Ghanduri Micro Plan

Himachal Pradesh Forest Ecosystem Services (HP-FES) Project

Ministry of Environment, Forest and Climate Change

Himachal Pradesh Forest Department

german cooperation
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The project aims to enable the Forest Department of Himachal Pradesh to introduce the Forest Ecosystem Services (FES) approach in the state's forest management system.
HP-FES

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Shimla, 2019

Micro Plan for Ghanduri

Himachal Pradesh Forest Ecosystem Services (HP-FES) Project

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List of Abbreviations

ACWADAM	Advanced Center for Water Resources Development and Management
BMZ	German Federal Ministry for Economic Cooperation and Development
CBD	Convention on Biological Diversity
CHF	Compartment History File
DBH	Diameter at Breast Height
FES	Forest Ecosystem Services
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HH	Household
HPFD	Himachal Pradesh Forest Department
HPFES	Himachal Pradesh Forest Ecosystem Services
IGA	Income Generations Activities
JFM	Joint Forest Management
JFMC	Joint Forest Management Committees
M&E	Monitoring & Evaluation
MoA	Memorandum of Agreement
MoU	Memorandum of Understanding
NTFP	Non-timber Forest Product
PES	Payment for Ecosystem Services
PMU	Participatory Monitoring Unit
PRA	Participatory Rural Appraisal
RCC	Reinforced Cement Concrete
RF	Reserved Forest
rmt	Running meter
SHG	Self Help Group
VFMS	Village Forest Management Society
WP	Working Plan

1 Introduction

1.1 Forest Ecosystem Service (FES) Approach

The ecosystem approach, as defined by the Convention on Biological Diversity (CBD) in 2000, is the integrated management of ecosystems to promote conservation and sustainable use of the services and goods provisioned by these ecosystems to be enjoyed equitably by all sections of society. These services and goods are together termed as "Ecosystem Services".

The ecosystem services derived from forests came to be referred to as "Forest Ecosystem Services" or FES. The FES Approach may be defined as "Forest Management that aims at sustainable provision of a set of ecosystem services based on stakeholder choices".

The FES Approach states that stakeholders prioritize ecosystem services based on their needs.

The forest management under FES Approach will be guided by the ecosystem service/s thus prioritized, with due importance given to the remaining goods and services.

1.2 Himachal Pradesh Forest Ecosystem Service (HP-FES) Project

1.2.1 Project Background

The German Federal Ministry for Economic Cooperation and Development (BMZ) commissioned Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) to partner with the Himachal Pradesh Forest Department (HPFD) to integrate FES Approach in forest management. The project activities started from April 2016. Using the FES approach in a microplan can facilitate institutionalizing of the approach in management and planning processes of HPFD.

1.2.2 Project Objective

The overall objective of the HP-FES Project is to enable HPFD to introduce the ecosystem approach into its forest management.

For this purpose, Ghanduri is selected as a demonstration site. Microplans for Ghanduri are prepared with the FES prioritized by the dependent communities which includes water, soil conservation and fodder and few non-timber forest product (NTFP).

1.3 Role of Microplan in New Working Plan Code

Since 1837, the Indian forests are managed under working plan (WP) guidelines. However, it evolved with changing society and policy demands. Until the National Working Plan Code (2004), the major focus of these codes was on timber extraction which in turn determined the amount to be planted and harvested. The Honourable Supreme Court of India with its ruling (Dec 1996) towards a blanket ban on green tree felling triggered a policy evolution, of which the first step was the Forest Working and Management Plan Code (2014). This Code facilitates management of Indian forests to improve the provision of ecosystem services to dependent

population. This enabled FES approach in forest management. The FES approach makes participatory forest management plans (now known as microplans) essential in the new working plan code.

The National Working Plan Code 2014 has made provisions for use of microplans as tools for participatory forest management for forest areas under Joint Forest Management Committees (JFMCs) and working circle within the scope of the Forest Right Act 2006 and the Biodiversity Act 2002.

1.3.1 Objectives of the Microplan

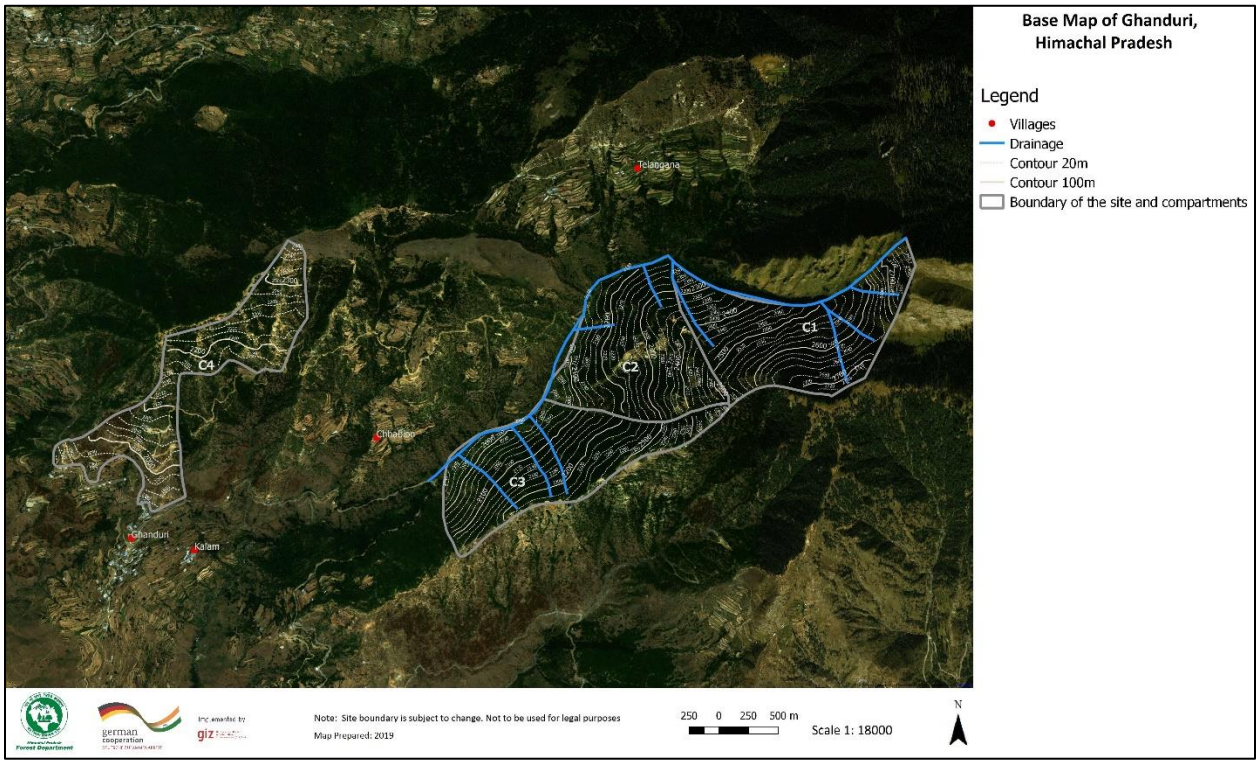
The objective of this microplan is to incorporate ecosystem services into the forest management in the R-5 Ghanduri, a reserve forest of Renuka Forest Division at 17 km from Nohradhar on Nohradhar-Haripur-Dhar road. This falls on the left-hand side of Telangana Nala near to hamlets of Ghanduri. A forest assessment and a participatory rural appraisal (PRA) exercise were carried out as a base to formulate the management objectives of the plan provided in Chapter 5.

1.3.2 Description of Subsequent Chapters of the Microplan

Chapter 2 describes the planning site. It also includes data collection and results of data collection process. Chapter 3 provides the list of elected members of the VFMS Ghanduri along with their phone numbers. Chapter 4 discusses the aims of forest management clearly spelling out the short-term management objectives that leads to mid-term forest management objectives, resulting in long-term objectives of forest management. It is to be ensured that these objectives are in line with the visioning exercise undertaken with stakeholder participants during the PRA exercise. Chapter 5 dwells into the details of activities undertaken for meeting the short-term forest management goals for the prioritized FESs. Chapter 6 discusses the Monitoring and Evaluation plan for activities undertaken to meet the short-term forest management objectives. This chapter will also enlist the indicators for ex-post assessment of the project and its long-term impacts. This is followed by Annexures that support the microplan.

2 Description of the Planning Site

The project site Ghanduri is about 15 kms from Range Office Nohradhar, on the northern side of Nohradhar–Haripur Dhar road. Compartment 1 (C1) to Compartment 3 (C3) of Ghanduri forest form a continuous forest block on the left-hand side of Telangana Nala. and Compartment 4 (C4) is located close to Ghanduri village on the above said road (Map 2.1). The forest type, the area, the vegetation structure and composition of each compartment is given in Table 2.10. It is in Gram Panchayat Ghanduri of Sangrah Development Block, District Sirmour. It falls in Charna beat of Nohradhar Forest Range of Renuka Forest Division. The coordinates of the planning site are given in Table 2.1.



Map 2.1: Base Map of Ghanduri

Name of hamlets in Ghanduri Village are Ghanduri, Kalam, Kando, Chhabion and Telangana (Map 2.1). The rivulet or nala originating from the north of C1 meets the Telangana nala at the confluence of C1 and C2. This Telangana Nala is the lifeline of all hamlets of Ghanduri as it is the main source of water for drinking and irrigation. Water is abundant during rainy season, but decreases as the summer sets in. Compartment No. 1, 2 and 3 of Ghanduri Reserve Forest form the main catchment of Telangana Nala. The health of this forest has a direct bearing on the availability of water in the Nala. Earlier, there used to be a "common" water channel from Telangana Nala to Ghanduri which progressively degraded to become currently non-functional. This led to water mining using motors and alkathene pipes from the nala to Ghanduri. However, the economically weaker section was at the mercy of the rich for the supply of water. The project aims to ensure equitable distribution of water to all dependent inhabitants in hamlets of Kalam, Ghanduri and Kando in Ghanduri village.

The communities from Kalam, Ghanduri, Kando and Chhabion are dependent on the forests for grass, fuelwood, etc. The community are also dependent on forest for seasonal grazing.

Table 2.1: Coordinates of Planning Site in Ghanduri

Direction	Latitude	Longitude
Northern-most Point	30^{0}48'04" N	77^{0}29'40" E
Southern-most Pint	30^{0}47'23" N	77^{0}27'26" E
Eastern-most Point	30^{0}48'00" N	77^{0}29'42" E
Western-most Point	30^{0}47'29" N	77^{0}27'09" E

2.1 Methodology

2.1.1 Environmental Data

Environmental information key to planning process is listed here. The data for Ghanduri site is collected from official records, analyzed and listed in **Table** 2.3 in section 2.2.1 of this plan. This is based on structured field observation, local meteorological data, working plan of Renuka Forest Division. It contains information about rainfall, temperature, type of forest in the planning area.

2.1.2 Demographic Data and User Rights

The demographic data is displayed in Table 2.4. The data was collected using Participatory Rural Appraisal (PRA), baseline survey report, and other secondary sources like documents from the Gram Panchayats, Department of Animal Husbandry and Local Revenue Office.

Mapping and facilitation were the tools used to gather information regarding forest user rights. A google image or map of forest R-5 Ghanduri (C1 to C4) was displayed to the PRA participants. Data on forest user rights was also collected from Forest Settlement Reports. The result of the baseline survey on forest user rights of Ghanduri village comprising of Ghanduri, Kalam, Kando and Chhabion- Telangana were verified and recorded in Table 2.5 under section 2.2.2.

2.1.3 Seasonality of Labour Distribution

Facilitation and matrix were the tools used to collect information on seasonality and labour availability. Materials used were charts and sketch pens. Seasonality of engagement in agriculture, horticulture, wage labour, migration, labour availability for project activities and rain and snowfall were recorded. The calendar was displayed in front of the PRA group and information of months of occurrence; type of work and its availability was gathered and indicated against the corresponding period or month. Response for various variables were probed and recorded in the Table 2.6 under section 2.2.3.

2.1.4 Stakeholder Mapping

Facilitation and stakeholder map were the tools used during stakeholder mapping. The PRA participants were briefed about the concept of stakeholder. A diagram (Figure 2.1) on a chart with four concentric circles and three lines or axes emerging from the central theme of HP-FES was shared with the PRA participants. Almost equal sections were formed with HP-FES. The participants were asked to write names of institutions falling in

the three broader categories namely civil society, private institutions and state institutions, which they considered potential in influencing the Project. The participants provided information that was recorded on the map and translated into Table 2.7 under section 2.2.4.

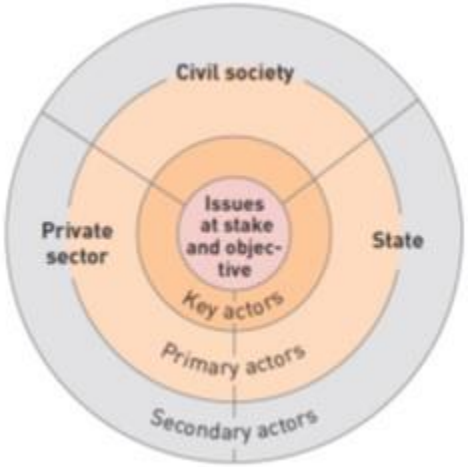


Figure 2.1: Stakeholder Diagram

2.1.5 Institutional Mapping

Through Facilitation and a Venn Diagram (Figure 2.2), the institutional mapping was undertaken to understand how the community members perceive institutions both within the community (in terms of decision making, accessibility, and services) and outside the community (in terms of participation, accessibility, and services). It also helped in identifying potential entry points for strengthening or improving relationships between key social actors while undertaking implementation of the plan.

On the site, the PRA participants identified government institutions as relevant to their procuring the forest ecosystem services and other dependent occupation. The information thus gathered is provided in Table 2.8 under section 2.2.5.

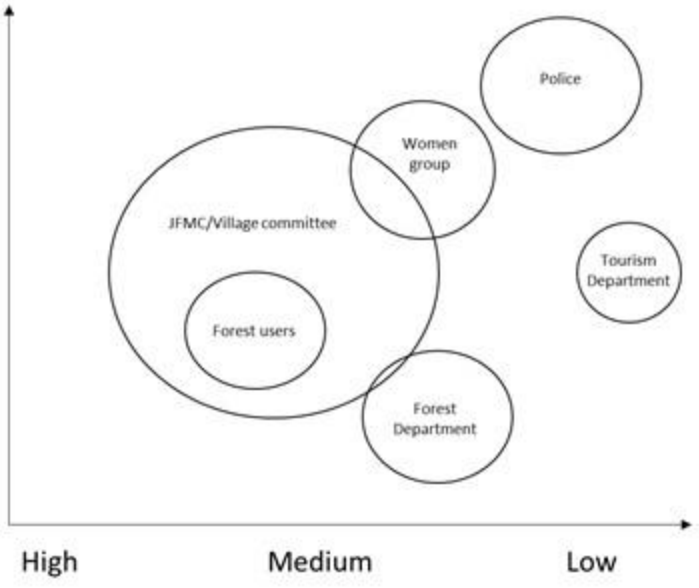


Figure 2.2: Example of Venn Diagram [The big circle is the group for which the relations to institutions is looked at (Village Forest Management Committee or Village community)]

2.1.6 Forest

Data on forest was collected through forest assessment during baseline survey and from documents of HPFD like the Divisional Working Plans, Compartment History Files (CHF), etc.

