery Development :**

To raise successful plantations it is necessary to have a good planting stock. It is proposed to establish two nurseries at Sorang and Chhota Kamba. These nurseries shall be raised in the 1st year of the project and will be further maintained till the completion of the HEP project.

In addition to that it is also proposed to bring about effective closure of pasture area with the prior consent of the local people for raising of seed locally i.e. over 15 hac. at Sorang, Kumrang and Dumti and it will be collected in the 1st year of the project. This would help collection of seed from the closed area. The local grass spp. i.e. marchunang and parchunang is available and would be consulted from the Scientists of UHF Nauni, Solan for choice of local spp, collection of seed and planting techniques etc. during the 1st two years of the project period.

Expenditure Detail :

1. Establishment of New Nursery at Sorang Dogri (UF – 13) and Chotta Kamba (C – 96)	6,00,000
2. Maintenance of Nursery during the project period	4,00,000
Total	10,00,000

ii) **Treatment of Culturable Waste Land :**

The grass land, wetland and common waste land/grazing lands are extremely valuable for wildlife conservation. Their productivity potential needs to be restored. Therefore, the culturable waste land treatment are proposed to be treated on Government land i.e. Charagah Dharkhtan and Charagah Billa dharkhtan through a silvo-pastoral treatment and shall be improved by undertaking the following measures :-

- i) Eradicate unwanted bushes, shrubs and grasses
- ii) Sowing of suitable locally good palatable grasses
- iii) Minor soil conservation measure

Planting and grass sowing along contour is required. All the area to be fenced with wooden fence posts and three four strand barbed wire. The model for raising of culturable waste land over one hectare area is given in Annexure – VI. Under this component about 17 hac. area is proposed. Maintenance of these areas shall be done for five years. The list of various areas proposed to be treated is given below:-

S. No.	Name of area	Area in Hac.
1.	UF-15	8
2.	UF-14	5
3.	UF-13	4
Total		17

Expenditure Detail :		Amount in (Lacs)
1.	Cost of treatment of culturable wasteland over 17 hac. @ 20,600/-	3.50
2.	Maintenance cost for 5 years.	
	1 st year maint. Of 17hac. @ Rs. 6600/-	1.12
	2 nd year maint. Of 17 hac. @ Rs. 4800/-	0.81
	3 rd year maint. Of 17 hac. @ Rs. 3400/-	0.57
	4 th year maint. Of 17 hac. @ Rs. 2450/-	0.41
	5 th year maint. Of 17 hac. @ Rs. 2450/-	0.41
	Total	3.35
	Grand Total (New + Maint.)	6.85

iii) **Treatment of Alpine Pasture :**

The restoration and management of degraded alpine pasture and habitats of Wild animals in Sanctuary is a vital objective, both to provide sufficient habitat for spatial movement of spill over species outside PA's and to provide biological resources. The alpine pasture have their own significance in the geophysical, environmental and socio-economic conditions of the tract. They are

the main source of herbage for the wild herbivores which are prey base for carnivores, cattle, sheep and goats. These pastures are extensively grazed during summers for 3 – 4 months and also by a large number of goats and sheep which are also brought in by the migratory graziers. Discussion with the local people revealed that these pastures have badly degraded over a period of time. The palatable grasses are no more than a few inches tall and the other related pasture species have also started showing signs of stress. This apparently degraded status of these pastures seems to be due to very heavy grazing pressure in the area. As a result of continuous and heavy pressure of grazing, barren patches have developed over vast areas and soil erosion rampant in these alpine pastures. Till now no survey about the carrying capacity of pasture, grazing land and common waste lands has been specifically carried out for this purpose. No estimates for grazing incidence on forests land is available. The pressure is so much that even closed plantation and re-generation areas are raised for grazing. Owing to traditional rights of the graziers, it is difficult to restrict the number of animals grazing there. Thus the only alternative left is to increase the productivity of these pastures to cope with the grazing pressures.

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 800 – 1000 strips of 100 x 30 x 50 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 HFRI Shimla, Plantation must use local and indigenous species since exotics have long term negative impacts on the environment. No treatment with fertilizers and B/wire fencing is feasible in these areas, 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 misutilized by some permit holders.
- Education of needs.
- Closure of areas in pastures for the proliferation of seeds of desirable grass species.
- Rotational deferred grazing system be followed to give the advantage of early nutritive growth and rest period during the growing season.
- To dialogue with the local people and the migrating graziers so that a sort of social fencing could be achieved. No B/wire fencing is suggested.
- There is need to assessment of the carrying capacity of alpine pasture and grazing land in forests. Role of different categories of live stock and their grazing requirement needs to be investigated.

The list of various pastures proposed for treatment is given below.

Sr. No.	Name of Area	Area in hac.
1.	DASURANG Kanda	10
2.	URANG Kanda	10
3.	DUGE	20
4.	LATYA	20
5.	KUMRANG Kanda	50
6.	DEDYA	20
7.	MOTA THACH	20
	Total	150

Expenditure for Treatment of Alpine pasture :	Rs (Lac)
1. Cost of Treatment of Alpine pastures over 150 hac. @ 10,550/- per hac.	15.82
2. Maintenance cost for 2 years	
1 st year maint. Of 150 hac. @ 1100/-	1.65
2 nd year maint. Of 150 hac. @ 600/-	0.90
Total	2.55
Grand Total (New + Maint.)	18.37

iv) **Construction of Water Holes in PA's :**

The water hole should be constructed in PA's wherever there is required. Water holes needs to be constructed at various points as per management plan. The recommended size of water ponds is 7m x 6m x 2m (with stone masonry inside) it is strongly emphasized that all these water point must be kept under vigil of patrolling staff. This is to preempt any suspected poaching attempt at the water ponds/holes.

It is further emphasized that no bunkers will be constructed on the pattern of the Spiti Valley because these bunkers would be used by a prospective hunter/Poacher or shepherd in the area for illegal activities.

An outlay for Rs. 2,50,000/- has been proposed to be incurred during the plan period.

3.4.2 Development of Sarahan Pheasantry ----- Ex-Situ Conservation of Western Tragopan :

The Sarahan Pheasantry was established during the year 1987-88 and initially it covered an area about 3.5 ha and now it has been extended by including the area of the adjoining UPF. With this inclusion the total area of Pheasantry has become about 11-12-37 ha. under the provision H.P. Land Revenue Act, 1954. It was initially set up rescue and rehabilitation center for the

wild Western Himalayan fauna driven down to the habitations for food due to snowfall at higher reaches, the infrastructure and the management input in the initial stages were limited to provide poor accommodation and care to the rescued inmates at the center. It was only when the element of breeding of red listed pheasants was added during 1990-91 and construction of enclosures was taken up with special attention to pen, hygiene and feed etc. In the past many numbers of Western Tragopan have been rescued from the Rupi -Bhaba Wildlife Sanctuary to the Pheasantry. Initially two pairs of rescued western Tragopan from Darannghati Sanctuary arrived in the Pheasantry during Feb.1990 and then Rupi – Bhaba Wildlife Sanctuary. During 1993-94 Sarahan Pheasantry witnessed first ever breeding of Western Tragopan in captivity in the world. Again during the year 2005 the second ever breeding of Western Tragopan in captivity in the world after a gap of 12 years. It is the only Sarahan Pheasantry where this rare endangered species kept in captivity at Sarahan in the world and the proposed conservation breeding project of Western Tragopan will lead the world in Pheasants reintroduction programme under the guidelines of I.U.C.N. As the only place in the world where member/local people/visitors can see the Western Tragopan very closely at Sarahan Pheasantry. The Western Tragopan only ever filmed once in wild in Pakistan and only bred second time in world after a gap of 12 years at Sarahan Pheasantry on 6th June 2005.

Since the establishment of Sarahan Pheasantry at Sarahan no management plan of Sarahan Pheasantry for ex-situ conservation breeding of endangered species has ever been prepared and also no proposal was formulated for meeting the requirement of Central Zoo Authority of India, New Delhi under the Wildlife (Protection) Act, 1972. The first ever management plan of Sarahan Pheasantry prepared by Sri B.L. Negi D.F.O Wildlife Sarahan during the year 2002-03, which was approved by the CZA for an amount of Rs. 493.90 Lacs (w.e.f. 2003-04 to 2007-08). It will be financed by the different agencies against the approved management plan as follows :

Total Project Cost	Rs. in Lacs
a) 100% full share by CZA	Rs. 493.90
b) Matching share by CZA & state government under NJPC CAT Plan (50 : 50 share) 128.95+128.95 Lacs	Rs. 257.90
c) Total Share by CZA (236.00+128.95 Lacs)	Rs. 364.95
d) Total share by H.P. Govt. under NJPC CAT Plan	Rs. 128.95
e) Total Project Cost	Rs. 493.90

Out of the total project cost a sum of Rs. 17.50 Lac during the year 2003-04 and Rs. 30.00 Lac during the year 2004-05 stand released by the CZA for the fencing work of Sarahan Pheasantry, land scaping development and enclosures for Western Tragopan etc. The funds are being utilized as per approved management plan and estimates approved by the competent authority under the supervision of CZA New Delhi.

The state share to the tune of Rs. 128.95 Lac for the conservation breeding project of the Western Tragopan will be met from the NJPC CAT Plan. This provision has already been made in the NJPC CAT Plan which was approved by the MOEF, Govt. of India.

The Satluj Valley has, over the year, come to be recognized as having large-scale potential for generation of hydro electricity. The project authorities are under the obligation to fund various CAT Plan activities related to conservation of habitat and endangered species in lieu of disturbance and maintenance of ecological equilibrium caused during the project activities. Keeping in view of the facts and reason, the provision for development of Sarahan Pheasantry – ex-situ conservation breeding centre for endangered species will therefore be made during the plan period.

Thus the present infrastructure of Sarahan Pheasantry is adequate for captive breeding only but totally inadequate for conservation breeding of endangered species i.e. Western Tragopan. All the infrastructure at Sarahan Pheasantry needs the major addition/renovation/special repair and new complex on the pattern of John Corder's Down lands Aviaries at Sommerset, U.K. to up keep the Pheasants especially Western Tragopan by providing basic facilities i.e. enlarge aviary, aviary planting, shelter, Pop holes, furniture, nest box / baskets. feeding and displaying facilities, hospital cage etc. for providing the security and seclusion opportunities, that hence needed to encourage natural breeding and rearing.

The present cost projection was prepared/based upon the prevailing wage rate of Rs. 75/- per day during the year 2002-03. The cost of the project i.e. wages and material are hiked with the passage of time. The works which are not covered in the management plan and differential amount due to escalation of wage rate/material cost with the passage of time will be met from the Sorang CAT Plan so that objectives of conservation breeding of endangered species could be achieved.

Therefore, a provision of Rs 70 Lacs has been made for this component during the plan period. However this annual allocation is only indicative and actual funds required on this account will be sought for annually after finalization of A.P.O with the approval of competent authority under the supervision of CZA New Delhi.

3.5 Soil & Moisture Conservation

i) Land slides/slips stabilization :

Land slide are costs 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 control measure which would depend upon the size, extent and location of the slip of the area. However in general the following measure shall be applied depending upon the situation on the site/field.

- a) Construction of masonry check wall and undertaking of vegetative measure.
- b) Planting of shrubs, grass and quick growing species and carryout soil conservation measures to treat the sliding/eroding slip areas. Choice of species will be depending upon the site/field.

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

Land slip stabilization

Sr. No.	Name of location	No.
1	PIYAG Slip	1
2	DUMTI Slip	1
3	KUMRANG Slip	2
4	DUGE Slip	1
	Total	5

The Expenditure Detail :

Amount in (Lacs)

1. Cost of land slip/stabilization over 5 Nos. @ 10,00,000/- LS 50.00

ii) Nallah Stabilization :

About 6 nallahs with a length about 9 Km are required to be treated depending upon the sites/location not to treat total length in the catchment area. The identified areas are given in the CAT Plan shall be stabilized through control measure which will depend upon the size, extent and location of the Nallah/area. The following methods shall be applied depending upon the situation in the field.

- 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 constructing crate wire of check wall/check dams and spurs.
- c) Live hedge vegetative spurs along the nallah shall be put up after one or two years, when the nallah will be filled by the silt. Local species, which are known as good soil binder like Salix, Alnus nitida, Ailanthus Hippophae spp. etc. will be planted.
- d) The sites which are highly vulnerable to soil erosion are to be taken up on high priority and silt detention dams shall be constructed in order to reduce the silt load in the river Sorang. These structures would break the velocity of the water and arrest the silt discharge in the river Sorang. Besides this construction of spurs where ever required will also be constructed. Planting of shrubs and quick growing species to treat the nallahs will also be carried out.

The details of Nallah's with length in Km are given below.

S. No.	Name of Nallah	No.	Area (Km)
	Buro Nallah	1	1
	Shannag Nallah	1	1
	Kumrang Nallah	1	4
	Sheura Nallah	1	1
	Rakcha Nallah	1	1
	Jeachham Nallah	1	1
	Total	6	9

Financial Implications :

Amount in (Lacs)

1. Cost of Nallah stabilization over 9 Km @ 6,00,000 L/s 54.00

iii) River Bank Stabilization :

Sorang Khad bank/stream bank erosion is a result of various reasons - destruction of vegetative cover, mass movement due to unstable bank

slopes, sliding of slopes etc. Direct protection measures by construction of spurs/check dams and vegetative spurs etc. stream bank can be effectively controlled by creation of vegetative cover with suitable species i.e. Seabuckthorn *Alnus nitida* and willow etc. in between space of the spurs. The vegetative cover shall be carried after 1-2 years when the reach soil will be deposited in between the space of spurs. *Alnus nitida*, *Salix* spp. and *Hippophae* species will be planted.

About 7 Km. of the Sorang Khad, bank/stream bank erosion has been identified for the treatment of riverbank stabilization. The details of the river bank treatment area is given below :

S.No.	Name of Location	No.	Area (Km.)
1.	Kumrang to Dumti	1	3
2.	Dumti to Talpa	1	3
3.	Shangling	1	1
	Total	3	7

Expenditure for River Bank Stabilization :	Amount (lacs)
Cost of river bank stabilization over 7 km. @ 5.30 Lacs L/s	37,00,000.00

3.6 Protection of Forest and Wildlife

i) Fire Protection :

The PA's must be saved from forest fires. The forest fires do damage in Deodar - Kail forests during November to December and April to June. There have been repeated fires in the 15/20 area of Kinnaur district adjoining to the

cultivated land. Control burning of forest debris/disposal of slash is recommended in dry season in dried up nallahs/paths and along the cultivation private land/Govt. land in accordance with the management plan, rules Acts and deptt. instructions and also under Section 33 of the Wild Life (Protection) Act, 1972. For this purpose two fire watchers in all 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 cultivation. The nallahs and path will act as fire barriers. No new fire lines and green fellings will be carried out in compliance of the Apex Court order in CWP 202/95 dated 12.12.1996 and 14.02.2000.

In order to protect the forests in and around Sanctuary area from fire, the following works are proposed to be undertaken along the plan period is as under:

- a) Engagement of fire watcher during fire season.
- b) Construction of fire watch tower
- c) Purchase of fire fighting equipments
- d) Clearance and maintenance of fire lines.
- e) Controlled burning of grass land and debris etc. to facilitate growth of fresh grass. Removal of vegetation, either slash and debris and early or cool controlled burning.
- f) Incentives to Mahila Mandals/self help groups.
- g) Reward to informer against fire, illicit felling and poaching etc.

An outlay for Rs. 16.80 Lacs is proposed to be incurred during the plan period.

ii) Anti-poaching activities :

The sanctuary 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 un-employed youth. Local youth are to be trained and engaged them to give assistance to field staff and clues regarding poaching in the 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. 6.30 lac is required to meet this purpose during the plan period.

iii) Demarcation of Boundaries and construction of boundary Pillars and check pillars :

For the proper management of Sanctuary area and to prevent any illegal activities i.e. encroachment and trespass in the sanctuary there is need to identification of the Sanctuary boundaries and construction of boundary pillars and check pillars along the cultivation of private land as per the H. P. Govt. final notification under Section 26 (A) of the Wildlife (P) Act, 1972. By constructing check pillar/B/pillars, it will facilitate to prevent illegal activities i.e. encroachment on forest land, illicit felling and poaching etc. within the Sanctuary area. Therefore, an amount of Rs. 4.00 Lacs is required for this purpose during the plan period.

iv) Construction of Check post/chowkies :

The Sanctuary area is required to be guarded against any illegal activities under the Wildlife (P) Act, 1972 through out the year especially during the HEP project plan period. In order to curve these illegal activities construction of check post/chowkies at Nigulsari or Chaura is to be established after the approval of the competent authority. Therefore, an amount of Rs. 5.50 Lacs has been proposed for this purpose during the plan period.

v) Communication Network :

There are no motorable road and telephone facilities in the Sanctuary area. The whole tract is on foot, steep and difficult. For effective patrolling against poaching, illicit felling and encroachment on Forest land, it is necessary to establish the wireless network in and around the Sanctuary area through HEP Project in kind. At present there is one wireless set is available at Rupi Range Head Quarter which is not workable condition. Equipment supplied by the Punwire Company has become out dated/non functional and requires immediate replacement. Therefore, it is recommended that the wireless networking system should be established by the Sorang Project authority in kind and connect Sarahan Division to Rupi – Bhaba Wild life Sanctuary within first two years of the Project.

