Template/Pro forma for Submission

NMHS-Himalayan Nature Learning Centre (NLC) Grant

NMHS-FINAL TECHNICAL REPORT (FTR)

NMHS Grant Ref. No.:	NMHS/2017/NLC-04

Date of Submission:	2	0	0	4	2	0	2	3
	d	**d**	**m**	**m**	**y**	**y**	**y**	**y**

PROJECT TITLE (IN CAPITAL)

ESTABLISHMENT OF HIM-NATURE LEARNING CENTRE (NLC) - HIMACHAL PRADESH

Project Duration: *from (19.03.2018) to (31.03.2021).*

(Extension till November, 2021)

***Submitted to*:**
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GENERAL INSTRUCTIONS:

1. The Final Technical Report (FTR) has to commence from the date of start of the Project (as per the Sanction Order issued at the start of the project) till its completion. Each detail has to comply with the NMHS Sanction Order.
2. The FTR should be neatly typed (in Arial with font size 11 with 1.5 spacing between the lines) with all details as per the enclosed format for direct reproduction by photo-offset process. Colored Photographs (4-5 good action photographs), tables and graphs should be accommodated within the report or should be annexed with captions. Sketches and diagrammatic illustrations may also be given giving step-by-step details about the methodology followed in technology development/modulation, transfer and training. Any correction or rewriting should be avoided. Please give information under each head in serial order.
3. Training/ Capacity Building Manuals (with details contents of training programme technical details and techniques involved) or any such display material related to project activities along with slides, charts, photographs should be brought at the venue of the Annual Monitoring & Evaluation (M&E) Workshop and sent at the NMHS-PMU, GBP NIHE HQs, Kosi-Katarmal, Almora 263643, Uttarakhand. In all Knowledge Products, the Grant/ Fund support of the NMHS should be duly acknowledged.
4. The FTR Format is in sync with many other essential requirements and norms desired by the Govt. of India time to time, so each section of the NMHS-FTR needs to duly filled by the proponent and verified by the Head of the Lead Implementing Organization/ Institution/ University.
5. Five (5) bound hard copies of the Project Final Technical Report (FTR) and a soft copy should be submitted to the **Nodal Officer, NMHS-PMU, GBP NIHE HQs, Kosi-Katarmal, Almora, Uttarakhand**.

The FTR is to be submitted into following two parts:

Part A – Project Summary Report

Part B – Project Detailed Report

Following Financial and other necessary documents/certificates need to be submitted along with Final Technical Report (FTR):

Annexure I	**Consolidated and Audited Utilization Certificate (UC) & Statement of Expenditure (SE)**, including interest earned for the last Fiscal year including the duly filled GFR-19A (with year-wise break-up)
Annexure II	**Consolidated Interest Earned Certificate**
Annexure III	**Consolidated Assets Certificate** showing the cost of the equipment in Foreign and Indian currency, Date of Purchase, etc. (with break-up as per the NMHS Sanction Order and year wise).
Annexure IV	**List of all the equipment, assets and peripherals** purchased through the NMHS grant with current status of use including location of deployment.
Annexure V	Letter of Head of Institution/Department confirming Transfer of Equipment Purchased under the Project to the Institution/Department
Annexure VI	**Details, Declaration and Refund of any Unspent Balance transferred through Real-Time Gross System (RTGS) in favor of NMHS GIA General**

DSL: Date of Sanction Letter

1	9	0	3	**2**	**0**	**1**	**8**
d	d	m	m	y	y	y	y

DPC: Date of Project Completion

3	0	1	1	**2**	**0**	**2**	**1**
d	d	m	m	y	y	y	y

Part A: Project Summary Report

1. NLC Description

i.	NMHS-Grant Ref. No.:	NMHS/2017/NLC-04
ii.	NLC Title:	**HIM NATURE LEARNING CENTRE (NLC) - HIMACHAL PRADESH**
iii.	NLC Sites (State/UT) (*Location Maps attached*)	Himachal Pradesh *Himachal Pradesh is a state in North India situated in the Western Himalayas. Himachal Pradesh shares boundaries with union territories of J&K and Ladakh to the North, state of Punjab to the West Harayana to the South-West and Uttrakhand to the South. Total geographical area of the state is 55673 Km^2. The climate varies from hot and sub-humid tropical in the southern tracks to, cold, alpine and glacial in the northern and eastern mountain ranges. (Annexure-1)*
iv.	Total Budget:	3.71 (in Cr)
v.	Lead Agency:	Himachal Pradesh Forest Department
	Lead PI/ Proponent:	Sh. Nishant Mandhotra, IFS GHNP, Shamshi, Kullu, Himachal Pradesh
	Co-PI/ Proponent:	NA
vi.	Implementing Partners:	1. GB Pant NIHE, Mohal, Distt. Kullu 2. ICFRE-HFRI Shimla 3. WII, Dehradun 4. Botanical Survey of India/Zoological Survey of India 5. (BSI & ZSI) 6. Govt. Degree College Banjar 7. HP State Council for Science & Technology.
	Key Persons (*Contact Details, Ph. No, E-mail*):	Smt. Meera Sharma, Chief Conservator of Forests, Great Himalayan National Park, Shamshi, Distt. Kullu (HP)-175125. Phone No. 01902-265320, e-mail: dirghnp@g-mail.com

2. NLC Outcomes

2.1. Abstract/ Summary

Background: The project NMHS Him-Nature Learning Centre (NLC)-Himachal Pradesh is funded and supported by the Ministry of Environment, Forest and Climate Change (MoEF&CC) and is implemented by the HP Forest Department, Govt. of Himachal Pradesh. The project Him-NLC, HP was established with a vision to educate, engage and empower the community to understand the environment and sustainably conserve and manage our biodiversity and natural resources. The Project had three components, namely, to develop a nature learning centre by upgrading and diversifying the botanical garden; to establish the ground linkage between partner institutions for environmental awareness; and to create a team of trainers among the staff of interested user groups for the sustainability of the project beyond the project duration. The State of HP has policies like Van Smridhi Jan Smaridhi, Samudayak Van Samvardhan, Ek Buta Beti Ke Naam and Vidyarthi Van Miter Yojna to involve people in project & environment conservation activities for the future continuity of the goal.

Objectives/Aim: To develop nature learning centre by upgrading and diversifying the botanical garden; To establish the ground linkages between partner institutions for environmental awareness; To create a team of trainers among the staff or interested user groups for the project's sustainability beyond the project duration.

Methodology: In order to achieve the said objectives, the following methodology was followed:-

1) To develop a nature learning centre and upgrading the botanical garden:

- A thorough research and investigation of the literature was done, and based on the literature the animal size models were fabricated along with their habits and habitat. The signages were accordingly developed.
- The Great Himalayan National Park flora was kept in view to develop & strengthen the botanical garden.

2) Training to Community-based organizations:

- The communities were trained for various livelihood activities to enhance their capacity by identifying a renowned, reputable institute such as Wildlife Institute to impart training.

3) Besides learning, mass awareness programs for school children include interactive, attractive learning aids and illustrated maps to raise their curiosity and equip them with nature knowledge.

Approach: Under the project, a participatory approach with the community and progressive and latest technology approach to the development education friendly publicity & information material for disseminating education and awareness. The documentation was done in the form of gap-filling.

Results/Conclusion: The staff was identified, and based on their interest, the staff groomed so that the project essence sustains even after the project period is over.

The field guide training etc., to the communities, improved their capacity, especially in handling eco-tourism and having an enriching experience with tourists.

The development of the nature learning centre and all these components in the park, such as the herbal garden, bambusetum, botanical garden, and animals and birds diorama (Statues), enriched the experience for the visitors in Tirthan Valley. In fact, the Nature Learning Centre at Sai Ropa in Banjar sub-division is the only place where the children and researchers can now experience such knowledge gain.

The documentation in the form of sacred grooves/trees and medicinal plants usage in the form of primary data by the Research fellows during the project has enhanced the knowledge database of the Great Himalayan National Park eco-zone area.

Recommendations: The National Mission of Himalayan Studies (NHMS) has improved the infrastructure and evolved a plan in the form of a Nature Learning Centre, which will be an education centre for all times. Stakeholders created may continue to carry out the mandates assigned by NLC HP. More interpretive centres and botanical gardens may be built to raise community awareness. Key persons with similar initiatives undertaken in other states may be given access to a knowledge-sharing portal to engage and share ideas.

2.2. Objective-wise Major Achievements

S#	Objectives	Major achievements (**in bullets points**)
1.	To develop nature learning centre by upgrading and diversifying the botanical garden;	Under this project, the major achievements have been made as under: The existing botanical garden at Sai Ropa has been developed and extended into the Nature Learning Centre. An additional area of 17.4 ha. has been acquired by the wildlife wing of the HP Forest Deptt. The extended area was developed with the below-mentioned facilities established within the Nature Learning Centre. • Bambusetum Nursery was established for planting bamboo within the park. • Medicinal Herbal Garden established. • Developed nursery to raise 100000 seedlings. • Arboretum developed within the Centre. • Amphitheater with a celebration point developed for tourists and students within the NLC park. • Nature trails of 01 Km approx. all across the park developed. • Rock and Rose Garden developed within the park. • Bridal paths developed. • Water harvesting tank constructed for water harvesting. • Fauna Life-size models of the GHNP were developed and showcased to the public for education and awareness within the Centre. • Children's Park was developed with all the basic facilities for amusement. • Wooden hanging bridges were developed for connecting the nature trails and for nature lovers. • Landscaping was done and tree species were planted within the park found in the GHNP area. • Chinar trees planted within the Nature park. An e-learning module has been developed for school children which is more education-friendly for disseminating education and awareness. The module uses animations and easy language so that students grasp the concept of conservation easily.

2.	To establish the ground linkages between partner institutions for environmental awareness;	• The project proponent partnered with the Wildlife Institute of India Dehradun to provide livelihood training nature environment awareness, field guides, and Eco-tourism to enhance their capacity to bring awareness to the visitors in GHNP. A team of trainers has been identified and trained for specific activities and will be groomed in the future for specialization. • Various Sensitized programs were organized for environmental education to School children of the Kullu districts.
3.	To create a team of trainers among the staff or interested user groups for sustainability of the project beyond the project duration.	• The team has been provided with training minimum of 1000+ individuals. The learning material video, an illustrated wildlife map of Himachal Pradesh, and an illustrated wildlife map of Himachal Pradesh has been developed under the project which shall be distributed/ introduced to school student to understand the biodiversity of Himachal Pradesh. 67 registers of nature guides of GHNP have been trained and 489 community members were sensitized by the NLC team. For livelihood training Nature and field guides, training was imparted through WII to identified youth who are registered with GNHP. A team of trainers has been identified and they have been trained for specific activities and shall be groomed in the future too for the specialization beyond the project period.

2.3. Outputs in terms of Quantifiable Deliverables*

S. No.	Quantifiable Deliverables*	Monitoring Indicators*	Quantified Output/ Outcome achieved	Remarks
1.	State-of-the-art Nature Learning Centre;	State-of-the-art Nature Learning Centre established	• 01 State-of-the-art Nature Learning Centre established at GHNP (Sai Ropa, Himachal Pradesh). • Developed a nursery to raise 100000 seedlings (Appendix 4).	
		No. of Collaborations/ Connect Areas established;	• Interaction with Nature Conservation Foundation (NCF) and synergy developed with the foundation • Collaboration with local people/local NGO and local administration. • No. of Communications and visits were made by the government officials of the department/state.	
		No. of Policy Guidelines and Legislative Mechanisms: Prepared and/ or Communicated	• 03 important policies of the state govt. of H.P. like Samudayak Van Samvardhan yojna, Van Samridhi Jan Samridhi and Vidyarthi van miter yojna communicated and briefed to the local people of Ecozone of GHNP. • Polythene Hatao Paryawaran Bachao Abhiyan celebrated.	

2.	Nature Conservation and Education – Students and others (Annual target of students to be educated: Minimum 1000 per year);	No. of Nature Learning and Awareness Curricula Developed; No. of Crucial Nature Learning and Awareness Topics covered; No. of Field/ Green Technologies Demonstrations/ Exposure Visits organized;	• An e-learning module developed easy to understand & interactive for the school children • 20 awareness programs were organized under the NLC for environmental awareness and education within the Kullu Districts and Schools from the Vicinity sensitized. • Some of the specific Awareness programs were: ✓ Awareness about the Flora and Fauna of Himalaya specially GHNP. ✓ Awareness regarding the Cultivation of Medicinal Herb of Himalaya Specially GHNP ✓ Awareness regarding nursery development ✓ Awareness regarding major issues like Forest Fire, Illicit Felling, Poaching, Proper waste disposal, Plastic Ban etc. ✓ Ban of plastic, Forest Fire, Illicit felling, use of biodegradable material, and proper waste disposal. • 120 students from two schools visited Sai Ropa and exposure to	An e-learning module has been developed for the school children which are more education friendly for disseminating education and awareness. The module uses animations and easy language so that student grasp the concept of conservation easily. The team provided training minimum of 1000 individuals. The learning material video, an illustrated wildlife map of Himachal Pradesh, an illustrated wildlife map of Himachal Pradesh has been developed under the project which were distributed/ introduced to school students to understand the biodiversity of Himachal Pradesh. ***Remarks:*** *The list of the awareness/training programs and no. of participants are given in Appendix 3 and details in Annexure 2*

			Botanical garden, trap cameras, GPS and cameras were provided with the help of NLC staff and Forest Guard. • 20 students from school visited to Bishleou Pass, trap cameras, GPS and cameras were provided with the help of NLC staff and Forest Guard.	
3.	Training for community-based organizations (Annual target: 200 members from different community based organizations).	No. of Trainings organized with No. of stakeholders benefited in each segment;	• 03 No. of Trainings organized & 25 participants in each training got benefitted. • Trained 67 registered nature guides of GHNP, and 489 community members were sensitized by the NLC team.	
		No. of Dissemination and Awareness Publications (short/detailed) circulated;	• 300 Pamphlets distributed on four major issues like ban of plastic, use of biodegradable material, proper waste disposal etc.	***Remarks:*** *Annexure 3*
			• Sacred Trees in the Eco-Zone of Great Himalayan National Park documented • Document prepared on Traditional uses of medicinal plants in Great Himalayan National Park of Himachal Pradesh, North Western Himalaya, India. • An Illustrated field guidebook prepared	***Remarks:*** *Appendix 2 attached*

		No. of Beneficiaries visited the centre;	on Birds of Great Himalayan National Park 10000+ visitors visited the GHNP and NLC.	

(*) As stated in the Sanction Letter issued by the NMHS-PMU.

2.4. Strategic Steps with respect to Outcomes (in bullets)

S. No.	Particulars	No.	Remarks/ Attachment
1.	Demonstrations developed	02	• Traditional use of medicinal plants in Great Himalayan national Park (Appendix 2) • An e-learning module developed for the school children which is more education-friendly for disseminating education and awareness. The module uses animations and easy language so that students grasp the concept of conservation easily and the existing Illustrated Wildlife Map of GHNP and Himachal Pradesh were also developed.
2.	New Facilities created	01	• 01 NLC established for environmental education, awareness, and nature conservation.
3.	Others (if any)		

3. Demonstrative Skill Development and Capacity Building/ Manpower Trained

S. No.	Type of Activities	No. of Events (*Details to be provided in Part-B in Section-4&5*)	Beneficiary Category (Student/farmer/ Officials/ Others)	Participants/Trained			
				SC	**ST**	**Woman**	**Total**

1.	Workshops	6 meeting and training of local people.	Workshop /meeting/community-based training have been organized in connection with a tourist guide, eco-tourism, protection, survey of biodiversity skill development, etc.				**168**
2.	On Field Trainings		Community members were sensitized by the NLC team.				**489**
3.	Awareness building activities	20 awareness programs	Students were educated and sensitized through the awareness building programs				**1044**
4.	Awareness building activities	06 awareness programs	Commnities were educated and sensitized through the awareness building programs				**117**
5.	Awareness building activities	06 awareness programs	03 State policies communicated & briefed to the Local Communities & Students				**1223**

4. Linkages with Regional & National Priorities (SDGs, INDC, etc)/ Collaborations

S. No.	Linkages /collaborations	Detail of activities (No. of Events held)*	No. of Beneficiaries
1.	Sustainable Development Goals (SDGs)/ Climate Change/INDC targets addressed	SDG 15 - managing forests sustainably	489
2.	Any other	Collaboration with local people/local NGO and local administration. Several visits were made by the government officials of the department/state.	Government and CBOs, Women groups., youth groups.

*Further details to be provided in Part B-Section 5.4.

5. Financial Summary (Cumulative)

Please attach the consolidated and audited Utilization Certificate (UC) and Year-wise Statement of Expenditure (SE) separately in the NMHS prescribed format, *ref*. **Annexure I.**

Already Submitted to NMHS-PMU.

6. Major Equipment/ Peripherals Procured/ Facilities under the Project* (if any)

S. No.	Name of Equipment/ Facilities/ Peripherals	Quantity	Cost (INR)	Utilisation of the Equipment after project
1.				
2.				
3.				