2.1.6.1 Forest Assessment during Baseline Survey

This section states in brief the methodology for forest assessment used in the baseline survey. The forest assessment served three objectives as given below:

i) Knowing the regenerating tree species
ii) Knowing the human impacts on different forest types
iii) Information of the basal area for each forest type viz. 12/ C1b Moru Oak & Fir/ Spruce and 12/ C1a Ban Oak with scattered Deodar.

The assessment was based on circular plots arranged on a transect. A forest type was represented by at least two transects. The transects were placed in a way that they represent the forest type. Stands or parts of the forest type that were significantly different from other parts were assessed separately.

Allocation of the Transect: The investigator chose a spot representative of the forest type at the beginning of the transect in the forest 10 m from the edge. The transect was oriented along the longest site of the forest type. The first plot was allocated 30m away from the starting point of the transect and all subsequent plots were placed at similar intervals. Holes, riverbeds and similar locations unrepresentative of the stand were skipped and plots installed 30 m further along the transect.

Assessment of Regeneration: Regenerating tree individuals of different sizes were assessed in circular plots of different sizes. Details are shown in Table 2.2. For analysis, the existing data were combined into two categories: seedlings and saplings.

Table 2.2: Plot Size and Data Collected for Different Sizes of Regeneration Trees

Type	Definition	Plot used for assessment	Area of each plot	Data collected (Same for all plots)
Seedling 1	Tree species >0-0.30 m height	Circular plot (r=1 m)	3.14 sq. m	• Species Name • Number of individuals • Number of individual grazed/burnt/cut/others • Number of coppiced individuals • Photo number of species • Herbarium sheet number
Seedling 2	Tree species >0.30 m-1.3 m height	Circular plot (r=1.5 m)	7.06 sq. m	
Sapling 1	Tree species >1.3 m height and DBH <3.18 cm	Circular plot (r=2.5 m)	19.62 sq. m	
Sapling 2	Tree species DBH >3.18 cm-<7 cm	Circular plot (r=4 m)	50.24 sq. m	

Assessment of Human Impact: Signs of human impact (trampling, fire, livestock dung, lopping, resin tapping) were assessed using ocular method within 12m radius and noted as present or absent.

Assessment of Basal Area: Basal area gives an insight about the number and size of trees in an area. The basal area was assessed with the Angle Count Method in seven locations in each forest type. This method calculates the basal area for one tree based on the distance between the tree and the investigator and the diameter at breast height (dbh). The investigator counts the trees that fall in a certain range of dbh (count factor 4 or 2) while turning 360°. The number of trees counted in this manner are multiplied by the chosen count factor to get the basal area for the stand. The figures of all locations were averaged to get the value for the forest type.

2.1.6.2 HPFD Documents like Divisional Working Plan and Compartment History Files

Documents of HPFD used in planning and forest management were also referred. The Compartment History File (CHF) and Divisional Working Plans were referred to study the management objectives used historically, as well as forest use rights and practices by local communities.

2.1.7 Assessment of Forest Ecosystem Services (FES)

Information on the extent of FES use, the quantity used by different households (hhs) and information on the trends of FES demand and availability were gathered and verified during the PRA exercise. Information on the factors or drivers for these trends was also gathered. PRA group was further probed if the FES received were sufficient to fulfill the current demand. All information thus collected is presented in Table 2.11 under section 2.2.7.

2.1.8 Human-Wildlife Conflict

Human-Wildlife conflicts often hamper the well-being of people and information on the same was collected during the PRA. Facilitation and matrix were the tools used in collecting this. Wild animals causing damage to crop were enlisted, and details of the type and extent of damage were discussed. The result of this exercise is given in Table 2.12 under section 2.2.8.

2.1.9 Conflict Management

Conflicts on FES use was discussed with PRA participants. Facilitated focus group discussion and matrix were the tools used to gather data. Issues of conflict with parties were identified and recorded along with their intensity. The PRA group was asked to narrate the conflicts (apparent and latent) on FES which occurred in the past or are ongoing. The information is recorded in Table 2.13 under section 0.

2.2 Results

This chapter provides the results of the data collected as described under the section **Error! Reference source not found.**2.1 and includes information generated in PRA, baseline survey, census data and forest records. It is reproduced in this section in the form of tables and figures, supported by text.

2.2.1 Environmental Data

The results of environmental data are discussed in Table 2.3.

Table 2.3: Environmental Characteristics of Ghanduri

Features	Value	Source
Name of the Site	Ghanduri	-
Name of Hamlets	Kalam, Kando, Ghanduri and Chibayan	-
Elevation Range (m)	2000 m to 2800 m	Toposheet
Annual Average Precipitation (mm)	645 mm (1981 to 1991) Recorded at Renuka	Working Plan (1990-2000 to 2013-14)
As Rain (%)	100%	Working Plan (1990-2000 to 2013-14)
As Snow (%)	Snowfall is common during winter. When it occurs, the snow remains for some time in the forests on northern and northeastern slopes	PRA
Dry Months (with precipitation <50 mm)	Just above the margin (50-52 mm) in the months of November, April, May, October, January and March	Working Plan (1990-2000 to 2013-14) and PRA
Average Number of Frost Days	Not mentioned in the WP	-
Period of Frost	From November to February. Last frost occurs occasionally in March. When it occurs, it is most harmful	Working Plan (1990-2000 to 2013-14) and PRA

Features	Value	Source
Extreme Events	Not mentioned in the WP	-
Temperature (°C/No. of days)	Extreme temperature upto -4°C during winter	PRA
Planning Area (ha)	163.80 ha	CHF
Forest Type and Area (ha)	• 12/C1b Moru Oak & Fir/Spruce (41.60 ha) • 12/C1a Ban Oak with scattered Deodar (122.20 ha)	CHF
Total Area (ha)	163.80 ha	CHF

2.2.2 Demographic Data and User Rights

The demographic data of Ghanduri site is presented in Table 2.4.

Table 2.4: Demographic Data at Ghanduri

Particulars		Number	Source
Population (number)	Female (y)	943	PRA and Panchayat Records
	Male (x)	887	
	Children (below 6 years)		
Gender ratio (adult > 14 years) (number)	x/y	887/ 943	PRA and Panchayat Records
Livestock (number)	Cow	103	Animal Husbandry Record
	Buffaloes	8	
	Bullocks	-	
	Sheep & goat	57 + 107 = 164	
	Horses & mules	8	
Occupation	Government job	-	No data could be collected
	Private job	-	
	Self employed	-	
	Agriculture/Horticulture	-	
	Artisan	-	
Land holding (no of HH) Total 25	Marginal	-	No data could be collected
	Small	-	
	Medium	-	
	Large	-	
Land use (%)	Agriculture	-	No data could be collected
	Grassland	-	

Main crops of the site include garlic in winter, sweet peas and tomato in summer. Most of the private land is irrigated through pipes laid over ground from Telangana Nala (2.2 km away).

The local communities from Ghanduri Village have rights to the Provisioning FES without any encumbrances. The information on the existing rights and their use by villagers as gathered in PRA is reproduced in Table 2.5.**Error! Reference source not found.** The 'Others' column in the table below includes water.

Table 2.5: Forest Use Rights of Communities in Ghanduri

Village Name	Timber		Fuelwood		Grazing		Fodder		Others	
	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.
Kalam	×	✓	×	✓	×	✓	×	✓	×	✓
Ghanduri	×	✓	×	✓	×	✓	×	✓	×	✓
Kando	×	✓	×	✓	×	✓	×	✓	×	✓
Chibayan	×	✓	×	✓	×	✓	×	✓	×	✓

(Ext. = user right holders outside Ghanduri; Int. = user right holders inside Ghanduri; × = No; ✓= Yes)
Source: PRA at Ghanduri, forest settlement records and facilitation through interview

2.2.3 Seasonality of Labour Distribution

The information on seasonality of labour distribution is important for planning the implementation of activities. The information collected during PRA using the season calendar is presented in Table 2.6. Agriculture or horticulture activities are continued throughout the year.

Table 2.6: Seasonal Calendar for Microplan Activities for Ghanduri

Seasonal activity & climatic events	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Wage Labour												
Agri/Horticulture												
Grass/Fodder												
Rains												
Snow/Winter Rains												
Frost												
Irrigation												
Fuelwood												
Legends												
	Fully Occupied (full month)											
	Partially Occupied (15 days/month)											

2.2.4 Stakeholder Mapping

There are a series of stakeholders who needs to be considered in the planning site. Among them the local communities and HPFD are the key stakeholders including groups such as the Self-Help Groups (SHG), an effective vehicle for women empowerment who could play an important role in regulating the FES use. The results from stakeholder analysis exercise of PRA are presented in Table 2.7.

Table 2.7: Stakeholders of Ghanduri

Type	Key	Primary	Secondary
Civil Society	• Local Communities • Self-help Groups	• Mahila Mandal • Anganwadi • Krishak Mandal	Horticulture Cooperative Society
State	• HPFD • Panchayat	• School • Patwari (Revenue Department)	• IPH • Animal Husbandry Dispensary • Health Sub Centre • Agriculture & Horticulture Department
Private	None	None	None

2.2.5 Institutional Mapping

Many institutions are identified in the planning site and were put together graphically in the form of an institutional map during the PRA. The institutions, their importance, relevance and relations with local communities and with each other were probed. The results of the exercise are presented in Table 2.8.

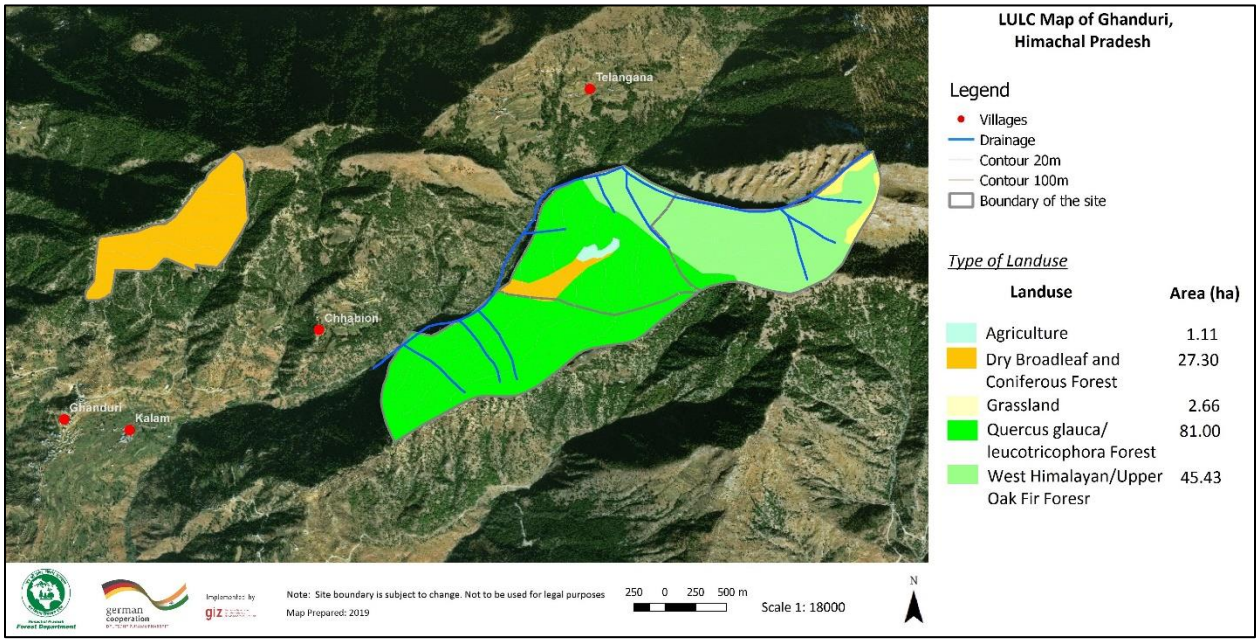
Table 2.8: Institutional Mapping of Ghanduri

Particulars/ Item	Institutions			
Importance	HPFD	Self Help Groups Mahila Mandal	IPH, Agriculture & Horticulture Department	Revenue Department. Krishak Mandal
Relevance	H	M	M	L
Relation	H	M	L	L
Conflict	L	L	L	L

Note: H: High, M: Moderate, L: Low, G: Good

2.2.6 Forest

The site consists basically of three forest types: Dry Broadleaved and Coniferous Forest, *Quercus glauca/leucotricophora* Forest and West Himalayan/Upper Oak Fir Forest (Map 2.2). A total of five plots were laid each in *Quercus glauca/leucotricophora* Forest and West Himalayan/Upper Oak Fir Forest while a total of ten plots were laid in Dry Broadleaved and Coniferous Forest for the assessment of the human disturbance, tree species regeneration and basal area.



Map 2.2: Landuse/Landcover Map of Ghanduri

2.2.6.1 Forest Assessment during Baseline Survey

- Human disturbances in different forest types of Ghanduri

  Although the forest types in Ghanduri are not affected by fire, cutting and lopping were found to be the major human disturbances in the Dry Broadleaved and Coniferous Forest and *Quercus glauca/leucotricophora* Forest. Table 2.9 shows percentage of plots having signs of human interference in each of the forest type.

Table 2.9: Percentage of Plots in which Signs of Human Interference were observed in Ghanduri

Forest Type	Fire	Cutting	Trampling	Lopping	Resin	Track	Dung
12/C2b West Himalayan Upper Oak/Fir Forest	0	20	0	0	0	60	0
13(i)/C1 Dry Broadleaved & Coniferous Forest	0	40	40	80	0	50	0
Quercus glauca/leucotricophora Forest	0	60	20	80	0	20	0

- Regeneration in different forest types of Ghanduri (Figure 2.3)

  - Regeneration in Western Himalayan Upper Oak/Fir Forest: In this forest type, no species was found to be regenerating

  - Regeneration in Dry Broadleaved & Coniferous Forest: A fair number of seedlings were found to be regenerating in this forest type. The species having highest number of seedlings were *Quercus dilata* followed by *Quercus leucotricophora*. However, the number of saplings were lesser compared to the number of seedlings. This indicates the presence of human disturbances in the area.

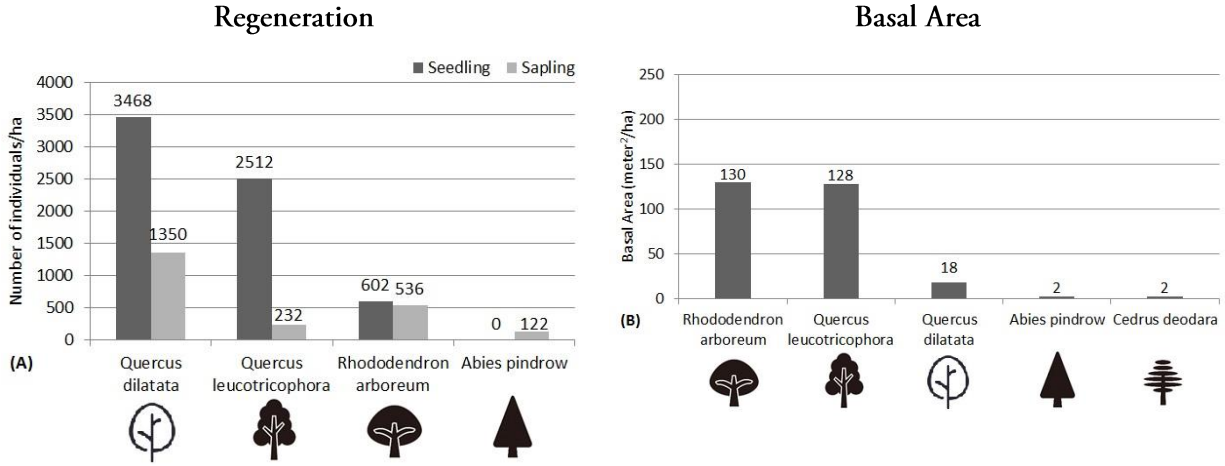
  - Regeneration in *Quercus glauca*/*leucotricophora* Forest: No species was found to be regenerating in this forest type.