Therefore, an outlay for Rs. 10.00 Lacs, is proposed for this purpose during the plan period.

vi) Sign and Slogan Boards :

It is recommended that the sign and slogan boards must be put up at selected sites. All these sign and slogan boards must be in Hindi and English Languages in the form of an appeal to the local people, telling them the importance of Wildlife conservation under the provision of Wildlife (Protection) Act, 1972 and IFA, 1927 and FCA, 1980 etc. All such development works which are taking place in the project area must be properly displayed at the site of execution e.g. plantation work, nursery, pasture development, soil conservation works etc. Therefore, an amount of Rs. 2.00 Lacs has been proposed for this purpose during the plan period.

vii) Reward/Incentive to Informer :

Reward/Incentive to the informers are required for proper protection of Sanctuary area against poaching, encroachment and illicit felling. Forest guard alone are helpless to protect or detect wild life offences. With the help of association of the local people by providing reward/incentives the department get clues from these people. It is necessary to make people aware about the biological, ecological hardships with the bio-diversity conservation of the Sanctuary. Therefore, the people should be encouraged by providing them reward/incentive for giving information to the Department about the offender/culprits. It is also ensured that informer's name should not be disclosed publically or otherwise people will not dare to come forward on this issue. Therefore, an amount of Rs. 1.00 lac is required to meet this purpose during the plan period.

viii) Wildlife Census Operation:

It is proposed to carry out wild life census in the key areas to know the density of key species so that these can be further improved and developed from management point of view. During last four years no census has been carried out in the Sanctuary area due to non-availability of funds. The census should be carried out twice in an alternative year. Therefore, an amount of Rs. 2.50 Lacs is required for this purpose during the plan period.

a) Census Methodology:

Census of Wild animals in the Himalayas is difficult due to several reasons. Trying to obtain absolute density estimate is impossible and not our aim, hence it would be better if relative density estimates are arrived at. Census is carried over a period of one week. The census is conducted over four distinct phases within each PA's. The phases are (i) Organisation, (ii) Pre-Census

training (iii) Census Operations spread over seven days in 2 regimes. 1) – First 5 days regime, 2) – Last 2 days, regime 3) – data collection, analysis and finalization of census tally.

Existing trails or beaten tracks can be permanently marked and animals counted regularly. Transects of shorter length is better than longer ones. It is always better to have adequate replicates i.e. two or three small transects for a given area after stratifying them.

Another major suggestion is about the visibility of the transects or the survey routes taken. Shrub and grass cover differ from season to season. Logically an animal is not missed in a area where the visibility is good e.g. the Himalayan Tahr in the alpine meadow will not be missed even from large distances, but the Musk Deer will be missed even from 3 mtr away. It would be better if the visibility of each area of every transect could be measured or every route once for both the seasons. May and December/January months after first snowfall/second snowfall are the best months for cesusing.

The places where we can not walk (steep ridge, valley etc) Scanning that area with binoculars or spotting scope is the best method. This method involves counting animals by two independent observers from two different vantage points for 2 or 3 days for a given area in a season. The number, time, location and direction of movement of the animals can help in avoiding double counts. Equal amount of time should be spent for every area for every scan.

b) Method of estimating visibility in transects :

For example Transect length = 1 Km

- Step 1 : In the permanently marked transect or route segments of equal length can be made
- Step 2 : For every point (say 100 mtr. to 200 mtr etc.) measures visibility on both sides.
- Step 3 : Calculate average visibility for the transect.

It can be done for the two different season. Pugmarks are a means to identifying real live animals, they are not an end in themselves, instead they should lead to the recognition of real animals. Done over a period of months this practice can result in the ability to recognize individual animals from their pugmarks and will make the observer a better judge of pugmarks characteristics.

During census and routine pug and dung collection operations great use should be made on maps. Pugmark data, when well collected and analysed can yield more information than simply population size alone. Reasonably accurate sexing of adults can be made from the over all comparative share of pugmark. Pugmarks of young one are smaller. Sexing and aging is thus possible from pugmarks record.

ix) Compensation against wildlife Depredation :

Wildlife depredation 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. A provision for Rs 3.00 Lacs has been made during the plan period for this purpose.

3.7 Mitigation of Human – Wild life Conflict

The tribal communities of this project are largely occupied forestry region of the Sanctuary area 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. Tribal life is

connected one way or the other with forest and wild life, right from birth to death. We cannot deny the needs as the tribal people who live in harmony with the forests, environment and ecologically they cannot be disregarded. Safeguards are required to ensure that catchment area treatment and other works should be effected ecologically. 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 sanctuary area, maintained ecological balance and conservation of wild life alongwith eco-development activities in the Sanctuary area, an outlay of Rs. 79.90 lacs is proposed to be incurred. The following important mitigative measures are to be undertaken in this regard are as under: -

3.7.1 Eco-Development Activities :

3.7.1.1 a) Village support activities

In order to reduce the pressure from forests of Sanctuary, it is proposed to provide alternate sources like C. G. I. sheet for roofing of houses. G.I. pipes for installation of religious flag, sulabh shauchalaya, construction of cattle ponds, construction/repair of spring water bowaries for the villager residing in and around the sanctuary area. By providing these alternative resources, the pressure on sanctuary would be reduced. Otherwise in the name of house construction and repair and also other work, the villagers/right holder cut minimum 3 to 4 trees by way of T.D per family at concessional rate under the provision of forest settlement report, 1921, For the optimum conservation of natural resources of the Sanctuary, it is essential to develop rural infrastructure development i.e. village paths, repair/construction of spring water bowaries. Cattle pond and 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. Therefore, an outlay for Rs. 32.20 lacs is proposed for these purposes during the plan period. The component wise detail is given below.

1. Distribution of CGI sheets
2. Distribution of GI pipes for installation of religious flags
3. Construction of Sulabh Shochalaya
4. Construction of Cattle Ponds
5. Construction of Spring Water Bowaries
6. Vaccination of domestic cattle

3.7.1.2 Fuel Saving Devices :

In order to reduce the pressure from forest resources in and around the Sanctuary area, it is proposed to provide alternative sources like LPG cylinders on subsidized rate (50% cost to be given by the beneficiaries) to poor tribal people, construction of crematoria and distribution of solar lights etc. in each village of Chhota Kamba and Rupri Panchayats. Therefore, an outlay of Rs. 14.75 lacs has been proposed for the these purpose during the plan period. The component wise detail is given below.

1. Distribution of LPG cylinders	150 no. families
2. Distribution of Solar light	10 nos.
3. Construction of crematoria	7 nos.

3.7.1.3 Income generation activities (IGA) :

One of the major factors impacting on the effective bio-diversity conservation is the dependence of tribal 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. Forest Deptt. and the Apex Court Order dated 14.02.2000, prohibited the removal of dead deceased, dying and fallen trees, drift wood and grasses from National Park and Sanctuary but they extracted NTFP for the their livelihood.

there by threatening the very existing of the rare and endangered species of medicinal herbs. A provision for Rs. 26.50 Lacs has been made during the plan period for this purpose.

Therefore, it is need to address the livelihood issue by encouraging forest based enterprises for development of NTFP along with bee keeping, floriculture, extraction and sale of oil and vermi composting and organic farming are required on the 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. Therefore, sum of Rs. 2.00 Lacs has been earmarked for raising of NTFP nursery during the plan period.

Vermi composting culture, bee keeping, floriculture are one of the alternative sources of income generation which is easy to adopt and can bring fast income returns to the local people ecologically. Forest Deptt. and Horticulturist in Kinnaur District will be a potential buyer of all such vermi composting and organic farming for its vast network of forest nurseries also. Women in and around the Sanctuary area can adopt these activities as a part time without compromising with their day to day work. Therefore, an amount of Rs. 1.00 Lac has been made for this purpose during the plan period.

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 harmonious effect on the environment. 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 Distt. Administration i.e. line department subject to the approval of A.P.O. Therefore, a sum of Rs. 10.00 lacs has been earmarked for this purpose during the plan period.

Animal husbandry is an important occupation of the people of the area. Live stock practices are rather primitive in the project area. Mostly open grazing is practiced with little stall feeding and minimum fodder cultivation. A large number of unproductive cattle are trampling the grazing land, which results in severe damage to the vegetation and soil productivity. It is therefore required that need to keep large herds of unproductive cattle is reduced by demonstrating benefits of improved breeds cattle to the local people and strengthening the animal husbandry infrastructure support to such a change with the passage of time. Thus, a provision for Rs. 8.00 lac has been made under this component to provide animal husbandry support and diary development in the project area with the consultation of animal husbandry department and public subject to the approval of A.P.O during the plan period.

3.7.1.4 Sustainable Eco-Tourism Development

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

- a) Awareness of sustainable Eco-Tourism and its benefit amongst the local population through various trainings is needed.
- b) To protect and preserve the the local culture, heritage in the area.
- c) Conservation and preservation of Bio-diversity
- d) Trainings of youth on various aspects of Eco-tourism

Training on various aspects :

- i) Guides
 - ii) Adventure activities
 - iii) Linguistics
 - iv) First Aid/high altitude survival
 - v) Camp stablishment
 - vi) Regular workshops on conservation viz-a-viz sustainable Eco-tourism
- e) Construction of Trekking Routes
 - f) Development of Camping Sites
 - g) Maintenance of Local Temples as local cultural heritage and hill architectures

To encourage all interested persons, both domestic and foreign tourist, with a view to acquaint them and create awareness of this unique eco-system. The pastures and adjoining mountain slopes with Betula, Bird Cherry and Juniperus recurva forests present a magnificent panoramic view. The wild life staff must be actively associated in such a programme.

Therefore, an outlay for Rs. 16.00 lacs is required for this purpose during the plan period.

3.8 Field equipments and Medicines for Management of Wild Life Sanctuary :

The rich and unique bio-diversity of Rupi-Bhaba Wildlife Sanctuary is under tremendous pressures and stress due to ever increasing demographic pressure. Increasing conflicts between Wildlife and local communities is a major factor that lead 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. Bear cause extensive damage to agriculture crops, cattle lifting and bee keeping farming in the catchment area of Sorang Valley. However, continuous habitat degradation in the recent years has resulted into enhanced bear – man conflict. Current knowledge on the ecology and behaviour of Black bear is inadequate. Special field training workshop on wildlife damage control with emphasis on use and handling of animal repellants, deterrants, 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 Wild Life (P) Act, 1972.

In addition to that it is necessary to purchase a medicine also for management of Wild life – because in the past it has been frequently responded to call from a different Sanctuary to deal with human – Wild life conflict.

Therefore, an amount of Rs. 10.00 Lacs is required for this purpose during the plan period. 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, altimeter, pedometer, compass, Sony handycam, Tape Recorder, Census equipments.
- 5) Binoculars and spotting scope etc.
- 6) Medicines
- 7) Protection Guns two nos.
- 8) Other equipments

3.9 Development of Forest Infrastructures in PA's

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. Only 2 no. of paths has been existed in the Sanctuary area, which needs repair. Some paths have been identified for new construction to facilitate efficient wild life Management in the PA's. Similarly in case of buildings, the establishment of new complex Rupi Range office cum residence and other infrastructures at Bara Kamba/Chhota Kamba and also few existing buildings will need immediate repair. Sarahan Wildlife Division was created during July 1984, it includes four Wildlife Sanctuaries namely Rupi-Bhaba, Rakchham- Chhitkul, Lippa- Asrang and Daranghati which fall in Kinnaur District and Rampur Sub Division of Shimla District H.P. respectively. The total geographical area of this division is 1005 Sq. Km. Rupi – Bhaba Wild Life Sanctuary is constituted of two ranges namely Rupi Range at Nugalseri and

Katgaon Range at Katgaon. During 1986 – 87 the range office cum residence of Rupi Range at Nugalsari and other infrastructures were created at Nigalsari on NH – 22, because the 15/20 area of Kinnaur was not connected with the road and was not approachable from division HQ Sarahan at that time. Now Bara kamba Village is being connected with road by Sorang Project. As the road will be constructed upto Intake i.e. Sorang Dogari from Chhota Kamba.

The present infrastructure of Rupi Range at Nugalsari is not adequate and safe due to land slide below the Range Head Quarter. More over there is no scope for further development and extension in near future. Secondly, for the management point of view, law and governance of wild life Sanctuary Bara Kamba village is the centre place, which is now approachable by the road and also in future Rupi village will also be connected by the road. By the establishment of Range Office cum Residence and other infrastructures at Bara Kamba village will not only facilitate the field functionaries in Wild life Management but it will also help to bring the administration to the door step of people of 15/20 area of Kinnaur District. The existing infrastructure at Nigalsari may be used as transit camp or Forest Rest House and Range store etc. A provision of Rs. 20.00 Lac has been made for this component. Year wise allocation shown in the schedule is only indicative and funds may be used as per actual requirement of the site/proposal during the plan period and extra expenditure will be met under Tribal sub plan with the approval of the Government. In addition to these one Forest Inspection hut at Sorang Dogri has been proposed to construct to facilitate the field staff & tourists. A provision for Rs. 18.00 lacs for maintenance/repair of existing buildings/FRH, Rs. 24.00 lacs for B/paths and I/paths and Rs. 18.00 Lacs for construction and maintenance of existing bridges has been proposed under this component. Thus, a total amount of Rs. 80.00 Lacs has been kept under these activities during the plan period.

3.10 Research and Studies

The Sorang valley 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 grasses and herbaceous plants. Many of which are of 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. Moreover conservation of soil forest resources, degradation of bio-diversity and grass land, soil erosion, silt laden in the Sorang Gad due to soil erosion and other ecological reason has also not been documented. It is utmost important that a waste land information about the floral diversity, ecological studies and law and policy and composition is generated to guide future conservation action. Funds will be allotted to implementing agency, who will determine the study areas with focus on present scenario during the plan period. The implementing agency will contact most appropriate agency, institution to conduct their research activities from the institution HFRI Shimla, WII, Dehradun, and any recognized University in India. Priority will be given to undertake research studies in the following subjects: -

- a) Floristic studies of Rupi Bhaba Sanctuary.
- b) A study on distribution, relative abundance and food habits of the Musk Deer and Himalayan Tahr in Rupi – Bhaba Wild Life Sanctuary.
- c) A study on distribution, relative abundance and food habits of the Leopard and Black bear in Rupi – Bhaba Wild Life Sanctuary.
- d) Ecological and behavioral studies of Western Tragopan in Rupi – Bhaba Wild Life Sanctuary.
- e) Socio – Economic studies of the villages dependent on the Rupi – Bhaba

First preference will be given to the in-service candidate who having a knowledge and experiences on forestry management and conservation. The research and studies will be conducted through the W.I.I Dehradun.

A provision of Rs. 15 lac has been made for this component. Year wise and division wise allocation shown in the schedule is only indicative and funds may be used as per actual requirement of research activities proposal/plan, submitted by the candidate/institution, through implementing agency.

3.11 Training of Forest Officers/Officials in India and Abroad

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

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

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

i) Durrell Wildlife Conservation Trust, UK.

Durrell Wild life Conservation Trust runs unique courses in good conservation practice both in its international training centre in Jersey and in locations around the world. Some of the courses recommended to the wildlife professionals are as under:

1. Facilitators Skills Workshop
2. Summer School in Endangered Species Management and Conservation
3. Endangered Species Conservation
4. Amphibians Biodiversity Conservation

The course fees for these courses varies from £1000 to £2500 approximately. These are short term courses and are run year to year basis. Seats are given to the deserving wildlife professionals after screening their curriculum vitae. This trust also conducts need based courses at different locations around the world for the cause of wildlife conservation.

ii) American Zoos and Aquarium Association

American Zoos and Aquarium Association (AZA) professional training programme provides professional development and training on a variety of topics targeted for ex-situ and in-situ conservation of wild populations. The various courses for example are as under.

1. Wild life Population Management
2. Managing Animal Enrichment
3. In-situ Conservation Strategy etc.

The course fees varies from time to time. The seats are given to the deserving wild life professionals.

iii) Wildlife Institute of India

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

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

Training in Soil and Moisture Conservation :

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

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

A provision for Rs. 18 Lacs has been made for this component during the plan period. However this annual allocation is only indicative and actual funds required on this account will be sought for annually after finalization of activities with the approval of competent authority.