*Details should be provided in details **(***ref.* **Annexure III &IV).**

Details in the form of Annexure III & IV already submitted to NMHS-PMU.

7. Knowledge Products and Publications:

S. No.	Publication/ Knowledge Products	*Total*	Enclosures
1.	Technical Reports/ Manuals (Skill Development/ Capacity Building)		
2.	Information Dissemination Material (Guide Book, Manuals)	03	Appendix 2 enclosed
3.	Any other (Pamphlets on like ban of plastic, use of biodegradable material, proper waste disposal, etc.	04	Annexure 3 enclosed

*Please mention or Acknowledge the NMHS Support in all Knowledge Products/ Publications.

8. Recommendation on Utility of NLC Findings, Replicability and Exit Strategy

Particulars	Recommendations
Utility of the NLC Findings:	• Training and other awareness programmes were performed to develop a cadre of trainers among students/officials who can lead conservation measures and capacity development at various levels. These programmes have effectively instilled a nature-friendly attitude in students and other stakeholders. More community people were able to participate in environmental learning and conservation due to these outreach programs. • Capability and Training Building on alternative livelihoods options among homestay owners and other stakeholders will familiarise them with other livelihood possibilities and minimise reliance on forest resources. Training and capacity development initiatives carried out to economically empower the community and close the gender gap and inequity. The project's state-of-the-art NLC with herbal garden, and nurseries will be valuable to the community.
Replicability / Way Forward:	Since awareness and sensitization are important tools in conservation, the initiative is easily replicable due to a systematic implementation framework. Additionally, increasing the ability to generate sustainable income would help ease the pressure on forest resources. In this approach, communities and students will become involved and offer their time for environmental conservation. It has also led to the adoption of sustainable economic activities that have helped the communities generate income, reduce gender inequality, economically empower the weaker groups, and empower young people especially students. • Implementation of similar activities, such as sustainable mountain tourism promotion, indigenous horticulture and medicinal plantation training, will help local communities generate income and also help distress the reserve forest, protected areas, and national parks. • More interpretation centres and botanical gardens to be established along the lines of Him-NLC, HP. It raises awareness about environment conservation, biodiversity, waste management etc. and helps educate the community, particularly the youths, about the richness of the IHR. • Similar programmes in many states should have an interactive forum for sharing ideas and information. It has been discovered that the products of interactive audio-visual museums and interpretation centres capture the interest of both communities and youngsters. • More training and employment options may be explored in the future to meet the needs of the local communities. More school students and non-governmental organisations may be involved in the future too.

Exit Strategy:	• The Nature Learning Centre creat will be used in the future by the community, students, and visitors to learn about nature conservation and flora and fauna of the GHNP. Since NLC Himachal Pradesh partnered with the HP Forest Department, has similar mandates from the state government. • The Stakeholders, Tourist Guides and Students will continue educating the community for wider dissemination. • Implementing agency DFO Shamshi, Forest Dept. HP may continue replicating NLC, HP outcomes in other parts of the districts, and HP Forest department may replicate it at a larger scale for the whole HP State. • The Forest Department and DFO Shamshi may also continue offering alternative training and livelihood programmes as per the department's responsibilities. • The established NLC, with facilities like nature trails, herbal gardens, adventure park etc., have been handed over to the HP Forest Department for smooth execution during post completion.

(**PROJECT PROPONENT/ COORDINATOR**)

(Signed and Stamped)

(**HEAD OF THE INSTITUTION**)

(Signed and Stamped)

Place: ……..
Date: …../……/……

PART B: DETAILED PROJECT REPORT – NLC Grant

The Detailed Project Report should include an **Executive Summary** along with separate chapters on (i) **Introduction** (ii) **Demonstration/Strategy/Approach**, (iii) **Major Events and Activities**, (iv) **Overall Achievements** (v) **NLC Impacts** (vi) **Exit Strategy** and Sustainability (vii) **References** and (viii) **Acknowledgement** (acknowledging the financial grant support from the NMHS, MoEF&CC, GoI).

Other necessary details/ Supporting Documents/ Dissemination Materials (*New Products/ Manuals/ Standard Operating Procedures (SOPs)/ Technology developed/Transferred, etc*, if any) may be attached as Appendix(ces).

1 EXECUTIVE SUMMARY

The HIM-NLC Himachal Pradesh project is a comprehensive initiative designed to promote environmental awareness, conservation, and sustainable development in the state of Himachal Pradesh. With a focus on infrastructure development and awareness creation, the project encompasses the primary project site at Sai Ropa Nature Park at GHNP in the Banjar sub-division of Himachal Pradesh.

At the Sai Ropa Nature Park, Himachal Pradesh, the project focused on repair and renovation work within the park. The project Him-NLC Himachal Pradesh has primarily three components, namely, to develop a nature learning centre by upgrading and diversifying the botanical garden; to establish the ground linkages between partner institutions for environmental awareness, and to create a team of trainers among the staff or interested user groups for the sustainability of the project beyond the project duration.

This included upgrading amenities such as washrooms, doors, and walls and a complete renovation of the Conference Hall. The hall was equipped with state-of-the-art technology, including a projector, motorized projector screen, sound system, microphones, and furniture. Additionally, sitting areas for visitors were created with proper amenities also. New Nature Trails were developed to provide visitors with an immersive "Walk in Nature" experience.

The HIM-NLC Himachal Pradesh project plays a vital role in fostering environmental awareness and promoting conservation practices among the people of Himachal Pradesh. Through infrastructure development, capacity building, and awareness creation, the project aims to create a society that values and actively participates in preserving its natural resources. By providing engaging and educational experiences at the project site, the project inspires students, teachers, and community members to become champions for biodiversity conservation and sustainable development.

2 INTRODUCTION

2.1 Background

The Nature Learning Centre (NLC) project is a vital initiative that aims to create awareness, promote conservation, and empower local communities to protect and sustainably use their natural resources. With an increasing global focus on biodiversity conservation and sustainable development of natural resources, there is a growing need to engage communities and equip them with the knowledge and skills necessary to preserve their local ecosystems. Recognizing this need, the NLC project was established as a collaborative effort between the Ministry of Environment, Forests & Climate Change (MoEFCC) and the Himachal Pradesh Forest Department, Government of Himachal Pradesh. The NLC-HP was established with a vision to make the stakeholders aware & conserve nature and sustainably explore nature through education, awareness and skill development, capacity building and livelihood security, and employment generation through eco-tourism.

2.2 Overview of the NLC

Despite various initiatives by the state and central governments, the government cannot address all stakeholders and establish capacity for the sustainable use of natural resources in general and bio-resources in particular. Thus, a concentrated and focused effort is required through a dedicated entity like NLC Himachal Pradesh, which primarily works towards increased understanding of nature, natural ecosystems, biological resources, their importance and conservation, etc. Another essential point is that many departments have made several interventions to create and sensitise people about these issues. These are frequently discrete activities that must be brought together under a single umbrella. Efforts are being undertaken to address the lack of coordination between several departmental actions aimed at nature and biodiversity protection. The NLC HP served as a mechanism for promoting environmental learning and biodiversity conservation throughout the state.

The major issues addressed under NLC-HP are as follows:-

- To develop interpretation models and upgrading and diversifying the botanical garden and NLC.
- To develop & establish a ground linkage between partner institutions.
- To develop a team of trainers amongst permanent staffs of the area/interested user groups for the sustainability of NLC beyond the NLC duration.

2.3 Baseline Data and NLC Scope

2.4 NLC Objectives and Target Deliverables (*as per the NMHS Sanction Order*)

Objectives	Deliverables
To develop nature learning centre by upgrading and diversifying the botanical garden;	State-of-the-art Nature Learning Centre;
To establish the ground linkages between partner institutions for environmental awareness;	Nature Conservation and Education – Students and others (Annual target of students to be educated: Minimum 1000 per year);
To create a team of trainers among the staff or interested user groups for sustainability of the project beyond the project duration.	Training for community-based organizations (Annual target: 200 members from different community-based organizations).

3 DEMONSTRATION/ STRATEGY/ APPROACH – *supporting documents to be attached.*

3.1 Demonstrations/ Strategy used

The NLC, Himachal Pradesh objectives were accomplished by raising awareness through interactive learning programs, practical activity-based learning, green technologies demonstration/exposure visits, audio-visual training materials, signages for awareness among masses, organizing various events for awareness generation, reading materials, promoting sustainable livelihood training programmes and development of interpretation centres/models, nature trails, bambusetum, adventure park etc.

3.2 Data collected and Equipment utilized (*Appendix 2*)

- Documentation of the Sacred Trees in the Eco-Zone of Great Himalayan National Park.
- Traditional uses of Medicinal Plant in GHNP of Himachal Pradesh
- Guidebook on the Birds of Great Himalayan National Park

3.3 Details of Educational and Awareness Programmes, if any

For education and awareness, Nature Learning Centre (NLC), Himachal Pradesh, conducted and organized various Educational Awareness programs for the Students and Stakeholders of the Tirthan and Sainj Valley, HP. Various Environment issues like forest fire management, waste management, afforestation & deforestation, flora & fauna of the GHNP were among the selected themes of the awareness programs. The brief about the awareness education programs is given in the Table 1 and detailed information is in annexure 2.

Table 1: List of the Awareness Programmes organized under the NLC HP (Further details in Annexure 2)

S#	Subject of Awareness	Place of Awareness (School/ Villages)	Participants
1.	Polythene Hatao Paryawaran	GMS Doghri Ropa	50

	Bachao		
2.	Forest Fire, To Reduce the Use of Polythene	GMS Tinder	49
3.	Illicit Felling, Forest Fire, To reduce the use of Polythene Bag	GSSS bathad	119
4	Forest Fire, To Reduce the Use of Polythene	GMS Ghaliyad	30
5.	Environment Protection, To Reduce the Use of Polythene	GMS Lapah	24
6.	Forest Fire, Environment Protection, To reduce the use of Polythene Bag	GSSS Shanghar	130
7.	Environment Protection, Forest Fire, To reduce the use of Polythene Bag	GMS Nahin	31
8.	Forest Fire, To reduce the use of Polythene Bag	GPS Gushaini	125
9.	Effect of Deforestation, Forest Fire,	GPS Faryadi	72
10.	Deficit of Polythene Use, Forest Fire, Illicit Felling	GPS Bathad	76
11	Deficit of Polythene Use,	GPS Shrikot	48
12.	Forest Fire, Deficit of Polythene	GHS Shrikot	84
13.	Forest Fire, Deforestation, Deficit of Polythene Use	GM S Majhali	40
14.	Forest Fire, Deforestation, Deficit of Polythene Use	GPS Majhali	58
15.	Deficit of Polythene Use, Deforestation, Forest Fire	GPS Ghalingcha	25
16.	Flora and Fauna in GHNP, COVID-19	MPS Banjar	17
17.	Flora and Fauna in GHNP, COVID-19	SVM School Banjar	20
18	Flora and Fauna in GHNP, COVID-19	GSSS Goshaini	11
19.	Flora and Fauna , COVID-19	GMS Tinder	14
20.	Flora and Fauna in GHNP, COVID-19	SET Model School Banjar	21
Total			**1044**

3.4 Strategic Planning for each Event

Awareness and Sensitization Program: The programmes were conducted mainly to increase awareness of the community members and students on various issues of nature conservation, including field exposure-based learning.

Knowledge products development: The easy learning materials prepared like pamphlets, posters, standees, Maps etc., to facilitate understanding of nature and the ecosystem as well as the creation of awareness on conservation.

Creating a cadre of trainers and conservation workers: A cadre of nature enthusiasts, conservation workers and trainers within the state created so that the concepts of conservation and nature learning reach out to every stakeholder. Training modules, short-term learning courses, workshops etc. were prepared for students and other stakeholders.

Alternative Livelihood Programme: Training programmes provided to the community members and women members on alternative livelihoods like nursery development, ecotourism, etc., to reduce pressure on the forest resources near the protected areas.

4 MAJOR EVENT AND ACTIVITIES – *supporting documents to be attached.*

4.1 Major Events and Activities

Under this project, the major events and activities undertaken for the environment education, awareness and nature learning during the project tenure are being summarized below:

- The existing botanical garden at Sai Ropa developed and extended into the Nature Learning Centre.
- Bambusetum Nursery established for planting bamboo within the park.
- Medicinal Herbal Garden established.
- Developed nursery to raise 100000 seedlings.
- Arboretum developed within the Centre.
- Amphitheatre with a celebration point developed for tourists and students within the NLC park.
- Nature trails of 01 Km approx. all across the park developed.
- Rock and Rose Garden developed within the park.
- Bridal paths developed.
- Water harvesting tank constructed for water harvesting.
- Fauna Life-size models of the GHNP were developed and showcased to the public for education and awareness within the Centre.
- Children's Park was developed with all the basic facilities for amusement.
- Wooden hanging bridges were developed for connecting the nature trails and for nature lovers.

- Landscaping was done and tree species were planted within the park found in the GHNP area.
- Chinar trees planted within the Nature park.
- An e-learning module developed for school children
- Reports on Documentation of sacred trees, assessment of traditional uses of medicinal plants, and bird guidebook in GHNP were explored.
- Partnership with the Wildlife Institute of India, Dehradun to provide livelihood training nature environment awareness, field guides, and Eco-tourism.
- Sensitized programs were organized for environmental education to School children of the Kullu districts.
- Training given to communities and stakeholder.
- Team of trainers identified and trained for specific activities.

5 OVERALL ACHIEVEMENTS – *supporting documents to be attached.*

5.1 Achievements on NLC Objectives/ Target Deliverables

Under this project, the major achievements in terms of environment education and awareness and nature learning various achievements during the project tenure are being summarized below:

The existing botanical garden at Sai Ropa has been developed and extended into the Nature Learning Centre. An additional area of 17.4 ha. has been acquired by the wildlife wing of the HP Forest Deptt. The extended area was developed with the below-mentioned facilities established within the Nature Learning Centre.

1. Bambusetum Nursery was established for planting bamboo within the park.
2. Medicinal Herbal Garden established.
3. Developed nursery to raise 100000 seedlings.
4. Arboretum developed within the Centre.
5. Amphitheatre with a celebration point developed for tourists and students within the NLC park.
6. Nature trails of 01 Km approx. all across the park developed.
7. Rock and Rose Garden developed within the park.
8. Bridal paths developed.
9. Water harvesting tank constructed for water harvesting.
10. Fauna Life-size models of the GHNP were developed and showcased to the public for education and awareness within the Centre.
11. Children's Park was developed with all the basic facilities for amusement.
12. Wooden hanging bridges were developed for connecting the nature trails and for nature lovers.
13. Landscaping was done and tree species were planted within the park found in the GHNP area.

14. Chinar trees planted within the Nature park.

An e-learning module has been developed for school children which is more education-friendly for disseminating education and awareness. The module uses animations and easy language so that students grasp the concept of conservation easily.

The project proponent partnered with the Wildlife Institute of India Dehradun to provide livelihood training nature environment awareness, field guides, and Eco-tourism to enhance their capacity in bringing awareness to the visitors in GHNP. A team of trainers has been identified and they have been trained for specific activities and shell be groomed in the future too for specialization.

Various Sensitized programs were organized for environmental education to School children of the Kullu districts.

The team has been provided with training minimum of 1000+ individuals. The learning material video, an illustrated wildlife map of Himachal Pradesh, and an illustrated wildlife map of Himachal Pradesh has been developed under the project which shall be distributed/ introduced to school student to understand the biodiversity of Himachal Pradesh. 67 registers of nature guides of GHNP have been trained and 489 community members were sensitized by the NLC team. For livelihood training Nature and field guides, training was imparted through WII to identified youth who are registered with GNHP. A team of trainers has been identified and they have been trained for specific activities and shall be groomed in the future too for the specialization beyond the project period.

Apart from that Documents of sacred trees, assessment of traditional uses of medicinal plants in GHNP and Illustrated bird guidebook were explored during the project tenure.

Documentation of the Sacred Trees in the Eco-Zone of Great Himalayan National Park:

The conservation remains an important concept since ancient times. Tree as a symbol for various local communities reflects the historical reality that man is dependent on trees for his existence. The Community-Based Conservation such as sacred groves and sacred trees keep ecological process in a balanced state. The present study is carried out in the Eco- Zone of the Great Himalayan National Park (GHNP) to document sacred tree species which have been protected by the local people for their cultural and religious beliefs that deities reside in them and protect the villagers from various calamities since ancient times. Copy enclosed as Appendix 2.