- Basal Area in different forest types of Ghanduri (Figure 2.3)

  - Basal Area in Western Himalayan Upper Oak/Fir Forest: *Abies pindrow* has the highest basal area in this forest type.

  - Basal Area in Dry Broadleaved & Coniferous Forest: The species having highest basal area in this forest type *Quercus leucotricophora* and *Rhododendron arboreum*.

  - Basal Area in *Quercus glauca*/*leucotricophora* Forest: This forest type was represented by *Rhododendron arboreum* having basal area of 214 m^2/ha followed by *Quercus leucotricophora* having basal area of 70 m^2/ha.



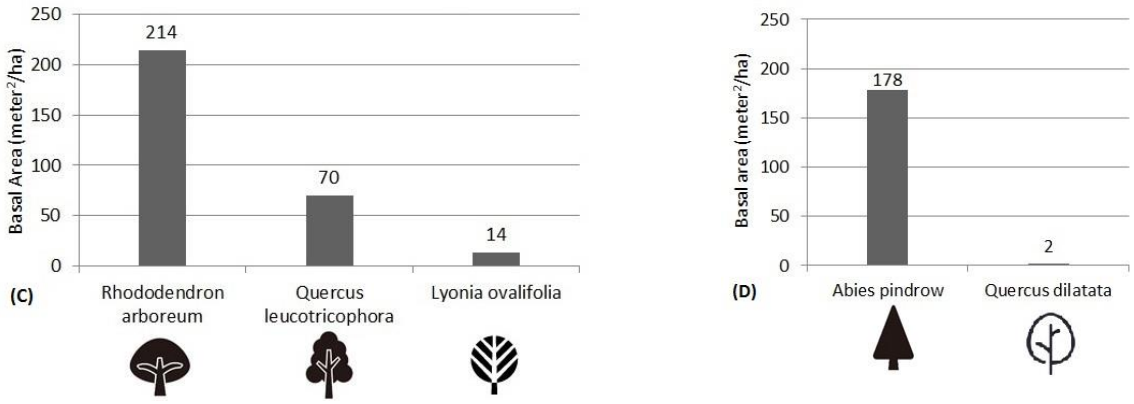


Figure 2.3: Regeneration and Basal area in different forest types of Ghanduri [A: Regeneration in Dry Broadleaved and Coniferous Forest, B: Basal Area in Dry Broadleaved and Coniferous Forest C: Basal Area in *Quercus glauca*/*leucotricophora* Forest, D: Basal area in West Himalayan Upper Oak/Fir Forest, No regeneration was found in *Quercus glauca*/*leucotricophora* and West Himalayan Upper Oak/Fir Forest]

2.2.6.2 HPFD Documents like Divisional Working Plan, Compartment History Files and PRA

The description of each of the compartment in the Ghanduri is shown in Table 2.10. In compartment C4 towards the Ghanduri hamlet blanks were planted with Chil. A substantial blank remains adjoining to the private lands of Ghanduri Hamlet above Patwarkhana and on either side of newly constructed road to Telangana Hamlet in front of C1.

Table 2.10: Description of Forest Compartments at Ghanduri

Compartment	Forest Type	Area (ha)	Vegetation structure & composition
C1	12/C1b (Moru Oak forest)	41.60	• Elevation: 2000 m to 2797 m • Top Pathe Ka Tibba to Telangana Nala. Supports Fir and Spruce (39 Ha) with Moru Oak (2.60 Ha) and other BL Species. • Dotted blanks are found in the eastern half. • It is the main recharge Zone of the Springs below.
C2	12/C1a (Ban Oak Forest)	44.20	• Elevation: 1960 m to 2719 m • Supports well stocked crop of all age classes of Ban Oak and Moru Oak dotted with deodar. • Other allied Broadleaved species like *Rhododendron* also present.

			• Blank spots are present towards the south of included cultivation (Buti Dochi).
C3	12/C1a (Ban Oak Forest)	44.20	• Elevation: 1920 to 2400 m • Ban Oak Forest with scattered Deodar and Other Broadleaved species.
C4	12/C1a (Ban Oak Forest)	33.80	• Moderately stocked middle aged to mature crop of Ban Oak and other Broaleaved species. • Dotted blanks also exist. • Western half is a grassy blank with little encroachment in the portion below road to Telangana. • The quality of Ban is quite inferior due to southern aspect and proximity to the habitation.

Source: Compartment History File, HPFD and Transect Walk.

2.2.7 Forest Ecosystem Service

Most of the households use fuel and fodder from the Ghanduri reserve forest. Water source of the entire Ghanduri village is the Telangana Nala originating from the Ghanduri RF. The FES derived from Ghanduri, its trend and drivers are presented in Table 2.11.

Table 2.11: Forest Ecosystem Services: its rank, trends and drivers

Category	Service	Rank	Sub-category	% HH using FES (Approx.)	Annual amount used		Quantity sufficient (Y/N)	Trend	Driver
					Total	Avg. no. of HH using FES			
Provisioning	Fuelwood	3	Dry trees/ twigs	50%	ND	ND	Y	↔	Decrease in Use
	Fodder/ Grass	4	Green leaves & grass	80%	ND	ND	Y	↓	Decrease in use
	Timber	5	Construction purpose	20%	ND	ND	N	↔	Alternative use of steel
	NTFP	8	Medicinal plants	10%	ND	ND	Y	↔	No new Use
		7	Wild Mushrooms /Fruits	ND	ND	ND	Y	↓	Alternatives are available
		6	Rhododendron flowers, dry leaves/ leaf Litter etc.	ND	ND	ND	Y	↔	No new use

Regulating	Example: Watershed protection	1	Soil and Water Conservation	100%	ND	Entire Community use water sources	Y	↓	Decreasing Rainfall, Increasing Agri-use
		1	Water purification	10%	ND	Natural Water source is clean	Y	↓	Spring water is pure
	Climate	2	Clean Air, Rainfall	100%	ND	ND	Y	↔	Some pollution during summer
Cultural	Aesthetic	9	Ecotourism	None	ND	ND	Y	↔	Big Potential
	Recreational	9	Picnic/ social gathering	None	ND	ND	Y	↔	Spill over from other tourist site
	Spiritual	9	Pathe ka Tibba	20%	ND	Entire Community	Y	↔	Annual worship of the Forest Deity

Note: Trend – Decreasing: ↓ Increasing: ↑ No change: ↔, ND: No Data available

2.2.8 Human-Wildlife Conflict

Human-Wildlife conflicts often hamper the well-being of people and information on the issue was facilitated during the PRA exercise. Information about wild animals causing damage to crop and livestock in the project site was gathered and is given in Table 2.12.

Table 2.12: Human Wildlife Conflict: Type and Extent of Damage

List of Wild animals	Type of Damage	Extent of damage
Monkeys	From Crop sowing to harvesting	Medium
Hare/ Rabbit	Maize, Wheat, Barley and Peas on germination	Low
Leopard	Cattle and Pets	Low

2.2.9 Conflict Management

During the PRA, it was gathered that some conflict exist over grazing rights with adjoining Charna village communities (Table 2.13). On the upper ridges of C1 compartment, there are instance of transhumance who trespass the forest area at certain times. They also have points of temporary camping on the other side of the ridge. There is no other conflict observed in the area.

Table 2.13: Intercommunity Conflict for FES at Ghanduri

Conflict type	Conflict with	Intensity
Water	Conflict between haves (who engage in water mining using alkathene pipes even from a distance of 2 km from the nala) and have-nots (who are at the mercy of the haves)	Low
Transhumance	Gaddi and Guzzars	Low
Local Graziers	Grazing by adjoining Charna communities	Low
Fuelwood & Fodder	Sporadic collection by Charna community	Low

3 Village Forest Management Society (VFMS) Ghanduri

Village Forest Management Society (VFMS) of Ghanduri Project Area consisting of representatives of communities from Kalam, Ghanduri, Kando and Chibayan hamlets was constituted on 27th June 2018. It is registered under the Himachal Pradesh Society Registration Act, 2006 with Sub-Divisional Magistrate Sangrah. There are more than 30 members in this VFMS and has an executive consisting of 13 members. The details of the members are given in Table 3.1.

Table 3.1: Details of Executive Members of Ghanduri VFMS

S. No.	Name Father's/ Husband's Name	Address for Correspondence (P.O. Ghanduri, Tehsil Nohra, Distt. Sirmour, HP Pin 173104)	Designation	Occupation and Mobile No.
1	Sh. Meen Singh S/o L/ Shri Attar Singh	Ghanduri	President	Farmer 9805220304
2	Sh. Virender Kumar, Dy. Ranger	B.O. Charna, Nohra Forest Range	Ex-Officio Treasurer	Deputy. Ranger 9816396169
3	Sh. Jagdish Thakur	Gandhuri	Member Secretary	Farmer 8894171666
4	Smt. Lakshmi Devi W/o Mr. Virender Kumar	Gandhuri	Executive Member	Housewife 7807269443
5	Smt. Reena Devi W/o Mr. Yashpal	Kando	Joint Secretary	Housewife 8894657347
6	Smt. Yoglata W/o Sh. Kapil Sharma	Gandhuri	Executive Member	Housewife 9805521655
7	Shri Raghunath Thakur S/o L/Sh. Mani Ram	Ghanduri	Executive Member	Farmer 9882223667
8	Smt. Surendra Devi W/o Mr. Joginder Singh	Gandhuri	Executive Member	Housewife 9816168313
9	Smt. Lalita Devi W/o Mr. Jagat Singh	Kando	Executive member	Housewife 9805759316
10	Smt. Snehlata W/o L/ Sh. Sunil Kumar	Kando	SHG Member	Housewife 9816576732
11	Smt. Deepo Devi W/ o Sh. Hemant Kumar	Chibayan	SHG Member	Housewife 9459817250
12	Sh. Roshan Lal S/o Sh. Molu Ram (Up-Pradhan)	Gandhuri	*Ex-officio Member*	Farmer 9418814469
13	Shri Basti Ram Forest Guard	Fgd, Charna Beat Nohra Ft. Range	*Ex- Officio Member*	Forest Guard 9816242643

4 Aims of the Management Plan

Based on PRA, the forest vegetation assessment and discussions with all stakeholders, the objectives for long-term, mid-term and short-term planning periods are defined (Table 4.1). The long-term and short-term planning sets the context for the orientation of this microplan and determines the measures suggested.

Table 4.1: Management Plan for Ghanduri

Plan Term	Water	Fuel & Fodder	Forest composition & structure	Measures
Long Term (30 years)	Irrigation water is available to all on equitable basis.	Fuel and fodder supply is sufficient to meet the changing demands of the local communities.	Degraded patches regenerates and there is increased natural regeneration	• Effective protection of the Water Recharge Zone in C1 by barbed wire fencing with angled iron fence posts along the ridge and stone wall fence along the Nala. • Group planting in gaps and enrichment planting in less stocked patches of C1 and C2. • Tall planting in a blank in C4 of Ghanduri reserve forest.
Mid Term (15 years)	Water supply in Telangana Nala is increased by 10%.	Fuel and Fodder demands, though decreased, are fully met with.	Degraded patches in groves improves and shows natural regeneration	• Social and physical fencing in place. • Social regulation on water, fodder and fuelwood distribution in place.
Short Term (5 years)	Water flow is increased by 5 % of baseline value.	Fuel and fodder demand, though decreased, are fully met with.	Groves plantation at degraded patches survives and regenerates	• Social and physical fencing in place • Social regulation on water, fodder and fuelwood distribution in place. • Communities realize forest as prime economic driver for irrigation-based crop and maintain the system under the microplan.
Project Period (till April 2020)	Water flow has not reduced within project period in similar rainfall.	Current fuelwood and fodder supply are maintained by community participation in regulation.	Enrichment planting done to fully stock the forest.	• Improvement of canopy density by group plantation in gaps. • Enrichment plantation. • Tall planting in blank.

5 The Plan (for 5 years)

During the PRA most of the community prioritized forest ecosystem services in order of water, fodder and fuelwood derived from R-5 Ghanduri. Therefore, the activity plan revolves around augmentation of water in the springs of Telangana nala and improvement in the availability of fodder and fuelwood.

A zone-wise management approach was evaluated with the community based on the zones used for accessing the forest ecosystem services (Table 5.1). Since PRA has identified water as the most prioritized ecosystem service, an additional input on aquifers and stream recharge was brought in by hiring specialized agency on geohydrology. As per the ACWADAM (Advanced Center for Water Resources Development and Management) report for water recharge area of springs in Telangana nala, the areas delineated as recharge zone comprises of almost entire area falling in Compartment 1 of Ghanduri reserve forest. The remaining compartments 2, 3 and 4 are categorized as Fuelwood and Fodder Zones. All FES zones for water, fodder and fuel are demarcated on the base map (Map 5.1).

Based on Table 5.1, physical and social interventions are planned and evaluated with the help of the community as it would need their support as following strict regulations. These interventions are aimed to achieve augmentation of FES and hold any degradation in near future. Water recharge zone in C1 needs effective closure from grazing by local and transhumance (though does not stay they pass the boundary of C1 along the upper ridge in transit). Though the transhumance population does not stay in the area they pass. Given that the compartment is well stocked except for certain blanks, grove plantation for enrichment of blanks is proposed. It is likely to be efficient to monitor the fencing as the area would be small. For fuelwood and fodder zone, Enrichment Planting in groups in less stocked patches has been suggested in C4 as the area lies in the vicinity of the villages. It has resulted in intervention map (Map 5.2) built on base map. Table 5.2 and Table 5.3 provides summary of physical treatments planned for Water conservation zone and Fuelwood and fodder zone, respectively.