3.12 Publicity, Nature, Awareness Camp, Exposure visit, Motivation and Extension Programme/workshop/meeting and evaluation of CAT Plan works :

The Sorang Catchment and the adjoining villages in Kinnaur suffer from over exploitation of Forest resources, overgrazing and soil erosion etc. To check these soil erosion by vegetative measure including afforestation & rehabilitation of grass land, control of natural resources are immediate necessary. The biotic pressure on the forest resources is ever increasing day by day due to the increase dependence of the local people for their livelihood. In order to tackle the ecological problem, publicity, nature awareness camp, exposure visit and educational programme has to be evolved for the local populace and VFDS.

Nature interpretation and awareness among all section of society living close must be aroused by systematically. The extension worker and field staff needs to be trained in JFM and extension. Methodology, Local populace/VFDS/VFDC has to be educated and trained regarding the programme incorporated with the project. VFDS/VFDC will be constituted in each village and VFDS workshop be organized to provide common forum for sharing of various experiences and for developing common understanding on the approach and strategy of participatory Joint Forest Management. The field functionary will organize the meeting of the farmers and the other beneficiary of the village, panchayat and block level, where they will be providing information about various activities of the project. Development officer of Horticulture and Animal Husbandry must also be associated in these meetings to provide guidance and techniques to the farmers. The wild life (Protection) Act, is 1972 must be explained to them. They must be told about ban on hunting, rules regarding collection of MFP's and compensation to be given if wild animal damages of cattle etc. Special Nature Awareness camps/exposure visit must be organized in winter when people are relatively free to attend such camps /visits. Wild life quizzes, painting, trekking and visit to nearby areas of PA's should be organized to attract the school going children to the cause of wild life and nature conservation.

Various workshops and training for C.B.O's and VFDS/VFDC on project programme would be organized at range, division and circle level. In these workshops, professional/expert or resource person from HFR Shimla/WII Dehradun and NGO's will be invited to suggest measures to overcome various problems being faced by the field functionary. Exposure visits to various Zoos and parks i.e. Corbett National Park, Kanha National Park and Delhi Zoo etc. would be organized with the approval of the competent authority.

Short term training for CBO's and VFDS/VFDC and farmers on agriculture:

horticulture and forestry will be organized at the divisional level. Liaison with University of Horticulture and Forestry is to be maintained for this purpose after approval of the A.P.O. Latest technology on agriculture, horticulture, forestry and allied subject is to be imparted to the farmers from UHF Nauni and Palampur University etc.

Documentary film on Wild Life and other activities will be shown to the villagers at convenient place. A full length of picture on wildlife and nature will be purchased for this purpose.

For extension of village works and Project activities female CBO's will be employed on daily wages to impart education/awareness to the public regarding this project. Forest Guard and Deputy Ranger will also act as extension worker along with CBO's.

Active non Governmental organizations operating in the Satluj Valley and also outside (within the state) are also to be involved.

Meeting and evaluation of CAT Plan progress work is yet another important and integral component for effective management and governance. Therefore, the provision has been made in the plan for this purpose. The regular quarterly meeting/workshop will be conducted/organized with the approval of the competent authority during the plan period.

Strategy for Capacity Building of Project Team :

To build in house capacity of the project team to take up this job a two pronged strategy needs to be developed.

First part of the strategy would include training/workshop.

- a) Appreciation of the issues

- b) Developing Skills
- c) Developing appropriate and specific extension technologies
- d) Developing extension material for various target groups
- e) Implementing the extension Programme and.
- f) Programme assessment and impact

The second part of the strategy would deal with actual execution of the extension programme, which would include :

- a) Identification of various target groups
- b) Sensitisation of the identified target groups to the problem
- c) Formation of village level programme participatory committee/ societies and their involvement in the programme
- d) Working outside specific solution with the participation of these committees/societies

Capacity building training, workshops, exposure visit programmes for the project team will be organized at various national institutes including IRMA, Anand Ahemdabad, CEE Ahemdabad, WII Dehradun etc. Experts from these institutes and some leading NGO's involved in community empowerment programmes could be invited to the project sites to suggest development of extension methodologies and material etc. Efforts would be made to relate conservation of Wildlife with cultural heritage of the area so that people could identify themselves with conservation of biodiversity in a more convincing way.

Towards this project a provision for Rs. 14.00 Lacs (Rs. 7.00 Lacs has been earmarked for workshop/meeting and evaluation while Rs. 7.00 Lacs has been earmarked for capacity building, workshop, exposure visit/extension publicity/documentary film etc.) has been made for this purpose during the plan period.

3.13 Operational Support/Establishment

The operational support will be provided to the implementing agency by the Project authority (in kind) in the form of operational vehicles, Computer with accessories such as printer, scanner, CD writer, UPS, Laptop etc. Camping Equipments and other equipments for Wild life Management and conservation, establishment cost i.e. salary of Draughtsman /JE on contract basis, Office expenses, TA, amenities to staff and labour to meet up the additional responsibilities of implementation of CAT Plan. A total outlay of Rs. 40.05 Lacs has been proposed during the plan period.

Sr. No	Description of items	Qty	Amount (in Lacs)
1.	Purchase of Computer with accessories Printer, Modem, Scanner, UPS, CD Writer etc. (in kind)	3 no.s 2 for Div. HQ and 1 for Range Office	2.10
2.	Camping Equipments : Alpine Tents 10 nos., Kitchen Tents 2 nos., Toilet Tents 10 nos., Dinning Tents 2 nos., Sleeping Bags 10 nos., Rucksacks 10 nos., Axe Hammer 10 nos., Jacket and lower 12 nos., Snow boots 12 nos., Trekking sticks 10 nos., Gloves 12 nos., Search lights 5 nos., Binoculars 6 no., Pedometer 1 no., Compass, altimeter, GPS (in kind)		3.00
3.	LCD Projector with Laptop (in kind)	1 no. each	2.00
4.	Sony Handycam (in kind)	2 nos.	0.90
5.	Still Camera Digital with zoom (in kind)	1 no.	0.80
6.	VCD/DVD Player (in kind)	1 no.	0.25
7.	Bolero GLX Jeep for Patrolling	1 no.	6.00
8.	Ambassador Car (for use of higher office) (in kind)	1 no.	6.00
9.	Storage Almirah, file cabinets etc (in kind)		0.50
10.	Estt. Of Intercom system in Division office (in kind)		0.50
11.	TA		5.00
12.	OE		4.00
13.	Maintenance of motor vehicles including fuel expenses.		4.00
14.	Amenities to staff and labour		2.00
15.	Salary of Draughtsman on contract basis for four years		4.00
16.	Books and periodicals (in kind)		1.00
	Total		42.05

3.14 Contingencies

Outlay in the CAT Plan for various components has been worked out on the wage rate of labour, market rate prevailing for the year 2005 – 06 as Rs. 87/- and as per H. P. Forest Department schedule rate. The lumpsum 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 excess 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 burden 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. 30.81 Lacs has been proposed for this purpose during the plan period. Similarly, any unspent amount left during the plan period it will be utilised by proposing the additional works in consonance with the project objectives which are not covered in the CAT Plan with the prior approval of the competent authority.

COST ESTIMATE

ABSTRACT OF IN-SITU AND EX-SITU CONSERVATION WORKS

Sr. No	Name of Works	Total Expenditure (in Lac)	Physical Target	% age of Total 647.02
1 HABITAT IMPROVEMENT				
i) Biological Works				
a) Afforestation of Degaraded forest land				
	New	7.65	25 hac	
	Maint.	3.45	25 hac	
	Total	11.1		1.72
ii) Bamboo/shrubs Plantation				
	New	4.29	15 hac	
	Maint.	2.44	15 hac	
	Total	6.73		1.04
b) Enrichment Plantation				
	New	2.86	10 hac	
	Maint.	1.63	10 hac	
	Total	4.49		0.69
c) Assisted Natural Regeneration				
	New	4.25	25 hac	
	Maint.	1.27	25 hac	
	Total	5.52		0.85
d) NTPF Plantation				
	New	11.40	30 hac	
	Maint.	3.55	30 hac	
	Total	14.95		2.31
e) Nursery Development				
	New	6.00	1.5 hac	
	Maint.	4.00	1.5 hac	
	Total	10.00		1.55
ii) Treatment of Culturable Waste land				
	New	3.50	17 hac	
	Maint.	3.35	17 hac	
	Total	6.85		1.06

iii) Treatment of Alpine Pastures			
New	15.82	150 hac	
Maint.	2.55	150 hac	
Total	18.37		2.84
iv) Construction of Water Holes			
New	2.50	30 Nos.	
Total	2.50		0.39
v) Development of Sarahan Pheasantry - Ex-situ conservation breeding of W/Tragopan			
New	70.00	1 Nos.	
Total	70.00		10.82
G. Total (1)	150.51		23.27
2 Soil & Moisture Conservation			
i) Land slide/slips stabilization			
New	55.00	5 Nos.	
Total	55.00		8.50
ii) Nallah Stabilization			
New	54.00	9 Km	
Total	54.00		8.35
iii) River bank Stabilization			
New	37.10	7 Km	
Total	37.10		5.73
G. Total (2)	146.10		22.58
3 Protection of Forests & Wildlife			
i) Fire Protection			
a) Fire Watchers			
	4.80 L/s		
Total	4.80		0.74
b) Fire Fighting Equipments			
	1.00	L/s	
			0.15
c) Fire Watch Towers			
	6.00	3 Nos.	
			0.93
d) Maint. of Fire lines & Controlled burning			
	4.00	L/s	
			0.62
e) Incentives to Mahila Madal & Self Help Groups			
	1.00	L/s	
			0.15
ii) Anti-Poaching Activities			
	6.30	L/s	
			0.97

iii) Demarcation of Boundaries of Sanctuary & Const. B/pillars & C/Pillars	4.00	L/s	0.62
iv) Const. of Check Post/Chowkies	5.5	1 Nos.	0.85
v) Communication Network in PA's (in kind from user agency)	10.00	L/s	1.55
vi) Sign & Slogan Boards	2.00	L/s	0.31
vii) Rewards & Incentives to informers	1.00	L/s	0.15
viii) Wild life Census Operation	2.50	L/s	0.39
ix) Compensation against Wild life Depredation	3.00	L/s	0.46
G. Total (3)	51.10		7.90
4 Mitigation of Human-WL Conflict			
a) Village support activities			
i) Distribution of CGI sheets			
	11.00	300 Nos.	1.70
ii) Distribution of GI Pipes for installation of religious flags			
	0.60	60 Nos.	0.09
iii) Const. of Sulabh Shochalaya			
	6.00	6 Nos.	0.93
iv) Const. of Cattle Ponds			
	3.60	6 Nos.	0.56
v) Cost. of Spring Water Bowaries			
	9.00	9 Nos.	1.39
vi) Vaccination of domestic cattles			
	2.00	L/s	0.31
Sub-Total (a)	32.20		4.98
b) Fuel saving devices			
i) Distribution of LPG Cylinders			
	3.75	150 Nos	0.58
ii) Cost. of crematoria			
	7.00	7 Nos	1.08
iii) Distribution of Solar Lights			
	4.00	10 Nos	0.62
Sub-Total (b)	14.75		2.28
c) Income Generation activities			
i) Vermi composting & organic farming			

	1.00	L/s	0.15
ii) Raising of NTPF Nursery & Cultivation	2.00	L/s	0.31
iii) Floriculture	2.00	L/s	0.31
iv) Bee keeping	2.00	L/s	0.31
v) Extraction & sale of Oil from stone fruits	1.50	L/s	0.23
vi) Agriculture improvement, horticulture & vegetative farming	10.00	L/s	1.55
vii) Animal Husbandry & Dairy Development	8.00	L/s	1.24
Sub-Total (c)	26.50		4.10
d) Eco-Tourism development			
i) Const. of Trekking Route	6.00	L/s	0.93
ii) Development of Camping sites	3.00	L/s	0.46
iii) Training of local youths for Tourism activity	2.00	L/s	0.31
iv) Maint. of Local Temples/ Cultural heritage/Hill architecture	5.00	L/s	0.77
Sub-Total (d)	16.00		2.47
G. Total (4)	89.45		13.83
5 Field Equipments & Medicine for Management of WL Sanctuary (Physical Capture Cages, Traps, Immobilizing Gun, Darts, Drugs) Animal rescue,translocation/transportation Capture Devices, Net and accessories GPS, Altimeter, Pedometer, Compass, Video Camera, Tape Recorder, Census Equipment, Binoculars,Spotting Scope, Medicine, Protection Gun 2 nos.& others (in kind)	10.00	L/s	1.55
6 Development of Forest Infrastructure in PA's			
a) Const. & Maint. of B/paths & l/paths			
i) Const. of B/Paths	7.00	24 Km	1.08
ii) Special Repair of B/path	6.00	16 Km	0.93

iii) Const. of New I/paths	6.00	16 Km	0.93
iv) Maint. of Existing I/paths	5.00	42 Km	0.77
b) Const. of I/hut at Sorang	8.00	1 No	1.24
c) Maint. of Existing Buildings			
i) Maint. of G/qtrs.	3.00	4 Nos.	0.46
ii) Maint. of FRH Rupi	2.00	1 No	0.31
d) Const. of Bldg/transit Camps			
i) Const. Transit camp at Sarahan	5.00	1 No	0.77
ii) Const. of Range office/qtrs at Bara Kamba	20.00	1 No	3.09
e) Const./Repair of Bridges			
i) Const. of Bridges	10.00	4 No	1.55
ii) Maint. of existing Bridges	8.00	5 No	1.24
G. Total (6)	80.00		12.36
7 Research & Studies	15.00	L/s	2.32
8 Training of Forest Officers/ Officials in India & Abroad	18.00	L/s	2.78
9 Publicity, Nature awareness camp, exposure visit, training of CBO's & ext. Prog./workshop & meeting/evaluation expenses	14.00	L/s	2.16
10 Operational Support/Establishment			
i) O. E	4.00	L/s	0.62
ii) T. A.	5.00	L/s	0.77
iii) Fuel & maint. of veh.	4.00	L/s	0.62
iv) Purchase of Computers (In Kind from User Agency)	2.10	3 Nos.	0.32
v) LCD Projector with Laptop (In Kind from User Agency)	2.00	1 Nos.	0.31
vi) Sony Handycam (In Kind from User Agency)	0.90	2 Nos.	0.14

v) Still Camera	0.80	1 Nos.	0.12
(In Kind from User Agency)			
vi) Purchase of vehicles			
a) Bolero (GLX) for Patrolling	6.00	1 Nos.	0.93
(In Kind from User Agency)			
b) Ambassador Car	6.00	1 Nos.	0.93
(In Kind from User Agency)			
vii) Camping Equipments	3.00	L/s	0.46
(In Kind from User Agency)			
viii) Books & Periodicals	1.00	L/s	0.15
ix) VCD & DVD Player	0.25	L/s	0.04
(In Kind from User Agency)			
x) File Cabinets & Almirahs	0.50	L/s	0.08
(In Kind from User Agency)			
xi) Intercom facility at Div. Office at Sarahan			
(In Kind from User Agency)	0.50	L/s	0.08
xii) Salary of Draughtsman/JE			
(on contract basis for 4 years)	4.00	L/s	0.62
xiii) Amenities to staff & labour	2.00	L/s	0.31
G. Total (10)	42.05		6.50
11 Contingencies	30.81		5.00
G. Total (1 - 11)	647.02		100.00

CHAPTER – IV

ORGANIZATIONAL STRUCTURE AND IMPLEMENTATION

4.1 Time Phasing :

The CAT Plan works will be implemented w.e.f. 2007 – 08 to 2016 -17. The implementation of CAT Plan will be done on society mode or CAMPA constituted by the MOEF, Govt. of India, New Delhi. The Government of Himachal Pradesh has notified UPPER SATLUJ VALLEY WATERSHED DEVELOPMENT SOCIETY by the H. P. Govt. Notification no. FEE – B(F)2 – 73/97 dated 23.10.2002 and has been registered under Registration of Societies Act, 1860.

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

4.2 Organizational structure and Implementation :

The execution of CAT Plan is proposed to be carried out through H. P. Forest Department under the administrative/financial control of the Project Director cum C. F. Rampur Bushahr. At the field level the actual implementation will be done by the D. F. O. Wildlife, Sarahan, who have territorial jurisdiction over the area covered under this CAT Plan. The A. P. O. will be prepared by DFO and it will be approved by the Executive Committee of the Satluj Valley

Watershed Development Society on the recommendation of the Project Director cum C. F. Rampur. The Project Director shall be empowered to modify the activities under this plan or the works which are not covered in this plan, if required during the implementation period to resolve the issue or to fulfill the objectives of the CAT Plan. Any major modification if required with the passage of time it shall be approved from executive body through Pr CCF H. P. during the plan period. For successful achievement of the CAT Plan objectives, a close liaison shall be maintained with the other Departments like Civil Administration, Agriculture, Horticulture, Animal Husbandry, Art and Culture, Social Welfare and Panchayati Raj etc.