Traditional uses of medicinal plant in Great Himalayan National Park of Himachal Pradesh, North Western Himalaya, India:

The Indian Himalayan region (IHR) supports huge variety of medicinal plant. Still, there has been little authentication on medicinal plant in several protected areas of IHR. Great Himalayan National Park (GHNP) is a world heritages site, harbours a wide variety of medicinal plants. The present study is an attempt to assess the medicinal plant diversity of Great Himalayan National Park. A total of 152 species of medicinal plants belonging 63 different families were used by local people to cure different diseases. Out of these, most of plant species were have leaves as medicinal value followed by roots, fruits, rhizomes, and seed. All these medicinal plants species were identified to cure human disease except 10 medicinal plant species which were used by local inhabitants for the treatment of veterinary ailments. Local People, especially older age group, including women heavily use these traditionally available medicinal plants as a primary health care. Maximum species were used for wound healing (31), followed by cough (25), dysentery (21), cold (20) and stomachache (18). Due to grassing, over-exploitation and habitat degradation, the population of many medicinal plant species is decreasing day by day (Appendix 2).

Illustrated Field Guidebook on Birds of the GHNP:

An Illustrated field guidebook prepared on Birds of Great Himalayan National Park. Besides other species, GHNP is an important bord area and home to more than 200 birds (as per the e-bird database, the list is 243 birds). Through the Illustrated booklet, it was aimed to update the database as well as to bring it into the public domain. A compiled list of the important birds in the form of a pictorial field guide which could be shared with the masses in soft or hard copy as an awareness material for the visitors of the GHNP (Appendix 2).

5.2 Interventions

A State-of-the-art Nature Learning Centre established at GHNP (Sai Ropa, Himachal Pradesh) with all the facilities of education and awareness in one place. The education as well as the demonstration of the flora fauna of the GHNP given to the target people at the NLC. The interventions have been taken like Medicinal Herbal Garden, Bambusetum Nursery, Life-size models of the GHNP Fauna during the execution of the establishment of the Nature Learning Centre.

A several training/awareness program/workshops were conducted to change the mindset of the various target stakeholders towards nature conservation & biodiversity in the region.

5.3 On-field Demonstration and Value-addition of Products, if any

The NLC comprises both education awareness and demonstration of the developed modules and models within the Centre. The demonstration of the flora and fauna was added to the project since the commencement of the project. After establishing models like the herbal garden, bambusetum nursery,

life-size models of the fauna, rock and rose garden, water harvesting tanks, and other forms of demonstration, the visitors, stakeholders, communities and students during the visit were completely demonstrated the established models in the Centre.

The interpretation hall at GHNP within the NLC established in Sai Ropa, also gives a full demonstration of the GHNP and NLC before and after the visit of the students and stakeholders and other interested visitors to the GHNP. Demonstration of all the information about the Centre and Park is imparted to the visitors through the audiovisuals and display materials provided within the Nature Interpretation Centre.

5.4 Addressing Cross-cutting Issues

Cross-cutting issues addressed during the project execution were the waste management issues in the HP State, particularly in the Kullu district. For that, various awareness generation programs and cleanliness drives were organised and conducted to make the masses aware of the large quantity of waste and without proper disposal. People have been sensitized, and large masses have shown interest during the awareness drives and program conducted. 300 Pamphlets were distributed on major issues like ban on plastic, use of biodegradable material, proper waste disposal etc. The pamphlets on the mentioned issues are given in Annexure 3.

6 NLC IMPACTS – *supporting documents to be attached.*

6.1 Socio-economic impact

Rapid population increase, mostly caused by poverty, has harmed natural resources, particularly renewable ones, such as forests, water bodies, and land resources. It causes economic and societal disintegration in addition to ecological and biospheric damage. The most significant indicators of a community's progress are its livelihood and socio-economic development.

In accordance with this, NLC, HP aspires to attain this goal by teaching community members/SHGs in and around eco-zone areas on alternative livelihood alternatives to lessen the strain on forest resources and promote effective natural resource utilisation.

Throughout the region, the NLC, HP have delivered training and seminars to community people on the following alternate and sustainable sources of income:

- The project partnered with the WII Dehradun to provide livelihood training, field guides, and Eco-tourism to enhance their capacity to bring awareness and sustain their livelihood-generated options. For that, a team of trainers were identified and trained for specific

activities. After completion, these groups will further train the people in Ecotourism, and sustainable livelihood options like field guides etc.

Various programs have been organized to involve the masses so that their livelihood becomes sustainable and long-lasting with good economic benefits. Homestays owners and locals communities participated in these Prooograms for their benefit, and details are given below:

S#	Type of Training Program/Topics Covered	Stakeholders/Participants
1.	Nature Guide Training	29
2.	Skill Development Training for communication skills, body language, etiquette, and the role of tour guide.	30
3.	About World Heritage Sites	30
4.	Forest Protection and Conservation	25
5.	Eco-tourism, Forest Protection and Conservation	22
6.	Forest Fire Management	32
	Total	**168**

NLC, HP sought to give varied economic development options based on the location and community living in the region. Herbal gardens established and nurseries developed also motivated the visitors, and many have shown interest in adopting such kind of livelihood options in the region.

6.2 Impact on Natural Resources/ Environment

NLC, HP promotes the management of natural resources through community participation-based conservation practices. The stakeholders, communities, students and government officials were trained and made aware of Natural Resource Management and environment conservation through the participatory approach. The NLC's awareness campaigns are largely focused on raising knowledge of Himachal Pradesh's natural resources and biodiversity and how management or mismanagement of those natural resources impacts everyone living on this planet, both directly and indirectly.

6.3 Conservation of Biodiversity/ Land Rehabilitation in IHR

Biodiversity Conservation and Natural resources management in general has been discussed and focussed very much during the project tenure. For the awareness about biodiversity conservation, herbal

gardens have been established within the Park. A bambusetum with adjacent Rock and rose garden has also been demonstrated for awareness and education. Paaarticuuularly for fauna, Life-size models of the GHNP fauna have been established, and complete information has been given on the signages of these models. Apart from that, various programs on Natural resource management and audiovisuals of the flora fauna of the GHNP were demonstrated to these visitors and students for awareness and education.

6.4 Developing Mountain Infrastructures

A well-established NLC at Sai Ropa, Tirthan Valley, HP within the GHNP added infrastructure to the GHNP and Forest Department HP. The Basic facilities for the interpretation Centre have been provided like Projectors, Printers, Cameras, Walki-Talkies etc. Other facilities like state-of-the-art NLC have been established, and an existing garden has been refurbished into a well-established Nature Learning Centre. Amusement Park, Solar lighting, Botanical Gardens, and Recreation Unit facilities have added value to the Centre regarding the tourist/visitors attraction. This place provides education about Nature Conservation and a place to spend time in Clam Nature.

6.5 Strengthening Networking in State

The project has paved the way for various institutes, organizations and departments that have been involved since the beginning of the project to strengthen the network and disseminate the outputs to the wider section. The project also included activities where many stakeholders and officials visited the Centre and received positive feedback from them.

7 EXIT STRATEGY AND SUSTAINABILITY

7.1 Utility of project findings

Training and other awareness programmes were performed to develop a cadre of trainers among students/officials who can lead conservation measures and capacity development at various levels. These programmes have effectively instilled a nature-friendly attitude in students and other stakeholders. More community people were able to participate in environmental learning and conservation due to these outreach programs.

Capability and Training Building on alternative livelihoods options among homestay owners and other stakeholders will familiarise them with other livelihood possibilities and minimise reliance on forest resources. Training and capacity development initiatives carried out to economically empower the community and close the gender gap and inequity. The project's state-of-the-art NLC with herbal garden, and nurseries will be valuable to the community.

7.2 Major Recommendations/ Way Forward

Since awareness and sensitization are important tools in conservation, the initiative is easily replicable due to a systematic implementation framework. Additionally, increasing the ability to generate sustainable income would help ease the pressure on forest resources. In this approach, communities and students will become involved and offer their time for environmental conservation. It has also led to the adoption of sustainable economic activities that have helped the communities generate income, reduce gender inequality, economically empower the weaker groups, and empower young people especially students.

- Implementation of similar activities, such as sustainable mountain tourism promotion, indigenous horticulture and medicinal plantation training, will help local communities generate income and also help distress the reserve forest, protected areas, and national parks.
- More interpretation centres and botanical gardens to be established along the lines of Him-NLC, HP. It raises awareness about environment conservation, biodiversity, waste management etc. and helps educate the community, particularly the youths, about the richness of the IHR.
- Similar programmes in many states should have an interactive forum for sharing ideas and information. It has been discovered that the products of interactive audio-visual museums and interpretation centres capture the interest of both communities and youngsters.
- More training and employment options may be explored in the future to meet the needs of the local communities. More school students and non-governmental organisations may be involved in the future too.

7.3 Replication/ Upscaling/ Post-Project Sustainability of Interventions

NLC Himachal Pradesh partnered with the HP Forest Department, which has comparable mandates from the state government.

Over the course of the project, NLC, HP has worked with various government organisations and agencies to carry out various activities such as outreach programmes, capacity building programmes, and awareness campaigns.

Implementing agency DFO Shamshi, Forest Dept. HP may continue replicating NLC, HP outcomes in other parts of the districts, and HP Forest department may replicate it at a larger scale for the whole HP State. The Forest Department and DFO Shamshi may also continue offering alternative training and livelihood programmes per the department's responsibilities.

The established NLC, with facilities like nature trails, herbal gardens, adventure park etc., have been handed over to the Forest Department's respective authorities.

The Stakeholders, Tourist Guides and Students will continue educating the community for wider dissemination.

8 REFERENCES/ BIBLIOGRAPHY (NIL)

9 ACKNOWLEDGEMENTS

The NMHS Him-NLC, Sai Ropa, Himachal Pradesh, would like to acknowledge the National Mission on Himalayan Studies, Ministry of Environment, Forest & Climate Change (MoEF&CC) and G.B. Pant "National Institute of Himalayan Environment" (NIHE) for financial and technical assistance in successfully establishing the centre & accomplishing the project. We also sincerely thank the Department of Forest & Environment, Govt. of Himachal Pradesh, for the smooth execution and overall guidance. NMHS Him-NLC, Himachal Pradesh, would also like to acknowledge the project partners for their assistance and encouragement in completing all the activities. The organization acknowledges all the schools & other educational institutions that have facilitated our activities.

APPENDIX(CES), if any

Appendix 1 – Details of Technical Activities
Appendix 2 – Copies of Publications/ Reports/ Knowledge Products duly Acknowledging the Grant/ Fund Support of NMHS
Appendix 3 – List of Trainings/ Workshops/ Seminars with details of trained resources and dissemination material and Proceedings (Details in Annexure 2)
Appendix 4 – Nurseries Developed

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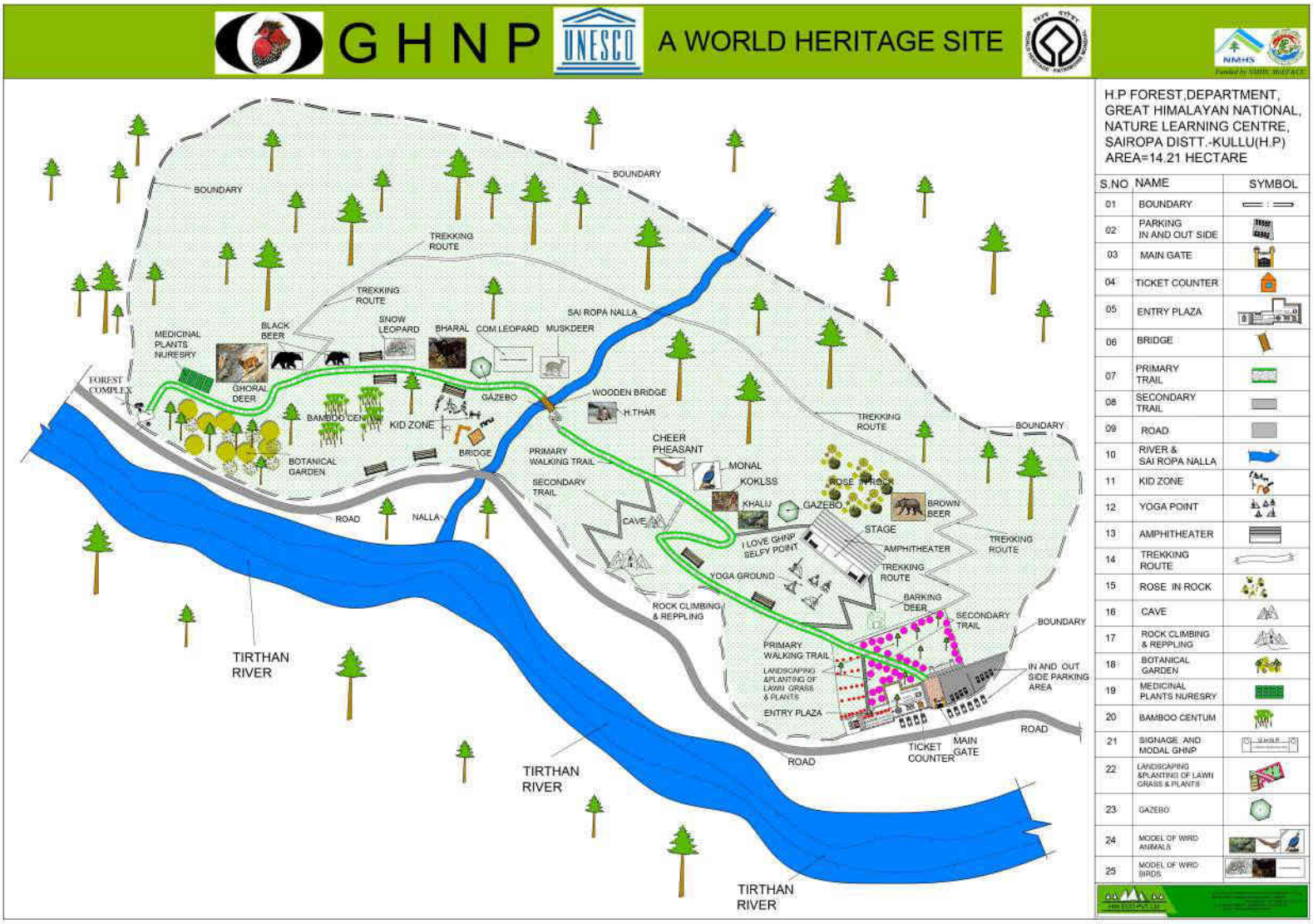
Annexure 1


G H N P
UNESCO
A WORLD HERITAGE SITE
BOUNDARY
TREKKING ROUTE
SAI ROPA NALLA
MEDICINAL PLANTS NURESRY
BLACK BEER
SNOW LEOPARD
BHARAL
COM LEOPARD
MUSKDEER
FOREST COMPLEX
GHORAL DEER
GAZEBO
WOODEN BRIDGE
H.THAR
BAMBOO CENTUM
KID ZONE
BRIDGE
BOTANICAL GARDEN
ROAD
NALLA
CHEER PHEASANT
MONAL
KOKLSS
KHALIJ
PRIMARY WALKING TRAIL
SECONDARY TRAIL
CAVE
I LOVE GHNP SELFY POINT
YOGA GROUND
ROCK CLIMBING & REPPLING
ROSE IN ROCK
BROWN BEER
STAGE
AMPHITHEATER
BARKING DEER
LANDSCAPING &PLANTING OF LAWN GRASS & PLANTS
ENTRY PLAZA
TICKET COUNTER
MAIN GATE
IN AND OUT SIDE PARKING AREA
TIRTHAN RIVER
H.P FOREST,DEPARTMENT, GREAT HIMALAYAN NATIONAL, NATURE LEARNING CENTRE, SAIROPA DISTT.-KULLU(H.P) AREA=14.21 HECTARE
S.NO NAME SYMBOL
01 BOUNDARY
02 PARKING IN AND OUT SIDE
03 MAIN GATE
04 TICKET COUNTER
05 ENTRY PLAZA
06 BRIDGE
07 PRIMARY TRAIL
08 SECONDARY TRAIL
09 ROAD
10 RIVER & SAI ROPA NALLA
11 KID ZONE
12 YOGA POINT
13 AMPHITHEATER
14 TREKKING ROUTE
15 ROSE IN ROCK
16 CAVE
17 ROCK CLIMBING & REPPLING
18 BOTANICAL GARDEN
19 MEDICINAL PLANTS NURESRY
20 BAMBOO CENTUM
21 SIGNAGE AND MODAL GHNP
22 LANDSCAPING &PLANTING OF LAWN GRASS & PLANTS
23 GAZEBO
24 MODEL OF WIRD ANIMALS
25 MODEL OF WIRD BIRDS