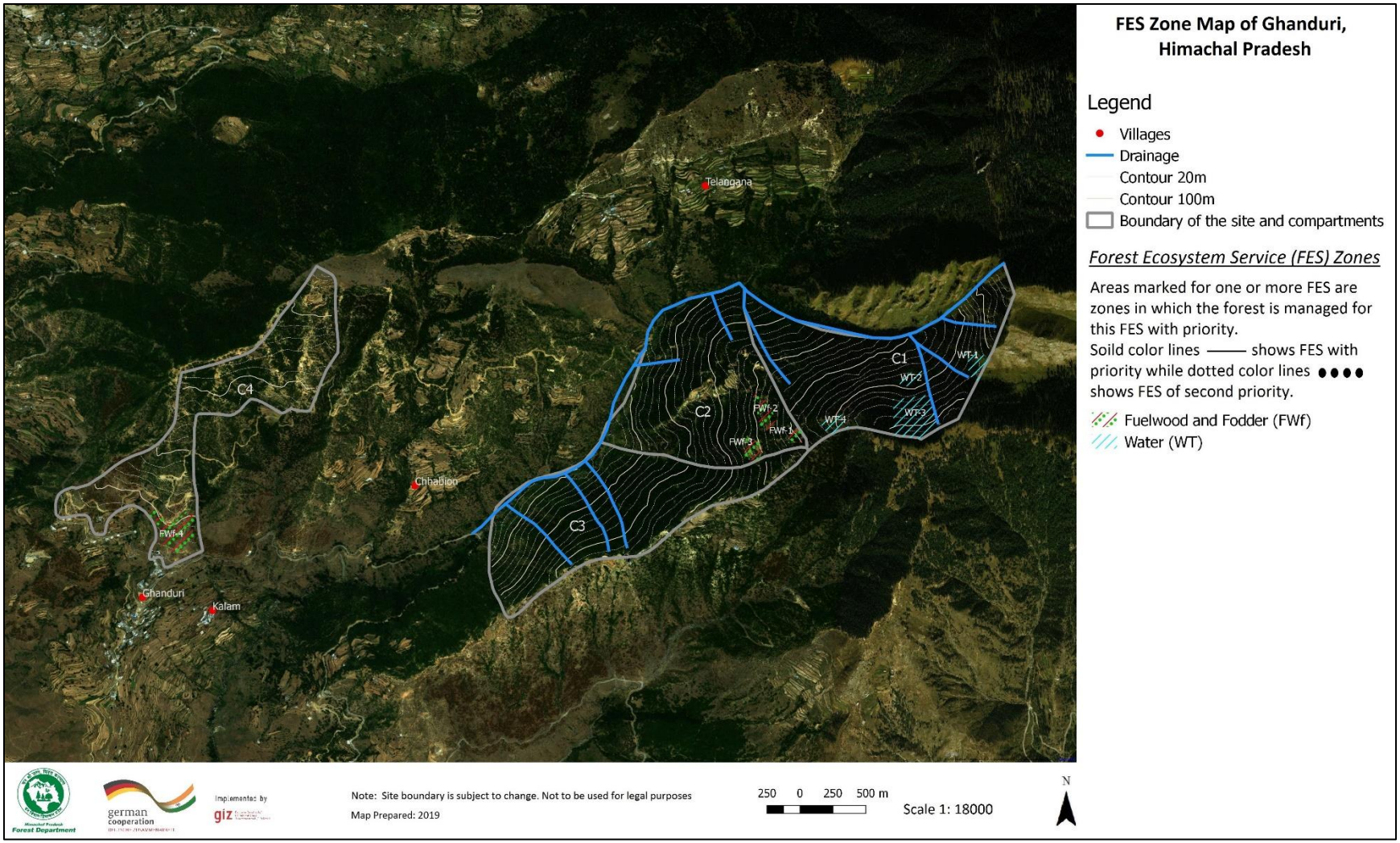
Table 5.1: Zone-wise Management Plan of Ghanduri

FES Zone*	Priority FES	Area (Ha)	Compartment No.	Description	Treatment Planned	Proposed Species
W-1	Water	0.80	C1	• This lies below ridge pass of C 1 • Altitude: 2620 – 2670 m	• No separate fencing needed • To be planted with suitable BL species at 2.5 X 2.5 m spacing	Broadleaved species
W-2	Water	0.40	C1	• This lies to the middle of C1 above the cliff • Altitude: 2580 – 2600 m	• No separate fencing needed • Enrichment Planting at 3.00 x 3.00 m spacing	Broadleaved species
W-3	Water	3.00	C1	• This patch lies towards the southern boundary of C 1 • Fairly stocked with Spruce and Fir • Altitude: 2632m -2692m	• B/wire fencing with AI Posts along the ridge and no fencing inside. Length – 210 m. • Enrichment planting with available BL and conifer species.	Broadleaved and conifer species
W-4	Water	0.60	C1	• This blank lie along the ridge boundary of C 1 towards Charna. • Altitude: 2540 – 2600 m	• B/ Wire fencing with wooden poles in three strands • Enrichment planting at 3.00 X 3.00 m spacing	Deodar and Broadleaved species Perimeter: 320 m
-	-	-	C1	Nearly flat patch at the end of C1 boundary towards Telangana Nala at the confluence of boundary with C2.	Sunken Pond for water retention and percolation. Location –30^0 48' 01.20" N 77^0 28' 59.50" E	Size: 12 x 8 x 1.5 m Altitude: 2195 m
-	-	-	C1	• Top of C1 along the ridge • The depression/pass over to the other side of the slope	• Barbed Wire Fencing with Angle Iron along the ridge boundary of C1.	Effective closure will improve the natural Forest for water recharging.

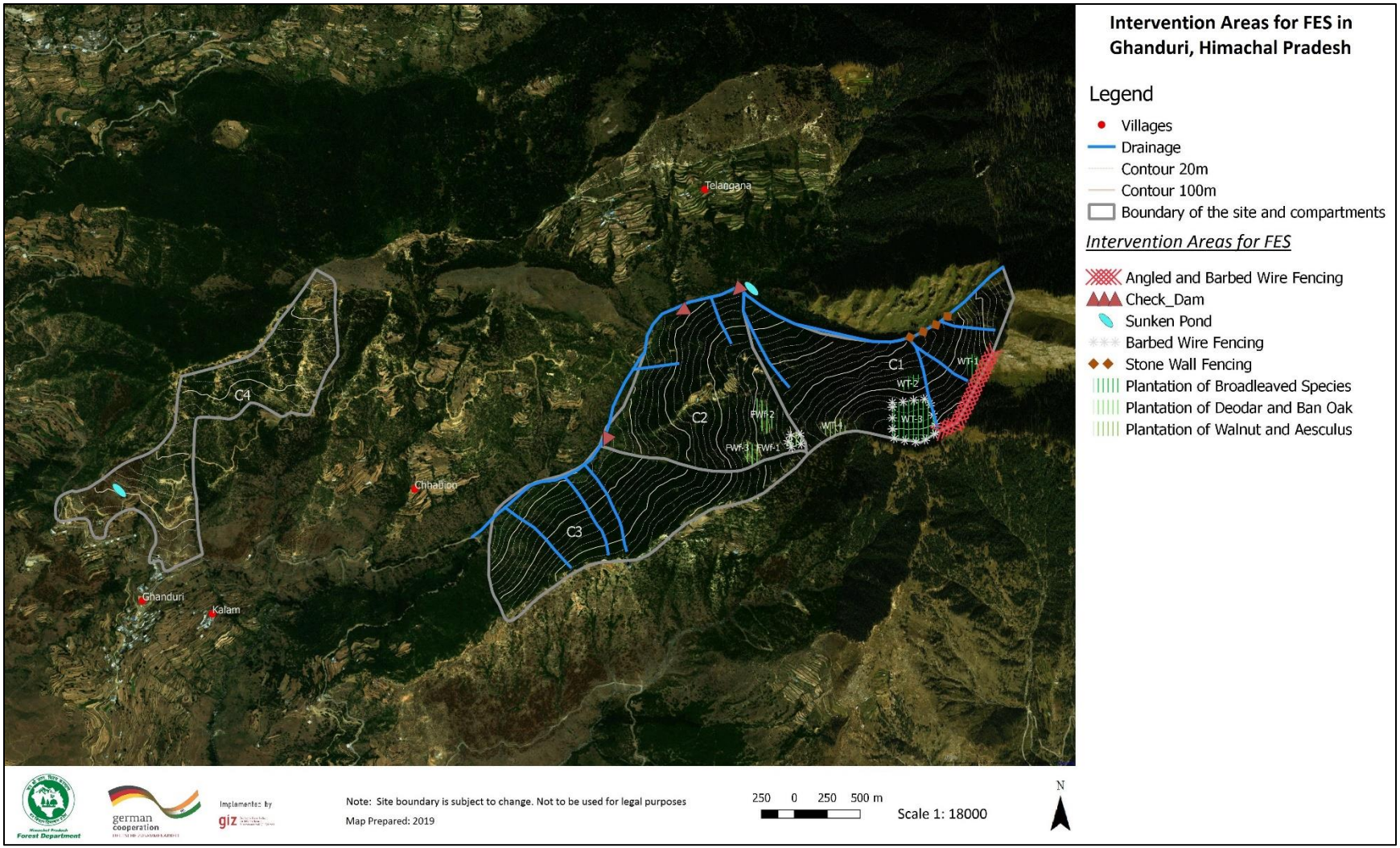
FES Zone*	Priority FES	Area (Ha)	Compartment No.	Description	Treatment Planned	Proposed Species
				• Movement of migratory herds in the area	• This will prevent the entry of migratory Herds from entering the forest enroute. • Three strands of B/wire with two cross wires. Length 424 Meters.	0.50 x 0.50 x 0.5 mm
-	-	-	C1	Grazing pressure	Plenty of boulder stone available for constructing stone wall fence along the Nala side boundary of C 1. 242 m x 0.5 m x 1.00 m	Effective closure with available material on site.
-	-	-	C1	The flow of water and sediments in Telangana Nala needs to be checked for soil and water conservation	Check Dams are to be constructed in the Telangana Nala along the boundary of C2	3 check dams of suitable sizes.
FWf-1	Fuelwood & Fodder	0.30	C2	• This blank lie in the Top of C2. Slope facing towards south west. • Altitude: 2450 m to 2500 m	• Enrichment planting of Conifer and Broadleaved species • Hill Bamboo in Depressions	Deodar, Ban Oak and Hill Bamboo. Perimeter: 215 m
FWf-2	Fuelwood & Fodder	0.85	C2	• This blank lie towards south of Buti Dochi (included cultivation) in C 2 • Altitude: 2390 m to 2430 m.	• Enrichment planting of Conifer and Broadleaved species • Hill Bamboo in Depressions	Deodar, Ban Oak and Hill Bamboo. Perimeter: 405 m

FES Zone*	Priority FES	Area (Ha)	Compartment No.	Description	Treatment Planned	Proposed Species
FWf-3	Fuelwood & Fodder	0.55	C2	This blank lie along boundary of C2 with C3 towards south.	• Enrichment planting of Conifer and Broadleaved species • Hill Bamboo in Depressions	Deodar, Ban Oak and Hill Bamboo. Perimeter: 291 m
FWf-4	Fuelwood & Fodder	2.24	C4	• In C4 above Ghanduri hamlet on lower side of Approach road to Telangana • Moderate South west • Scattered and stunted Ban Oak • Altitude: 1920 m to 1980 m	• Plantation of Deodar and *Robinia* • Grass Cut and carry system • No Grazing • Existing upper stone wall fence to be strengthened and remaining boundary to be B/ wire fenced with RCC fence posts	• Deodar, Ban oak and *Robinia* • Stone Wal fence 80 m • RCC post fence 415 m
-	-	-	C4	• Blank area above approach road to Telangana above Ghanduri Hamlet • Used as grazing ground for cattle and playground for children.	Sunken Pond for water retention and cattle Location – 30^0 47' 33.19" N 77^0 27' 17.54" E	Size: 15 x 10 x 1.5 m Altitude: 2000 m

* Solid colour lines show the priority FES while the dotted colour lines show the FES of second priority. The combination of two lines shows that the zone has two FES, with different priorities



Map 5.1: FES Zone Map of Ghanduri



Map 5.2: Intervention Map of Ghanduri based on 5-year plan

5.1 Summary of Physical Treatment in Water Conservation/Recharge Zone

Table 5.2: Activity Plan for the Water Conservation/Recharge Zone

FES Zone	C No.	Name of Activity	Formation Cost		Maintenance Cost in Year					Other Expdt.	Total Cost (₹)
			Fencing	Planting	1st	2nd	3rd	4th	5th		
W-1	C-1	Group -1 (C1) - Normal Planting 1100 Plants per Ha - 0.80 ha	0	25986	4104	2784	2112	1456	1456	0	37898
W-2	C-1	Group -2 (C1) - Enrichment Planting 800 Plants per Ha (0.40 ha)	164	9230	1512	1000	760	520	520	0	13706
W-3	C-1	Group - 3 (C1) - Enrichment Planting 800 Plants per Ha (3.00 ha)	123800	60978	11340	7500	5700	3900	3900	0	217118
W-4	C-1	Group - 4 (C1) - Enrichment Planting 800 Plants per Ha - 0.60 ha & Perimeter - 320 Mt. fencing in 3 strands)	30583	13096	2268	1500	1140	780	780	0	50147
-	C-1	Barbed Wire Fencing with Angle Iron Posts (50x50x5mm) on top of C1 (Length - 423 Rmt, 132 posts of 1.90 m with 5 strands of B/Wire)	230868	-	-	-	-	-	-	0	230868
-	C-1	Stone Wall Fence along the Nala side Boundary of C1 (200 Rmt. - 0.5x1.00m)	85523	-	-	-	-	-	-	0	85523
-	C-1	Construction of Check Dams in Telangana Nala - Ghanduri RF (C2 & C3)	-	-	-	-	-	-	-	60132	60132
-	C-1	Construction of Sunken Pond at the confluence of C1 & C2 along Telangana Nala in Ghanduri RF	-	-	-	-	-	-	-	48218	48218
		Nursery cost of plants	0	81774	18789	11487	7399	4089	4089	0	127626
		Total	**470938**	**191064**	**38013**	**24271**	**17111**	**10745**	**10745**	**108350**	**871236**

5.2 Summary of Physical Treatment in Fuelwood and Fodder Zone

Table 5.3: Activity Plan for Fuelwood and Fodder Zone

FES Zone	C No.	Name of Activity	Formation Cost		Maintenance Cost in Year					Other Expdt.	Total Cost (₹)
			Fencing	Planting	1st	2nd	3rd	4th	5th		
FWf-1	C2	Enrichment Planting 800 Plants per Ha - Group 1 (C2) (Area - 0.30 ha & Perimeter - 215 Mt. fencing in 3 strands)	20531	7298	1134	750	570	390	390	0	31063
FWf-2	C2	Enrichment Planting 800 Plants per Ha - Group 2 (C2) (Area - 0.85 ha & Perimeter - 405 Mt. fencing in 3 strands)	38703	17927	3213	2125	1615	1105	1105	0	65793
FWf-3	C2	Enrichment Planting 800 Plants per Ha - Group 3 (C2) (Area - 0.55 ha & Perimeter - 291 Mt. fencing in 3 strands)	27801	12129	2079	1375	1045	715	715	0	45859
FWf-4	C4	Tall Planting 1100 plants per ha Group 4 (C4) (Area 2.24 ha & Perimeter- 415 mt. with RCC fence posts in five strands and 80 mt. for Stone wall)	133951	78828	7182	4872	3696	2548	2548	0	233625
-	C4	Construction of Sunken Pond in C4 above approach road to Telangana above Ghanduri Hamlet	0	0	0	0	0	0	0	48218	48218
		Nursery cost of plants	0	95132	20986	12798	8285	4637	4637	0	146475
		Total	**220986**	**211314**	**34594**	**21920**	**15211**	**9395**	**9395**	**48218**	**571033**

Note: The above Summary of expenditure is inclusive of Nursery cost of plants as per HPFD rates for 2018-19 (Annexure III)

5.3 Summary of Human Capacity Building

Apart from the richness in ecosystem services, the site also boosts of strong women groups who try to microfinance their agriculture needs for example seeds for sowing with the help of Self-Help Groups (SHGs). However more capacity building is needed within the project as well as additional support from NABARD agencies. SHG meetings also provide a gender specific platform to discuss other issues related to regulation in forest resource as mostly women are prime users of fodder and water for their households. A two-day capacity building workshop (Table 5.4) has been proposed in the project which is likely to be followed by convergence.