4.3 Project Staff :

The existing staff of Sarahan Wildlife Division will be involved for the implementation of CAT Plan works in addition to their own duties. Only Draughtsman/JE for preparation of design/estimates and monitoring and evaluation of technical works will be engaged on contractual basis with the prior approval of Executive Committee/Governing body of Upper Satluj Valley Watershed Development Society Rampur for implementation of CAT Plan

4.4 Cost Escalation :

The present cost projections are based on the prevailing wage rates of Rs. 87/- per day. 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 – V

COST ESTIMATE

5.1 Total Project Cost :

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

Year	Amount (Rs.)
2007 – 08 1 st Year	81,59,000.00
2008 – 09 2 nd Year	1,65,92,000.00
2009 – 10 3 rd Year	1,61,10,000.00
2010 – 11 4 th Year	86,41,000.00
2011 – 12 5 th Year	68,07,000.00
2012 – 13 6 th Year	28,33,000.00
2013 – 14 7 th Year	12,72,000.00
2014 – 15 8 th Year	5,94,000.00
2015 – 16 9 th Year	3,31,000.00
2016 – 17 10 th Year	2,81,000.00
Total Rs.	6,16,21,000.00

5.2 Annual Phasing:

Annual phasing of works to be carried out in Sorang HEP as per approved CAT Plan is as per article 5.2.1 to 5.2.10. The schematic planning is attached as Annexure VIII.

Details of works/expenditure of 1st year 2007 - 08

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)
1	HABITAT IMPROVEMENT				
a)	Nursery Development	Sorang	1 hac.	400000.00	4.00
		Total	1 hac.		4.00
b)	Const. of Water Holes	UF - 15	3 Nos.	10000.00	0.30
		UF - 14	2 Nos.	10000.00	0.20
		Total	5 hac.		0.50
c)	Treatment of Alpine Pasture New	Dasurang Kanda	5 hac.	10550	0.53
		Duge Kanda	5 hac.	10550	0.53
		Kumrang Kanda	5 hac.	10550	0.53
		Total	15 hac.		1.58
d)	Development of Sarahan Pheasantry	Sarahan	1 No.	L/s	20.00
	Sub-Total (1)				26.08
2	Soil & Moisture Conservation				
a)	Nallah stabilization	Kumrang	1 Km	L/s	6.00
		Rakchha	1 Km	L/s	6.00
	Sub-Total (2)	Total			12.00
3	Protection of Forest & Wildlife				
i)	Fire Protection				
a)	Engagement of Fire Watchers 3 nos. for six months @ 87.50	Rupi- Bhaba WL Sanctuary	3 Nos.	L/s	0.48
b)	Purchase of Fire Fighting Equipments (In Kind)	Rupi WL Range		L/s	0.30
c)	Const. of Fire Watch Towers	Rupi-Bhaba WL Sanctuary		L/s	2.00
d)	Maint. of Fire Lines & Controlled Burning	Rupi		L/s	1.00
e)	Incentives to Mahila Mandal, SHG	Rupi		L/s	0.05
		Sorang		L/s	0.05
		Total			0.10
ii)	Anti-Poaching Activities				
a)	Engagement of Anti-poachers 4 nos. for six months @ 87.50	Rupi WL Range		L/s	0.63

iii) Demarcation of Boundaries of Sanctuary & Const. of B/pillars C/pillars	Rupi-Bhaba WL Sanctuary		L/s	4 00
iv) Const. of Check Post	Nugalsari/Chaura		L/s	5 50
v) Communication Network	Rupi-Bhaba WL Sanctuary		L/s	10 00
vi) Sign and Slogan Boards	Rupi-Bhaba WL Sanctuary		L/s	0 50
			L/s	0 50
vii) Reward & Incentive to Informer	Rupi WL Range		L/s	0 10
viii) Compensation against WL depredation	Rupi-Bhaba WL Sanctuary		L/s	0 20
Sub-Total (3)				25.31
4 Mitigation of Man-Wildlife Conflict				
a) Eco-development Activities				
i) Vaccination of Domestic Cattle	Sanctuary Area		L/s	0 50
b) Income Generation Activities				
i) Raising of NTPF nursery & cultivation	Sorang		L/s	2.00
Sub-Total (4)				2.50
5 Forest Infrastructure in PA's				
i) Maint. of Guard Quarters	Rupi	1 No	L/s	1.00
ii) Maint. of FRH	Rupi	1 No	L/s	1.00
iii) Const. of B/Path	Chaura - Rupi	5 Km	L/s	1.00
iv) Const. I/Path	Sorang - Khargoch	3 Km	L/s	1.00
v) Const. of Bridges	Terro Nallah	1 Nos.	L/s	2.00
vi) Maint. of existing bridges	Rupi	1 No.	L/s	2.00
Sub-Total (5)				8.00
6 Operational support				
i) O. E.			L/s	0 50
ii) T. A.			L/s	0 50
iii) Fuel & Maintenance of vehicle			L/s	0 20
iv) Purchase of Computer (in Kind)		2 No.	70000	1 40

v) Sony Handycam (in kind)	1 No.	45000	0.45
vi) Still Camera (in kind)	1 No	80000	0.80
vii) Camping Equipments (in kind) Alpine Tents 10 nos., Kitchen Tents 2 nos, Toilet Tents 10 nos., Dinning Tents 2 nos., Sleeping Bags 10 nos., Rucksacks 10 nos., Axe Hammer 10 nos.		L/s	1.50
viii) Books & Periodicals (in kind)		L/s	0.10
ix) File Cabinet & Almirah (in kind)		L/s	0.50
x) DVD/VCD Player (in kind)		L/s	0.25
xi) Salary of Draughtsman/JE		L/s	1.00
xii) Intercom facility at Div. office Sarahan		L/s	0.50
Sub-Total (6)			7.70
Grand Total			81.59

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)	
1 HABITAT IMPROVEMENT						
i) Biological works						
a)	Bamboo Plantation	New	UF - 12	5 ha	28650	1.43
			UF - 11	5 ha	28650	1.43
			Total			2.86
b)	Enrichment Plantation	New	UF - 13	5 ha	28650	1.43
			Total			1.43
c)	Assisted Natural Regeneration	New	UF - 8	5 ha	17000	0.85
			UF - 11	5 ha	17000	0.85
			Total	10 ha	17000	1.70
d)	Nursery Development	New	Chhota Kamba	0.5 hac.	400000.00	2.00
		Maint.	Sorang	1 hac.	100000.00	1.00
			Total	1.5 hac.		3.00
ii) Treatment of Culturable waste land						
		New	UF - 15	8 hac.	20600	1.65
			UF - 14	2 hac.	20600	0.41
			Total	10 hac.		2.06
iii) Treatment of Alpine Pastures						
		New	Urang Kanda	10 hac.	10550	1.55
			Latye Kanda	15 hac.	10550	1.05
			Deyda Kanda	10 hac.	10550	1.05
		1st year	Dasurang Kanda	5 hac.	1100	0.05
		Maint.	Duge Kanda	5 hac.	1100	0.05
			Kumrang Kanda	5 hac.	1100	0.05
			Total	50 hac.		3.85
iv)	Const. of Water Holes	New	UF - 13	3 Nos.	10000.00	0.30
			UF - 12	2 Nos.	10000.00	0.20
			Total	5 hac.		0.50
v)	Development of Sarahan Pheasantry		Sarahan	1 No.	L/s	30.00
Sub-Total (1)						45.40
2 Soil & Moisture Conservation						
a)	Land slip/slide Stabilization		Kumrang Slip	1 No	L/s	10.00
b)	Nallah stabilization		Kumrang	1 Km	L/s	5.00
			Sheura	1 Km	L/s	5.00

	Total			12.00
c) River bank Stabilization	Kumrang to Dumti	1 Km	L/s	5.00
	Dumti to Talpa	1 Km	L/s	5.00
	Total			10.00
Sub-Total (2)				32.00
3 Protection of Forest & Wildlife				
i) Fire Protection				
a) Engagement of Fire Watchers 3 nos. for six months @ 87.50	Rupi WL Range	3 Nos.	L/s	0.48
b) Purchase of fire fighting Equipments (in kind)	Rupi WL Range		L/s	0.30
c) Const. of fire watch towers	Rupi-Bhaba WL Sanctuary		L/s	2.00
d) Maint. of fire lines & controlled burning	Sanctuary Area		L/s	1.00
e) Incentives to Mahila Mandal, SHG	Chhota Kamba/ Rupi Panchayat		L/s L/s	0.05 0.05
	Total			0.10
ii) Anti-Poaching Activities				
a) Engagement of Anti-poachers 4 nos. for six months @ 87.50	Rupi WL Range		L/s	0.60
iii) Sign and Slogan Boards	Rupi WL Range Sanctuary		L/s	1.00
iv) Reward & Incentive to Informer	Rupi WL Range		L/s	0.10
v) WL Census operation	Rupi-Bhaba WL Sanctuary		L/s	0.50
vi) Compensation against WL depredation	Rupi-Bhaba WL Sanctuary		L/s	0.40
Sub-Total (3)				6.50
4 Mitigation of Human-Wildlife Conflict				
a) Eco-development activities				
i) Village support activities				
a) Distribution of CGI Sheets	Chhota Kamba/ Rupi Panchayat	1500 Nos.	L/s	4.50
	Total	1500 Nos.		4.50
b) Distribution of GI Pipes for regious flags	Chhota Kamba/ Rupi Panchayat	10 Nos	L/s	0.10
	Total	10 Nos		0.10

c) Const. of Sulabh Shochalaya	Rupi	2 Nos.	100000	2.00
d) Const. of Cattle ponds	Sorang	1 No	60000	0.60
	Chhota Kamba	1 No	60000	0.60
	Total			1.20
e) Const. of Spring Water Bowaries	Rupi	2 Nos.	100000	2.00
f) Vaccination of domestic Cattles	Sanctuary Area		L/s	0.50
	Total			10.30
b) Fuel Saving devices				
i) Distribution of LPG Cylinders	Chhota Kamba/ Rupi Panchayat	50 Nos.	L/s	1.25
	Total	50 Nos.		1.25
ii) Const. of Crematoria	Rupi	3 No.	100000	3.00
iii) Distribution of Solar lights	Sorang	2 Nos.	40000	0.80
	Rupi	2 Nos.	40000	0.80
	Total			5.85
c) Income generation activities				
i) Vermi composting & organic farming	Sorang		L/s	0.20
ii) Bee Keeping	Chhota Kamba/ Rupi Panchayat		L/s	1.00
iii) Floriculture	Chhota Kamba/ Rupi Panchayat		L/s	0.50
iv) Extraction & Sale of Oil from Stone Fruits	Chhota Kamba/ Rupi Panchayat		L/s	0.50
v) Agriculuture Improvement & Vegetative Farming	Chhota Kamba/ Rupi Panchayat		L/s	2.00
vi) Animal Husbandry & Dairy Development	Chhota Kamba/ Rupi Panchayat		L/s	2.00
	Total			6.20
d) Eco-Tourism Development				
i) Const. of Treking routes	Sorang - Dochada	2 Km	100000	2.00
ii) Development of Camping Site	Gaukanda	1 No	100000	1.00
iii) Training of local youths for Tourism activity	Chhota Kamba/ Rupi Panchayat		L/s	0.50

iv) Maintenance of local Temples & Cultural heritage	Chhota Kamba	1 No.	L/s	1.00
	Bara Kamba	1 No.	L/s	1.00
	Total			5.50
Sub-Total (4)				27.85
5 Field equipments & medicines for management of WL Sanctuary	Rupi-Bhaba WL Sanctuary		L/s	5.00
Physical capture cages, Traps, Immobilizing gun, Darts, Drugs, Protection Guns 2 nos., Animal rescue Translocation/Transportation, Capture Devices-Net & accessories (in kind)				
6 Forest Infrastructure in PA's				
i) Const. of Transit Camp at Sarahan	Sarahan	1 No	L/s	5.00
ii) Const. of Range office & Qtrs	Bara Kamba	1 No	L/s	10.00
iii) Maint. of Guard Quarters	Rupi	1 No	L/s	1.00
iv) Maint. FRH	Rupi	1 No	L/s	1.00
v) Const. of B/path	Chaura - Rupi	5 Km	L/s	1.00
vi) Repair of B/path	B Kamba - Kumrang Kanda	3 Km	L/s	1.00
vii) Const. of New I/path	Kumrang Kanda - Kamba Khago	3 Km	L/s	1.00
viii) Maint. of Existing I/path	Rupi - Shumnag	8 Km	L/s	1.00
ix) Const. of Bridges	Sorang	1 No.	L/s	4.00
x) Mant. Of Exst. Bridges	Rupi	1 Nos.	L/s	2.00
Sub-Total (6)				27.00
7 Research & Studies	Sarahan WL Div.		L/s	3.00
8 Training of Forest Officers/Officials	Sarahan WL Div.		L/s	3.00
9 Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses			L/s	2.00
10 Operational support				
i) O. E.			L/s	0.60
ii) T. A.			L/s	0.70

iii) Fuel & Maintenance of vehicle		L/s	0.60
iv) Purchase of Computer (in kind)	1 No.	70000	0.70
v) LCD Projector with Laptop (in kind)	1 No.	200000	2.00
vi) Sony Handycam (in kind)	1 No.	45000	0.45
vii) Ambassador Car (in kind) for use of Higher Office	1 No.	600000	6.00
viii) Camping Equipments (in kind) Jacket & Lower 12 nos., Snow boots 12 nos., Trekking Sticks 10 nos., Gloves 12 nos., Search lights 5 nos., Binoculars 6 nos. Pedometer 1 no., Compass, Altimeter, GPS.		L/s	1.50
ix) Books & Periodicals		L/s	0.10
x) Salary of D/Man/JE (on contract basis for 4 years)		L/s	1.00
xi) Amenities to staff & labour		L/s	0.50
Sub-Total (10)			14.15
Grand Total			165.92

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)	
1 HABITAT IMPROVEMENT						
i) Biological works						
a)	Afforestation of Degraded forest land	New	UF - 15	10 ha	30600	3.06
			UF - 14	5 ha	30600	1.53
			Total	15 ha		4.59
b)	Bamboo/Shrubs Plantation	New	UF - 13	5 ha	28650	1.43
		1st year	UF - 12	5 ha	4500	0.23
		Maint.	UF - 11	5 ha	4500	0.23
			Total			1.88
c)	Enrichment Plantation	New	C - 97	5 ha	28650	1.43
		1st year	UF - 3	5 ha	4500	0.23
		Maint	Total			1.66
d)	Assisted Natural Regeneration	New	UF - 7	10 ha	17000	1.70
		1st year	UF - 8	5 ha	1900	0.10
		Maint.	UF - 11	5 ha	1900	0.10
			Total	20 ha		1.89
e)	NTPF	New	UF - 10	10 ha	38000	3.80
			Total	10 ha		3.80
f)	Nursery Development	Maint.	Chhota Kamba	0.5 hac.	60000.00	0.30
			Sorang	1 hac.	60000.00	0.60
			Total	1.5 hac.		0.90
ii) Treatment of Culturable waste land						
		New	UF - 14	3 hac.	20600	0.62
			UF - 13	4 hac.	20600	0.82
		1st year	UF - 15	8 hac.	6600	0.53
		Maint.	UF - 14	2 hac.	6600	0.13
			Total	17 hac.		2.10
iii) Treatment of Alpine Pastures						
		New	Dausrang Kanda	5 ha	10550	0.53
			Kumrang Kanda	30 ha	10550	3.17
		1st year	Urang Kanda	15 hac.	1100	0.17
		Maint	Latye Kanda	10 hac.	1100	0.11
			Deyda Kanda	10 hac.	1100	0.11
		2nd year	Dasurang Kanda	5 hac.	600	0.03
		Maint	Duge Kanda	5 hac.	600	0.03
			Kumrang Kanda	5 hac.	600	0.03