Appendix 1


WELCOME TO
NATURE LEARNING CENTRE
SHAIROPA(GHNP)
Nature Learning
CENTRE
GHNP
A WORLD HERITAGE SITE

Please park your vehicles here

Main Entry View of the Park

Portraying GHNP landscapes along the walls

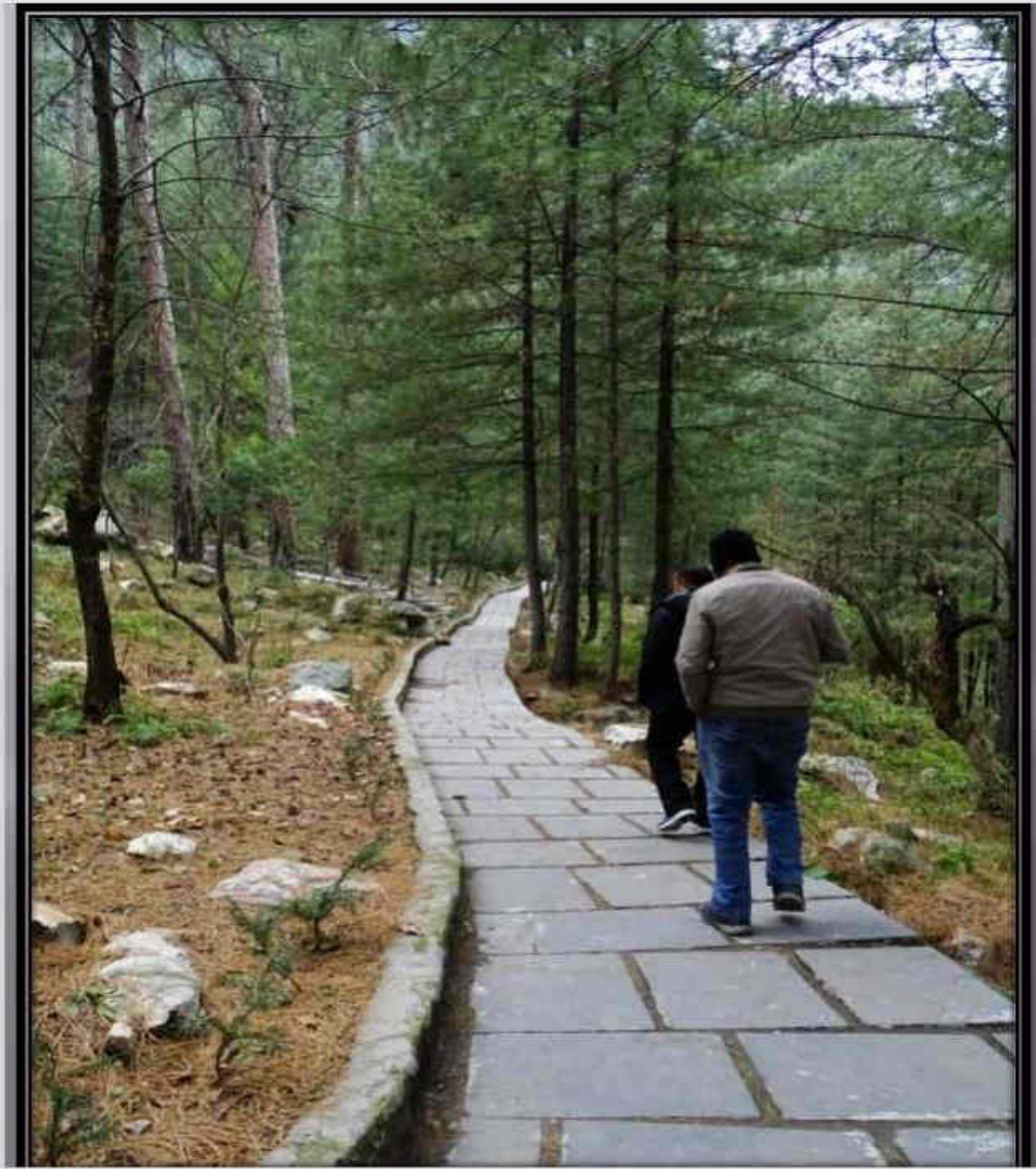
Please grab your tickets here

Depicting GHNP on a mini model

Grab your eatables here

Lets Sit and Enjoy your Meal

Toilet for Visitors



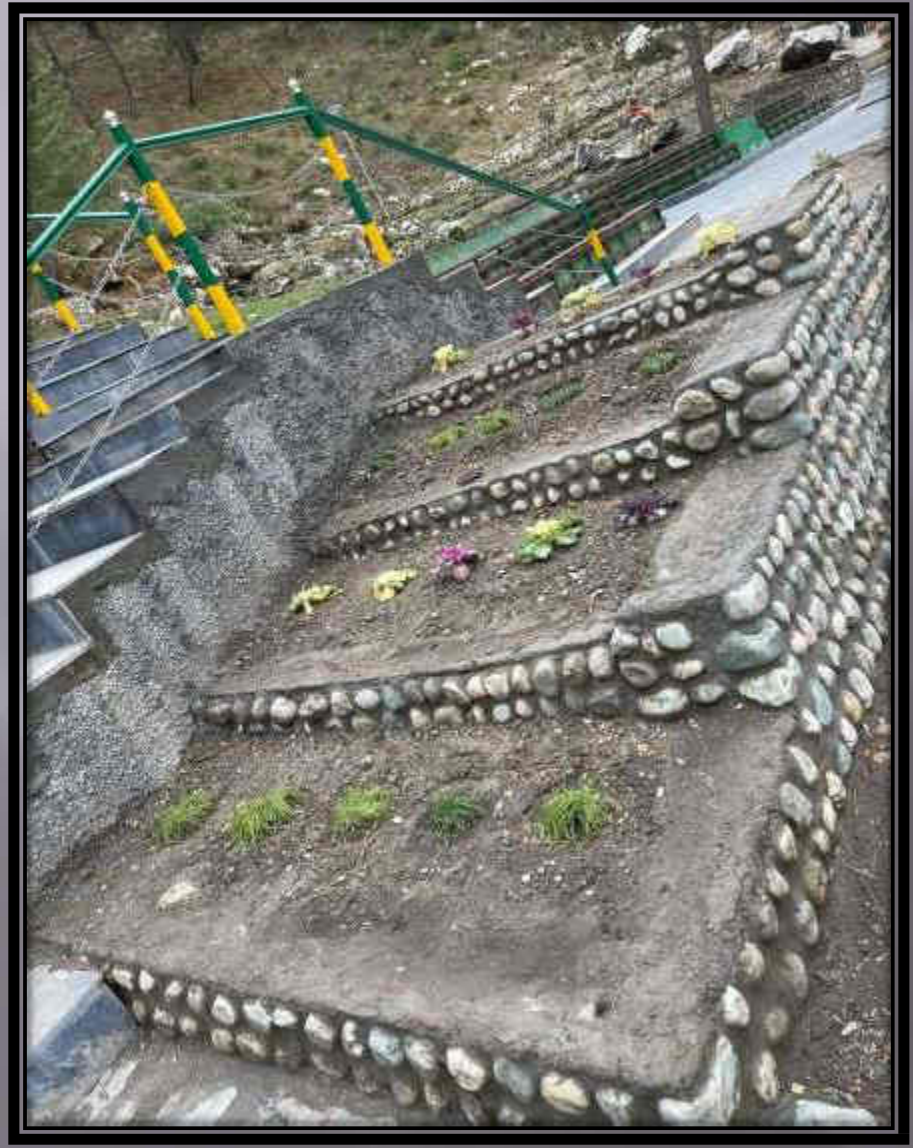
Come .....
Let's Walk

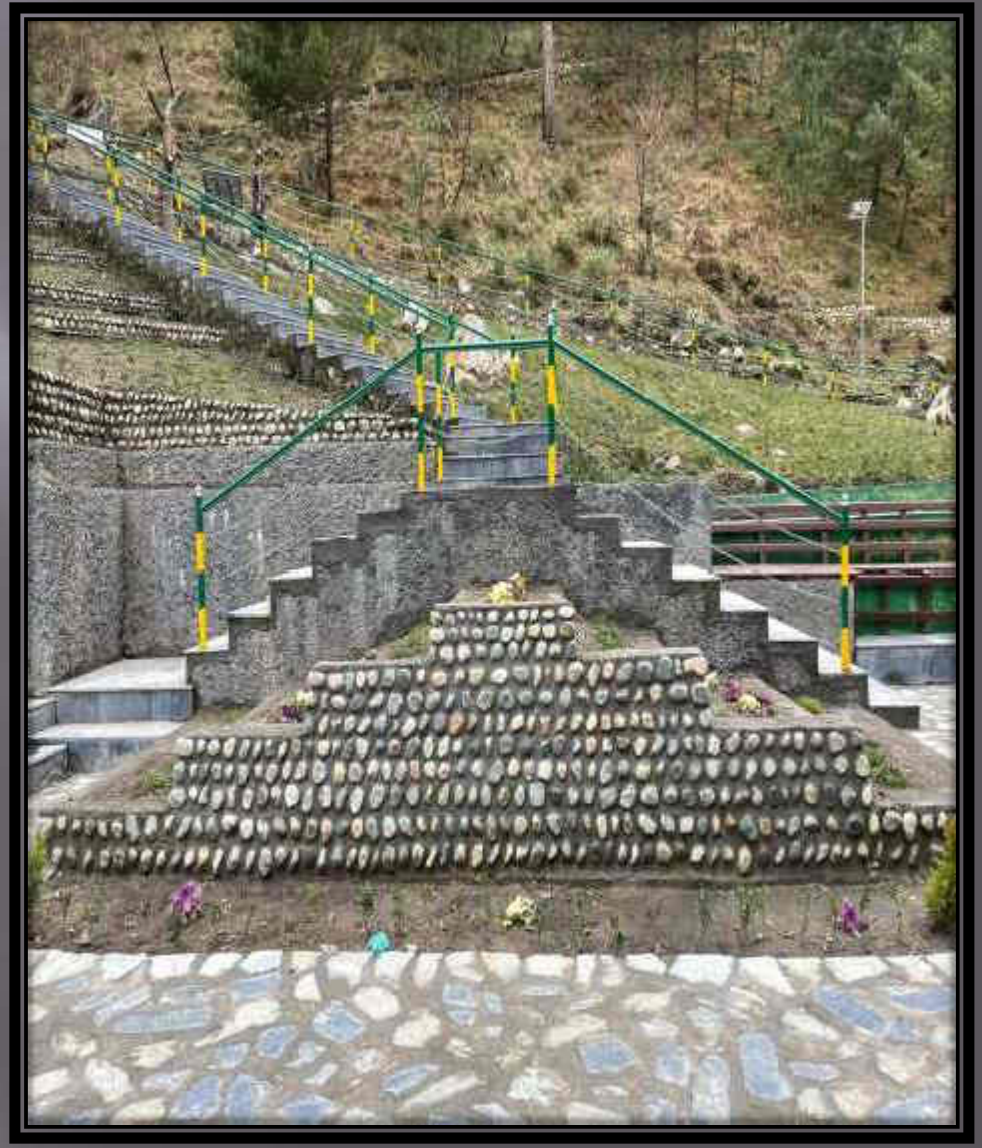
Walking Trails inside Park

Please do not cut trees

Please plant trees

Some landscaping



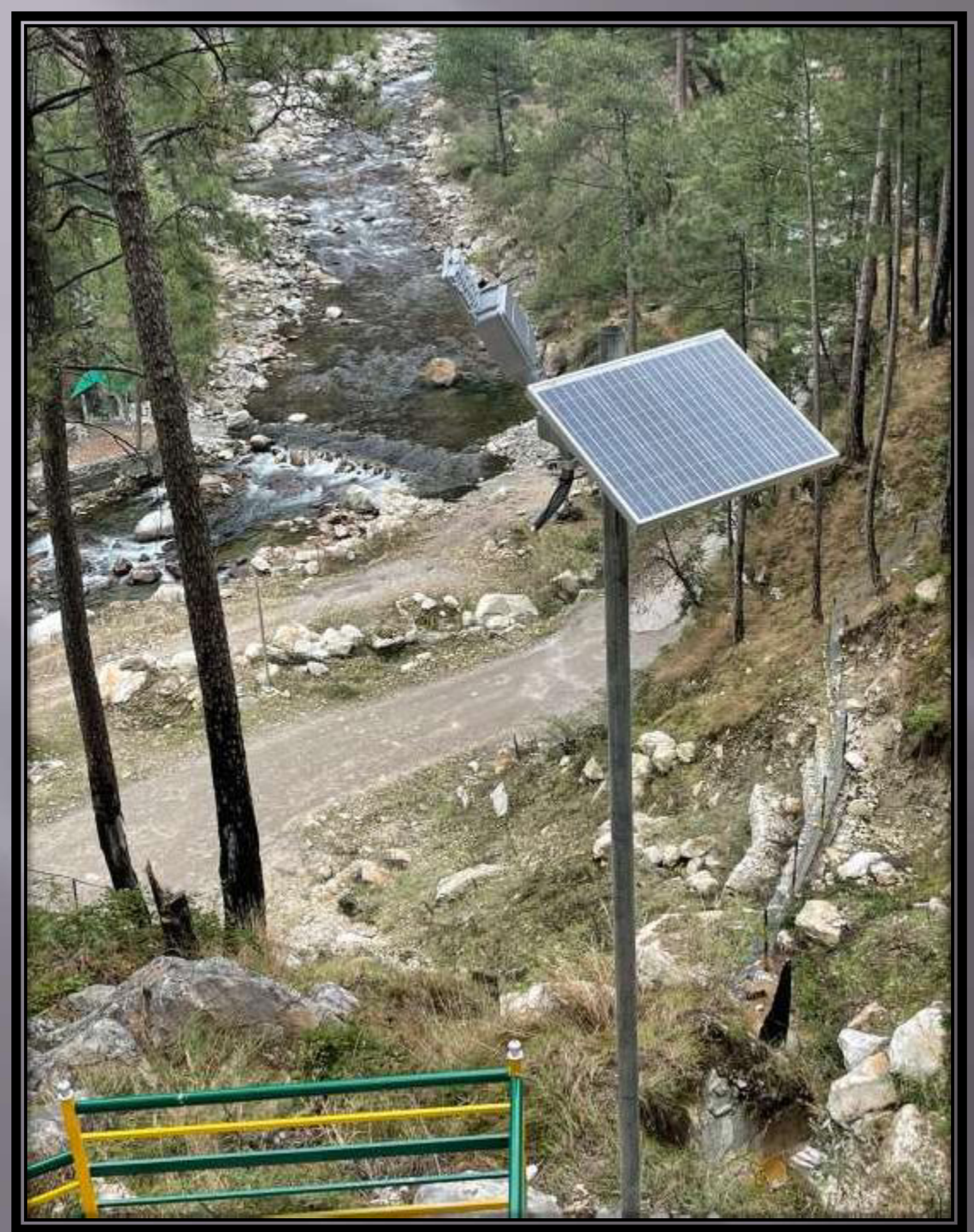


Amphitheater

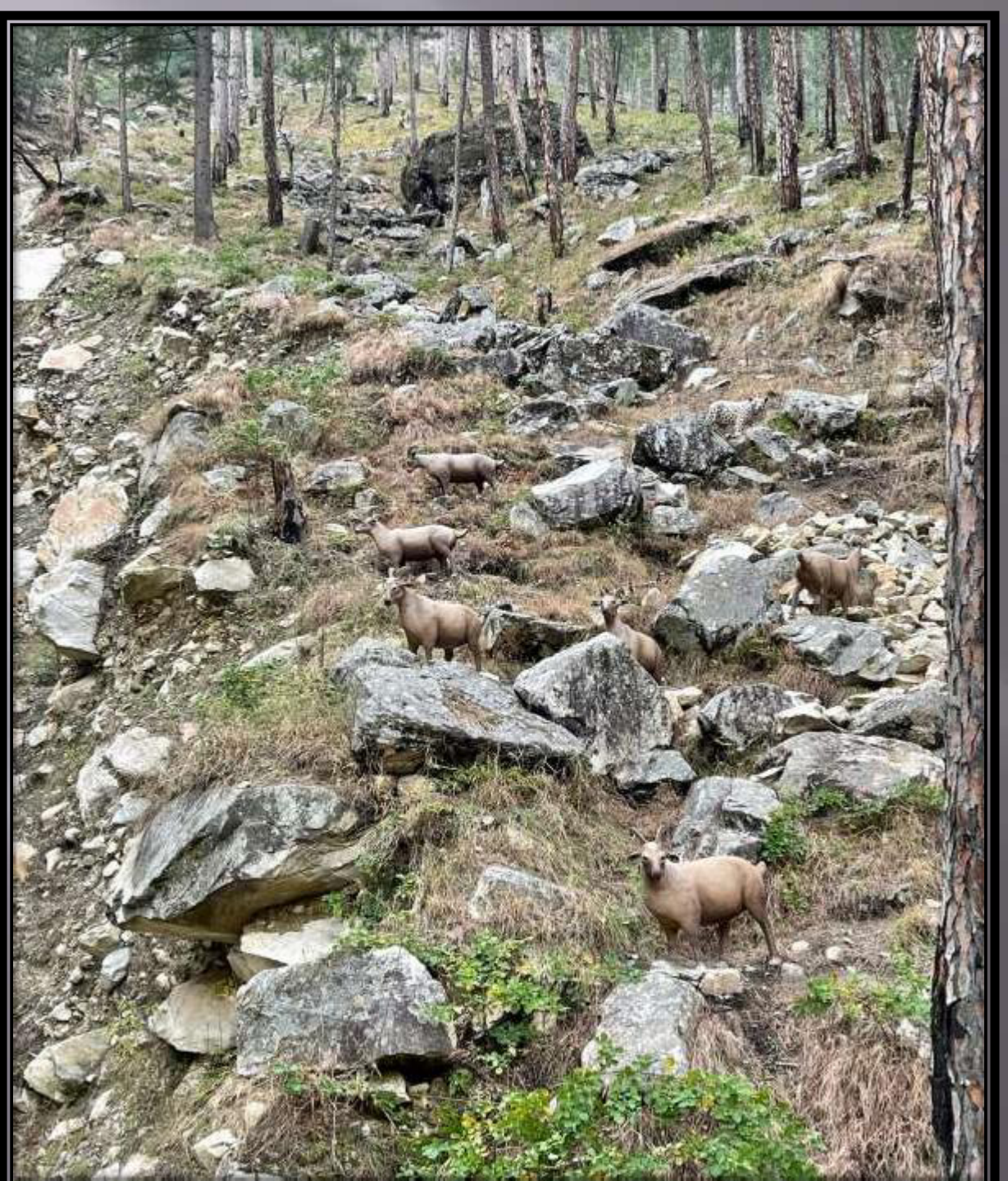
Selfie please

Let's rest for a while

Rocks n Roses



Let's utilize some solar power



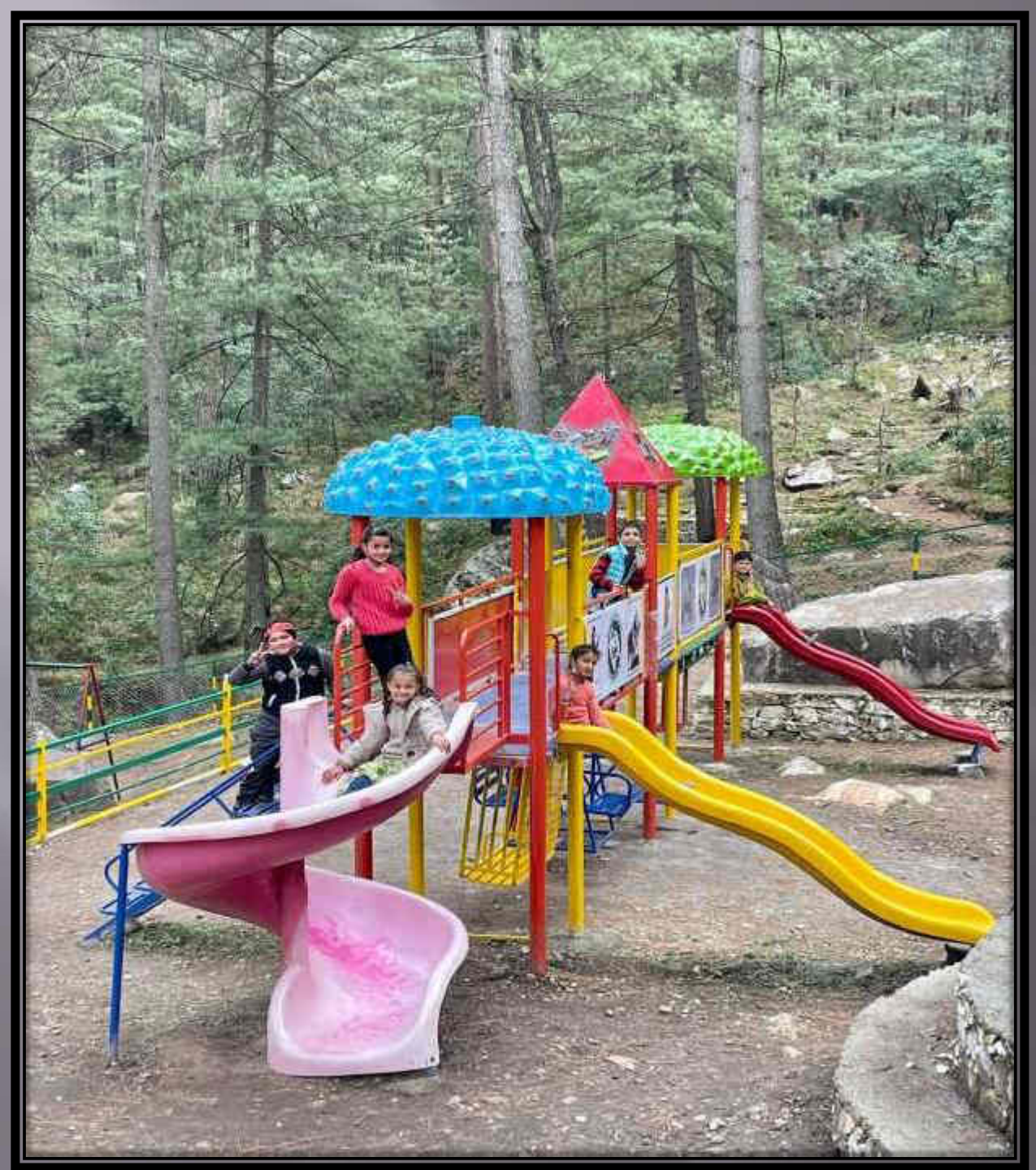
Let's graze together

Save wildlife

Please protect my habitat

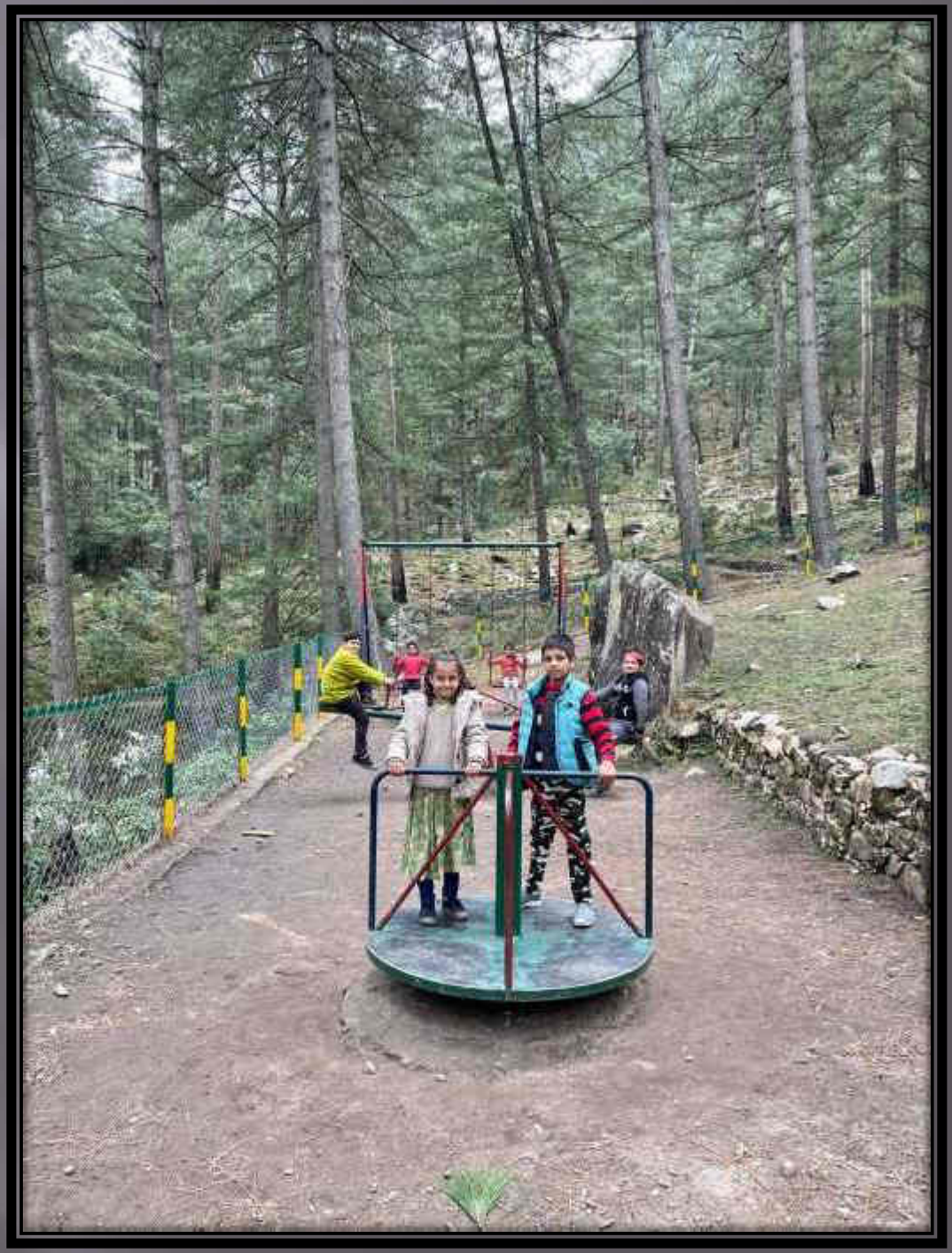
Bridging the Nallah

Fountain with aquatic marvels

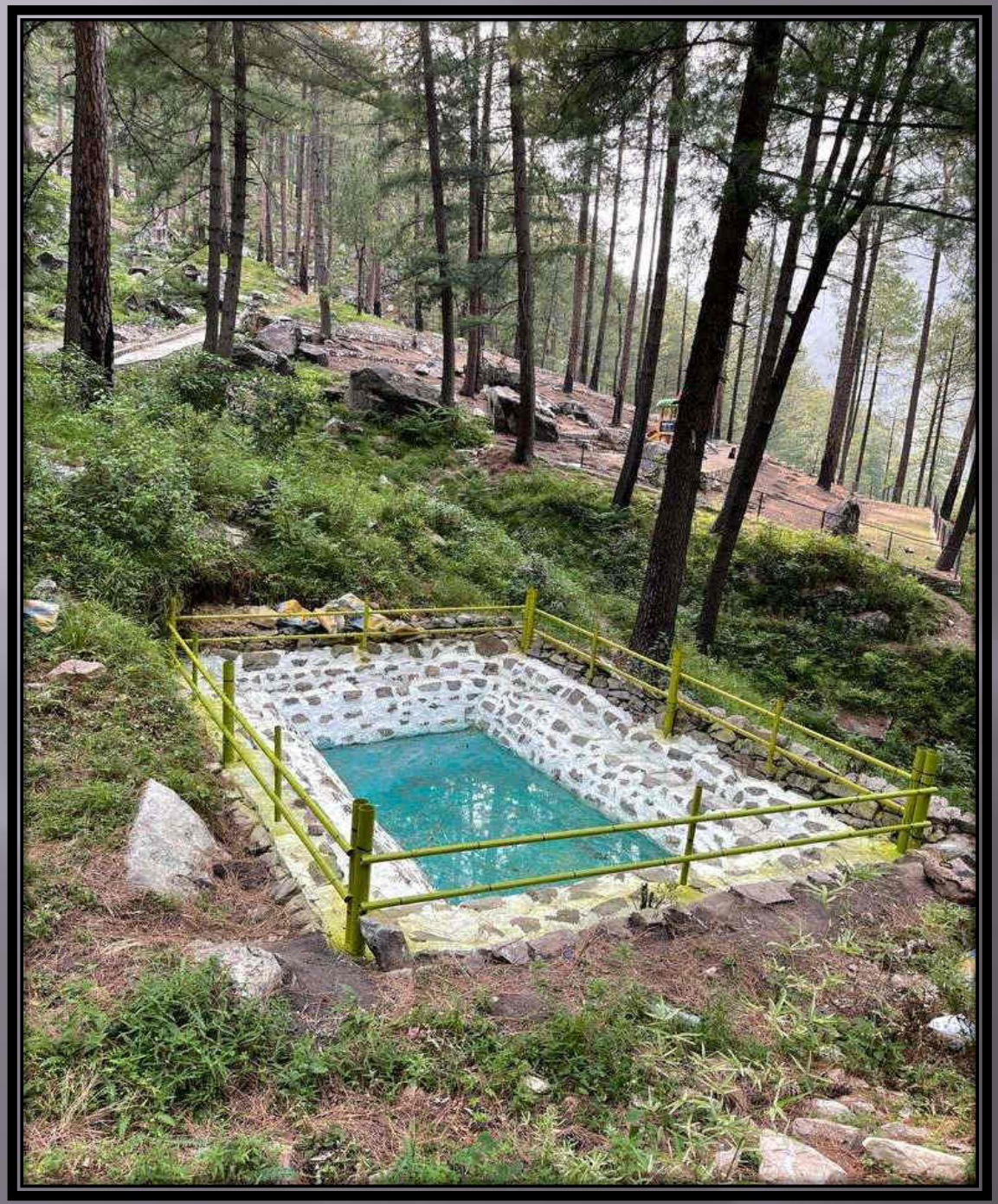


Hey! let's play together

Not tired at all