Table 5.4: SHG Livelihood Improvement: Training Budget (two workshops a year)

S. No.	Particulars	No of SHGs	No of Persons	Rate (₹)	Amt. (₹)	1st year		2nd year		Total	
						Phy.	Fin. (₹)	Phy.	Fin. (₹)	Phy.	Fin. (₹)
1	Refreshment/Lunch	14	12	160	26,880	-	-	-	-	-	-
	Stationary	14	12	30	5,040	-	-	-	-	-	-
	Resource Person (Honorarium and Travel)	2	4	2,500	20,000	-	-	-	-	-	-
	Banner and Photography	2	2	250	1,000	-	-	-	-	-	-
	Total	-	-	-	52,920	-	52,920	-	-	168	52,920
2	Refreshment/Lunch	12	12	160	23,040	-	-	-	-	-	-
	Stationary	12	12	30	4,320	-	-	-	-	-	-
	Resource Person (Honorarium and Travel)	2	4	2,500	20,000	-	-	-	-	-	-
	Banner and Photography	2	2	250	1,000	-	-	-	-	-	-
	Total	-	-	-	48,360	-	-	144	48,360	144	48,360
Grand Total						**-**	**52,920**	**144**	**48,360**	**312**	**1,01,280**

6 Monitoring and Evaluation (M& E) Framework

A participatory framework is established to monitor the efforts made by the stakeholders, the flow of Ecosystem service and related forest management goal. The participatory framework will be segregated in two sections as given below:

- Monitoring and Evaluation by the Forest Department (in-house/outsourced infrastructure support): This system will timely evaluate vegetation and other related ecosystem service flow through the GIS-based map of JFM areas, with village boundaries.

- Participatory Unit: This will be instrumental in providing ground truthing of vegetation growth and related improvement of the ecosystem service flow and appropriate protection measures in a frequency of every two years. This will also assess the commensurate improvement in livelihood through socio-economic survey. The participatory unit will do the monitoring and evaluation based on clearly agreed protocol on rights and responsibilities of all stakeholder parties.

Monitoring and Evaluation Plan with Indicators are provided in Table 6.1.

Table 6.1: Monitoring and Evaluation Plan

S. No.	FES	Measures to be monitored	Baseline value	Target value	Indicator	Means of verification	Responsibility
1	Water Increase of water supply of spring in Telangana Nala	M1: Availability of water flow and seasonality especially during summer months of May to June	0 (data from ACWADAM report)	Sufficient water availability during summer season.	Crops don't dry up due to lack of irrigation water during summers.	Record keeping by Participatory Monitoring Unit (PMU)	PMU (part of Village Forest Management Committee unit)
2	Fuel & Fodder Continued or improved fuel or fodder supply	M2: All the blanks are fully stocked with plantation.	6 degraded patches visible in google earth C2 & C4. 0 fodder bundles	0 Degraded patches 10% increase in fodder bundle and fuelwood bundle	Continued availability of fuel and/or fodder.	Record keeping of the number of headloads of fuel/ fodder.	PMU of VFMC

S. No.	FES	Measures to be monitored	Baseline value	Target value	Indicator	Means of verification	Responsibility
			0 fuelwood bundles				
3	Livelihoods	Formation of women SHGs	Existing SHGs	All women from BPL families covered under SHGs	Women know the importance of SHG in their livelihoods	Number of SHG increased and some started IGA.	PMU of VFMC

7 Recommendations

Ghanduri catchment covers an area of around 163.80 ha. Sumel makes the mainstream and a high discharge perennial spring joined by several small seasonal streams. The stream is tapped at several places along its course through a pipeline system that takes water to individual households and small farms of Ghanduri village. It is an important source of water for domestic including drinking water, livestock as well as for irrigation purposes to cash crops like garlic and ginger. It was highly required to take up a special study to provide accurate assessment of spring recharge zones. Thus, a special study was assigned to ACWADAM* and People Science Initiative to provide assessment of geohydrological features of these springs, their recharge zones, soil water measures to be taken up. The report was taken as recommendations for locating soil water conservation measures as well social restriction on grazing to maximize spring recharge.

At next level, the microplanning discussions recommended that farmer community to be motivated to take up the drip irrigation and other such micro-irrigation instead of flood irrigation to maximise the crop output on principle of more crop per drop. It is recommended to take up demonstration in mode of Public-private partnership (PPP) with subsidy support from private companies who are already leading in micro-irrigations.

8 Annexures

Annexure I: Details of Interventions in Water Conservation/Recharge Zone

Annexure 8.1: Details of Barbed Wire Fencing with Angle Iron Posts (50x50x5mm) on Top of C1 (Length - 423 rmt, 132 posts of 1.90 m with 5 strands of Barbed Wire)

S. No.	Particulars of work	No.	Length	Breadth	Depth	Volume	Rate (in ₹)	Amount (in ₹)
1	Excavation of pits - P/Jumper work at 3 m spacing	132	0.45	0.45	0.45	12.03	222.80	2679.95
2	Fixing of angle iron (AI) posts in CC 1:3:6 i/c strutting	132	-	-	-	-	6.82	900.24
3	Laying of CC in foundation of AI posts in 1:3:6 - as per item No. 1	-	-	-	-	12.03	400.60	4,818.62
4	Fixing of barbed wire in AI fence posts -Five strands with a spacing of 30, 28, 25, 25, 25 cm from top to bottom and 42 cm deep.	5	423.00	-	-	2,115.00	4.85	10,257.75
5	Transport of barbed wire and angle iron posts - uphill for over 3 km (barbed wire in quintals)	-	-	-	-	3.02	-	-
	Angle Iron in quintals. 1.75 m + 0.15 m = 1.90 m (weight = 3.8 kg/m)	132	1.9	-	-	9.53	-	-
	Total for Angle-Iron and Barbed Wire	-	-	-	-	12.55	170.60	6,423.09
6	Transport of cement over 3 km by mule - 54 bags - 2.7 ton	-	-	-	-	2.70	545.68	4,420.00

S. No.	Particulars of work	No.	Length	Breadth	Depth	Volume	Rate (in ₹)	Amount (in ₹)
7	Transport of sand by mule over 3 km -	-	-	-	-	5.65	455.56	7,721.74
8	Transport of sand 15-20mm over 3 kms by mule	-	-	-	-	11.31	455.56	15,457.15
							Total	52,678.55
9	Provision for 50% increase in labour costs (from ₹150 to ₹ 225)	-	-	-	-	-	-	26,339.27
							Total Labour Cost	**79,018.00**
Cost of Material								
1	Barbed Wire - 3.02 quintals	-	-	-	-	3.02	7,000.00	21,140.00
2	Angle Iron - 9.53 quintals	-	-	-	-	9.53	7,000.00	66,710.00
3	Cement - 54 bags	-	-	-	-	54.00	400.00	21,600.00
4	Sand - 5.65 m^3	-	-	-	-	5.65	2,500.00	14,125.00
5	Bajri - 11.31 m^3	-	-	-	-	11.31	2,500.00	28,275.00
							Total Material Cost	**1,51,850.00**
							Grand Total (Total Labour Cost + Total Material Cost)	**2,30,868.00**

Annexure 8.2: Stone Wall Fence Along the Nala Side Boundary of C1 (242 rmt. -0.5x1.00m)

S. No.	Particulars of work	No	Length	Qty	Rate (₹)	Amount (₹)
1	Construction of stone fence wall i/c collection and transport of stone upto 200m in DRS masonry - 0.5 m X 1 m	1	242	242	235.60	57,015.20
2	Provision for 50% increase in labour costs (from ₹150 to ₹225) due to inflation	-	-	-	-	28,507.60
					Total Cost	**85,523.00**

Annexure 8.3: Details of Work for Normal Planting (1100 plants/ha) in Group -1 (C1) in 2018-19

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
A	**Survey, Demarcation & Fencing**				
1	Survey and Demarcation of Plantation Area	ha	0.8	102.35	81.88
2	Lay out of Pits	ha	0.8	170.60	136.48
				Total	218.36
				Provision for 50% increase in labour charges (₹ 150/- to ₹ 225/-) due to inflation	109.18
				Total of A (Survey, Demarcation & Fencing)	**328.00**
B	**Planting**				
1	Digging of Pits 45cmX45cmX45cm	No.	500	9.54	4,770.00
2	Filling of Pits 45cmX45cmX45cm	No.	500	2.73	1,365.00
3	Digging of Pits 30cmX30cmX30cm	No.	500	4.77	2,385.00
4	Filling of Pits 30cmX30cmX30cm	No.	500	1.91	955.00
5	Transport of plants from nursery to nearest road head	L/S			1,500.00
6	Transport of plants in plastic bags from road head to work site O/D 3 km - 5"x9" plants(uphill)	No.	500	2.73	4,095.00
7	Transport of naked root plants O/D of 3 kms from road head to work site(uphill)	No.	500	0.35	525.00
8	Planting of plastic bag plants i/c ramming	No.	500	2.18	1,090.00
9	Planting of naked root plants i/c ramming	No.	500	1.84	920.00
				Total	**17,605.00**
				Provision for 50% increase in labour charges (from Rs. 150/- to Rs. 225/-) due to inflation except on item No. 5	8,052.50
				Total of B (Planting)	**25,658.00**
				Grand Total (A+B)	**25,986.00**
C	**Maintenance**				

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
1	1st year - 23% - 230 plants	-	0.8	5,130.00	4,104.00
2	2nd year - 14% - 140 plants	-	0.8	3,480.00	2,784.00
3	3rd year - 9% - 90 plants	-	0.8	2,640.00	2,112.00
4	4th year - 5% - 50 plants	-	0.8	1,820.00	1,456.00
5	5th year- 5% - 50 plants	-	0.8	1,820.00	1,456.00
				Total of C (Maintenance)	**11,912.00**
				Grand Total (A+B+C)	**37,898.00**

Annexure 8.4: Details of Work for Enrichment Planting (800 plants/ha) - Group 2 (C1) 0.40 ha in 2018-19

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
A	**Survey, Demarcation & Fencing**				
1	Survey and Demarcation of Plantation Area	ha	0.4	102.40	40.94
2	Lay out of Pits	ha	0.4	170.60	68.24
				Total	**109.18**
	Provision for 50% increase (₹ 150/- to ₹ 225/-) in labour cost due to inflation				54.59
				Total of A (Survey, Demarcation & Fencing)	**164.00**
B	**Planting**				
1	Digging of Pits 45cmX45cmX45cm	No.	160	9.54	1,526.40
2	Filling of Pits 45cmX45cmX45cm	No.	160	2.73	436.80
3	Digging of Pits 30cmX30cmX30cm	No.	160	4.77	763.20
4	Filling of Pits 30cmX30cmX30cm	No.	160	1.91	305.60
5	Transport of nursery plants from nursery to nearest road head	L/S	-	-	1,500.00
6	Transport of plants in plastic bags from road head to work site O/D 3 km - 5"x9" plants(uphill)	No.	160	2.73	1,310.40

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
7	Transport of naked root plants O/D of 3 kms from road head to work site (uphill)	No.	160	0.35	168.00
8	Planting of plastic bag plants i/c ramming	No.	160	2.18	348.80
9	Planting of naked root plants i/c ramming	No.	160	1.84	294.40
				Total	**6,653.60**
	Provision for 50% increase in labour costs (₹ 150/- to ₹ 225/-) due to inflation except on item No. 5				2,576.80
				Total of B (Planting)	**9,230.00**
				Grand Total (A+B)	**9,394.00**
C	**Maintenance**				
1	1st year - 23% - 75 plants	-	0.4	3,780.00	1,512.00
2	2nd year - 14% - 45 plants	-	0.4	2,500.00	1,000.00
3	3rd year - 9% - 30 plants	-	0.4	1,900.00	760.00
4	4^{th} year - 5% - 15 plants	-	0.4	1,300.00	520.00
5	5th year- 5% - 15 plants	-	0.4	1,300.00	520.00
				Total of C (Maintenance)	**4,312.00**
				Grand Total (A+B+C)	**13,706.00**

Annexure 8.5: Details of Work for Barbed Wire Fencing with Angle Iron Posts for Group 3 (C1) top - 210 rmt.

S. No.	Particulars of work	No	Length	Breadth	Depth	Volume	Rate (₹)	Amount (₹)
1	Excavation of pits - P/Jumper work at 3m spacing	71	0.45	0.45	0.45	6.47	222.80	1,441.49
2	Fixing of angle iron posts in concrete 1:3:6 i/c strutting	71	-	-	-	-	6.82	484.22

S. No.	Particulars of work	No	Length	Breadth	Depth	Volume	Rate (₹)	Amount (₹)
3	Laying of concrete for angle iron fence post foundation in 1:3:6 - as per item No. 1	-	-	-	-	6.47	400.60	2,591.83
4	Fixing barbed wire in angle iron fence posts -Five strands with a spacing of 30, 28, 25, 25, 25 cm from top to bottom with 42 cm deep.	5	210.00	-	-	1050.00	4.85	5,092.50
5	Transport of barbed wire and angle iron post for over 3 km (uphill with barbed wire in quintals)	-	-	-	-	1.50	-	-
	Angle Iron in quintals 1.75 m + 0.15 m = 1.90 m (wt.= 3.8 kg/m)	71	1.90	-	-	5.13	-	-
					Total	**6.63**	**170.60**	**3,393.23**
6	Transport of cement over 3 km by mule - 29 bags 1.45 Ton	-	-	-	-	1.45	545.68	2,373.71
7	Transport of sand by mule over 3 km	-	-	-	-	3.04	455.56	4,154.71
8	Transport of Bajri 15-20mm over 3 kms by mule	-	-	-	-	6.08	455.56	8,309.41
							Total	**27,841.10**
							Provision for 50% increase in labour cost due to inflation (from ₹150 to ₹225)	13,920.55
							Total Labour Cost	**41,762.00**
Cost of Material								
1	Barbed wire - 1.50 quintals	-	-	-	-	1.50	7,000.00	10,500.00

S. No.	Particulars of work	No	Length	Breadth	Depth	Volume	Rate (₹)	Amount (₹)
2	Angle Iron - 5.13 quintals	-	-	-	-	5.13	7,000.00	35,910.00
3	Cement - 29 bags	-	-	-	-	29.00	400.00	11,600.00
4	Sand - 3.04 m^3	-	-	-	-	3.04	2,500.00	7,600.00
5	Bajri - 6.08 m^3	-	-	-	-	6.08	2,500.00	15,200.00
							Total Material Cost	**80,810.00**
							Grand Total (Total Labour Cost + Total Material Cost)	**1,22,572.00**

Annexure 8.6: Detail of Work for Enrichment Planting (800 plants/ha in 3.00 ha Group 3 (C1) in 2018-19

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
A	**Survey, Demarcation & Fencing**				
1	Survey and Demarcation of Plantation Area	ha	3	102.35	307.05
2	Lay out of Pits	ha	3	170.60	511.80
3	Barbed wire fence with Angle Iron Posts (50X50X5) 210 rmt. As per sheet AI Fence (2)	-	-	-	1,22,572.00
				Total	**1,23,390.85**
				Provision for 50% increase in labour costs (from ₹150 to ₹225) for 1&2 due to inflation	409.42
				Total of A (Survey, Demarcation & Fencing)	**1,23,800.00**
B	**Planting**				
1	Digging of Pits 45cmX45cmX45cm	No.	1,200	9.54	11,448.00
2	Filling of Pits 45cmX45cmX45cm	No.	1,200	2.73	3,276.00
3	Digging of Pits 30cmX30cmX30cm	No.	1,200	4.77	5,724.00
4	Filling of Pits 30cmX30cmX30cm	No.	1,200	1.91	2,292.00
5	Transport of nursery plants from nursery to nearest road head	L/S			3,000.00

