



BOHAL MICROPLAN

HIMACHAL PRADESH FOREST ECOSYSTEM SERVICES (HP-FES) PROJECT



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CHAPTER- 1

Introduction

Forest Ecosystem Services Approach

Forests provide people with a lot of benefits. We get tangible things like fuel wood, timber, fodder, fruits and many other services from forests. Forests also regulate many aspects of the environment that we are benefiting from like water, air purity and micro climate. These benefits that we get from nature are called Ecosystem Services. The ones that we get from forests are therefore called Forest Ecosystem Services. The FES approach now means, that the forest is managed to produce those services that we need.

As the demands and importance for services differ much within society, a key element of the FES approach is to include all groups of people that have an interest in the forest that is objective to management. Like this, the FES approach aims of forests that enables a supply of FES that are most important to majority of the bestiaries.

HP-FES Project Background

The Indian and German Governments are working closely together in many areas that are important for our society. The GIZ works on behalf of the BMZ with the Himachal Pradesh Forest Department on new ways for forest management. The HP-FES project aims at the integration of forest management that addresses the wide range of benefits we get from the forest. These benefits are called as Forest Ecosystem Services. The Forest Ecosystem Services approach is nothing else, but managing the forest for a specific forest ecosystem service.

To identify which set of Forest Ecosystem Services the forest is managed for, the important stakeholders are consulted. With them together, the forest ecosystem services that are derived from the forest are listed and prioritised. Based on this, a management plan like this one is developed.

CHAPTER-2

Bohal Forest Ecosystem Services Vision

Forests are ecosystems that need a long time for their development. The project can guide the plan for only two years or so. This is hardly anything, considering that the forests can be hundreds of years old. Therefore, it is important that a forest management has a long term vision and that the plan of today is in line with the long term vision.

Long Term Vision (30 years)

- 1. Water:**
 - a. Increased flow of water in springs is sustained despite climatic hostilities.
 - b. Increased PES incentive contributes in economic upliftment of communities of Bohal
- 2. Fuelwood and Fodder:**
 - a. Fuel and fodder supply is increased to meet out the demand of Bohal village
 - b. Increase in income and employment opportunities due to enhanced availability of leaf fodder and fuel
 - c. Visible changes in forest structure.
- 3. Forest:**
 - a. Proportion of dense forest increases up to 10 % of the base value.
- Measures:**
 - a. VFDS ensures equitable usufruct sharing, regulated use of forest and protection against fire, illicit felling.

Mid Term Vision (15 years)

- 1. Water:**
 - a. Increased flow of water in springs is sustained
 - b. Protection incentive for PES is substantially increased
- 2. Fuelwood and Fodder:**
 - a. Regenerated areas have attained pole stage forest with moderate density
- 3. Forest:**
 - a. Proportion of dense forest increases up to 5 % of the base value.
- Measures:**
 - a. VFDS strictly protects plantation against lopping/illicit cutting
 - b. Review of PES agreement for rational enhancement of protection incentives



Short Term Vision (5 years)

- 1. Water:**
 - a. Reduced silt load in run-off
 - b. Increased water flow in targeted springs up to 10 % of base discharge
- 2. Fuelwood and Fodder:**
 - a. Treated areas have well grown sapling stage plantations with 90 per cent survival.
- 3. Forest:**
 - a. Reduced silt load in run-off due to grass cover
- Measures:**
 - a. Effective protection of forest and plantation by VFDS is carried out
 - b. Conflicts in usufruct sharing are resolved by VFDS
 - c. VFDS is enabled to get funds from other donors /development agencies

First 2 years of 5 year Project Period

- 1. Water:**
 - a. Soil and water conservation related planned activities implemented.
 - b. Set up a baseline and system for measuring spring water flows and run off silt load.
- 2. Fuelwood and Fodder:**
 - a. Plantation of multi-purpose fodder yielding broad leaf tree spp. carried out with survival percentage up to 80 percent
 - b. VFDS ensures protection of plantation against grazing and fire
 - c. Grass yield from treated area increased upto 50 per cent
- 3. Forest:**
 - a. More forest area closed for grazing
 - b. VFDS members are motivated for actively involved in forest protection and management
- Measures:**
 - a. Degraded and denuded areas are brought under regeneration and plantation
 - b. Rules for protection and usufruct sharing are framed and followed
 - c. Soil and water conservation measures are planned and implemented





Micro plan Objective

To maximise the Forest Ecosystem Service values being derived from the Birni forest of Bohal, and incorporate the forest ecosystem services into the forest management.