	Total	85 hac.		4.17
iv) Const. of Water Holes New	UF - 15	5 Nos.	10000.00	0.50
v) Development of Sarahan Pheasantry	Sarahan	1 No.	L/s	20.00
Sub-Total (1)				41.49
2 Soil & Moisture Conservation				
a) Land slip/slide Stabilization	Kumrang slip	1 No.	L/s	20.00
b) Nallah stabilization	Burro	1 Km	L/s	6.00
c) River bank Stabilization	Dumti to Talpa	2 Km	L/s	10.00
Sub-Total (2)				36.00
3 Protection of Forest & Wildlife				
i) Fire Protection				
a) Engagement of Fire Watchers 3 nos. for six months @ 87.50	Rupi WL Range	3 Nos.	L/s	0.48
b) Purchase of fire fighting Equipments (in kind)	Rupi WL Range		L/s	0.20
c) Const. of fire watch towers	Rupi-Bhaba WL Sanctuary		L/s	2.00
d) Maint. of fire lines & controlled burning	Sanctuary area		L/s	1.00
e) Incentives to Mahila Mandal, SHG	Chhota Kamba/ Rupi Panchayat		L/s L/s	0.05 0.05
	Total			0.10
ii) Anti-Poaching Activities				
a) Engagement of Anti-poachers 3 nos. for six months @ 87.50	Rupi WL Range		L/s	0.63
iii) Reward & Incentive to Informer	Rupi WL Range		L/s	0.10
iv) Compensation against WL depredation	Rupi-Bhaba WL Sanctuary		L/s	0.40
Sub-Total (3)				4.91
4 Mitigation of Man-Wildlife Conflict				
a) Eco-development activities				
i) Village support activities				
a) Distribution of CGI Sheets	Chhota Kamba/ Rupi Panchayat	1500 Nos.	L/s	4.50
	Total	1500 Nos.		4.50

b) Distribution of GI Pipes for religious flags	Chhota Kamba/ Rupi Panchayat	10 Nos	L/s	0.10
	Total	10 Nos		0.10
c) Const. of Sulabh Shochalaya	Sorang	1 No.	L/s	1.00
	Chhota Kamba	1 No.	L/s	1.00
	Total			2.00
d) Const. of Cattle ponds	Rupi	2 No	L/s	1.20
e) Const. of Spring Water Bowaries	Bara Kamba	2 Nos	L/s	2.00
f) Vaccination of domestic Cattle	Sanctuary Area		L/s	0.50
b) Fuel Saving devices				
i) Distribution of LPG Cylinders	Chhota Kamba/ Rupi Panchayat	50 Nos.	L/s	1.25
	Total	50 Nos.		1.25
ii) Const. of Crematoria	Bara Kamba	2 No.	L/s	2.00
iii) Distribution of Solar lights	Bara Kamba	2 Nos.	L/s	0.80
c) Income generation activities				
i) Vermi composting & Organic farming	Chhota Kamba/ Rupi Panchayat		L/s	0.30
ii) Bee Keeping	Chhota Kamba/ Rupi Panchayat		L/s	1.00
iii) Flori culture	Chhota Kamba/ Rupi Panchayat		L/s	1.00
	Total			1.00
iv) Extraction & sale of Oil from stone fruits	Chhota Kamba/ Rupi Panchayat		L/s	0.50
v) Agriculature Improvement & Vegetative farming	Chhota Kamba/ Rupi Panchayat		L/s	2.00
vi) Animal Husbandry and Dairy Development	Chhota Kamba/ Rupi Panchayat		L/s	2.00
d) Eco-Tourism Development				
i) Const. of Treking routes	Sorang - Dochhda	2 Km	L/s	2.00
ii) Development of camping site	Stre Dogari	1 No	L/s	1.00
iii) Training of local youths for Tourism activity	Chhota Kamba/ Rupi Panchayat		L/s	0.50

iv) Maintenance of local Temples & Cultural heritage	Garsu & Rupri	2 Nos.	L/s	2.00
Sub-Total (4)				26.65
5 Field equipments & medicines for management of WL Sanctuary				
GPS, Altimeter, Pedometer, Compass, Video Camera, Tape Recorder, Census Equipments, Binoculars, Spotting scope, Medicines & other equipments (in kind)	Rupi-Bhaba WL Sanctuary		L/s	5.00
6 Forest Infrastructure in PA's				
i) Const. of Range office & Qtrs	Bara Kamba	1 No	L/s	10.00
ii) Const. of Inspection Hut	Sorang	1 No	L/s	8.00
iii) Maint. of Guard Quarters	Chhota Kamba	1 No	L/s	0.50
iv) Const. of B/path	Chaura - Rupri	7 Km	L/s	3.00
v) Const. of New I/path	Sorang - Khargoch	5 Km	L/s	2.00
vi) Maint. of I/path	Garsu Dhar - Jheacham Thach	8 Km	L/s	1.00
vii) Const. of Bridges	Kumrang	1 No	L/s	2.00
viii) Mant. Of Exst. Bridges	Sorang	1 Nos.	L/s	2.00
Sub-Total (6)				28.50
7 Research & Studies	Sarahan WL Div.		L/s	3.00
8 Training of Forest Officers/Officials in India & Abroad	Sarahan WL Div.		L/s	3.00
9 Publicity, Nature awareness camp, exposé visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses			L/s	2.50
10 Operational support				
i) O. E.			L/s	0.70
ii) T. A.			L/s	0.70
iii) Fuel & Maintenance of vehicle			L/s	0.70
iv) Bolero (in kind)		1 No.	L/s	6.00
v) Books & Periodicals (in kind)			L/s	0.20

vi) Salary of D/Man/JE (on contract basis for 4 years)	L/s	1.00
vii) Amenities to staff & labour	L/s	0.75
Sub-Total (10)		10.05
Grand Total		161.10

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)	
1 HABITAT IMPROVEMENT						
i) Biological works						
a)	Afforestation of Degraded forest land	New	UF - 13	5 ha	30600	1.53
			C - 96	5 ha	30600	1.53
		1st year	UF - 15	10 ha	4300	0.43
		Maint	UF - 14	5 ha	4300	0.22
			Total	25 ha		3.71
b)	Bamboo/Shrubs Plantation	1st year	UF - 13	5 ha	4500	0.23
		Maint.				
		2nd year	UF - 12	5 ha	3900	0.20
		Maint.	UF - 11	5 ha	3900	0.20
			Total			0.62
c)	Enrichment Plantation	1st year	C - 97	5 ha	4500	0.23
		Maint				
		2nd year	UF - 3	5 ha	3900	0.20
		Maint	Total			0.42
d)	Assisted Natural Regeneration	New	UF - 11	5 ha	17000	0.85
		1st year	UF - 7	10 ha	1900	0.19
		Maint.				
		2nd year	UF - 8	5 ha	1100	0.06
		Maint.	UF - 11	5 ha	1100	0.06
			Total			1.15
e)	NTPF	New	UF - 11	10 ha	38000	3.80
		1st year	UF - 10	10 ha	7950	0.79
		Maint	Total			4.59
f)	Nursery Development	Maint.	Chhota Kamba	0.5 hac.	L/s	0.20
			Sorang	1 hac.	L/s	0.30
			Total	1.5 hac.		0.50
ii)	Treatment of Culturable waste land	1st year	UF - 14	3 hac.	6600	0.20
		Maint.	UF - 13	4 hac.	6600	0.26
		2nd year	UF - 15	8 hac.	4800	0.38
		Main	UF - 14	2 hac.	4800	0.10
			Total	17 hac.		0.94
iii)	Treatment of Alpine Pastures	New	Duge Kanda	15 ha	10550	1.58

		Kumrang Kanda	15 ha	10550	1.58
		Latya Kanda	5 ha	10550	0.53
	1st year	Dausrang Kanda	5 ha	1100	0.06
	Maint	Kumrang Kanda	30 ha	1100	0.33
	2nd year	Urang Kanda	15 hac.	600	0.09
	Maint	Latye Kanda	10 hac.	600	0.06
		Deyda Kanda	10 hac.	600	0.06
		Total	105 hac.		4.29
iv) Const. of Water Holes	New	UF - 14	5 Nos.	10000.00	0.50
Sub-Total (1)					16.71
2 Soil & Moisture Conservation					
a) Land slip/slide Stabilization		Piyag slip	1 No	L/s	10.00
b) Nallah stabilization		Shannag	1 Km	L/s	6.00
c) River bank Stabilization		Shangling	1 Km	L/s	5.10
Sub-Total (2)					21.10
3 Protection of Forest & Wildlife					
i) Fire Protection					
a) Engagement of Fire Watchers 3 nos. for six months @ 87.50		Rupi WL Range	3 Nos.	L/s	0.48
b) Purchase of fire fighting Equipments (in kind)		Rupi WL Range		L/s	0.20
c) Maint. of fire lines & controlled burning		Sanctuary Area		L/s	1.00
d) Incentives to Mahila Mandal; SHG		Chhota Kamba/ Rupi Panchayat		L/s L/s	0.05 0.05
		Total			0.10
ii) Anti-Poaching Activities					
a) Engagement of Anti-poachers 3 nos. for six months @ 87.50		Rupi WL Range		L/s	0.63
iii) Reward & Incentive to Informer		Rupi WL Range		L/s	0.10
iv) Wild Life Census Operation		Rupi-Bhaba WL Sanctuary		L/s	0.50
v) Compensation against WL depredation		Rupi-Bhaba WL Sanctuary		L/s	0.30
Sub-Total (3)					3.31
4 Mitigation of Man-Wildlife Conflict					
a) Eco-development activities					
i) Village support activities					

a) Distribution of CGI Sheets	Chhota Kamba/ Rupi Panchayat	300 Nos.	L/s	2.00
b) Distribution of GI Pipes for regious flags	Chhota Kamba/ Rupi Panchayat	10 Nos	L/s	0.10
	Total	10 Nos		0.10
c) Const. of Sulabh Shochalaya	Garsu	1 No.	L/s	1.00
	Bara Kamba	1 No.	L/s	1.00
	Total			2.00
d) Const. of Cattle ponds	Bara Kamba	1 No	L/s	0.50
e) Const. of Spring Water Bowaries	Chhota Kamba	2 Nos.	L/s	2.00
f) Vaccination of domestic Cattle	Sanctuary Area		L/s	0.50
b) Fuel Saving devices				
i) Distribution of LPG Cylinders	Chhota Kamba/ Rupi Panchayat	50 Nos.	L/s	1.25
	Total	50 Nos.		1.25
ii) Const. of Crematoria	Chhota Kamba	1 No.	L/s	1.00
iii) Distribution of Solar lights	Chhota Kamba	2 Nos.	L/s	0.80
c) Income generation activities				
i) Vermi composting & Organic farming	Chhota Kamba/ Rupi Panchayat		L/s	0.50
ii) Flori culture	Chhota Kamba/ Rupi Panchayat		L/s	0.50
iii) Extraction & sale of Oil from stone fruits	Chhota Kamba/ Rupi Panchayat		L/s	0.50
iv) Agriculuture Improvement & Vegetative farming	Chhota Kamba/ Rupi Panchayat		L/s	2.00
v) Animal Husbandry and Dairy Development	Chhota Kamba/ Rupi Panchayat		L/s	2.00
d) Eco-Tourism Development				
i) Const. of Treking routes	Sorang - Dochhdha	2 Km	L/s	1.00
ii) Development of camping site	Talpa	1 No	L/s	1.00
iii) Training of local youths for Tourism activity	Chhota Kamba/ Rupi Panchayat		L/s	0.50
iv) Maintenance of local Temples				

& Cultural heritage	Rupi	1 Nos.	L/s	0.50
Sub-Total (4)				18.75
5 Forest Infrastructure in PA's				
i) Const. of B/path	Sorang - Rupi	7 Km	L/s	2.00
ii) Special repair of B/path	Kimpui Dhar - Garsu	5 Km	L/s	2.00
ii) Const. of New I/path	Sorang - Khargoch	5 Km	L/s	2.00
iii) Maint. of I/path	Rupi - Sorang	5 Km	L/s	0.70
	Rupi - Shamnug	3 Km	L/s	0.30
iv) Const. of Bridges	Terro Nallah	1 No	L/s	2.00
v) Mant. Of Exst. Bridges	Talpa	1 Nos.	L/s	2.00
Sub-Total (5)				11.00
6 Research & Studies	Sarahan WL Div.		L/s	5.00
7 Training of Forest Officers/Officials in India & Abroad	Sarahan WL Div.		L/s	4.00
8 Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses			L/s	2.50
10 Operational support				
i) O. E.			L/s	0.70
ii) T. A.			L/s	0.70
iii) Fuel & Maintenance of vehicle			L/s	0.70
iv) Books & Periodicals (in kind)			L/s	0.20
v) Salary of D/Man/JE (on contract basis for 4 years)			L/s	1.00
vi) Amenities to staff & labour			L/s	0.75
Sub-Total (10)				4.05
	Grand Total			86.42

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)
1 HABITAT IMPROVEMENT					
i) Biological works					
a) Afforestation of Degraded forest land	1st year	UF - 13	5 ha	4300	0.22
	Maint.	C - 96	5 ha	4300	0.22
	2nd year	UF - 15	10 ha	3700	0.37
	Maint.	UF - 14	5 ha	3700	0.19
	Total		25 ha		0.98
b) Bamboo/Shrubs Plantation	2nd year	UF - 13	5 ha	3900	0.20
	Maint.				
	3rd year	UF - 12	5 ha	3400	0.17
	Maint.	UF - 11	5 ha	3400	0.17
Total				0.535	
c) Enrichment Plantation	2nd year	C - 97	5 ha	3900	0.20
	Maint.				
	3rd year	UF - 3	5 ha	3400	0.17
	Maint.	Total			0.360
d) Assisted Natural Regeneration	1st year	UF - 11	5 ha	1900	0.10
	Maint.				
	2nd year	UF - 7	10 ha	1100	0.11
	Maint.				
	3rd year	UF - 8	5 ha	900	0.05
	Maint.	UF - 11	5 ha	900	0.05
Total				0.295	
e) NTPF	New	UF - 13	10 ha	38000	3.80
	1st year	UF - 11	10 ha	7950	0.80
	Maint.				
	2nd year	UF - 10	10 ha	2600	0.26
Maint.	Total			4.86	
f) Nursery Development	Maint.	Chhota Kamba	0.5 hac.	L/s	0.20
		Sorang	1 hac.	L/s	0.30
	Total		1.5 hac.		0.50
ii) Treatment of Culturable waste land					
	2nd year	UF - 14	3 hac.	4800	0.14
	Maint.	UF - 13	4 hac.	4800	0.19
	3rd year	UF - 15	8 hac.	3400	0.27
	Maint.	UF - 14	2 hac.	3400	0.07
	Total		17 hac.		0.676

iii) Treatment of Alpine Pastures					
	New	Dedy Kanda	10 ha	10550	1.06
		Motta Thach	20 ha	10550	2.11
	1st year	Duge Kanda	15 ha	1100	0.17
	Maint.	Kumrang Kanda	15 ha	1100	0.17
		Latya Kanda	5 ha	1100	0.06
	2nd year	Dausrang Kanda	5 ha	600	0.03
	Maint.	Kumrang Kanda	30 ha	600	0.18
		Total			3.76
iv) Const. of Water Holes New					
		UF - 13	5 Nos.	10000.00	0.50
Sub-Total (1)					12.46
2 Soil & Moisture Conservation					
a) Land slip/slide Stabilization					
		Dumti slip	1 No	L/s	10.00
b) Nallah stabilization					
		Jeachham	1 Km	L/s	6.00
c) River bank Stabilization					
		Dumti - Talpa	2 Km	L/s	12.00
Sub-Total (2)					28.00
3 Protection of Forest & Wildlife					
i) Fire Protection					
a) Engagement of Fire Watchers					
		Rupi WL Range	3 Nos.	L/s	0.48
		3 nos. for six months @ 87.50			
b) Incentives to Mahila Mandal, SHG					
		Chhota Kamba/ Rupi Panchayat		L/s	0.10
Total					0.10
ii) Anti-Poaching Activities					
a) Engagement of Anti-poachers					
		Rupi WL Range		L/s	0.63
		3 nos. for six months @ 87.50			
iii) Reward & Incentive to Informer					
		Rupi WL Range		L/s	0.10
iv) Compensation against WL					
		Rupi-Bhaba WL Sanctuary		L/s	0.30
		depredation			
Sub-Total (3)					1.61
4 Mitigation of Man-Wildlife Conflict					
a) Eco-development activities					
i) Village support activities					
a) Distribution of GI Pipes for					
		Chhota Kamba/ Rupi Panchayat	10 Nos	L/s	0.10
		regious flags			
b) Const. of Cattle ponds					
		Rupi	1 No	L/s	0.60
c) Const. of Spring Water Bowaries					
		Sorang	1 No.	L/s	1.00
		Garsu	1 No.	L/s	1.00

iii) Treatment of Alpine Pastures					
	New	Dedya Kanda	10 ha	10550	1.06
		Motta Thach	20 ha	10550	2.11
	1st year	Duge Kanda	15 ha	1100	0.17
	Maint.	Kumrang Kanda	15 ha	1100	0.17
		Latya Kanda	5 ha	1100	0.06
	2nd year	Dausrang Kanda	5 ha	600	0.03
	Maint.	Kumrang Kanda	30 ha	600	0.18
		Total			3.76

iv) Const. of Water Holes	New	UF - 13	5 Nos.	10000.00	0.50
Sub-Total (1)					12.46