Bambusetum



Water pond

Herbal Garden

hedge of Rakhal

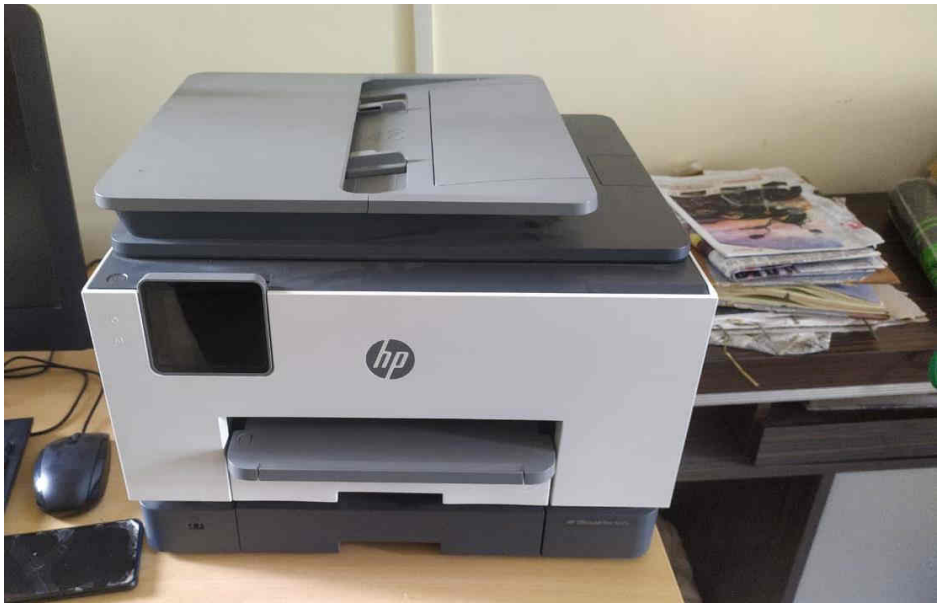
Thanks for visiting Nature Learning Centre

Walki-Talkie

Body Worn Camera

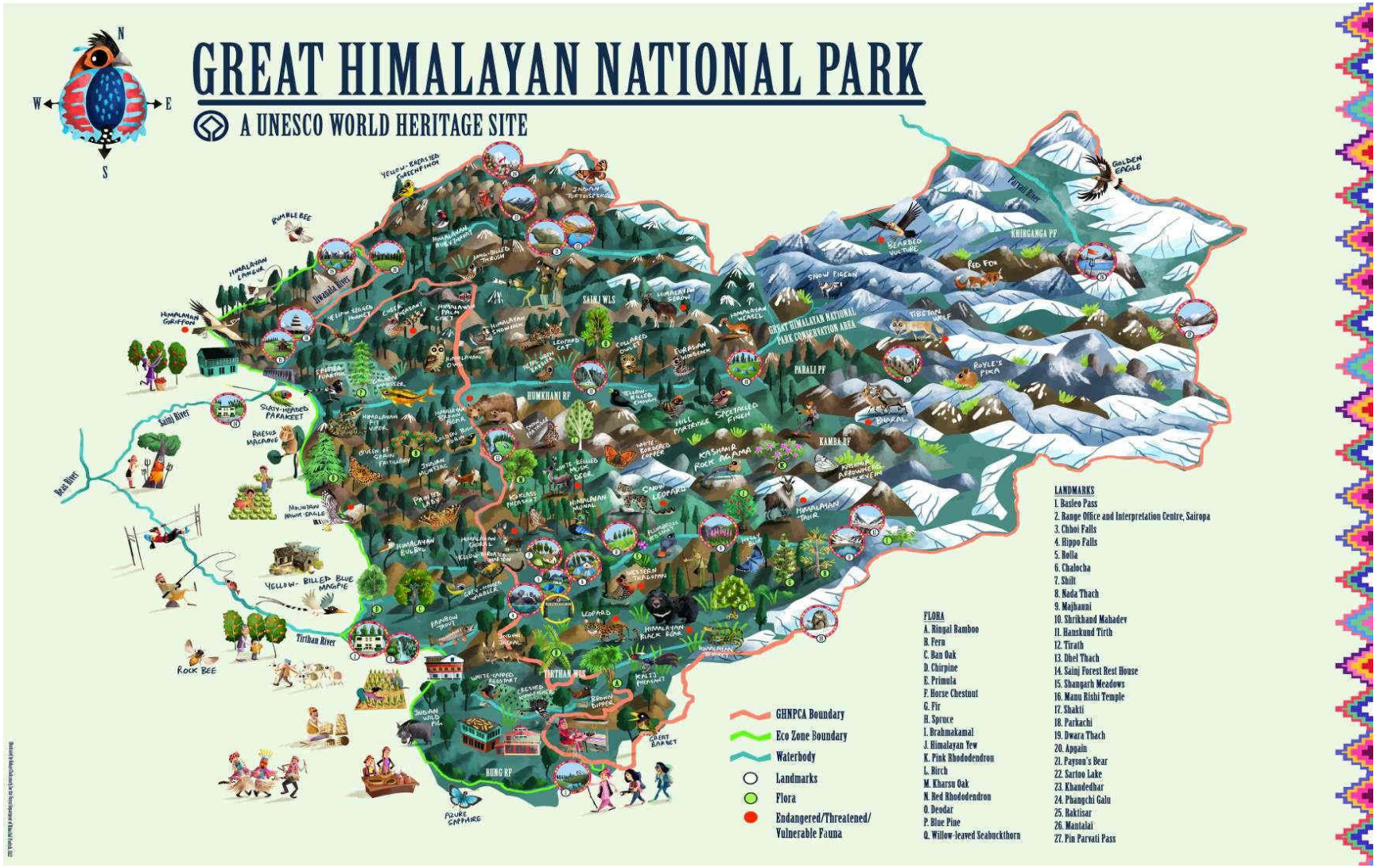
Projector

Printer



Photocopier

Uniform/Jackets for Staff



Special Thanks to NMHS for developing this Nature Park at Sai Ropa

Appendix-2

Sacred Trees in the Eco- Zone of the Great Himalayan National Park

Abstract

The conservation remains an important concept since ancient times. Tree as a symbol for various local communities reflects the historical reality that man is dependent on trees for his existence. The Community-Based Conservation such as sacred groves and sacred trees keep ecological process in a balanced state. The present study is carried out in the Eco- Zone of the Great Himalayan National Park (GHNP) to document sacred tree species which have been protected by the local people for their cultural and religious beliefs that deities reside in them and protect the villagers from various calamities since ancient times.