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
6	Transport of plants in plastic bags from road head to work site O/D 3 km - 5"x9" plants (uphill)	No.	1,200	2.73	9,828.00
7	Transport of naked root plants O/D of 3 Kms from road head to work site (uphill)	No.	1,200	0.35	1,260.00
8	Planting of P/ Bag Plants i/c ramming	No.	1,200	2.18	2,616.00
9	Planting of Naked Root Plants i/c ramming	No.	1,200	1.84	2,208.00
				Total	**41,652.00**
	Provision for 50% increase in labour costs (from ₹ 150/- to ₹ 225/-) due to inflation except on item No. 5				19,326.00
				Total of B (Planting)	**60,978.00**
				Grand Total (A+B)	**1,84,778.00**
C	**Maintenance**				
1	1st year - 23% - 550 plants	-	3.00	3,780.00	11,340.00
2	2nd year - 14% - 335 plants	-	3.00	2,500.00	7,500.00
3	3rd year - 9% - 215 plants	-	3.00	1,900.00	5,700.00
4	4th year - 5% - 120 plants	-	3.00	1,300.00	3,900.00
5	5th year - 5% - 120 plants	-	3.00	1,300.00	3,900.00
				Total of C (Maintenance)	**32,340.00**
				Grand Total (A+B+C)	**2,17,118.00**

Annexure 8.7: Details of Work for Enrichment Planting (800 plants/ha) - Group 4 (C1) in 2018-19 (Area - 0.60 ha & Perimeter - 320 m fencing in 3 strands)

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
A	**Survey, Demarcation & Fencing**				
1	Survey and Demarcation of Plantation Area	ha	0.60	102.35	61.41

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
2	Lay out of Pits	ha	0.60	170.60	102.36
3	Cutting & preparation of wooden fence posts 1.8 m long and 8 to 10 cm diameter i/c debarking and shaping the top 15 cm to a conical shape	No.	108	12.95	1,398.60
4	Transport of wooden fence posts over a distance of 1Km	km No.	108	6.82	736.56
5	Charring and coal tarring of ends of FPs upto 45 cm at bottom and 15 cm at top conical end.	No.	108	2.80	302.40
6	Preparation and digging of holes of 20 to 30 cm diamete and 45 cm deep	No.	108	9.07	979.56
7	Fixing of wooden fence posts i/c strutting	No.	108	6.96	751.68
8	Transport of barbed wire over a distance of 4 kms up hill	km/ quintal	1.371	170.60	935.86
9	Stretching and fixing of barbed wire in 3 strands	rmt.	960	4.85	4,656.00
10	Interlacing of thorny bushes along the fence	rmt.	960	4.15	3,984.00
11	Cost of barbed wire	quintal	1.371	7,000.00	9,600.00
12	Cost of U-staple	quintal	0.017	7,000.00	120.00
				Total	**23,628.43**
	Provision for 50% increase in labour costs (₹ 150/- to ₹ 225/-) due to inflation (except on item Nos. 11 & 12				6,954.22
				Total of A (Survey, Demarcation & Fencing)	**30,583.00**
B	**Planting**				
1	Digging of Pits 45cmX45cmX45cm	No.	240	9.54	2,289.60
2	Filling of Pits 45cmX45cmX45cm	No.	240	2.73	655.20
3	Digging of Pits 30cmX30cmX30cm	No.	240	4.77	1,144.80
4	Filling of Pits 30cmX30cmX30cm	No.	240	1.91	458.40
5	Transport of nursery plants from nursery to narest road head	L/S	-	-	1,500.00

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
6	Transport of plants in plastic bags from road head to work site O/D 3 km (uphill) - 5"x9" plants-	No.	240	2.73	1,965.60
7	Transport of naked root plants O/D of 3 kms from road head to work site (uphill)	No.	240	0.35	252.00
8	Planting of plastic bag plants i/c ramming	No.	240	2.18	523.20
9	Planting of naked root plants i/c ramming	No.	240	1.84	441.60
				Total	**9,230.40**
				Provision for 50% increase in labour costs due to inflation (₹150/- to ₹225/-) except on item No. 5	3,865.20
				Total of B (Planting)	**13,096.00**
				Grand Total (A+B)	**43,679.00**
C	**Maintenance**				
1	1st year - 23% - 110 plants	-	0.60	3,780.00	2,268.00
2	2nd year - 14% - 70 plants	-	0.60	2,500.00	1,500.00
3	3rd year - 9% - 45 plants	-	0.60	1,900.00	1,140.00
4	4th year - 5% - 25 plants	-	0.60	1,300.00	780.00
5	5th year - 5% - 25 plants	-	0.60	1,300.00	780.00
				Total of C (Maintenance)	**6,468.00**
				Grand Total (A+B+C)	**50,147.00**

Annexure 8.8: Details of Construction Work of Check Dams in Ghanduri RF -Telangana Nala (C2 & C3)

S. No.	Particulars	Comp. No.	Measurements (in m)			Vol.	Rate (₹)	Amount		Total (₹)
			L	B	D/ H			First year (₹)	Second year (₹)	
1	Construction of one check dams in dry stone masonry near Panayare-Ka-Pani C1/C2 of Telangana Nala	1 and 2	6.25	2.00	2.50	31.25	256.65	8,020.00	-	-
2	Construction of one check dams in dry stone masonry in C2 below boundary pillar in Telangna Nala	2	6.00	2.00	2.00	24.00	256.65	6,160.00	-	-
4	Additional 20% for construction of wing walls (1+2) *20%	-	-	-	-	11.05	256.65	2,836.00	-	-
5	Collection of boulder stones - As per Item No. 1, 2, 3 & 4	-	-	-	-	66.30	175.30	11,622.00	-	-
6	Breaking of boulder stone 70% of Item No. 5	-	-	-	-	39.78	112.50	4,475.00	-	-
7	Transport of stone for up to 200m @ ₹526/km/m^3	-	-	-	-	66.30	526.00	6,975.00	-	-
							Total	**40,088.00**	-	-
							Provision for 50% increase in labour cost due to inflation	20,044.00	-	-
							Grand Total	**60,132.00**	**0**	**60,132.00**

Annexure 8.9: Details of Construction Work of Sunken Pond at the confluence of C1 & C2 along Telangana Nala in Ghanduri RF

S. No.	Particulars	Comp. No.	Measurements			No.	Vol.	Rate (₹)	Amount		Total (₹)
			L	B	D				First year (₹)	Second year (₹)	
1	Levelling of ground in pick work	1	10	8	0.75	1	60	90.15	5,409.00	-	5,409.00
2	Excavation for one sunken pond in P/J work	1	10	8	1.50	1	120	222.80	26,736.00	-	26,736.00
								Total	**32,145.00**	-	-
								Add 50% increase for wage hike	16073.00	-	16073.00
								Grand Total	**48218.00**	**0**	**48218.00**

Annexure 8.10: Summary of Nursery Cost for Water Conservation/Recharge Zone

S. No.	Name of Plantation Area	No of Plants and Cost						Total (₹)
		Formation	Maintenance Cost in Year (in ₹)					
			1st	2nd	3rd	4th	5th	
1	Group -1 (C1)- Normal Planting (1100 plants/ha in 0.80 ha)	1,000	230.00	140.00	90.00	50.00	50.00	1,560.00
2	Group -2 (C1) - Enrichment Planting (800 plants/ha in 0.40 ha)	320	75.00	45.00	30.00	15.00	15.00	500.00
3	Group - 3 (C1) - Enrichment Planting (800 plants/ha in 3.00 ha)	2,400	550.00	335.00	215.00	120.00	120.00	3,740.00
4	Group - 4 (C1) -Enrichment Planting (800 plants/ha in 0.60 ha & Perimeter - 320m fencing in 3 strands)	480	110.00	70.00	45.00	25.00	25.00	755.00
Total		**4,200**	**965.00**	**590.00**	**380.00**	**210.00**	**210.00**	**65,55.00**
Cost of Nursery Plants @ 19.47 per plant		**81,774**	**18,789.00**	**11,487.00**	**7,399.00**	**4,089.00**	**4,089.00**	**1,27,626.00**

Annexure II: Details of Interventions in Fuelwood and Fodder Zone

Annexure 8.11: Details of Work for Enrichment Planting (800 plants/ha) - Group 1 (C2) in 2018-19 (Area - 0.30 ha & Perimeter - 215 m; fencing in 3 strands)

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
A	**Survey, Demarcation & Fencing**				
1	Survey and Demarcation of Plantation Area	ha	0.30	102.4	30.70
2	Lay out of Pits	ha	0.30	170.60	51.18
3	Cutting & preparation of wooden fence posts 1.80 m long and 8 to 10 cm diameter i/c debarking and shaping the top 15 cm to a conical shape	No.	73	12.95	945.35
4	Transport of wooden fence posts over a distance of 1 km	km/ No.	73	6.82	497.86
5	Charring and coal tarring of ends of fence posts upto 45 cm at bottom and 15 cm at top conical end	No.	73	2.80	204.40
6	Preparation and digging of holes of 20 to 30 cm diameter and 45 cm deep	No.	73	9.07	662.11
7	Fixing of wooden fence posts i/c strutting	No.	73	6.96	508.08
8	Transport of B/wire over a distance of 4 Kms up hill.	km/ quintal	0.921	170.60	628.78
9	Stretching and fixing of barbed wire in 3 strands	rmt.	645	4.85	3,128.25
10	Interlacing of thorny bushes along the fence	rmt.	645	4.15	2,676.75
11	Cost of barbed wire	quintal	0.921	7,000.00	6,450.00
12	Cost of U-staple	quintal	0.012	7,000.00	80.63
				Total	**15,864.09**
Provision for 50% increase in labour costs (₹ 150/- to ₹ 225/-) due to inflation (Due to increase of wage rates from except on item Nos. 11 & 12					4,666.73
				Total of A (Survey, Demarcation & Fencing)	**20,531.00**
B	**Planting**				
1	Digging of Pits 45cmX45cmX45cm	No.	120	9.54	1,144.80

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
2	Filling of Pits 45cmX45cmX45cm	No.	120	2.73	327.60
3	Digging of Pits 30cmX30cmX30cm	No.	120	4.77	572.40
4	Filling of Pits 30cmX30cmX30cm	No.	120	1.91	229.20
5	Transport of Nursery plants from Nursery to Nearest road head	L/S	-	-	1,500.00
6	Transport of plants in P/bags from Road head to work site O/D 3 km - 5"x9" plants- up hill	No.	120	2.73	982.80
7	Transport of Naked Root Plants O/D of 3 Kms from Road head to work site - up hill	No.	120	0.35	126.00
8	Planting of P/ Bag Plants i/c ramming	No.	120	2.18	261.60
9	Planting of Naked Root Plants i/c ramming	No.	120	1.84	220.80
				Total	**5,365.20**
				Provision for 50% increase in labour costs (₹ 150/- to ₹ 225/-) due to inflation (except on item No. 5	1,932.60
				Total of B (Planting)	**7,298.00**
				Grand Total (A+B)	**27,829.00**
C	**Maintenance**				
1	1st year - 23% - 55 plants	-	0.30	3,780.00	1,134.00
2	2nd year - 14% - 35 plants	-	0.30	2,500.00	750.00
3	3rd year - 9% - 20 plants	-	0.30	1,900.00	570.00
4	4th year- 5% - 10 plants	-	0.30	1,300.00	390.00
5	5th year - 5% - 10 plants	-	0.30	1,300.00	390.00
				Total of C (Maintenance)	**3,234.00**
				Grand Total (A+B+C)	**31,063.00**

Annexure 8.12: Details of Work for Enrichment Planting (800 plants/ha) - Group 2 (C2) in 2018-19 (Area - 0.85 ha & Perimeter - 405m; fencing in 3 strands)

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
A	**Survey, Demarcation & Fencing**				
1	Survey and Demarcation of Plantation Area	ha	0.85	102.35	86.99
2	Lay out of Pits	ha	0.85	170.60	145.01
3	Cutting & preparation of wooden fence posts 1.80 m long and 8 to 10 cm diameter i/c debarking and shaping the top 15 cm to a conical shape	No.	136	12.95	1,761.20
4	Transport of wooden fence posts over a distance of 1 km	km/	136	6.82	927.52
5	Charring and coal tarring of ends of fence posts upto 45 cm at bottom and 15 cm at top conical end	No.	136	2.80	380.80
6	Preparation and digging of holes of 20 to 30 cm diameter and 45 cm deep	No.	136	9.07	1,233.52
7	Fixing of wooden fence posts i/c strutting	No.	136	6.96	946.56
8	Transport of barbed wire over a distance of 4 kms up hill.	km/quintal	1.736	170.60	1,184.45
9	Stretching and fixing of barbed wire in 3 strands	rmt.	1215	4.85	5,892.75
10	Interlacing of thorny bushes along the fence	rmt.	1215	4.15	5,042.25
11	Cost of barbed wire	quintal	1.736	7,000.00	12,150.00
12	Cost of U-staple	quintal	0.022	7,000.00	151.88
				Total	**29,902.93**
Provision for 50% increase in labour costs due to inflation (Due to increase of wage rates from Rs. 150/- to Rs. 225/-) except on item Nos. 11 & 12					8,800.53
				Total of A (Survey, Demarcation & Fencing)	**38,703.00**
B	**Planting**				
1	Digging of Pits 45cmX45cmX45cm	No.	340	9.54	3,243.60

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
2	Filling of Pits 45cmX45cmX45cm	No.	340	2.73	928.20
3	Digging of Pits 30cmX30cmX30cm	No.	340	4.77	1,621.80
4	Filling of Pits 30cmX30cmX30cm	No.	340	1.91	649.40
5	Transport of nursery plants from nursery to nearest road head	L/S	-	-	1,500.00
6	Transport of plants in plastic bags from road head to work site O/D 3 km - 5"x9" plants-(uphill)	No.	340	2.73	2,784.60
7	Transport of naked root plants O/D of 3 kms from road head to work site (uphill)	No.	340	0.35	357.00
8	Planting of plastic bag plants i/c ramming	No.	340	2.18	741.20
9	Planting of naked root plants i/c ramming	No.	340	1.84	625.60
				Total	**12,451.40**
Provision for 50% increase in labour costs due to inflation (Due to increase of wage rates from Rs. 150/- to Rs. 225/-) except on item No. 5					5,475.70
				Total of B (Planting)	**17,927.00**
				Grand Total (A+B)	**56,630.00**
C	**Maintenance**				
1	1st year - 23% - 110 plants	-	0.85	3,780.00	3,213.00
2	2nd year - 14% - 70 plants	-	0.85	2,500.00	2,125.00
3	3rd year - 9% - 45 plants	-	0.85	1,900.00	1,615.00
4	4th year- 5% - 25 plants	-	0.85	1,300.00	1,105.00
5	5th year - 5% - 25 plants	-	0.85	1,300.00	1,105.00
				Total of C (Maintenance)	**9,163.00**
				Grand Total (A+B+C)	**65,793.00**