CHAPTER-3

Data Collection Results

Environmental Data

ELEVATION RANGE: 1600 m - 2100 m

Precipitation



Annual Average
Precipitation:

2125.6 mm

Rain % : 100%

Snow % : 0%

Maximum Rainfall
Recorded:

3341.7 mm
in 1988

Minimum Rainfall
Recorded:

1376.2mm
in 1991

Temperature



Monthly mean
temperature:

10.3 - 24.3 °C

Mean maximum
temperature:

15.3 - 30.0 °C

Mean minimum
temperature:

5.30 - 20.1 °C

Dry months:

April, October,
November

Forest types and area



Area	Forest Type
9C1b : 16.0 ha	Chir Pine
12C1a : 20.0 ha	Ban Oak

Demographic Data

POPULATION



47%

165 Males



46%

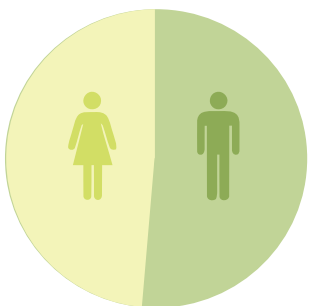
160 Females



7%

23 Children

GENDER RATIO



There are 970 females
against 1000 males

LIVESTOCK



Sheep + Goat:
1200+1100



Cows: 45



Bullocks: 10



Horses + Mules:
6+4



Buffaloes: 3

OCCUPATION

S.No.	Job Type	No. of Individuals	No. of Households
1.	Government	9	8
2.	Private	6	6
3.	Self Employed	6	6
4.	Agriculture/ Horticulture	6	6
5.	Wage Labour	Men: 17 Women: 30	

LAND HOLDING

S.No.	Land Holding Type	No. of Households
1.	Marginal	72
2.	Small	2
3.	Medium	—
4.	Large	—

Seasonality of Labour Distribution



Major Stakeholders









The inner most circle consists of the key stakeholders, followed by primary and secondary stakeholders with HP-FES as the theme. The 3 categories represent as to which class does each stakeholder belong.

Category/ Class	Key Stakeholders	Primary Stakeholders	Secondary Stakeholders
Civil Society	Villagers (Forest users)	Gram Panchayat, Mahila Mandal	HP Eco Development Society (HPEDS) Holta
Private	_____	_____	_____
State	HPFD & Wildlife Wing of HPFDMC Palampur	MC, Palampur	Department of Irrigation and Public Health