Keywords: Great Himalayan National Park, Sacred plants, Community Based Conservation**.**

1. Introduction

The Great Himalayan National Park has rich biodiversity. Around 90% of the population still lives in the villages. They speak dialect called “Pahari” which reflects the culture of the region. Plants are the ancient creation of the god on earth (Devi Kaushalya et., al. 2020). Plant have been worshipped since Vedic period (Bhatla et al. 1984) which is quite common in hilly regionsand are known to influence human culture, customs, myths and rituals.

In the Great Himalayan National Park (GHNP), many religious festivals are celebrated by the people which use one or several plants or plant p arts in their ceremonies. On the basis of ancient beliefs, a wide variety of plants like *Princepia utalis, Ocimum tenuiflorum* and *Cedrus deodara* etc. have divine qualities, hence are used in many religious activities and other ceremonies. Deodar (*Cedrus deodara*) is considered as “tree of god” and its wood is mixed with ghee and some other plants are burnt on the occasion of marriage, birth anddeath ceremonies.

Sacred plants are owned by the local deities and are managed by the Temple Committee. The Temple Committee consists of Kardar, Pujari, Bhandari and Gur. The Kardar manages the affair, Pujari performs worship and rituals, Bhandari looks

after the store and Gur is the spokesman of the deity and his orders are strictly followed by the local community. Inhabitants of the Great Himalayan National Park (GHNP) believe that the plant which are sacred to deities also have the medicinal potential and help to cure various diseases. So, probably this became the basis for the protection plants and might have started worshipping plants (Sharma & Joshi 2010, Mehra et al. 2014).

2. Material and Method

2.1 Study Area:

The present study was carried out in the Eco- zone of the Great Himalayan National Park (GHNP), District Kullu, Himachal Pradesh. GHNP is a protected area (PA) established in 1984, formally declared as a National Park in 1999.It has been inscribed on the list of UNESCO World Heritage Site on 23rdJune 2014 with an area of 1171 km^2. Geographically, the GHNP lies at 31°38′28" N to 31°51′58" N latitude and 77°20′11" E to 77°45′52" E longitude with an altitudinal range between 1,600-4,800meters. The Eco- Zone of the GHNP consists of seven Gram Panchayats (Nahonda, Pekhri, Tung, Mashiyar, Shilli, Kandi-dhar, and Shrikot) in the Tirthan valley. The present study has been conducted in 25 villages of these seven Gram Panchayats.

2.2 Methodology

For the assessment of Sacred Tree Species, various field tours were conducted in the villages of Eco- Zone of the Great Himalayan National Park (GHNP). Questionnaire was designed to gather the data which included details on name of deities, tree species, myths, and ideal location of the sacred tree. Photos were also collected during the field visits.

3. Terminology used for such trees

The Great Himalayan National Park region has a distinct mystique culture. The remote villages are characterized by the presence of deity, locally known as "Devta". Each deity has its own temple and community ground. Thereis a deity called "Pehradaar" on the outskirts of almost every village that protects the village and the villagers. These deities have been named locally by the villagers for ages as Jal Devta, Vansheera, Kadont, Damola, KhudaliVeer, Laxmi Narayan, Chaterkhand, Basuki Nag and BarkhadiJogani, etc.placed above and under the tree, which are

easily recognized by a trident (trishul), a redcloth (shalu), a moli (kalava thread) and an iron object (Fig3a,3b,3c).

Deities are worshiped for better rainfall, good agricultural yield and profitable economic activities. People going out of the village for business or job visit them and pray for their success and safety. They also make a vow, especially for health, harvest or birth of a child. Many festivals are celebrated collectively by the people worshiping these deities. Animals (mainly goats and sheep) and coconuts are sacrificed during rituals performed before these deities .Fruits and flowers are also offered at some places. It is believed that the deity looks after the well-being of the people and also protects the trees by punishingthe people engaged in felling of these trees.

Sacred trees help to define the cultural identity of the communities that respect and protect them. The enforcement of the rules for the management ofthe sacred trees is mainly through the religious beliefs of the villagers. Even though no separate body exists to enforce these rules or punish p eople. So, the Temple Management Committee plays an important role in this. There is a strong belief that the deities punish those people who violate the defined rules advocated by the Temple Management Committee.

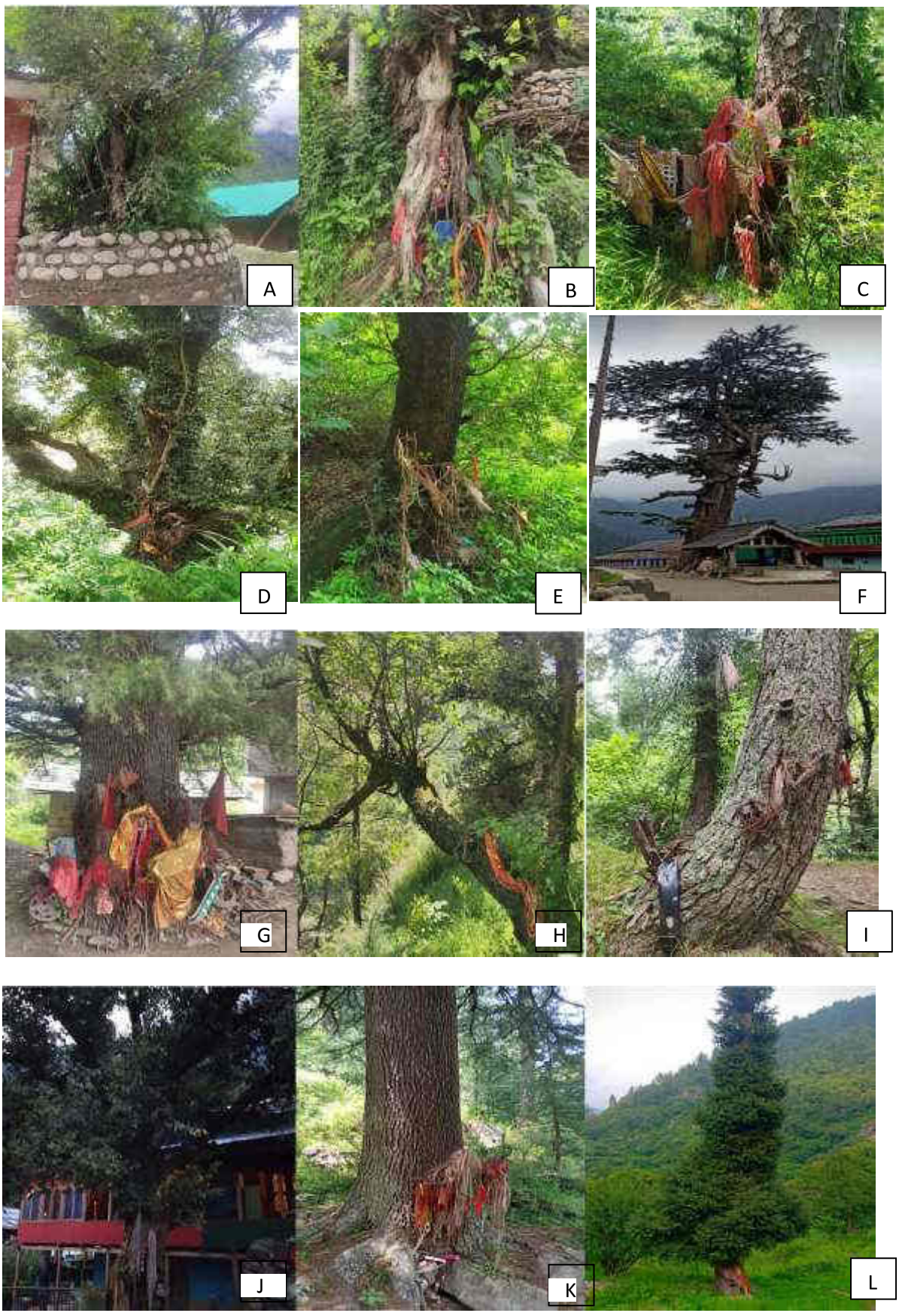


Fig.3 (a)Photo Plate of Deity

Fig.3 (b)Photo Plate of Deity

Fig.3 (c)Photo Plate of Deity

Abbreviation used; A=Jal Devta (*Zanthoxylum armatum, Prinsepia utilis, Berberis aristate)*; B= Shanghadi (*Morus alba*); C= Kadond; (*Pinus roxburghii*); D=Khudaliveer (*Quercus leucotrichophora*); E= Choi Devta (*Pistacia integerrima*);F=SheshNag (*Cedrus deodara*); G= Jal Devta(*Cedrus deodara*);H=Matloda(*Morus alba*);I=ChaladuDevta (*Pinus wallichiana*); J=Chaterkhand (*Celtis australis*); K= Damola (*Pinus roxburghii*); L=Baski Nag (*Piceasmithiana*); M=Koonh Devta (*Cotoneaster acuminatus*); N= Shiv (*Pinus roxburghii*); O=Khudali Veer; P= Rondu Narayan (*Ilex aquifolium*);Q=Narayan (*Morus alba*); R=BakhadiJogani (*Quercus semecapriflolia*);S=Panchveer (*Quercus semecapriflolia*);T=Kadond (*Prunus cornuta*); U=Shirdu (*Celtis australis, Ficus palmata*);V= Jal Devta (*Cedrus deodara*); W=BhareduDevta (*Morus alba*); X=DrakshaDevta(*Morus alba*); Y=Khudali(*Morus alba*); Z=Kadond (*Cedrus deodara*); 1=Kadond (*Morus alba*); 2=Chaterkhand (*Morus alba*); 3= Nag Devta (*Pyrus communis*) 4= Utam (*Morus alba*); 5= Luxmi Narayan (*Morus alba*);6=Luxmi Narayan (*Ficus palmata*);7=Choral Nag (*Taxus baccata*); 8=Damola (*Pinus roxburghii*); 9= BharyaduDevta (*Prunus cornuta*); 10= Doent Devta (*Quercus floribunda*).

4. Sacred Tree Species

In the GHNP, the traditional worshipping has protectedand conserve many plants from deforestationwhich also have tremendous medicinal value and made them as sacred. Sacred Species, including trees and shrubs are under the protection of the reigning deity of that village. Cutting of trees, even removal of dead parts of the tree is a taboobecause of the fear of deity. For this reason, the impact on exploitation of the natural resources by the human being is also very limited. A total of 21 sacred plants species were recorded which are worshipped by the local residents in many rituals and religious ceremonies. These sacred plant species which includes 17 tree species and 4 shrub species has been documented as sacred in the Eco- Zone of the GHNP (Table1).

Table1: Sacred plants in Eco Zone of the GHNP

Sr. No.	Botanical Name	Local Name	Family	LF	Medicinal Value
1	*Aesculus indica*	Khanor	Sapindaceae	T	Stomach pain and menstrual problems

2	*Berberis aristata*	Kashmal	Berberidaceae	S	Piles, Antidote to snake bite,
3	*Cedrus deodara*	Devdaar	Pinaceae	T	Lameness and itching in sheep and goat, decoction of wood is used to cure urinary disease, piles, kidney stone, diabetes, and fever.
4	*Celtis australis*	Khadik	Cannabaceae	T	Amenorrhoea
5	*Cotoneaster acuminatus*	Riush	Rosaceae	S	Rheumatism, arthritis, tooth cleaning, scabies.
6	*Ficus palmata*	Fagu	Moraceae	T	Digestive disorders, Stem latex is applied to extract spines and thorns deeply lodged in the flesh.
7	*Ilex aquifolium*	kalucha	Aquifoliaceae	T	Veterinary disease.
8	*Morus alba*	Cheemu	Moraceae	T	Stomach disorders.
9	*Piceasmithiana*	Rai	Pinaceae	T	-
10	*Pinus roxburghii*	Chil	Pinaceae	T	Boils, sprains
11	*Pinus wallichiana*	Kail	Pinaceae	T	Bone fracture in Sheep and Goat
12	*Pistacia integerrima*	Kakad-Singhi	Anacardiaceae	T	Cough Vomiting, asthma, fever, pulmonary disease, vomiting and Diarrhoea.
13	*Prinsepia utilis*	Bhekhal	Rosaceae	S	Rheumatic pain, wound, cut, burns and Boils.
14	*Prunus cornuta*	Jamun	Rosaceae	T	Stomach pain and fever.
15	*Pyrus communis*	Naashpati	Rosaceae	T	Antioxidant and antibacterial

16	*Pyrus pashaia*	Shegal		T	Fruits used in digestive problem and pterygium disease to cure affected eyes of cattle.
17	*Quercus floribunda*	Mohru	Fagaceae	T	Indigestion
18	*Quercus leucotrichophora*	Ban	Fagaceae	T	Asthma and diarrhea
19	*Quercus semecapriflolia*	Kharshu	Fagaceae	T	Astringent, tooth-ache and gum problems
20	*Taxus baccata*	Rakhal	Taxaceae	T	Common cold, cough, asthma, fever and bark used for cancer.
21	*Zanthoxylum armatum*	Tirmir	Rutaceae	S	Seed used for toothache and twigs for brushing teeth. Fruit paste is useful for scabies.

Abbreviation used; LH= Life from, S = Shrub, T = Tree,

5. Religious Belief

Footwear, leather accessories and tobacco products are not permitted near these trees or within the circumference of these groves. Women and girls who wear red dresses and those having in menstrual phase/period are not allowed

5.1 Taboo/Religious Beliefs on prohibition of felling of trees

Local people preserve and protect trees because of their religious beliefs and custom associated with them. It is believed that happiness and prosperity of the community depends upon the blessings of the gods and goddesses residing in these trees. People of the village believe that deities reside within these sacred trees. So, it is worshiped and protected in its natural state. Besides, no one is permitted to cut it down. It is the duty of every resident to protect not only the sacred trees but also the sacred groves located around them which signify their expression and relationship with divine p owers or nature. Local people of the communities

also believe that life of these trees is directly correlated to life of the people". If they turn against the tree and try to destroy it, people will suffer a lot and their power will also be lost.

The forest deities are very fierce. All the plants that flourish within the sacred grove, including shrubs and vines, live in the shelter of the forest deity who resides there. Any sort of destructive work is prohibited within the circumference of these sacred groves. As per tradition, only worship of the deity is performed here from time to time. There is a strict complete ban on felling of trees within the perimeter. Any person daring to violate the prescribed rules has to face serious consequences which may even lead to the death of that offender. The local people believe that any interference within the perimeter will offend the local deity. The consequences of such interference include disease epidemic, natural calamity or damage to crops. People consider these deities as "the abode of the protector" that protects the people and animals of the entire village from various calamities.

Sacredness offers protection to the sacred groves and sacred species. In the biodiversity rich areas of the valley, these sacred trees are very important for maintaining the ecosystem and also plays a significant role in promoting conservation and sustainable utilization of biodiversity of the region.

6. Ideal Location of such Sacred Trees

Sacred Tree is found near the village, water stream and road side area where accidents happen quite frequently.