2 Soil & Moisture Conservation

a) Land slip/slide Stabilization		Dumti slip	1 No	L/s	10.00
b) Nallah stabilization		Jeachham	1 Km	L/s	6.00
c) River bank Stabilization		Dumti - Talpa	2 Km	L/s	12.00
Sub-Total (2)					28.00

3 Protection of Forest & Wildlife

i) Fire Protection

a) Engagement of Fire Watchers		Rupi WL Range	3 Nos.	L/s	0.48
3 nos. for six months @ 87.50					
b) Incentives to Mahila Mandal, SHG		Chhota Kamba/ Rupi Panchayat		L/s	0.10
Total					0.10

ii) Anti-Poaching Activities

a) Engagement of Anti-poachers		Rupi WL Range		L/s	0.63
3 nos. for six months @ 87.50					

iii) Reward & Incentive to Informer		Rupi WL Range		L/s	0.10
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iv) Compensation against WL depredation		Rupi-Bhaba WL Sanctuary		L/s	0.30
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Sub-Total (3)					1.61
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4 Mitigation of Man-Wildlife Conflict

a) Eco-development activities

i) Village support activities

a) Distribution of GI Pipes for regious flags		Chhota Kamba/ Rupi Panchayat	10 Nos	L/s	0.10
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b) Const. of Cattle ponds		Rupi	1 No	L/s	0.60
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c) Const. of Spring Water Bowaries		Sorang	1 No.	L/s	1.00
		Garsu	1 No.	L/s	1.00

	Rupi Total	1 No.	L/s	1.00 3.00
b) Fuel Saving devices				
i) Const. of Crematoria	Sorang	1 No.	L/s	1.00
ii) Distribution of Solar lights	Garsu	1 No.	L/s	0.40
	Bara Kamba	1 No.	L/s	0.40
	Total			0.80
c) Income generation activities				
i) Agriculature Improvement & Vegetative farming	Chhota Kamba/ Rupi Panchayat		L/s	2.00
ii) Animal Husbandry and Dairy Development	Chhota Kamba/ Rupi Panchayat		L/s	2.00
d) Eco-Tourism Development				
i) Const. of Treking routes	Sorang - Dochhda	1 Km	L/s	1.00
ii) Training of local youths for Tourism activity	Chhota Kamba/ Rupi Panchayat		L/s	0.50
iii) Maintenance of local Temples & Cultural heritage	Rupi	1 Nos.	L/s	0.50
Sub-Total (4)				11.50
5 Forest Infrastructure in PA's				
i) Special repair of B/path	Bara Kamba - Kumrang Kanda	5 Km	L/s	2.00
ii) Maint. of I/path	Sorang - T hachi Dogari	6 Km	L/s	0.70
Sub-Total (5)				2.70
6 Research & Studies	Sarahan WL Div.		L/s	4.00
7 Training of Forest Officers/Officials in India & Abroad	Sarahan WL Div.		L/s	4.00
8 Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses			L/s	2.00
10 Operational support				
i) O. E.			L/s	0.50
ii) T. A.			L/s	0.50

iii) Fuel & Maintenance of vehicle

L/s

0.60

iv) Books & Periodicals (in kind)

L/s

0.20

Sub-Total (10)

1.80

Grand Total

68.07

	Total	17 hac.		0.483
iii) Treatment of Alpine Pastures				
1st year	Dedya Kanda	10 ha	1100	0.11
Maint.	Motta Thach	20 ha	1100	0.22
2nd year	Duge Kanda	15 ha	600	0.09
Maint.	Kumrang Kanda	15 ha	600	0.09
	Latya Kanda	5 ha	600	0.03
	Total			0.54
Sub-Total (1)				4.223
2 Soil & Moisture Conservation				
a) Land slip/slide Stabilization	Duge slip	1 No	L/s	5.00
b) Nallah stabilization	Kumarang	1 Km	L/s	6.00
Sub-Total (2)				11.00
3 Protection of Forest & Wildlife				
i) Fire Protection				
a) Engagement of Fire Watchers 3 nos. for six months @ 87.50	Rupi WL Range	3 Nos.	L/s	0.48
b) Incentives to Mahila Mandal, SHG	Chhota Kamba/ Rupi Panchayat		L/s L/s	0.05 0.05
	Total			0.10
ii) Anti-Poaching Activities				
a) Engagement of Anti-poachers 3 nos. for six months @ 87.50	Rupi WL Range		L/s	0.63
iii) Reward & Incentive to Informer	Rupi WL Range		L/s	0.10
iv) Wild life Census operation	Rupi-Bhaba WL Sanctuary		L/s	0.50
v) Compensation against WL depredation	Rupi-Bhaba WL Sanctuary		L/s	0.30
Sub-Total (3)				2.11
4 Mitigation of Man-Wildlife Conflict				
a) Eco-development activities				
i) Village support activities				
a) Distribution of GI Pipes for regious flags	Chhota Kamba/ Rupi Panchayat	20 Nos	L/s	0.20
b) Income generation activities				
i) Agricultrue Improvement & Vegetative farming	Chhota Kamba/ Rupi Panchayat		L/s	2.00

Sub-Total (4)				2.20
5 Forest Infrastructure in PA's				
i) Maint. of Guard Qtrs	Dubling		L/s	0.50
ii) Special repair of B/path	Bara Kamba - Kumrang Kanda	3 Km	L/s	1.00
Sub-Total (5)				1.50
6 Training of Forest Officers/Officials in India & Abroad	Sarahan WL Div.		L/s	4.00
7 Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses			L/s	2.00
8 Operational support				
i) O. E.			L/s	0.20
ii) T. A.			L/s	0.50
iii) Fuel & Maintenance of vehicle			L/s	0.40
iv) Books & Periodicals (in kind)			L/s	0.20
Sub-Total (10)				1.30
	Grand Total			28.33

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)
1 HABITAT IMPROVEMENT					
i) Biological works					
a) Afforestation of Degraded forest land	3rd year	UF - 13	5 ha	2500	0.13
	Maint.	C - 96	5 ha	2500	0.13
	4th year	UF - 15	10 ha	1700	0.17
	Maint.	UF - 14	5 ha	1700	0.09
	Total		25 ha		
b) Bamboo/Shrubs Plantation	4th year	UF - 13	5 ha	2250	0.11
	Maint.				
	5th year	UF - 12	5 ha	2250	0.11
	Maint.	UF - 11	5 ha	2250	0.11
Total					0.3375
c) Enrichment Plantation	4th year	C - 97	5 ha	2250	0.11
	Maint.				
	5th year	UF - 3	5 ha	2250	0.11
	Maint.	Total			
d) Assisted Natural Regeneration	3rd year	UF - 11	5 ha	900	0.05
	Maint.				
	4th year	UF - 7	10 ha	600	0.06
	Maint.				
	5th year	UF - 8	5 ha	600	0.03
Maint.	UF - 11	5 ha	600	0.03	
Total					0.165
e) NTPF	2nd year	UF - 13	10 ha	2600	0.26
	Maint.				
	3rd year	UF - 11	10 ha	1300	0.13
Maint.	Total				0.39
f) Nursery Development	Maint.	Chhota Kamba	0.5 hac.	L/s	0.15
		Sorang	1 hac.	L/s	0.15
	Total		1.5 hac.		0.30
ii) Treatment of Culturable waste land					
	4th year	UF - 14	3 hac.	2450	0.07
	Maint.	UF - 13	4 hac.	2450	0.10
	5th year	UF - 15	8 hac.	2450	0.20
	Maint.	UF - 14	2 hac.	2450	0.05
	Total		17 hac.		

Details of works/expenditure of 8th year 2014 - 15

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)
1 HABITAT IMPROVEMENT					
i) Biological works					
a)	Afforestation of Degraded forest land	4th year UF - 13	5 ha	1700	0.09
		Maint. C - 96	5 ha	1700	0.09
		5th year UF - 15	10 ha	1700	0.17
		Maint. UF - 14	5 ha	1700	0.09
		Total	25 ha		0.42
b)	Bamboo/Shrubs Plantation	5th year UF - 13	5 ha	2250	0.1125
		Maint.			
		Total			0.1125
c)	Enrichment Plantation	5th year C - 97	5 ha	2250	0.11
		Maint. Total			0.11
d)	Assisted Natural Regeneration	4th year UF - 11	5 ha	600	0.03
		Maint.			
		5th year UF - 7	10 ha	600	0.06
		Maint. Total			0.090
e)	NTPF	3rd year UF - 13	10 ha	1300	0.13
		Maint. Total			0.13
f)	Nursery Development	Maint. Chhota Kamba	0.5 hac.	L/s	0.15
		Sorang	1 hac.	L/s	0.15
		Total	1.5 hac.		0.30
ii)	Treatment of Culturable waste land	5th year UF - 14	3 hac.	2450	0.07
		Maint. UF - 13	4 hac.	2450	0.10
		Total	7 hac.		0.1715
Sub-Total (1)					1.337
2 Protection of Forest & Wildlife					
i) Fire Protection					
a)	Engagement of Fire Watchers 3 nos. for six months @ 87.50	Rupi WL Range	3 Nos.	L/s	0.48
b)	Incentives to Mahila Mandal, SHG	Chhota Kamba/ Rupi Panchayat		L/s	0.10

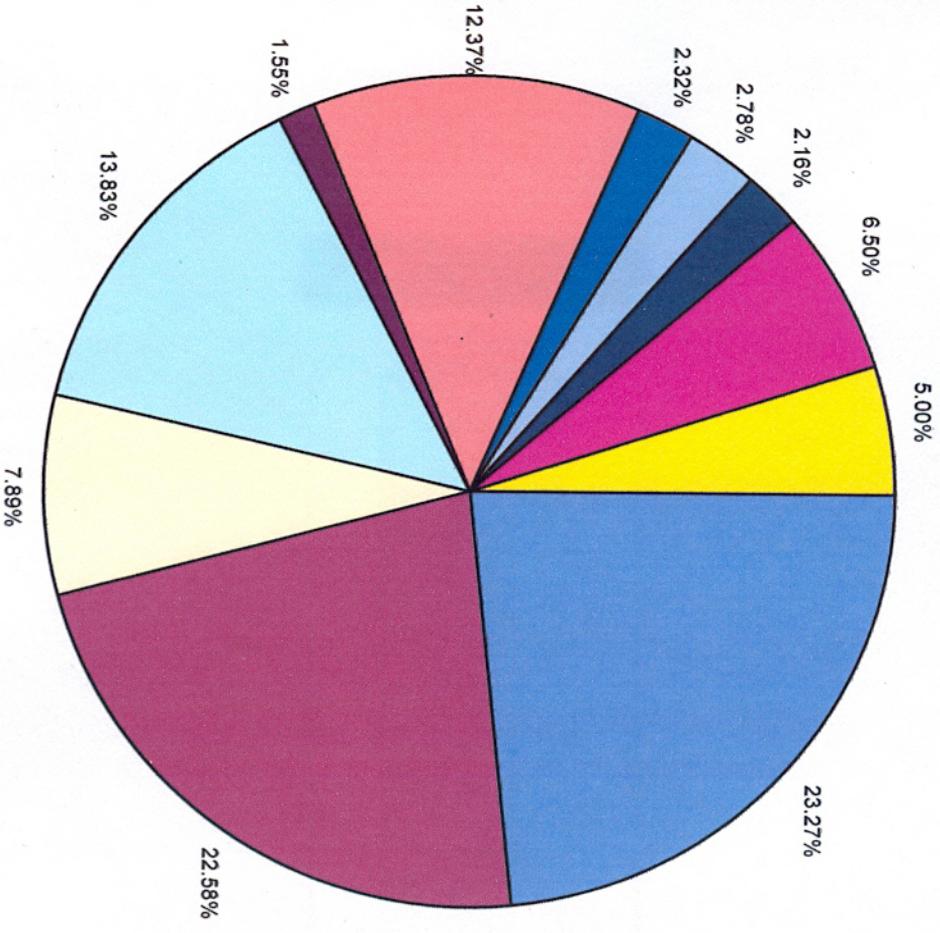
ii) Anti-Poaching Activities				
a) Engagement of Anti-poachers 3 nos. for six months @ 87.50	Rupi WL Range		L/s	0.63
iii) Reward & Incentive to Informer	Rupi WL Range		L/s	0.10
iv) Wild life Census operation	Rupi-Bhaba WL Sanctuary		L/s	0.50
v) Compensation against WL depredation	Rupi-Bhaba WL Sanctuary		L/s	0.30
Sub-Total (3)				2.11
3 Forest Infrastructure in PA's				
i) Maint. of existing l/path	Rupi - Sorang	6 Km	L/s	0.60
Sub-Total (5)				0.60
4 Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses			L/s	1.00
5 Operational support				
i) O.E.			L/s	0.20
ii) T. A.			L/s	0.50
iii) Fuel & Maintenance of vehicle			L/s	0.20
Sub-Total (10)				0.90
	Grand Total			5.947

Details of works/expenditure of 9th year 2015 - 16

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)
1 HABITAT IMPROVEMENT					
i) Biological works					
a)	Afforestation of Degraded forest land	5th year Maint.	UF - 13 C - 96 Total	5 ha 5 ha 10 ha	1700 1700 0.17
b)	Assisted Natural Regeneration	5th year Maint.	UF - 11 Total	5 ha	600 0.03
c)	Nursery Development	Maint.	Sorang Total	1 hac. L/s 1 hac.	0.10 0.10
Sub-Total (1)					0.30
2 Protection of Forest & Wildlife					
i) Fire Protection					
a)	Engagement of Fire Watchers 3 nos. for six months @ 87.50	Rupi WL Range	3 Nos.	L/s	0.48
b)	Incentives to Mahila Mandal, SHG	Chhota Kamba/ Rupi Panchayat		L/s	0.10
ii) Anti-Poaching Activities					
a)	Engagement of Anti-poachers 3 nos. for six months @ 87.50	Rupi WL Range		L/s	0.63
iii)	Reward & Incentive to Informer	Rupi WL Range		L/s	0.10
iv)	Compentation against WL depredation	Rupi-Bhaba WL Sanctuary		L/s	0.30
Sub-Total (2)					1.61
3 Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses					
				L/s	0.50
4 Operational support					
i)	O. E.			L/s	0.30
ii)	T. A.			L/s	0.30
iii)	Fuel & Maintenance of vehicle			L/s	0.20
Sub-Total (4)					0.90
Grand Total					3.31

Sr No	Name of Work	Name of area	Phys. Target	Rate	Amount (in Lac)
1 Protection of Forest & Wildlife					
i) Fire Protection					
a)	Engagement of Fire Watchers 3 nos. for six months @ 87.50	Rupi WL Range	3 Nos.	L/s	0.48
b)	Incentives to Mahila Mandal, SHG	Chhota Kamba/ Rupi Panchayat		L/s	0.10
ii) Anti-Poaching Activities					
a)	Engagement of Anti-poachers 3 nos. for six months @ 87.50	Rupi WL Range		L/s	0.63
iii)	Reward & Incentive to Informer	Rupi WL Range		L/s	0.10
iv)	Wild life Census operation	Rupi-Bhaba WL Sanctuary		L/s	0.50
v)	Compentation against WL depredation	Rupi-Bhaba WL Sanctuary		L/s	0.20
Sub-Total (1)					2.01
2 Publicity, Nature awareness camp, exposer visit training of CBO's & extn. Programme/workshop & meeting/evaluation expenses.					
				L/s	0.50
3 Operational support					
i)	O. E.			L/s	0.10
ii)	T. A.			L/s	0.10
iii)	Fuel & Maintenance of vehicle			L/s	0.10
Sub-Total (3)					0.30
Grand Total					2.81