Annexure 8.13: Details of Work for Enrichment Planting (800 plants/ha) - Group 3 (C2) in 2018-19 (Area - 0.55 ha & Perimeter - 291m; fencing in 3 strands)

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
A	**Survey, Demarcation & Fencing**				
1	Survey and Demarcation of Plantation Area	ha	0.55	102.35	56.29
2	Lay out of Pits	ha	0.55	170.60	93.83
3	Cutting & preparation of wooden fence posts 1.80 m long and 8 to 10 cm diameter i/c debarking and shaping the top 15 cm to a conical shape	No.	98	12.95	1,269.10
4	Transport of wooden fence posts over a distance of 1 km	km/ No.	98	6.82	668.36
5	Charring and coal tarring of ends of fence posts up to 45 cm at bottom and 15 cm at top conical end.	No.	98	2.80	274.40
6	Preparation and digging of holes of 20 to 30 cm diameter and 45 cm deep	No.	98	9.07	888.86
7	Fixing of wooden fence posts i/c strutting	No.	98	6.96	682.08
8	Transport of barbed wire over a distance of 4 kms up hill.	km/ quintal	1.247	170.60	851.05
9	Stretching and fixing of barbed wire in 3 strands	rmt.	873	4.85	4,234.05
10	Interlacing of thorny bushes along the fence	rmt.	873	4.15	3,622.95
11	Cost of barbed wire	quintal	1.247	7000.00	8,730.00
12	Cost of U-staple	quintal	0.016	7000.00	109.13
				Total	**21,480.10**
	Provision for 50% increase in labour costs due to infation (₹ 150/- to ₹ 225/-) except on item Nos. 11 & 12				6,320.49
				Total of A (Survey, Demarcation & Fencing)	**27,801.00**
B	**Planting**				
1	Digging of Pits 45cmX45cmX45cm	No.	220	9.54	2,098.80
2	Filling of Pits 45cmX45cmX45cm	No.	220	2.73	600.60
3	Digging of Pits 30cmX30cmX30cm	No.	220	4.77	1,049.40

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
4	Filling of Pits 30cmX30cmX30cm	No.	220	1.91	420.20
5	Transport of nursery plants from nursery to nearest road head	L/S	-	-	1,500.00
6	Transport of plants in plastic bags from road head to work site O/D 3 km - 5"x9" plants (uphill)	No.	220	2.73	1,801.80
7	Transport of naked root plants O/D of 3 Kms from road head to work site (uphill)	No.	220	0.35	231.00
8	Planting of plastic bag plants i/c ramming	No.	220	2.18	479.60
9	Planting of naked root plants i/c ramming	No.	220	1.84	404.80
				Total	**8,586.20**
	Provision for 50% increase in labour costs due to inflation (₹ 150/- to ₹ 225/-) except on item No. 5				3,543.10
				Total of B (Planting)	**12,129.00**
				Grand Total (A+B)	**39,930.00**
C	**Maintenance**				
1	1st year - 23% - 100 plants	-	0.55	3,780.00	2,079.00
2	2nd year - 14% - 60 plants	-	0.55	2,500.00	1,375.00
3	3rd year - 9% - 40 plants	-	0.55	1,900.00	1,045.00
4	4th year - 5% - 20 plants	-	0.55	1,300.00	715.00
5	5th year - 5% - 20 plants	-	0.55	1,300.00	715.00
				Total of C (Maintenance)	**5,929.00**
				Grand Total (A+B+C)	**45,859.00**

Annexure 8.14: Details of Work for Tall Planting (1100 plant/ha) in C4 (Area - 1.40 ha & Perimeter – 415m; for RCC fence in Five Strands and 80m for Stone Wall fencing in 3 strands)

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
A	**Survey, Demarcation and Fencing**				
1	Survey and Demarcation of Plantation Area	ha	1.4	102.35	143.29

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
2	Lay out of Pits	ha	1.4	170.60	238.84
3	Construction of stone fence wall i/c collection and transport of stone upto 200m in DRS masonry - 0.5 m X 1 m	rmt	80	235.60	18,848.00
4	Cost of RCC fence posts	No.	139	425.00	59,075.00
5	Transport of RCC fence posts	L/S	139		4,000.00
6	Preparation/ Digging of holes of 20 to 30 cm diameter and 45 cm deep for posts	No.	139	9.07	1,260.73
7	Fixing of RCC posts i/c strutting	No.	139	6.96	967.44
8	Stretching and fixing of barbed wire with U- staples in five strands	rmt	2,075	4.85	10,063.75
9	Interlacing of thorny bushes with barbed wire	rmt	415	4.15	1,722.25
10	Cost of barbed wire	quintals	2.964	7,000.00	20,750.00
11	Cost of U-staple	quintals	0.037	7,000.00	259.38
				Total	**1,17,329.00**
	Provision for 50% increase in labour costs due to inflation (₹ 150/- to ₹ 225/-) except on item Nos. 4, 5, 10 & 11				16,622.31
				Total of A (Survey, Demarcation & Fencing)	**1,33,951.00**
B	**Planting**				
1	Digging of Pits 60cmX60cmX60cm	No.	1,540	17.45	26,873.00
2	Filling of Pits 60cmX60cmX60cm	No.	1,540	3.54	5,451.60
3	Transport of plants in plastic bags from nursery to road head near to work site O/D 15 km - 8"x15" plastic bags (three trips by truck)	No.	2	1,200.00	2,400.00
4	Transport of plants in plastic bags from road head to work site O/D 0.5 km - 8"x15" down hill	No./km	1,540	8.18	6,298.60
5	Planting of tall plants i/c ramming	No.	1,540	6.54	10,071.60
6	Mulching of plants	No.	1,540	0.60	924.00
7	Irrigation as per need/ topography etc.	L/S	-	-	2,000.00
				Total	**54,018.80**
	Provision for 50% increase in labour costs due to inflation (₹ 150/- to ₹ 225/-) except on item Nos. 3 &7.				24,809.00
				Total of B (Planting)	**78,828.00**

S. No.	Description of Work	Unit	Qty	Rate (₹)	Amount (₹)
				Grand Total (A+B)	2,12,779.00
C	Maintenance				
1	1st year - 23% - 355 plants	-	1.40	5,130.00	7,182.00
2	2nd year - 14% - 215 plants	-	1.40	3,480.00	4,872.00
3	3rd year - 9% - 140 plants	-	1.40	2,640.00	3,696.00
4	4th year - 5% - 80 plants	-	1.40	1,820.00	2,548.00
5	5th year - 5% - 80 plants	-	1.40	1,820.00	2,548.00
				Total of C (Maintenance)	20,846.00
				Grand Total (A+B+C)	2,33,625.00

Annexure 8.15: Summary of Nursery Cost for Fuelwood and Fodder Zone

S. No.	Name of Plantation Area	No of Plants and Cost						Total (₹)
		Formation	Maintenance Cost in Year (in ₹)					
			1st	2nd	3rd	4th	5th	
1	Group -1 (C2)- Enrichment Planting 800 plants/ha - 0.80 ha	240	55	35	20	10	10	370
2	Group -2 (C2) - Enrichment Planting 800 plants/ha - 0.85 ha	680	110	70	45	25	25	955
3	Group - 3 (C2) - Enrichment Planting 800 plants/ha - 0.55 ha	440	100	60	40	20	20	680
	Total	1,360	265	165	105	55	55	2,005
	Cost of Nursery Plants @ Rs. 19.47 per plant	26,479	5,160	3,213	2,044	1,071	1,071	39,037
4	Group - 4 (C4) -Tall Planting 1100 plants/ha - 1.40 ha	1,540	355	215	140	80	80	2,410
	Cost of Tall Nursery Plants (in 3rd year) @ Rs. 44.58 per plant	68,653	15,826	9,585	6,241	3,566	3,566	1,07,437
	Grand Total	95,132	20,986	12,798	8,285	4,637	4,637	1,46,474

Annexure 8.16: Construction of Sunken Pond in C4 above approach road to Telangana above Ghanduri Hamlet

S. No.	Particulars	Comp. No.	Measurements			No.	Vol.	Rate (in ₹)	Amount (₹)		Total (₹)
			L	B	D				First year	Second year	
1	Levelling of ground in Pick work	4	10	8	0.75	1	60.00	90.15	5,409	-	5,409
2	Excavation for four sunken ponds in P/J work	1,2 and 4	10	8	1.50	1	120.00	222.80	26,736	-	26,736
								Total	32,145	-	32,145
								Add 50% increase for wage hike	16,073	-	16,073
								Grand Total	**48,218**	**0**	**48,218**

Annexure III: Cost per plant in HPFD Nursery (2018-19)

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Financial Year Wise split of per Plant Nursery Cost for different Species to be raised in Poly Bags for the year 2018-19 at the basic wage rate of ₹225/- per day

Financial Year	Chil/ Other BLs				Ban				Deodar				Fir/ Spruce	
	Normal (1½ Year Old)		Tall (2½ Year Old)		Normal (2½ Year Old)		Tall (3½ Year Old)		Normal (2½ Year Old)		Tall (3½ Year Old)		Normal (4½ Year Old)	
	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal
Ist	7.74	9.12	7.74	9.12	8.70	10.37	8.70	10.37	1.49	1.79	1.49	1.79	1.45	1.74
2nd	4.30	5.38	31.57	35.86	4.31	5.38	4.31	5.38	11.20	13.49	11.20	13.49	7.43	8.99
3rd	2.15	2.69	7.05	8.80	4.31	5.38	31.57	35.86	3.77	4.71	31.03	35.18	3.77	4.71
4th	--	--	3.80	4.75	2.15	2.69	7.04	8.81	1.61	2.02	6.50	8.13	18.54	21.32
5th	--	--	--	--	--	--	3.80	4.75	--	--	3.26	4.07	3.77	4.71
6th	--	--	--	--	--	--	--	--	--	--	--	--	1.62	2.02
Total Cost	**14.19**	17.19	50.16	**58.53**	**19.47**	**23.82**	**55.42**	**65.17**	**18.07**	**22.01**	**53.48**	**62.66**	**36.58**	**43.49**

15/12/18

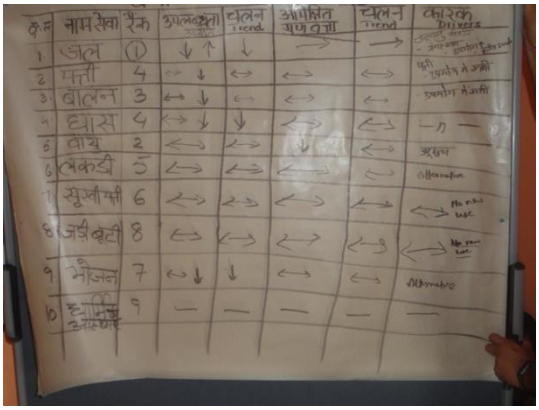
Pr. Chief Conservator of Forests (HoFF)
Himachal Pradesh, Shimla

Annexure IV: Photo Documentation of PRA

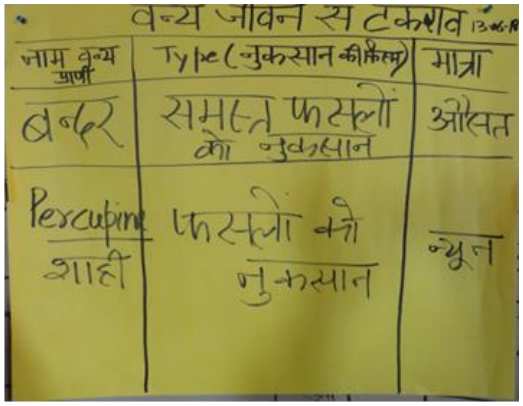
Annexure V: Photo Documentation of the Assessment during PRA

Seasonality Calendar Matrix

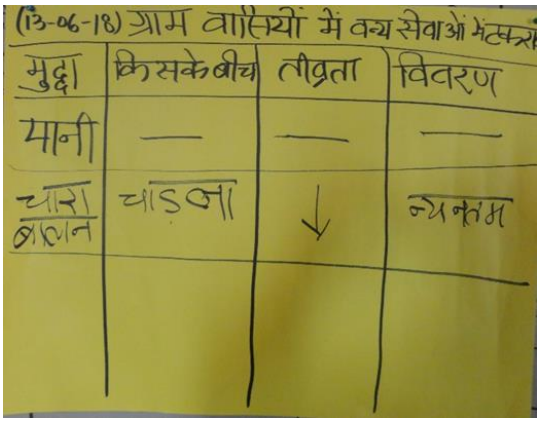
Stakeholder Mapping



FES Assessment



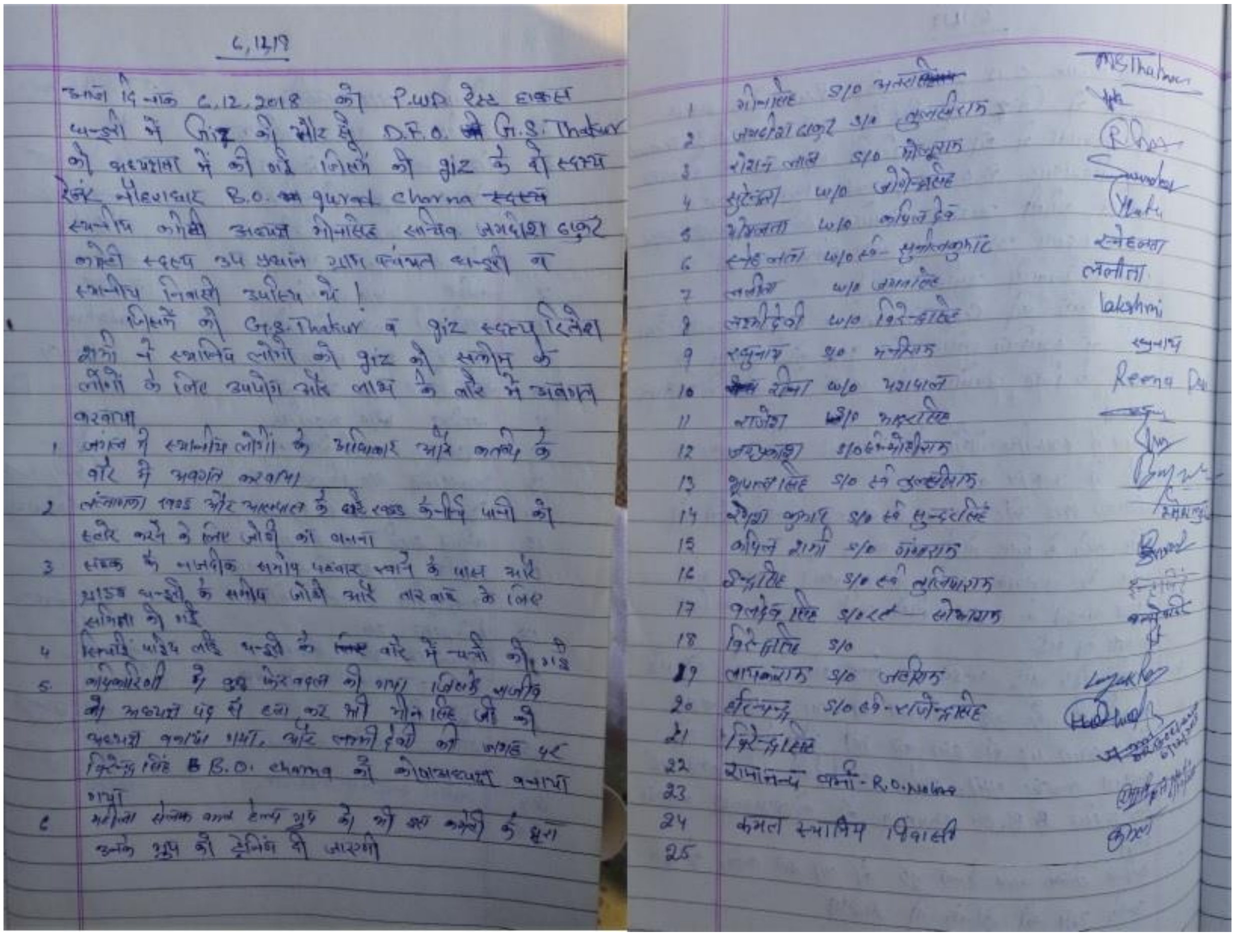
Human-Wildlife Conflict Assessment



Intra-community Conflict

Annexure VI: Photo Documentation of Microplan Approval (06/12/2018)