Table: 2. Sacred trees associated with God and Goddess distributed in Eco zone of The Great Himalayan National Park.

Name of Village	Sacred Tree	Associated localdeities	Latitude	Longitude
Nohanda Panchayat				
Dingcha	*Quercus semecapriflolia*	Panchveer	31°38′15.3” N	77°28′26.4” E
	Quercus semecapriflolia	Bakhari Mata	31°37′45.3” N	77°28′48.9” E
Tinder	*Celtis australis*	Chatarkhand	31°38′47.8” N	77°26′59.4” E
Kauncha	*Pyrus pashia*	Rondu Narayan	31°39’09.1’’ N	77°27’16.6’’ E
	Ilex aquifolium	Rondu Narayan	31°39’27.4’’ N	77°27’32.0’’ E
Baldhar	*Pinus wallichiana*	Doent	31°38’ 0” N	77°26’2’’ E
Kharungcha	*Picea smithiana*	Baski Nag	31°39’ 54” N	77°28’10’’ E
Kandhidhar Panchayat				
Dari	*Zanthoxylum armatum,* *Prinsepia utilis, Berberis aristata*	Jal Devta	31°38′27” N	77°23′41” E
	Morus alba	Shangadi	31°38′27” N	77°23′41” E
Chamani	*Pistacia integerrima*	Shirdu	31°38′36” N	77°24′30” E
Tung Panchayat				
Tung	*Pinus roxburghii*	Damola	31°36′17” N	77°28′42” E
Faryadi	*Celtis australis, Ficus palmata*	Shirdu	31°37′33.5” N	77°26′13.3” E

Chadhari	*Pyrus communis*	Beer Devta	31°38′17” N	77°25′52” E
Bathad	*Cedrus deodara* *Pinus wallichiana*	Jal Devta Chaladu	31°36′21” N 31°36′40” N	77°28′16” E 77°27′11” E
Chipani	*Morus alba* *Morus alba*	Luxmi Narayan Khudali	31°36′22.8” N 31°37′13” N	77°28′34.0” E 77°28′14” E
Barnagi	*Pyrus communis*	Nag Devta	31°36′41” N	77°27′33” E
Dhara Shalinga	*Morus alba*	Kadond	31°37′44.3” N	77°26′08.1” E
Pekhri Panchayat				
Pekhri	*Morus alba* *Morus alba*	Narayan Bhredu	31°38′914” N 31°38′367” N	77°25′77” E 77°26′114” E
Ludar	*Morus alba*	Chatarkhand	31°38′974” N	77°25′662” E
Nahin	*Cedrus deodara* *Morus alba*	Jal Devta Dharaksha	31°39′26.8” N 31°39′26.8” N	77°26′40” E 77°26′38” E
Manhar	*Morus alba*	Matloda	31°38′41” N	77°26′21” E
Dhar	*Morus alba*	Utam Devta	31°40′29.3” N	77°28′12.0” E
Shilli Panchayat				
Shill	*Cedrus deodara* *Taxus baccata* *Pinus roxburghii*	Shesh Nag Choraal Nag Damola	31°35′49” N 31°35′ 52” N 31°36′24” N	77°27′30” E 77°27′32” E 77°27′23” E
Parwari	*Cedrus deodara* *Prunus cornuta* *Cotoneaster acuminatus*	Kadond Kadond KunhDevta	31°36′9” N 31°36′10” N 31°36′21” N	77°26′53” E 77°26′41” E 77°26′29” E
Garuli	*Aesculus indica*	Kadond	31°36′10” N	77°26′41” E

Sharunger	*Aesculus indica*	Jal	31°35′53” N	77°27′58” E
		Devta&Jogani		
Mashiyar Panchayat				
Ghaliyad	*Quercus floribunda*	Doent	31°36′24” N	77°29′34” E
Shrikot Panchayat				
Anah	*Prunus cornuta*	BharyaduDevta	31°40′3” N	77°24′295” E
Kalwari Panchayat				
Dehuri	*Pinus wallichiana*	Shiv	31°38′46” N	77°22′50” E

Conclusion:

The religious activities play an important role in conservation of the biodiversity. All the plants which have been declared as sacred by our ancestors have medicinal values too. Hence, it is mandatory to encourage and p reserve these aesthetic values to conserve the nature and biodiversity. The limited traditional knowledge about sacred plants and their valuable uses have been passed on from generation to generation. So, there is an urgent need for p roperdocumentation.

Acknowledgement

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Annexure-VI

Traditional uses of medicinal plant in Great Himalayan National Park of Himachal Pradesh, North Western Himalaya, India

Abstract

The Indian Himalayan region (HRI) supports huge variety of medicinal plant. Still, there has been little authentication on medicinal plant in several protected areas of IHR. Great Himalayan National Park (GHNP) is a world heritages site, harbours a wide variety of medicinal plants. The present study is an attempt to assess the medicinal plant diversity of Great Himalayan National Park. A total of 152 species of medicinal plants belonging 63 different families were used by local people to cure different diseases. Out of these, most of plant species were have leaves as medicinal value followed by roots, fruits, rhizomes, and seed. All these medicinal plants species were identified to cure human disease except 10 medicinal plant species which were used by local inhabitants for the treatment of veterinary ailments. Local People, especially older age group, including women heavily use these traditionally available medicinal plants as a primary health care. Maximum species were used for wound healing (31), followed by cough (25), dysentery (21), cold (20) and stomach- ache (18). Due to grassing, over exploitation and habitat degradation the population of many medicinal plants species is decreasing day by day.

Key words: Great Himalayan National Park, world Heritage site, Medicinal plant, disease, local communities.

1. Introduction

The use of plants to cure disease is as old as humanity. Human society throughout the entire world gathers indigenous knowledge on medicinal plant and their uses. The countries like Sri Lanka, China, Cuba, Thailand and India have certified the official use of traditional system of medicines in their health care Programme. For example, the Indian system of medicine homeopathy such as Sindha, Unani and Ayurveda depend on plant extract or their derivatives for treatment of human illness (Prajapati et al., 2003). The Tibetan system of medicine is also depending upon Himalayan plant species (Samant et al., 1998). The preparation of traditionally available medicinal plants is essential part of health care for human, especially for population living in rural areas mostly depend upon nature, because of lack of instant

medical facilities and high prices of synthetic medicine. The forests area is the main source of medicinal plants since the time human realized the curative and preventive properties of plants and started using them for human and animal ailment. The Indian Systems of Medicine (ISM), is an ancient traditional medicine practices known to the entire world, and derives maximal formulations from plants and extracts of plant that exist in the forests area.

Great Himalayan National Park (GHNP) fallin North Western Himalaya which supports a large variety of Biodiversity elements including endangered, native, endemic medicinal plant.Vegetation in GHNP is subtropical, temperate, subalpine and alpine.The alpine vegetation is dominated by large number (>24)of herbaceous communities (Singh, 1999). Despite its remoteness and status as a park, GHNP is not free from human interference (Kala et al., 2002). An inhabitant of the GHNP is mostly poor and largely depends upon nature to fulfil their day to day needs. For the primary health care inhabitant depends upon medicinal plant prescribed by the local Vaidya's or local healers.

The exploitation of medicinal plants and grazing by sheep herds in meadows poses great riskof extinction of medicinal plant. About 20,000 sheep and goat are known to graze in the alpine zone of GHNP during the summer month (Singh, 1999 May – September)

1.1 **Review of Literature**

The 80% population of advance countries still use indigenous medicines extract from plants for the treatment of human illness (de Silva 1997). India has oldest, abundant and most diverse traditional cultural associated with the uses of medicinal plants in the form of traditional systems of medicine (GOI, 2000). Various studies have been done on the medicinal plant in IHR (Jain, 1991; Samant et al., 1998; Samant et al., 2001; Semwal et al., 2007; Pant et al., 2009; Lone et al., 2014; Malik et al., 2015; Sharma et al., 2015; Panday et al., 2017). Uttarakhand region has highest number (946) of medicinal and aromatic plant species (Kala, 2000) followed by Himachal Pradesh (643) Sikkim (707) and North Bengal (Samant et al., 1998, 2007). There are around 3470 species in the Himalaya which are considered exclusively endemic. The extreme anthropogenic pressure has been identified as the main reason of decline in medicinal plant population and availability in the Himalayan region (Samant et al., 1998). The majority of the population live in village and mainly

depends upon the Biodiversity for their daily needs such as religious purpose, fodder, food, fuel, agriculture tools, timber, fibre and medicines for different aliments (Samant et al., 1998, 2007, 2011).

Documentation of traditional knowledge of using medicinal plant provided several important drugs to the modern world (Fabricant and Farnsworth, 2001). The continuous transmission of traditional knowledge is under threat from the old generations to younger generation (Kargioglu et al., 2008). Therefore, traditional knowledge documentation is important for the biological resources utilization and conservation (Muthu et al., 2006). Large number of studies have been also done on medicinal plants in the Himachal Pradesh by many workers (Rai and Sharma, 1994; Negi and Bhalla, 2002; Chauhan, 2003; Samant et al., 2007a, b; Subramani et al., 2007; Singh et al., 2009; Negi and Chauhan 2009; Rana and Samant 2011; Vidyarthi et al., 2013; Sharma et al., 2014; Kumae et al., 2015; Rana et al., 2015; Thakur et al., 2016; Sharma et al.,). However, a review of the literature revealed that very few studies are available on the medicinal plant of the protective zone of the state (Subramani et al., 2007: Singh, et al., 2009; Rana and Samant, 2011; Lal and Samant 2015; Sharma et al., 2017). Thus, documentation has been attempted on the medicinal plant diversity of Great Himalayan National Park.

1.2 Justification and objectives of research

To consider the importance of wealth of medicinal plant and gradually decline in traditional knowledge, an attempt has been made to assess (i) Medicinal plant diversity and distribution patterns in Great Himalayan National Park. (ii) Document traditional uses and practices and (iii) Suggest strategy for conservation and management.

2. Material and Methodology

2.1 Study Area

The present study was carried out in some interior eco- zone areas of Great Himalayan National Park (GHNP). GHNP is a protected areas (PAs) located in the Kullu District of Himachal Pradesh, established in 1984, formally declared as National park in 1999 and inscribed in to the list of UNESCO world Heritage Site on 23 June 2014 with an area of 1171Sq. km. The GHNP lies at 31°38′28”N to 31°51′58” N latitude and 77°20′11” E to 77°45′52” E longitude with an altitude range

between 1,600- 4,800m.Most of the population (15000- 16000 people) in the Ecozone are poor and dependent on natural resources for their livelihood. The study area supports lager variety of biodiversity elements. The uniqueness and representativeness of biodiversity has attracted huge attention of the people of entire globe.

2.2 Methodology

For the assessment of medicinal plant Field surveys were conducted in various interior villages of Great Himalayan National Park. Vaidya's and local knowledgeable people especially, older age group were interviewed because collection of medicinal plant from the forest area is done by these people. Questionnaire was designed to gather the data. The local language was used during the interviewed. Details about local names of plants, valuable part and their uses to curer different diseases were recorded. The specimens were collected from their natural habitat and identified with the help of local people and consulting regional flora, and literature.

3. Results

Trend of using traditionally available medicine to cure diseaseis decreasing day by day, but still lost of the people especially who live in the rural areas realize the importance of these medicines obtained from different types of forest areas. There are various medicinal plant used by local community to cure both animal and human disease. It is more viable to promote traditional system of medicine as primary health care in rural area of the state due to lack of proper medical facilities.

Rural communities, especially, older age people heavily use these medicinal plant species for improvement of health and believe that these plants are easily available, less expensive, and have no side effects on the body. The trends of using these traditionally available medicinal plants were found more in older age class as compared to younger age. Older people including Vaidya's accurately diagnosis the symptom of the disease as compares with the modern medical practices. It is also observed that, the Vaidya's are hesitant to disclose this knowledge in the presence of other villagers, as this knowledge provide them respect and recognition in the society, they are more open when interviewed in separately (Fig.1**).**

3.1 Diversity

Local community used 152 species (Angiosperms: 141; Gymnosperms: 5; Pteridophytes: 6) of medicinal plants for cure of various ailments. These medicinal plant species belong to 69 different families. Out of these 20 species were trees, 24 Shrubs, 95 herbs, 7 Climbers and 5 ferns (Table 1). Rosaceae (14 Spp.), Astreaceae (11 Spp.), Lamiaceae (9 Spp.), were dominant families. Roots, barks, leaves, flowers, fruit, and rhizomes are used as a medicine value. Among the plant parts, use of leaf is most common, followed by roots and fruits. Resin and tuber are rarely used (Fig. 2)

3.2 Utilization pattern and Traditional uses

The medicinal plants species available in the area of GHNP have been used for the treatment of various ailments. The Maximum species were used for wound healing followed by cough, dysentery cold, boils, and stomach- ache (Table 2).

Figure 1: Interviews of local Inhabitants and Vaidyas in GHNP

Table 1: Taxonomic description of medicinal plant in GHNP

Taxonomic Group	Families	Species	Tree	Shrub	Herbs	Climbers	ferns
Angiosperm	59	141	15	24	95	7	-
Gymnosperm	2	5	5	-	-	-	-
Pteridophytes	5	6	-	-	-	-	6
Total	**66**	**152**	20	24	95	7	6

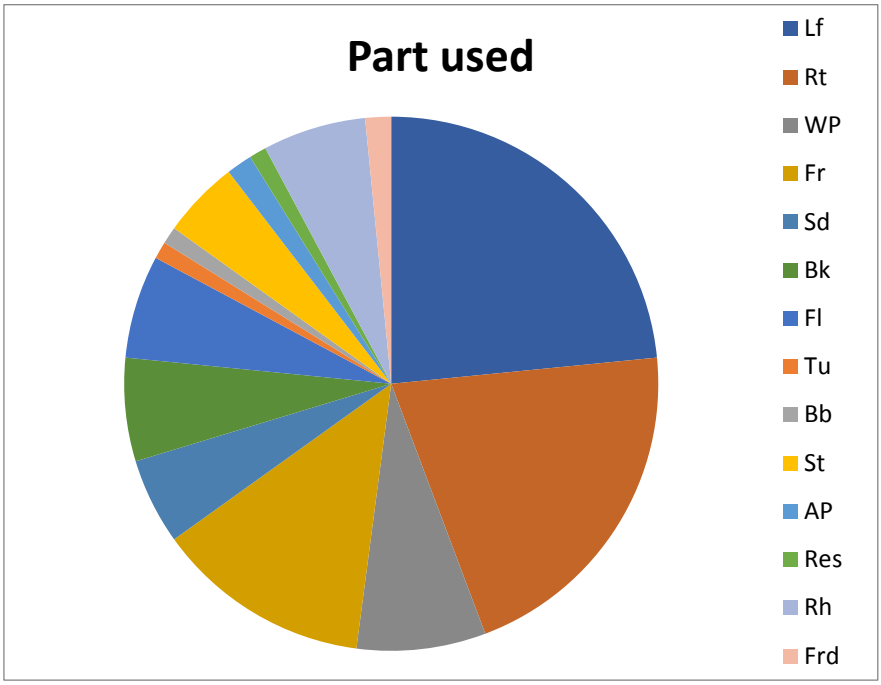

Fig. 2 Part of plant having medicinal value

Table 2: Utilization pattern of medicinal plant for the treatment of various diseases

Sr. No.	Disease	No. of Species	Sr. No.	Disease	No. of Species
1	Anti- cancerous	1	28	Leucorrhoea	3
2	Antiseptic	6	29	Liver problem	5
3	Asthma	13	30	Measles.	1
4	Astringent	5	31	Menorrhoea	2
	Abdominal pain	6	32	Menstrual	4
5	Blood purification	3	33	Nervous Disorder	3

6	Boils	17	34	Nose bleeding	1
7	Bone fracture	3	35	Pulmonary	1
8	Burns	5	36	Piles	3
9	cold	20	37	Rheumatism	9
10	Constipation	3	38	Stomach-ache	18
11	Cough	25	39	Skin Problem	17
12	Cuts	13	40	Sprain	5
13	Diabetes	3	41	Toothache	8
14	Diarrhoea	5	42	Tuberculosis	2
15	Digestive Disorder	10	43	Ulcer	3
16	Diuretic	1	44	Urinary problem	5
17	Dysentery	21	45	Vomiting	5
18	Ear -ache	3	46	Snake bite	4
19	Eye diseases	7	47	Veterinary	10
20	Fever	17	48	Whooping cough	2
21	Gastric	6	49	Wound	31
22	Hair problem	4			
23	Highblood pressure	2			
24	Headache	10			
25	Insect bit	4			
26	Jaundice	4			
27	Kidney,bladder stone	2			