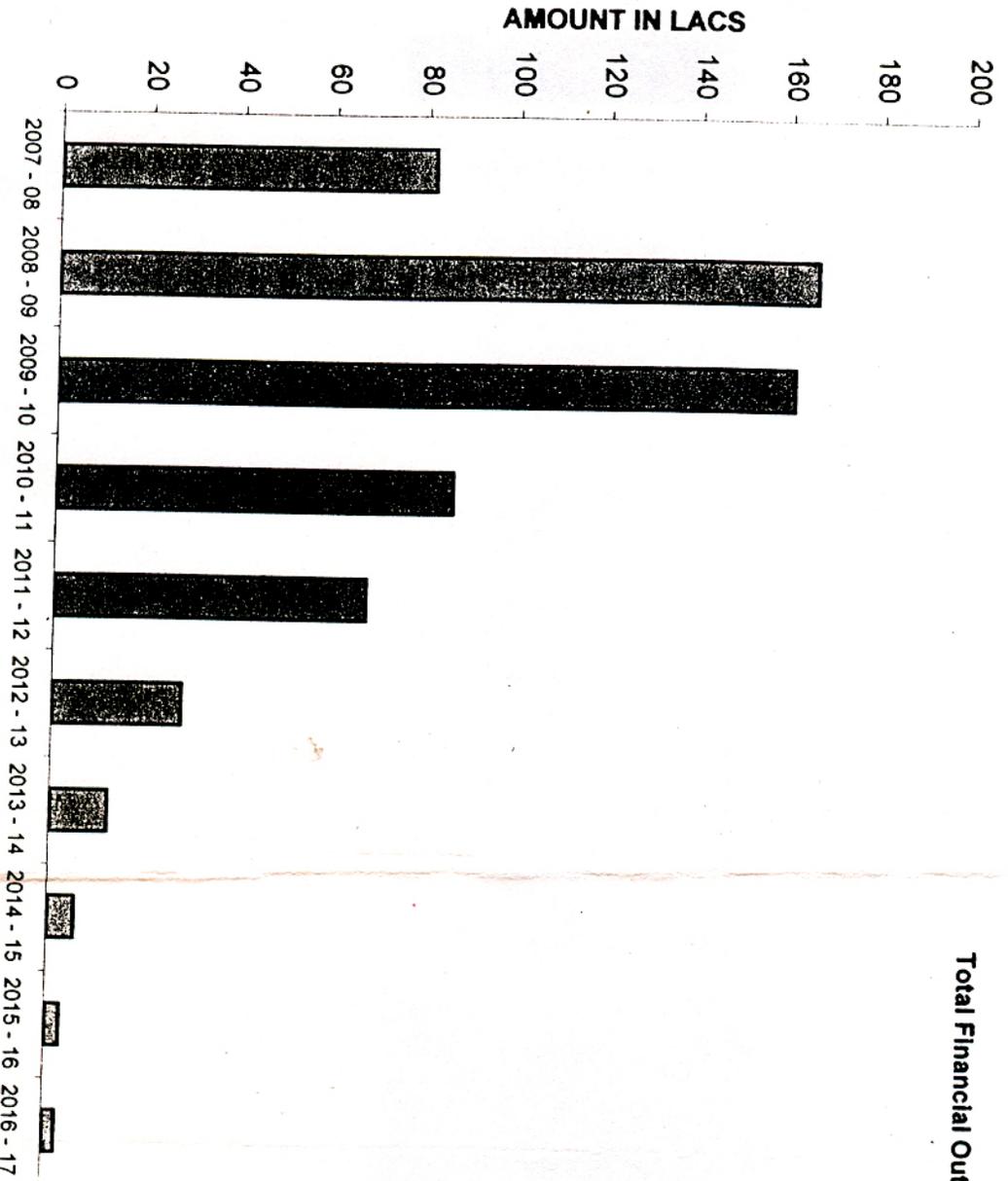
PERCENTAGEWISE SHARE OF VARIOUS ACTIVITIES



- HABITAT IMPROVEMENT
- SOIL AND MOISTURE CONSERVATION
- PROTECTION OF FORESTS & WILDLIFE
- MITIGATION OF HUMAN WILDLIFE CONFLICT
- FIELD EQUIPMENTS & MEDICINE FOR MANAGEMENT OF WILDLIFE SANCTUARY
- DEVELOPMENT OF FOREST INFRASTRUCTURE IN PAs
- RESEARCH AND STUDIES
- TRAINING OF FOREST OFFICERS/OFFICIAL IN INDIA AND ABOARD
- PUBLICITY, NATURE, AWARENESS/EXPOSURE, VISIT AND EXTENSION PROGRAMME
- OPERATIONAL SUPPORT AND ESTABLISHMENT
- CONTINGENCIES

YEARWISE EXPENDITURE BREAKUP

Total Financial Outlay = 647.02 Lacs



Per Ha. Cost model for Afforestation of Degraded Forests land

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including naking sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Layout of Pits over 1 hac.	1	68.15	Hac.	68.15
3	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	60	518.2	% Nos.	310.92
4	Charring & Coaltarring of the ends of F. Posts 45 cm bottom & 15cm conical top	60	111.8	% Nos.	67.08
5	Carriage of F. posts over distance of 1.5 km	60	272.7	% Nos/Km	245.43
6	Digging of holes for F. posts for 45 cm deep	60	362.8	% Nos.	217.68
7	Fixing of F. posts including strutting	60	278.45	% Nos.	167.07
8	Carriage of B/wire from depot to site O/D 8 Km U/H side	1	68.25	Qtls/Km	546
9	Stretching & fixing of B/wire with U/staple in 180x4 strand	0.72	1.9	Rmt	1368
10	Preparation of l/path 60cm wide	150	4.35	Rmt	652.5
11	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
12	Digging of Pits 45x45x45cm	500	381.8	% Nos.	1909
13	Digging of Pits 30x30x30cm	600	190.95	% Nos.	1145.7
14	Filling of Pits 45x45x45 cm	500	109.4	% Nos.	547
15	Filling of Pits 30x30x30 cm	600	76.35	% Nos.	458.1
16	Carriage of naked root plants O/D 2 Kms (U/h side)	500	14.1	% Nos/Km	141
17	Carriage of Plants in P/Bags O/D 2 Km (U/h side)	600	87.25	%Nos/Km	1047
18	Planting of naked root plants i/c ramming	500	73.6	% Nos.	368
19	Planting of Plants raised in P/bags i/c ramming	600	87.3	% Nos.	523.8
20	Moisture retention intervention i/c V. ditches (MRI)	1	900	Hac.	900
21	Construction of stairs i/c cost of i/nails	2	L/S	Nos.	200
22	Preparation/Digging of Patches 60x60x25 cm	400	259.05	% Nos.	1036.2
23	Patch sowing	400	75.3	% Nos.	301.2
	Total				12557.78
	Add 16.60% increase				2084.591
	Total				14642.37
	Add 25% increase for Tribal areas				3660.593
	Total (Works)				18302.96
	Material Cost				
1	Cost of B/wire	1	3900	Per Qtls	3900
2	Cost of U. Nails	1.25	45	Kg	56.25
3	Cost of Seeds	1	120	Kg	120
4	Cost of Plants	1100	3	Nos.	3300
5	Cost of Fense Posts	L/s		L/s	4900
	Total (Material)				12276.25
	G. Total				30579.21
	Or Say Rs.				30600.00

**Per Ha. Cost model for Afforestation of Degraded Forests land
Maintenance Norms of First year (30% Mortality)**

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 30x30x30 cm for P/bags	180	95.45	% Nos.	171.81
2	Re-digging of failure pits 45x45x45 cm for B/L spp.	150	190.95	% Nos.	286.43
3	Filling of Pits 30x30x30 cm	180	76.38	% Nos.	137.48
4	Filling of Pits 45x45x45 cm	150	109.4	% Nos.	164.10
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	180	87.25	% Nos/Km	314.10
6	Carriage of naked root plants (O.B.L) O/D 2 Km (uphill side)	150	14.1	% Nos/Km	42.3
7	Planting of plants raised in P/bags i/c ramming	180	87.3	% Nos	157.14
8	Planting of naked root plants of (O.B.L) I/cramming	150	73.6	% Nos	110.40
9	Mulching/weeding of plants in P/area	800	23.9	% Nos.	191.20
10	Cutting & prep. of wooden fence posts 1.80 mtr long 7 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
11	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
12	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
13	Fixing of fence Posts	15	278.45	% Nos.	41.77
14	Repair of B/wire fence	200	0.65	Rmt	130.00
15	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				2237.23
	Add 16.60% increase				371.38
	Total				2608.61
	Add 25% increase in Tribal area				652.15
	Total (Works)				3260.77
	Material Cost				
	Cost of Plants	330		3 Nos.	990
	Cost of U/staple	0.5		45 Kg	22.50
	Total (Material)				1012.50
	G. Total				4273.27
	or Say (Rs.)				4300
	New Norm for Plantation			L/s	30600
1	Maintenance norm for 1st year plantation (30% mortality)			L/s	4300
2	Maintenance norm for 2nd year plantation (20% mortality)			L/s	3700
3	Maintenance norm for 3rd year plantation (15% mortality)			L/s	2500
4	Maintenance norm for 4th year plantation (10% mortality)			L/s	1700
5	Maintenance norm for 5th year plantation (10% mortality)			L/s	1700
	G. Total for Afforestation of Degraded Forest Lands (with Barbed wire fence only)				44500
	G. Total for Afforestation of Degraded Forest Lands (with Stone fence wall and barbed wire)				51700

Per Ha. Cost model for Bamboo Plantation

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	40.95	Hac.	40 95
2	Layout of Pits over 1 hac.	1	68.15	Hac.	68 15
3	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	70	518.2	% Nos.	362 74
4	Charring & Coaltarring of the ends of F. Posts 45 cm bottom & 15cm conical top	70	111.8	% Nos.	78 26
5	Carriage of F. posts over distance of 5 km	70	272.7	% Nos/Km	954 45
6	Digging of holes for F. posts for 45 cm deep	70	362.8	% Nos.	253.96
7	Fixing of F. posts including strutting	70	278.45	% Nos.	194.915
8					
	Carriage of B/wire from depot to site O/D 10 Km U/H side	1	68.25	Qtls/Km	682.5
9					
	Streching & fixing of B/wire with U/staple in 180x4 strand	0.72	1.9	Rmt	1368
10	Preparation of l/path 60cm wide	150	4.35	Rmt	652.5
11	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
12	Digging of Pits 45x45x45cm	800	381.8	% Nos.	3054.4
13	Filling of Pits 45x45x45 cm	800	109.4	% Nos.	875.2
14	Carriage of naked root plants O/D 5 Kms (U/h side)	800	14.1	% Nos/Km	564
15	Planting of naked root plants i/c ramming	800	73.6	% Nos.	588.8
16	Construction of stairs i/c cost of i/nails	2	L/S	Nos.	450
	Total				10485.83
	Add 16.60% increase				1740.647
	Total				12226.47
	Add 25% increase for Tribal areas				3056.618
	Total (Works)				15283.09
	Material Cost				
1	Cost of B/wire	1	3900	Per Qtls	3900
2	Cost of U. Nails	1.25	45	Kg	56.25
3	Cost of Plants	800	3	Nos.	2400
4	Cost of Fense Posts	L/s		L/s	7000
	Total (Material)				13356.25
	G. Total				28639.34
	Or Say Rs.				28650.00

Per Ha. Cost model for Bamboo Plantation
Maintenance Norms of First year (30% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 45x45x45 cm for B/L spp.	150	190.95	% Nos.	286.43
2	Filling of Pits 45x45x45 cm	150	109.4	% Nos.	164.10
3	Carriage of naked root plants (O.B.L) O/D 6 Km (uphill side)	150	14.1	% Nos/Km	126.9
4	Planting of naked root plants of (O.B.L) l/cramming	150	73.6	% Nos	110.40
5	Mulching/weeding of plants in P/area	900	23.9	% Nos.	215.10
6	Cutting & prep. of wooden fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	30	518.2	% Nos	155.46
7	Carriage of F. Posts O/D of 10 Km	30	272.7	% Nos.	818.10
8	Digging of Holes for fixing of F/posts	30	362.8	% Nos.	108.84
9	Fixing of fence Posts	30	278.45	% Nos.	83.54
10	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				2398.86
	Add 16.60% increase				398.21
	Total				2797.07
	Add 25% increase in Tribal area				699.27
	Total (Works)				3496.34
	Material Cost				
	Cost of Plants	330		3 Nos.	990
	Cost of U/staple	0.5		45 Kg	22.50
	Total (Material)				1012.50
	G. Total				4508.84
	or Say (Rs.)				4500
	New Norm for Plantation			L/s	30600
1	Maintenance norm for 1st year plantation (30% mortality)			L/s	4500
2	Maintenance norm for 2nd year plantation (20% mortality)			L/s	3900
3	Maintenance norm for 3rd year plantation (15% mortality)			L/s	3400
4	Maintenance norm for 4th year plantation (10% mortality)			L/s	2250
5	Maintenance norm for 5th year plantation (10% mortality)			L/s	2250
	G. Total for Enrichment Plantation				46900

Per Ha. Cost model for Enrichment Plantation

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Layout of Pits over 1 hac.	1	68.15	Hac.	68.15
3	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	60	518.2	% Nos.	310.92
4	Charring & Coaltarring of the ends of F. Posts 45 cm bottom & 15cm conical top	60	111.8	% Nos.	67.08
5	Carriage of F. posts over distance of 5 km	60	272.7	% Nos/Km	818.1
6	Digging of holes for F. posts for 45 cm deep	60	362.8	% Nos.	217.68
7	Fixing of F. posts including strutting	60	278.45	% Nos.	167.07
8	Carriage of B/wire from depot to site O/D 10 Km U/H side	1	68.25	Qtls/Km	682.5
9	Stretching & fixing of B/wire with U/staple in 180x4 strand	0.72	1.9	Rmt	1368
10	Preparation of I/path 60cm wide	150	4.35	Rmt	652.5
11	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
12	Digging of Pits 45x45x45cm	400	381.8	% Nos.	1527.2
13	Digging of Pits 30x30x30cm	400	190.95	% Nos.	763.8
14	Filling of Pits 45x45x45 cm	400	109.4	% Nos.	437.6
15	Filling of Pits 30x30x30 cm	400	76.35	% Nos.	305.4
16	Carriage of naked root plants O/D 5 Kms (U/h side)	400	14.1	% Nos/Km	282
17	Carriage of Plants in P/Bags O/D 5 Km (U/h side)	400	87.25	%Nos/Km	1745
18	Planting of naked root plants i/c ramming	400	73.6	% Nos.	294.4
19	Planting of Plants raised in P/bags i/c ramming	400	87.3	% Nos.	349.2
20	Moisture retention intervention i/c V. ditches (MRI)	1	900	Hac.	900
21	Construction of stairs i/c cost of i/nails	2	L/S	Nos.	200
22	Preparation/Digging of Patches 30x30x25 cm	100	259.05	% Nos.	259.05
23	Patch sowing	100	75.3	% Nos.	75.3
	Total				11828.9
	Add 16.60% increase				1963.597
	Total				13792.5
	Add 25% increase for Tribal areas				3448.124
	Total (Works)				17240.62
	Material Cost				
1	Cost of B/wire	1	3900	Per Qtls	3900
2	Cost of U. Nails	1.25	45	Kg	56.25
3	Cost of Seeds	1	120	Kg	120
4	Cost of Plants	800	3	Nos.	2400
5	Cost of Fense Posts	L/s		L/s	4900
	Total (Material)				11376.25
	G. Total				28616.87
	Or Say Rs.				28650.00

Per Ha. Cost model for Enrichment Plantation
Maintenance Norms of First year (30% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of failure pits 30x30x30 cm for P/bags	200	95.45	% Nos.	190.9
2	Re-digging of failure pits 45x45x45 cm for B/L spp.	150	190.95	% Nos.	286.43
3	Filling of Pits 30x30x30 cm	200	76.38	% Nos.	152.76
4	Filling of Pits 45x45x45 cm	150	109.4	% Nos.	164.10
5	Carriage of plants with P/bags O/D 2 Km (uphill side)	200	87.25	% Nos/Km	349.00
6	Carriage of naked root plants (O.B.L) O/D 2 Km (uphill side)	150	14.1	% Nos/Km	42.3
7	Planting of plants raised in P/bags i/c ramming	200	87.3	% Nos	174.6
8	Planting of naked root plants of (O.B.L) I/cramming	150	73.6	% Nos	110.40
9	Mulching/weeding of plants in P/area	800	23.9	% Nos.	191.20
10	Cutting & prep. of wooden fence posts 1.80 mtr long 7 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
11	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
12	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
13	Fixing of fence Posts	15	278.45	% Nos.	41.77
14	Repair of B/wire fence	200	0.65	Rmt	130.00
15	Interlacing of thorny bush wood in B/wire	200	1.65	Rmt	330.00
	Total				2356.96
	Add 16.60% increase				391.26
	Total				2748.22
	Add 25% increase in Tribal area				687.05
	Total (Works)				3435.27
	Material Cost				
	Cost of Plants	330		3 Nos.	990
	Cost of U/staple	0.5		45 Kg	22.50
	Total (Material)				1012.50
	G. Total				4447.77
	or Say (Rs.)				4500
	New Norm for Plantation			L/s	30600
1	Maintenance norm for 1st year plantation (30% mortality)			L/s	4500
2	Maintenance norm for 2nd year plantation (20% mortality)			L/s	3900
3	Maintenance norm for 3rd year plantation (15% mortality)			L/s	3400
4	Maintenance norm for 4th year plantation (10% mortality)			L/s	2250
5	Maintenance norm for 5th year plantation (10% mortality)			L/s	2250
	G. Total for Enrichment Plantation				46900