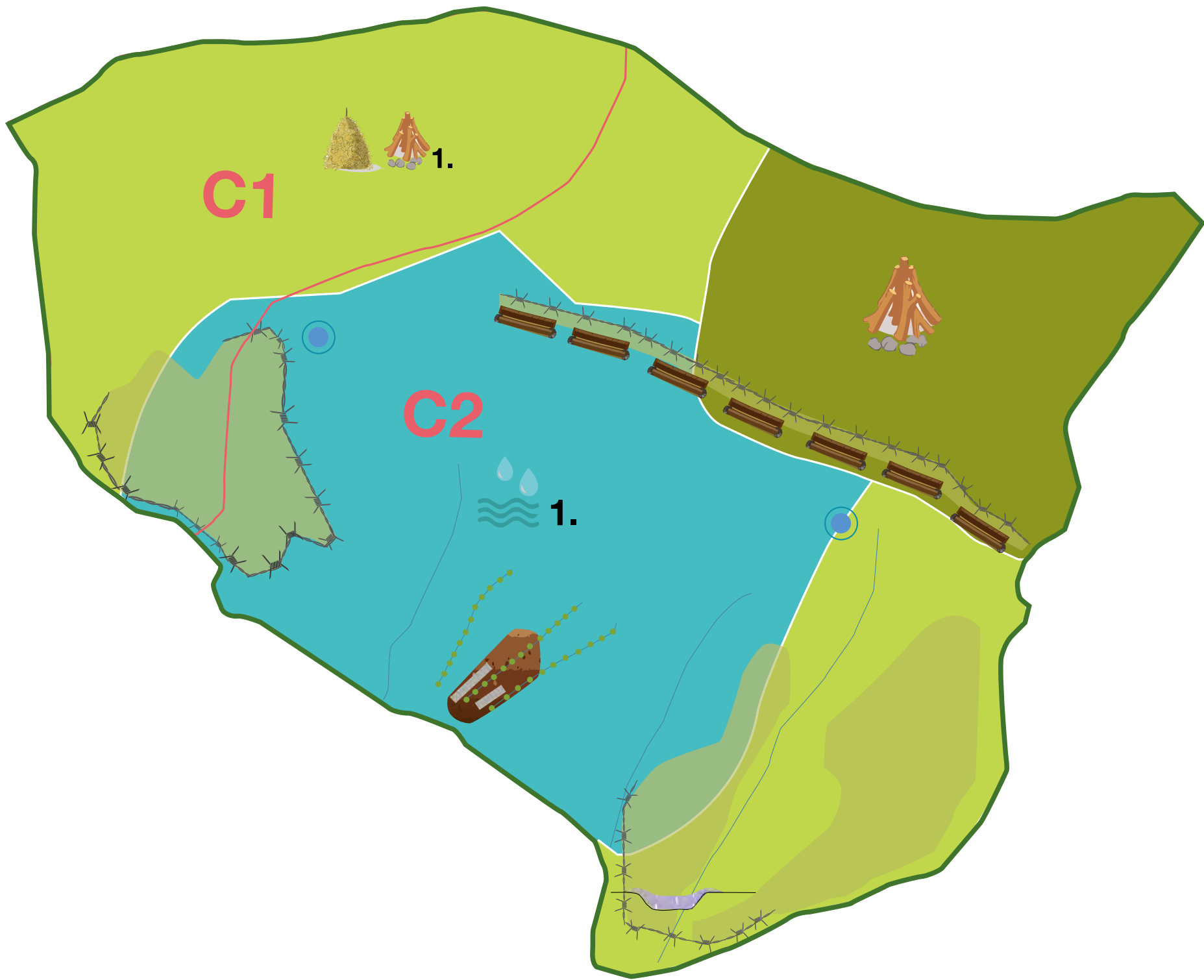
















CHAPTER-4

Rankwise Priority Forest Ecosystem Services

RANK	FOREST ECOSYSTEM SERVICE
1.	 Water Regeneration
2.	 Soil Conservation
3.	 Fuelwood
4.	 Fodder
5.	 Air
6.	 Aesthetics and Recreation <small>(Symbol Copyright: Flat icons)</small>

Priority and Intervention Map



 1.	WATER 1 ZONE
 1.	FODDER FUELWOOD 1 ZONE
	FUELWOOD ZONE
	BARBED WIRE FENCING
	NALA PLANTATION
	BAMBOO PLANTATION
	SOIL CONSERVATION
	CHECK WALL
	BAUHINIA
	BROAD LEAVED SPECIES (Ban Oak)
	ROBINIA
	CHECK DAM
	CONTOUR TRENCHING
	ACTIVITY AREA

The above map consists of the forest boundary, the areas for the prioritised Forest Ecosystem Services and the interventions and activities which will be done in order to maximise these services

DISCLAIMER: This map is only for marking the forest boundaries and not for any legal purpose.

Zonewise Management



COMPARTMENT	FOREST ECOSYSTEM SERVICE	INTERVENTION AND ACTIVITY
C2 AND SOUTHERN PART OF C1		Dry masonry check walls and check dams. (cement and mortar)
		Broad leaved species in contour trenches. (6500 plants in 4 hectares)
		Bamboo along the banks of streams to prevent soil erosion.
		No grazing



COMPARTMENT	FOREST ECOSYSTEM SERVICE	INTERVENTION AND ACTIVITY
C1		Ban Oak + Bauhinia + Robinia 2000 plants per 1.5 hectare
		Barbed wire fencing to check grazing.
C2		Ban Oak + Bauhinia + Robinia



COMPARTMENT	FOREST ECOSYSTEM SERVICE	INTERVENTION AND ACTIVITY
C2		Species in contour trenches. (2000 plants per 1.5 hectare)
		Plantation for water regulation.



COMPARTMENT	FOREST ECOSYSTEM SERVICE	INTERVENTION AND ACTIVITY
C2		Bamboo and other shrubs for soil conservation