Annexure VII: Resolution to Approve the Proposed Microplan
Dated 6th December 2018



6.12.18

आज दिनांक 6.12.2018 को P.W.D. रेस्ट हाउस चन्डी में GIZ की ओर से D.F.O. G.S. Thakur की अध्यक्षता में की गई जिसमें की giz के दो सदस्य [illegible] B.O. guard charna स्थानीय कमेटी अध्यक्ष [illegible] सचिव जगदीश ठाकुर [illegible] सदस्य उप प्रधान ग्राम पंचायत चन्डी व स्थानीय निवासी उपस्थित थे।

जिसमें की G.S. Thakur व giz सदस्य [illegible] ने स्थानीय लोगों को giz की स्कीम के लोगों के लिए उपयोग और लाभ के बारे में अवगत करवाया

1. जंगल में स्थानीय लोगों के अधिकार और कर्तव्य के बारे में अवगत करवाया
2. [illegible] 1905 और [illegible] के बाद [illegible] पानी को स्टोर करने के लिए जोहड़ी का बनाना
3. सड़क के नजदीक [illegible] के पास और [illegible] चन्डी के समीप जोहड़ी और तारबाड़ के लिए [illegible] की गई
4. [illegible] चन्डी के बारे में चर्चा की गई
5. कार्यकारिणी में कुछ फेरबदल की गयी जिसके [illegible] को अध्यक्ष पद से हटा कर [illegible] को अध्यक्ष बनाया गया, और लक्ष्मी देवी की जगह पर [illegible] सिंह B.O. charna को कोषाध्यक्ष बनाया गया
6. महिला [illegible] and [illegible] ग्रुप को [illegible] के द्वारा उनके ग्रुप की ट्रेनिंग दी जाएगी

1	[illegible] S/O [illegible]	M.S. Thakur
2	जगदीश ठाकुर S/O [illegible]	[illegible]
3	[illegible] S/O [illegible]	[illegible]
4	[illegible] W/O [illegible]	[illegible]
5	[illegible] W/O [illegible]	[illegible]
6	स्नेहलता W/O [illegible]	स्नेहलता
7	ललिता W/O [illegible]	ललिता
8	लक्ष्मी देवी W/O [illegible]	lakshmi
9	रघुनाथ S/O [illegible]	रघुनाथ
10	रीना W/O [illegible]	Reena Devi
11	[illegible] S/O [illegible]	[illegible]
12	[illegible] S/O [illegible]	[illegible]
13	[illegible] S/O [illegible]	[illegible]
14	[illegible] S/O [illegible]	[illegible]
15	कपिल शर्मा S/O [illegible]	[illegible]
16	[illegible] S/O [illegible]	[illegible]
17	[illegible] S/O [illegible]	[illegible]
18	[illegible] S/O	[illegible]
19	[illegible] S/O [illegible]	[illegible]
20	[illegible] S/O [illegible]	[illegible]
21	[illegible]	[illegible]
22	रामानन्द वर्मा - R.O. [illegible]	[illegible]
23		[illegible]
24	कमल स्थानीय निवासी	[illegible]
25		

Annexure VIII: Society Registration Certificate

Village forest management society was formed on June 27, 2018 and amended on December 06, 2018. Given the revision of the society bye-laws, the society was reconstituted whose registration process is on. The application for registration is submitted online as required by the Registering Authority.

Annexure IX: Memorandum of Understanding (MoU)/Memorandum of Agreement (MoA)*

The Memorandum of Understanding (MoU) must be signed with stakeholders, primarily between forest department and the community.

The rights and responsibilities include roles with regard to various protection and regeneration work as well as benefit sharing based on principles of transparency, trust, empowerment and accountability.

MoU should clearly mention:

- Short-term and long-term roles and responsibilities, powers, implementation plan, sharing usufructs, and conflict resolution
- Local needs, restoration plan
- Transparent accounting of seasonal, annual and periodical produce, financial accountability and distribution of sharing mechanism including flow to central funds for restoration
- Specific roles on boundary demarcation, fire prevention, grazing, encroachment, and illicit felling, non-destructive NTFP harvesting.

No._____/
H.P. Forest Department.

Dated Shree Renuka Ji, the _____ _____/.

From: DFO. Renukaji. To: CF. Nahan.

Subject: MOU regarding GIZ project.

Memo:

Enclosed please find herewith the copy of MOU between VFDS Ghanduri and DFO Renukaji duly signed for kind information and further necessary action please.

Encl: As above.

Divisional Forest Officer,
Renuka Ji Forest Division,
Renukaji.

Endst. No. 131-132 Dated Sri Renukaji, the 05/04/19

Copy is forwarded to for information:-

1. R.O. Nohra.
2. Pradhan, Gram Panchayat, Ghanduri, P.O. Ganduri, Tehsil Nohra Distt, Sirmour HP.

Encl: As above.

Divisional Forest Officer,
Renuka Ji Forest Division,
Renukaji.

No 1029447 801 Himachal Government Judicial Paper

HIMACHAL PRADESH FOREST ECOSYSTEM SERVICES (HP-FES) PROJECT

Memorandum of Understanding

between

The **Ghanduri** Village Forest Development Society

and

the Himachal Pradesh Forest Department

for Village Forest Management.

Whereas

The **Ghanduri** Village Forest Management Society (hereinafter called "Society") has been constituted as per procedure described in the HP PFM Regulations notified by Govt. of HP vide No. No FFE-C *(9). 112001* dated 23.8.2001, registered under the Himachal Pradesh Societies Registration Act, 2006 by the villagers of **Ghanduri** under Forest Division **Sri Renukaji** in the district **Distt. Sirmour** of Himachal Pradesh and has an elected Executive Committee (hereinafter called "EC") to implement the Micro Plan for Forest Management and Village Resource Development (hereinafter called "Plan") for protection, rehabilitation and management of the specified forest areas that has been prepared by the Society and the **Renuka Ji** Forest Division; the Plan contains details of activities to be undertaken for management and development of forest areas using a Forest Ecosystem Services (FES) approach and also description of equitable distribution of products and services obtained from the allocated forest areas and public resources of the village; the Plan has been approved by the Officer in Charge of the Forest Division (hereinafter called "Forest Officer") on behalf of the Government of Himachal Pradesh;

Now herewith

The **Renuka Ji** Forest Division and the Society have mutually agreed on this MoU, and consequently, this MoU is executed with the following articles:

1. Purpose of the Memorandum of Understanding

This Memorandum of Understanding (hereinafter called "MoU") details the responsibilities of the Society regarding management and protection of forest area(s) and village(s) resource development, in the manner specified in the Plan and for equitable distribution of benefits amongst its members/ working groups in the manner specified in the Plan. It further entails payments and support to be provided by the project (HP-FES) and other associated conditions.

2. Responsibilities of the Society

With regard to its Constitution, working, powers, duties and benefits, the Society agrees to act in accordance with the HP Government Notification No. Fts. II (B) 15.10.87 dated 23.08.2001 and other relevant Government orders and instructions.

2.1 The Society agrees to provide all necessary assistance to the Forest Officer in selection of intervention area(s) to be allotted to it for forest management so that there is no dispute regarding areas of common use of nearby villages.

2.2 The Society, pursuant to the approval of Micro plan by the DFO agrees to

develop a 6-month (Activity & Budget) Plan, get it approved by the General House of the Society, and submit to the Forest Officer for release of funds.

2.3 The Society agrees to carry out works laid out in the Plan for the forest area as per the approved schedule of rates of work and labour and in doing so, follow the principles of management of forest and wildlife specified therein, also taking into account the guidelines of the Government, prevalent legal provisions and technical principles. The Society will ensure that no existing acts/ rules of forest/ wildlife management are being violated.

2.4 The Society agrees to contribute to the cost of works proposed through a 10% cash/ kind contribution of total investment, to be collected by the VFDS from its members/ User Groups and deposited in the SB Account held by it. The amount of contribution so deposited by the VFDS will be returned along with interest accrued to the VFDS at the end of the project period and the VFDS will be free to spend the amount as jointly decided by them. This community contribution is to be made within 6 (six) months of the commencement of the Plan.

2.5 The Society agrees, after completion of the related works, to protect the forest area from fire, grazing, illicit felling, illicit transport, illicit mining, encroachments and poaching and shall help the forest department in this regard.

2.6 The Society agrees to pass the information regarding person(s) engaged in harming the wild animals and forests or those engaged in illegal activities on to the Forest Department. The Society agrees to help forest employees in apprehending such person(s) and provide all possible assistance in protecting any seized produce etc.

2.7 The Society agrees to rectify any shortcomings found during review of its works by the Forest Officer/ Monitoring Agency.

2.8 The Society agrees to keep accounts of income and expenditure of the funds from various sources, present it to the Forest Officer or his representative when required, and to get regular annual audits done by the agency assigned by the Forest Officer.

2.9 The Society agrees to maintain the records specified by the Forest Officer regularly and in prescribed formats.

2.10 The Society agrees that the distribution of products and services generated as a result of implementation of the Plan among its members/User Groups is done in an equitable manner. If the Forest Officer points out any mismanagement or irregularity in the equitable distribution of such products and services, then the Society agrees to implement the necessary corrections/ improvements suggested by the Forest Officer.

2.11 The society agrees to ensure that there is no misuse of funds allocated from the Forest Department for implementation of the activities under this project.

3. Responsibilities of the Forest Department

3.1 The Forest Department will provide to the Society the related input materials required to carry out the works specified in the Plan, such as saplings, fencing materials, etc. in a timely manner.

3.2 The Forest Department will provide the funds specified in the Plan to the Society for implementation of works carried out in the forest area on the basis of the Plan in a timely manner Subsequent to approval of the Plan, a 6-month (Activity & Budget) Plan will be developed by the VFDS and got approved by the General House. After acceptance of this 6-month plan, the DFO will transfer

the budgeted amount into the general account of the VFDS prior to commencement of works.

3.3 Funds from other department's schemes as the Panchayat may be able to converge/ garner, may also be used for activities that help meet the project's objectives.

3.4 The Forest Department shall provide the necessary advice and guidance to the Society for implementation of works carried out in the forest area on the basis of the Plan.

3.5 The Forest Department shall NOT be responsible for any loss in any of the works related to implementation of the Plan and no claim of any sort can be presented against Forest Department

3.6 In the event of any misutilization of the funds at the level of the VFMS, the Forest Department shall initiate proper legal action against the former.

4. Support by the Project

4.1 The Project (HP-FES) will provide to the DFO the funds (after signing the Financing Agreement with GIZ) for specified activities in the approved Plan for implementation of works carried out in the forest area (s). These funds will be disbursed by the DFO to the Society considering the 6-month plan submitted by the Society.

4.2 The Project (HP-FES) will provide training and other capacity building measuresto the Society members, as well as support for income generating activities as specified in the approved Plan.

4.3 The funds earmarked for plantations, fencing etc. (mentioned in the approved Plan) will be credited into the general bank account with the VFDS as per accepted 6-month plans derived from the Plan.

4.4 Payment and receipt of funds will be strictly by means of cheques or bank transfers to the account of the Society. All disbursals by the Society to VFDS members will also be executed through bank transfers.

5. Rights and Benefit Sharing

5.1 The Rights of right holders as admitted in the Forest Settlement will remain unaffected due to constitution of the Society and will continue to be exercised as such.

5.2 The Benefits which the Society members and their User Groups will be entitled to after closure of plots/ patches in the forest for various project interventions are as follows:

5.2.1 Group members responsible for protection and maintenance of different closed patches will harvest and share among themselves grass and fodder from those patches;

5.2.2 Group members responsible for nurturing and protecting fodder/ firewood lots raised by them will be entitled to collect fodder/ firewood from these lots and share it amongst themselves equitably;

5.2.3 Grass and hay production areas will be harvested and shared amongst the groups/ villagers as decided by the EC or in rotation;

5.3 The Society will be entitled to sale proceeds of all intermediate and final harvest of NTFPs, as laid out in the PFM Regulations of HP, 2001.

6. Monitoring &Evaluation

6.1 Monitoring and Evaluation of project activities will be done at different levels, including by the EC, a monitoring committee, the Forest Officer or his representative, and an independent third party.

6.2 The EC or any of its members will monitor progress and quality of work during execution of various works. The Member Secretary will record the date, places and names of EC members who checked the work(s) and whether works were satisfactory and any instructions given.

6.3 A participatory monitoring committee made up of members of the Society, a member from Panchayat as well as a representative from the Forest Department (e.g. Deputy Range Officer) will on quarterly basis review objectives, inputs and work progress and report to the whole Society. Their reports will then be sent to the Forest Officer for information.

6.4 Where Society groups have carried out or are responsible for activities like fencing, plantations and maintenance of plantations (all the works according to the Plan), annual monitoring will be carried out by Project-approved monitors (Third Party) and the results of this monitoring will determine the quantum of release of incentive payments as per the norms/scheme agreed upon in the approved Saving Book Approach Guidelines.

6.5 Settlement of Disputes: Settlement of disputes and conflict resolution will be governed as laid out under section49 & 50 of the Bye Laws of Society.

7. Memorandum of Understanding

We are aware that the terms of this agreement will be valid and benefits mentioned in this agreement shall be available to the Society only when it discharges its duties, responsibilities and works in a satisfactory manner and this is certified by the Forest Officer every year. However, if the Forest Officer fails to fulfill conditions mentioned in para 3 and 4 of this agreement and there is a cause for the Committee not able to discharge its responsibilities and works, the same will be kept in mind while evaluating the works of the Committee every year. I , President, Village Forest Management Society, declare on behalf of the Society, that Iam committed to follow all the conditions mentioned in this MoU and am signing this memo after reading/understanding all conditions mentioned herein, literally and in their original meaning.

(Name, Seal and Signature of the President, (VFDS) On behalf of (VFDS Ghandwi

Witness
1. Sh. Rajeev S/o Sh Bikam Singh V.P.O. Ghandwi Teh. Nichar
2. Sh Kamal S/o Sh Tulsi Ram V.P.O. Ghandwi Teh. Nichar

I, Shreshthanand, HPFS DFO. Renukaji [position] undertake, on behalf of HP. Forest Department, to implement all duties/responsibilities of the Forest Department mentioned in thismemorandum.

Divisional Forest Officer
Renuka Ji Forest Division,

(Name, Seal and Signature of the Divisional Forest Officer) On behalf of Government of HP Forest Department

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For further Information
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Himachal Pradesh, Talland, Shimla- 171001, India