Per Ha. Cost model for Assisted Natural Regeneration

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	60	518.2	% Nos.	310.92
3	Charring & Coaltarring of the ends of F. Posts 45 cm bottom & 15cm conical top	60	111.8	% Nos.	67.08
4	Carriage of F. posts over distance of 1.5 km	60	272.7	% Nos/Km	245.43
5	Digging of holes for F. posts for 45 cm deep	60	362.8	% Nos.	217.68
6	Fixing of F. posts including strutting	60	278.45	% Nos.	167.07
7	Carriage of B/wire from depot to site O/D 1.5 Km U/H side	1	68.25	Qtls/Km	102.38
8	Stretching & fixing of B/wire with U/staple in 180x4 strand	0.72	1.9	Rmt	1368
9	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
10	Prep. & Digging of Patches 60x60x25 cm	250	259.05	% Nos.	647.63
11	Sowing of seeds in Patches	250	75.3	% Nos.	188.3
12	Digging of Pits 30x30x30 cm for P/bags Planting	250	190.95	% Nos.	477.38
13	Carriage of Plants in P/Bags O/D 2 Km (U/h side)	250	87.25	%Nos/Km	436.25
14	Planting of Plants raised in P/bags i/c ramming	250	87.3	% Nos.	218.25
15	Filling of Pits 30x30x30 cm	250	76.35	% Nos.	190.875
	Total				4975.13
	Add 16.60% increase				825.87
	Total				5801.002
	Add 25% increase for Tribal areas				1450.25
	Total (Works)				7251.25
	Material Cost				
1	Cost of Plants	250		3 each	750
2	Cost of B/wire	1		3900 Per Qtls	3900
3	Cost of U. Nails	1.25		45 Kg	56.25
4	Cost of Seeds	0.5		120 Kg	60
5	Cost of Fense Posts	L/s		L/s	5000
	Total (Material)				9766.25
	G. Total				17017.5
	Or Say Rs.				17000.00

Per Ha. Cost model for Natural Regeneration
Maintenance Norms of First year (30% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 60x60x25 cm	75	129.52	% Nos.	97.14
2	Re-digging of Pits 30x30x30 cm	75	95.45	% Nos.	71.59
3	Filling of Pits 30x30x30 cm	75	76.38	% Nos.	57.29
4	Carriage of plants with P/bags O/D 2 Km (uphill side)	75	87.25	% Nos/Km	130.88
5	Planting of plants raised in P/bags	75	87.3	% Nos	65.475
6	Sowing of seeds in Patches	75	75.3	% Nos	56.48
7	Repair of B/wire fence	200	0.65	Rmt	130.00
	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical				
8	shape	15	518.2	% Nos	77.73
9	Carriage of F. Posts O/D of 1 Km	15	272.7	% Nos.	40.91
10	Digging of Holes for fixing of F/posts	15	362.8	% Nos.	54.42
11	Fixing of fence Posts	15	278.45	% Nos.	41.77
12	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				1120.66
	Add 16.60% increase				186.03
	Total				1306.69
	Add 25% increase in Tribal area				326.67
	Total (Works)				1633.36
	Material Cost				
	Cost of Plants	75		3 Nos.	225
	Cost of seeds	0.2		120 Kg	24
	Cost of U/nails	0.5		45 Kg	22.50
	Total (Material)				271.50
	G. Total				1904.86
	or Say (Rs.)				1900
	New Norm for Plantation			L/s	17000
1	Maintenance norm for 1st year plantation (30% mortality)			L/s	1900
2	Maintenance norm for 2nd year plantation (20% mortality)			L/s	1100
3	Maintenance norm for 3rd year plantation (15% mortality)			L/s	900
4	Maintenance norm for 4th year plantation (10% mortality)			L/s	600
5	Maintenance norm for 5th year plantation (10% mortality)			L/s	600
	Grand total for Natural Regeneration				22100

Per Ha. Cost model for Raising NTPF Plantation

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Plantation area including making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Layout of Patches over 1 Hac.	1	68.15	Hac.	68.15
3	Cutting & Preparation of Wooden Fence posts 1.80 mtr long & 8 to 10 cm dia including debarking & fastening of the top 15 cm conical shape	60	518.2	% Nos.	310.92
4	Carriage of F. posts over distance of 1.5 km	60	272.7	% Nos/Km	245.43
5	Digging of holes for F. posts for 45 cm deep	60	362.8	% Nos.	217.68
6	Fixing of F. posts including strutting	60	278.45	% Nos.	167.07
7	Charring & Coaltarring ends of F/Posts 45 cm bottom, 15cm conical top	60	111.8	% Nos.	67.08
8					
9	Carriage of B/wire from depot to site O/D 1.5 Km U/H side	1	68.25	Qtls/Km	102.38
10	Streching & fixing of B/wire with U/staple in 180x4 strand	0.72	1.9	Rmt	1368
11	Interlacing of bushes in B/wire fence	180	1.65	Rmt	297
12	Prep. of l/path 60 cm wide	150	4.35	Rmt	652.5
13	Prep. of Patches 30x30x25 cm	1000	130.9	% Nos.	1309.00
14	Rod Planting of Medicinal Plants in Patches (Naked roots)	5000	68.25	% Nos.	3412.5
	Carriage of Naked root medicinal plants O/D 2 Km (U/h side)	5000	14.1	%Nos/Km	1410
	Total				9668.655
	Add 16.60% increase				1605.00
	Total				11273.65
	Add 25% increase for Tribal areas				2818.413
	Total (Works)				14092.06
	Material Cost				
1	Cost of Medicinal Plants	5000	3 each		15000
2	Cost of B/wire	1	3900 Per Qtls		3900
3	Cost of U. Nails	1.25	45 Kg		56.25
4	Cost of Fense Posts	L/s	L/s		5000
	Total (Material)				23956.25
	G. Total				38048.31
	Or Say Rs.				38000.00

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

Per Ha. Cost model for Raising NTPF Plantation
Maintenance Norms of First year (30% Mortality)

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Re-digging of Patches 30x30x25 cm	300	65.45	% Nos.	196.35
2	Planting of Medicinal plants in 600 patches each	1500	73.6	% Nos.	1104.00
3	Carriage of plants with P/bags O/D 2 Km (uphill side)	1500	14.1	% Nos/Km	423.00
4	Cutting & prep. of wooden fence posts 1.80 mtr long 8 to 10 cm dia including debarking & fastening the top 15 cm conical shape	15	518.2	% Nos	77.73
5	Carriage of F. Posts O/D of 1.5 Km	15	272.7	% Nos.	61.36
6	Re-Digging of Holes for fixing of F/posts	15	181.4	% Nos.	27.21
7	Fixing of fence Posts	15	278.45	% Nos.	41.77
8	Repair of B/wire fence	200	0.65	Rmt	130.00
9	Interlacing of thorny bush wood in B/wire	180	1.65	Rmt	297.00
	Total				2358.42
	Add 16.60% increase				391.50
	Total				2749.91
	Add 25% increase in Tribal area				687.48
	Total (Works)				3437.39
	Material Cost				
	Cost of Plants	1500		3 Nos.	4500
	Cost of U/nails	0.5		45 Kg	22.50
	Total (Material)				4522.50
	G. Total				7959.89
	or Say (Rs.)				7960
1	New Norm for Plantation			L/s	38000
2	Maintenance norm for 1st year plantation (30% mortality)			L/s	7960
3	Maintenance norm for 2nd year plantation			L/s	2600
4	Maintenance norm for 3rd year plantation			L/s	1300
	Grand total for Raising for NTFP Plantation				49860

Financial Norms for treatment of Culturable waste land 1 hectare area

1	Context and conversion of F/Post 70 nos. @ 518.20	362.74
2	Carriage of F/post 70 nos. over distance 1 km @ 272.70	190.61
3	Digging of holes 70 nos. @ 362.80	253.96
4	Fixing of fence post 70 nos. @ 278.45	194.91
5	Survey and demarcation over 1 hac. Area @ 40.95	40.95
6	Barbed wire fencing 840 Rm @ 1.90	1596.00
7	Insertion of bushes 210 RM @ 1.65	346.00
8	Carriage of barbed wire in bundles 1.20 quintals over distance 2 km @ 68.25	163.80
9	Digging of pits 45x45x45 cms 300 nos. @ 381.80	1145.40
10	Filling of pits -do- 300 nos. @ 109.40	328.20
11	Planting of plants 300 nos. @ 261.75	785.25
12	Carriage of plants 300 nos. over distance 1 km @ 14.10 per hundred per km.	42.30
13	Preparation of strip 100x0.30x5 cm for sowing of grass seed @ 368.10 per hundred = 300 nos.	1104.30
	Total	6554.42
	Add 16.60% lab. Increase	1088.03
	Total	7642.45
	Add 25% Tribal Area increase	1910.61
	Total	9553.07
14	Soil Conservation works on 1 hac. Area @ L/s	5000.00
		14553.07
15	Cost of barbed wire 1.20 quintals @ 5000/- per quintal	6000.00
16	Cost of U nails etc. @ 80 L/s	89.00
	Grand Total	20642.07
	or say	20600.00

Financial Norms for treatment of culturable wasteland over 1 hectare area

Maintenance norms of 1st year (30% mortality)

1 Re-digging of Pits 45x45x45 cm 90 nos @ 381.80 per hundred		343.62
2 filling of pits 45x45x45-90 nos @109.40 per hundred		98.46
3 Carriage of plants 90 nos. over distance 1 km @ 14.10 per hundred per Km.		12.69
4 Planting of plants 90 nos. broad leaved species @ 261.75		235.57
5 Cutting and preparation of fence post 40 nos. @Rs 518/- per hundred		207.20
6 carriage of 40 Nos. of fence post over distance 2 Km. 272.30 per hundred per Km		217.84
7 Digging of holes 40 nos. @ 362.80 per hundred		145.12
8 Fixing of fence post 40 nos. @ 40.95 per hundred		16.28
9 Repair of barbed wire 500 RM @ 0.65 RMM		325.00
10 Repair of strips for grass for sowing 100x30x5 cms along contour at interval of 2 mts = 100 nos.@ 368.10 per hundred		368.10
11 Insertion of bushes along the barbed wire fence 200 RM @ 1.65 per RM		330.00
12 Repair of soil conservation works LS		1700.00
	Total	3999.88
	Or say	4000.00
Add 16.60% Tribal area increase		664.00
		4664.00
Add 25% Tribal area increase		1166.00
13 cost of material i. e. seeds U-Nails etc. LS		770.00
	Grand Total	6600.00
Maintenance norm of 2nd year 20% mortality		4800.00
Maintenance norm of 3rd year 15% mortality		3400.00
Maintenance norm of 4th year 10% mortality		2450.00
Maintenance norm of 5th year 10% mortality		2450.00

Per Ha. Cost model for Treatment of Alpine Pastures

S. No.	Particulars of Wors	Qty	Rate	Unit	Amount
1	Survey and demarcation of Pasture land i/c making sections, path & preparation of Map etc.	1	40.95	Hac.	40.95
2	Weeding of obnoxious weeds	1	L/s	Hac.	1875
3	Preparation of strips i/c sowing along contour at 100x30x5 cm interval of 2 m for grass sowing	800	368.1	% Nos.	2944.8
4	Application of vermi compost/organic fertilizers(twice over 1 hac @ 25Kg/Tin)	1	L/s	Hac.	300
5	Carriage of Feertilizers to work site o/d of 5 Km by mannual labour	0.5	33.4	Qtls/Km	83.5
6	Moisture retention inter\vention i/c V. ditches (MRI)	1	1500	Hac.	1500
7	Cost of fertilizer and seed	L/s	L/s		500
	Total				7244.25
	Add 16.60% increase				1202.546
	Total				8446.796
	Add 25% increase for Tribal areas				2111.699
	Total (Works)				10558.49
	Or Say Rs.				10550.00

Per Ha. Cost model for Treatment of Alpine Pastures
Maintenance norms for 1st year

S. No.	Particulars of Works	Qty	Rate	Unit	Amount
1	Re-preparation of strips 100x.30x.5 cm	240	190	% Nos.	456
	Total				456
	Add 16.60% increase				75.70
	Total				531.696
	Add 25% increase for Tribal areas				132.92
	Total (Works)				664.62
	Material Cost				
1	Cost of Seed	1	386.25	Kg	386.25
	G. Total				1050.87
	Or Say Rs.				1100.00
	New				10550
	1st year Maintenance				1100
	2nd year Maintenance				600
	Grand Total				12250.00

Activitywise Percentage of Financial Outlay of CAT Plan of Sorang HEP

Sr. No.	Components	Percentage
Management of Protected Areas - In-situ Conservation		
1	HABITAT IMPROVEMENT	
	i) Biological Works	
	a) Afforestation of Degaraded forest land	1.72 %
	b) Bamboo/Shrubs Plantation	1.04 %
	c) Enrichment Plantation	0.69 %
	d) Natural Regeneration	0.85 %
	e) NTPF Plantation	2.31 %
	f) Nursery Development	1.55 %
	ii) Treatment of Culturable Waste land	1.06 %
	iii) Treatment of Alpine Pastures	2.84 %
	iv) Construction of Water Holes	0.39 %
	ii) Development of Sarahan Pheasantry	10.82 %
	Ex-situ conservation breeding of Western Tragopan	
	Sub Total	23.27 %
2	Soil & Moisture Conservation	
	i) Land slide/slips stabilization	8.50 %
	ii) Nallah Stabilization	8.35 %
	iii) River bank Stabilization	5.73 %
	Sub-Total	22.58 %
3	Protection of Forests & Wildlife	
	i) Fire Protection	
	a) Fire Watchers	0.74 %
	b) Fire Fighting Equipments	0.15 %
	c) Fire Watch Towers	0.93 %
	d) Maintinance of Fire lines & Contolled burning	0.62 %
	e) Incentives to Mahila Madal & Self Help Groups	0.15 %
	ii) Anti-Poaching Activities	0.97 %
	iii) Demarcation of Boundaries of Sanctuaries & of B/pillars & C/Pillars	0.62 %
	iv) Const. of Check Post	0.85 %
	v) Communication Network	1.55 %
	vi) Sign & Slogan Boards	0.31 %
	vii) Rewards & Incentives to informers	0.15 %
	viii) Wild life Census Operation	0.39 %
	ix) Compensation against WL depredation	0.46 %
	Sub-Total	7.89 %
4	Mitigation of Human-Wild Life Conflict	
	a) Village support activities	
	i) Distribution of CGI sheets	1.70 %
	ii) Distribution of GI Pipes for installation of religious flags	0.09 %
	iii) Const. of Sulabh Shochalaya	0.93 %
	iv) Const. of Cattle Ponds	0.56 %

	v) Const. of Spring Water Bowaries	1.39 %
	vi) Vaccination of domestic cattle	0.31 %
	Sub-Total (a)	4.98 %
	b) Fuel saving devices	
	i) Distribution of LPG Cylinders	0.58 %
	ii) Cost. of crematoria	1.08 %
	iii) Distribution of Solar Lights	0.62 %
	Sub-Total (b)	2.28 %
	c) Income Generation activities	
	i) Vermi composting & organic farming	0.15 %
	ii) Raising of Nursery, Cultivation & Sale of NTPF	0.31 %
	iii) Floriculture	0.31 %
	iv) Bee keeping activities	0.31 %
	v) Extraction & sale of Oil from stone fruits	0.23 %
	vi) Agriculture improvement, horticulture & vegetative farming	1.55 %
	vii) Animal Husbandry & Dairy Development	1.24 %
	Sub-Total (c)	4.10 %
	d) Eco-Tourism development	
	i) Construction of Trekking Routes	0.93 %
	ii) Development of Camping sites	0.46 %
	iii) Training of local youths for Tourism activities	0.31 %
	iv) Maintenance of Local Temples/Cultural heritage/Hill archtecture etc.	0.77 %
	Sub-Total (d)	2.47 %
	G. Total (a - d)	13.83 %
5	Field Equipments & Medicine for Management of WL Sanctuary	1.55 %
6	Development of Forest Infrastructure in PA's	
	a) Const. & Maint. of B/paths & I/paths	
	i) Construction of B/Paths	1.08 %
	ii) Special repair of B/path	0.93 %
	iii) Construction of New I/paths	0.93 %
	iv) Maintenance of Existing I/paths	0.77 %
	b) Construction of I/hut at Sorang	1.24 %
	i) Maintenance of G/qtrs.	0.46 %
	ii) Maintenance of FRH Rupi	0.31 %
	d) Construction of Bldg/transit Camps	
	i) Construction Transit camp at Sarahan	0.77 %
	ii) Construction of Range office/qtrs at Bara Kamba	3.09 %
	e) Const./Repair of Bridges	
	i) Construction of Bridges	1.55 %
	ii) Maint. of existing Bridges	1.24 %
	Sub-Total	12.37 %
7	Research & Studies	2.32 %
8	Training of Forest Officers/Officials in India & abroad	2.78 %
9	Publicity, Nature awareness camp, exposure visit, training of CBO's & ext. Prog./workshop & meeting/evaluation expenses.	2.16 %
10	Operational Support/Establishment	6.50 %
11	Contingencies	5.00 %
	G. Total	100.00 %