Activity Plan and Budgeting

Activity plan for enhancing ground water recharge and control of soil erosion

S. No.	Activities	Location (latitudes & longitudes)	Year-I		Year - II		Year - III		Year - IV		Year -V		Total	
			P hy	Fin. (Rs.)	P hy	Fin. (Rs.)	P hy	Fin. (Rs.)	P hy	Fin. (Rs.)	P hy	Fin. (Rs.)	P hy	Fin. (Rs.)
1	Check walls in Dry stone masonry (in number)	Nali-1 (2 No.) 32 08' 15.6"N; 076 33 08.5"E 32 08' 24.6"N; 076 33 10.3"E Nali-2 (1No.) 32 08' 16.3"N; 076 33 15.3"E Nali-4: between point- 32 08'21.7"N; 76 33' 12.4"E & 32 08'23.3"N; 076 33' 12.4"E Nali -5: Between point- 32 08' 21.9"; 076 33' 09.4"E 32 08' 23.7"N; 076 33'11.4"E	12	60,520	-	-	-	-	-	-	-	-	12	60,520
2	Check Dams in Cement Mortar Stone Masonry. (in number)	Nali-1 (1No.) 32 08' 16.1"N 076 33 15.2"E	1	25,500	-	-	-	-	-	-	-	-	1	25,500
3	Stone Paving of Natural Resource Access Path (m)	32 08' 17.4"N; 76 33' 13.0"E 32 08' 19.2"N; 76 33' 12.4"E 32 08' 21.1"N; 76 33' 09.6"E 32 08' 27.5"N; 76 33' 04.6"E 32 08' 31.6"N; 76 33' 04.0"E	500	41,560	-	-	-	-	-	-	-	-	500	41,560
4	Rejuvenation of Water Source		1	8,640	-	-	-	-	-	-	-	-	1	8,640

Activity plan for Plantations of broad-leaved species to improve spring water flow

FES	C. No.	Activities	Details	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
WT-1	C2	Plant cost*	6500 plants	142565	-	-	-	-	142565
		Labour Cost	Contour and Trenches (400 m)	22345	-	-	-	-	22345
			Digging and filling pits (4 ha) **	237309	-	-	-	-	237309
		Material and supply	-	121582	-	-	-	-	121582
	Total Cost of Plantation			523801	-	-	-	-	523801
	Maintenance		6500 plants in 4 ha	-	19280	10680	6400	-	36360
	Grand Total (FES Water)			523801	19280	10680	6400	-	560161

Plants to be used for this activity: Ban oak (Quercus incana), Deodar (Cedrus deodar), Robinia pseudoacacia and Arundinaria falcata
** It includes digging 60 cm3 pits (number=1400) and 45cm3 pits (number=5100), filling pits, planting, barbed-wire fencing and mulching.

Activity plan for nala plantation with erosion controlling

FES	C. No.	Activities	Details	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
WT-1	C2	Plant cost*	280 plants	3973	-	-	-	-	3973
		Labour Cost**		6324	-	-	-	-	6324
	Total Cost of Plantation			10297	-	-	-	-	10297
	Grand Total (Plantation for erosion control)			10297	-	-	-	-	10297
	Grand Total 5 (Plan) Hydrological functioning			670318	19280	10680	6400	-	706678

* Plant species to be used for this activity: Nirgal (Arundinaria falcata), Siaru (Debregisea hypoleuca), Willow (Salix alba)
** It includes Digging 280 pits 45cm3, filling, planting, carriage and mulching.

Activity plan for enrichment plantation of broad-leaf fodder species

FES	C. No.	Activities	Details	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
Ffw-1	C1 and C2	Plant cost*	1.5 ha and 2000 plants	64330	-	-	-	-	64330
		Labour Cost**		90302	-	-	-	-	90302
		Material and supply		75217	-	-	-	-	75217
	Total Cost of Plantation			229849	-	-	-	-	229849
	Maintenance		1.5 ha/2000	-	7230	4005	2400	-	13635
	Grand Total (FES Fodder)			229849	7230	4005	2400	-	243484
	Grand Total 5 (Plan) FES water & fodder			900167	26510	14685	8800	-	950162 (9,50,160 INR)

* Plant species to be used: Ban oak (Quercus incana), Robinia pseudoacacia, Khirak (Celtis australis) Biul (Grewia oppositifolia) and Kachnar (Bauhinia variegata)
**It includes cost of digging 60 cm3 & 45cm3, filling pits, planting 1000 tall & 1000 normal plants of, mulching & barb wire fencing.

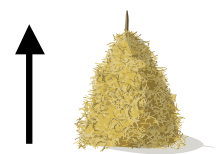
CHAPTER- 5

Monitoring and Evaluation



1. Increase in water supply

- a. Water flow in dry areas.
- b. Run off from the forest during the rainy season.



2. Increase in fodder availability

- a. Broad leaved enrichment plantation for yielding fodder and grass.



VISITOR'S FEEDBACK

S. No.	Name	Address/ E-mail	Feedback

S. No.	Name	Address/ E-mail	Feedback

S. No.	Name	Address/ E-mail	Feedback

S. No.	Name	Address/ E-mail	Feedback

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