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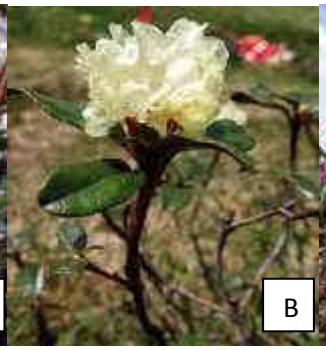
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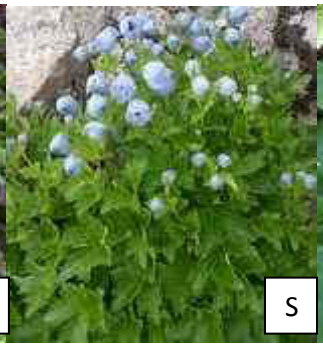
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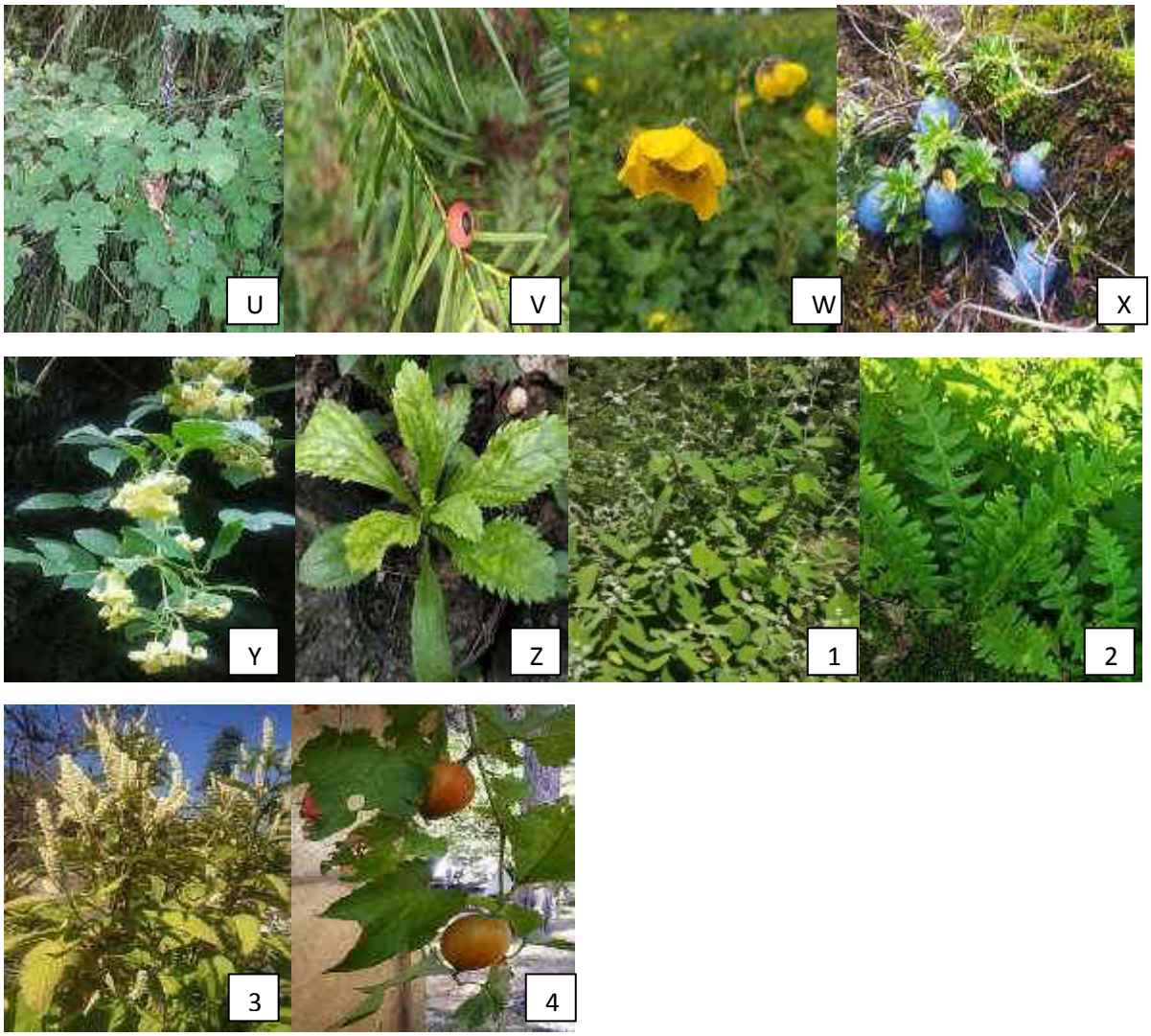

Fig. 3: Photo plates of medicinal plants

Abbreviations used; A= *Rhododendron companulatum*; B= *Rhododendron anthopogon*; C= *Rhododendron lapidotum*; D**=** *Bergenia ligulata*; E= *Fritillaria roylei*; F= *Hydychium spicatum*; G= *Trillitiumgovanianum*; H= *Jurineadolomiaea*; I= *Podophyllum hexandrum*; J= *Rheum austral*; K= *Dioscoreadeltoidea*; L= *Dactylorhizahatagirea*; M= *Morinalongifolia*; N= *Berberis aristata*; O= *Zanthoxylumarmatum*; P= *Rosa brunonii*; Q= *Phytolaccaacinosa*; R= *Juniperuscommunis;* S= *Delphinium brunonianum*; T= *Viola serpens*; U= *Thalictrum foliolosum*; V= *Taxus baccata*; W= *Geum elatum*; X= *Gaultheria trichophylla*; Y= *Clematis buchananiana*; Z= *Picrorhiza kurroa*; 1= *Plectranthus rugosus*; 2= *Asplenium dalhousiae*; 3= *Elsholtzia fruticosa;* 4= *Trichosanthes tricuspidata*;

Figure 4: Photo plates of valuable dried part of medicinal plants

Abbreviations used; a=*Aconitum heterophyllum*; b= *Picrorhiza kurroa*; c= *Rhododendron companulatum*; d= *Saussurea graminifolia*; e= *Arnebia benthamii*; f= *Nardostachys grandiflora*

Appendix: Traditional uses of Medicinal Plant in GHNP of Himachal Pradesh

S.No.	Botanical Name	Local Name	AR (m)	Habitat/s	Part Used	LF	Uses
	Angiosperm						
	Amaranthaceae						
1	*Amaranthus viridis L.*	Sariyara	1600-2300	1,10	Sd	H	Seed used for measles, digestion.
2	*Cyathula capitata* Moq.		1600-2200	2,5	Lf, St	H	Decoction is given in emetic
3	*Cyathula tomentosa* (Roth.) Moq.	Kathural	800-2700	1,3	Rt	H	Used for boils, skin disease.
	Alliaceae						
4	*Allium humile* Kunth.*	Farn	2500-3400	2,5	Fl	H	Digestion and flavour
	Anacardiaceae						
5	*Pistacia integrrima* Stew.	Kakar-	600-	1,3	Lf	T	Cough Vomiting, asthma,

		singhi	2500				fever, pulmonary disease, vomiting and Diarrhoea.
	Apiaceae						
6	*Angelica glauca* Edgew. **	Chora	2000-3000	2	Rt	H	Stomach pain, gastric complaints, vomiting, Dysentery and are used as a condiments & spices.
7	*Bupleurum falcatum* L.	Ban ajwain	1600-3000	2,3,5	Rt	H	Stomach acidity, Abdominal pain, inflammation, liver complaints
8	*Centella asiatica* (L.) Urb	Brahmi	900-1800	1,5	Lf	H	Brain relaxation and memory enhancer
9	*Pleurospermum densiflorum*	Losser	3000-4000	1,3,4, 5	Lf	H	Leaves used for massage with ghee on joint pain, stomach-ache.
	Araceae						
10	*Acorus calamus* L.	Bach	800-2200	4	Rh, St, Lf	H	Cough, cold, abdominal pain, asthma, cut, dysentery, Fever, skin disease, stomach-ache, snake bite, veterinary disease,
11	*Arisaema tortuosum* (Wall.) Schott	Bushar	1500-2200	1,2,3, 4,5	Sd, Rt	H	Veterinary disease, skin disease.
	Araliaceae						
12	*Hedera nepalensis* Koch.		800-2500	1,2,3, 4,8	Lf	S	Skin disease, cold, cough, rheumatism.
	Asteraceae						
13	*Ainsliaea optera* DC.*		1200-3600	1,2,3	Rt	H	Stomach-ache flower are edible
14	*Artemisia nilagirica* (Cl.) Pamp.		800-2700	1,2,3, 5	Lf, Rt	H	Asthma, skin disease, ear problems, headache, stomach-ache, wound.
15	*Artemisia parviflora* Roxb. Ex Besser**	Jhao	1600-2700	1,2,5	Lf	H	Used for Skin cut, throat problem.
16	*Cirsium falconeri* (Hk.f.) Petr.		1900-3400	1,2,3	Rt	H	High blood pressure
17	*Cirsium wallichii* DC.**	Bhusha	1600-3000	1,2,3, 4.5,9	Rt	H	Used of gastric problems, headache, Swelling.
18	*Galinsoga parviflora* Cav.	Pipulu ghas	1000-2000	4,5	Fl, St Lf	H	Nettle stings, blood coagulation of fresh cut and wound.
19	*Gerbera gossypina* (Royle) Beauv.**	Kopra	1600-2500	1,2,3, 4	Lf	H	Gastric problem.
20	*Jurinea macrocephala* DC.	Guggal dhup	2500-3600	2,3	Rt	H	Antiseptic, fever and incense.
21	*Saussurea graminifolia*	Googae	4000-5000		WP	H	Used for Whooping cough.
22	*Saussurea obvallata* (DC,) Edgew.	Brahm kamal	3000-4800	1,2,5	Rt	H	Wound, cuts, liver disorder, cough, boils and Skin disease.
23	*Taraxacum officinalis* Weber		1700-3000	1,2	WP	H	Blisters and wounds.
	Aquifoliaceae						
24	*Ilex aquifolium*	Kalucha	1500-2600	1,2	Lf	S	Veterinary disease.
	Balsaminaceae						

25	*Impatiens scabrida* DC.**		1200-3600	1,2,3, 4		H	Stomach pain.
	Berberidaceae						
26	*Berberis aristata* DC.**	Kashmal	1800-3000	1,2,5, 8	Rt	S	Piles, Antidote to snake bite,
27	*Berberis lyceum* Royle**	Kashmal	800-2200	1,2,3, 4	Rt, Fr	S	Decoction of root with honey is used to cure jaundice, eye disease.
	Betulaceae						
28	*Alnus nitida* (Spach) Endl*	Koish	1600-2500	4	Lf, St	T	Stomach pain, cuts and wound.
29	*Betula utilis* D. Don	Bhojpatra	3500-4500	2,3	Bk	T	Used for Sprain, wound cleaning, cut, burn, jaundice, veterinary ailments, ear complaint.
	Boraginaceae						
30	*Arnebia benthamii* (Wall.ex G.Don) I.M. Johnst.	Ratanjot	3000-4300	4,10, 11	Rt	H	Boils, ulcer, wounds, and hair tonic.
	Cannabaceae						
31	*Cannabis sativa L.*	Bhang	1200-3000	1,2,5, 9,10	WP, Fr	H	Analgesic, narcotics, cold, skin pigmentation, sleep pills, sores and sting of *Urticadioca*.
	Caprifoliaceae						
32	*Morina longifolia*	Bhushi	3000-4000		Rt	H	Used for Cough and Asthma
33	*Viburnum cotinifolium*	Tanahna	1900-3100	1,2,3, 11		S	Menorrhoea.
	Caryophyllaceae						
34	*Silene vulgaris*	Kapu-gha	1600-3300	2,3	Lf	H	Asthma and vegetables.
35	*Stellaria media* (L.) Vill.		1900-3000	2,8	WP	H	Itching, cough.
	Chenopodium						
36	*Chenopodium album* L.	Dhanger	1600-2600	2,5,9	Lf	S	Skin disease, urine complaint.
	Cornaceae						
37	*Cornus macrophylla* Wall.	Kachun	1600-2700	2,8	Lf, Bk, Fr	T	Used for Dysentery.
	Cucurbitaceae						
38	*Solena heterophylla*	Galakdi	1600-2500		Fr	C	Gastrointestinal disease.
39	*Trichosanthes tricuspidata* Lour.			1,2	Rt	C	Veterinary disease
	Cupressaceae						
40	*Juniperus communis*	Bittal	3000-4000		Lf	S	Used for incense and offering to God.
	Cuscutaceae						
41	*Cuscuta reflexa* Roxb.	Minjali/ Amar bel	1600-2600	1,3,4, 5,9	WP	H	Wound ,burn and hair fall
	Dioscoreaceae						
42	*Dioscorea deltoidea* Wall. ex Kunth	Singli-Mingli	1500-2500	1,2,5	Rh	C	Dysentery, pile, and dyeing purpose.

	Dipsacacea						
43	*Dipsacus inermis* Wall.	Tori	2200-3000	1,2,5	Lf	H	Decoction is used in swollen body part to cure swellings, ache.
	Ericaceae						
44	*Gaultheria trichophylla* Royle		2600-3400	2,3,4, 5	Lf, Fr	H	Cough, cold and leaf oil is used for swelling.
45	*Lyonia ovalifolia* (Wall.) Drude	Arain	1500-3000	1,2,3, 4	Lf, Sd	T	Seed paste applied on Boils, pimples and wounds, Young leaves poisonous to cattle.
46	*Rhododendron anthopogon* D.Don*	Talsi	3000-3400	5	Lf	S	Cough, cold.
47	*Rhododendron arboreum* Sm.	Buransh	1600-2700	1,2,3, 4	Fl	S	Flowers juice used for nose bleeding, Dysentery, headache, wound and fever
48	*Rhododendron companulatum D. Don**	Tangal	2800-3400	2,5,8	Fl, Lf	S	Skin Disease, cold, cough, headache, fever and Tangal ka Tallish is used for the Boils Treatment. Leaves are poisonous to sheep and goat if eaten.
49	*Rhododendron lapidotum* Wall.	Talsi	2700-3800	2,5,11	Lf	S	Cold and cough
	Fabaceae						
50	*Desmodium elegans* DC.	Kathi	1600-3000	1,2,3, 4,8,10	Rt, Lf ,St	S	Root juice is used for joint pain and stem prevent teeth form decaying.
51	*Indigofera heterantha* Wall. ex Brandis	Kali Kathi	1600-3000	1,2,3	Rt	S	Used for dysentery pain.
52	*Trifolium repens* L.		1600-3400	2,9,11		H	Astringent.
	Gentianaceae						
53	*Swertia chirata*	Charayta	2500	1,2	Lf	H	Skin irritation and itching.
	Geraniaceae						
54	*Geranium nepalense Sw.*	Ghass	1500-3000	1,2,3, 5,9	Rt	H	Rheumatic problem.
	Juglandaceae						
55	*Juglans regia* L.*	Akhrot	1000-2000	1,2,3	Bk, Lf, Fr	T	Antiseptic, Toothache, tooth decay, mosquito replant and Hair fall.
	Lamiaceae						
56	*Elsholtzia fruticosa* (Don) Rehd.	Pothi	1500-2400	1,2,5	Sd	H	Gastric and flavouring foodstuff.
57	*Elsholtzia flava* (Benth.) Benth.	Pothi	1500-2400	1,2,5	Lf	H	Stomach-ache
58	*Mentha longifolia* L.	Pudina	1600-3000	2,7	Lf	H	Carminative and Antiseptic
59	*Ocimum sanctum*	Tulsi			Lf	H	Cold and cough.
60	*Plectranthus rugosus*	Chichri	2000	1,	Lf	H	Used for digestive disorders.
61	*Salvia mukerjeei* Bennet &Raizada**		800-2200	1,2,3, 5	Rt	H	Cough
62	*Salvia moorcroftiana* Wall.ex Benth.**	Thuth	1500-2700	1,5,11	Lf	H	Astringent, and carminative

63	*Salvia nubicola* Wall.**		2100-4300	1	Lf, Rt	H	Cough, cold and wound
64	*Thymus serphyllum*	Ban Ajwain	1800-4500	5	WP	H	Antiseptic and digestion etc.
	Liliaceae						
65	*Fritillaria roylei* Hk.*	Van Lahasun	2700-4000	2,11	Bb	H	Digestive disorders.
66	*Polygonatum verticillatum*	Salam mishri	1600-3300	1,2,3	Rt	H	Used for spermatorrhoea and piles
	Malvaceae						
67	*Malva verticillata* L.		800-2000	1,2,9, 11	WP	H	Fever
	Meliaceae						
68	*Toona ciliate M. Roem.*	Daral	1600-2200	2,4,13	Bk	T	Dysentery, fever, wounds and gastric problems.
	Menispermaceae						
69	*Tinospora cordifolia*			1,2	St	H	Used for constipation.
70	**Moraceae**						
71	*Ficus Palmata* Forssk.	Fagu	600-2700	1,2	Fr	T	Used for Digestive disorders, Stem latex is applied to extract spines and thorns deeply lodged in the flesh.
72	*Ficus pumila* L.			1,2	Lf	C	Stomach ache, digestion
73	*Morus himalayana*	Chimu		2,4	Fr	T	Stomach disorders.
	Orchidaceae						
74	*Dactylorhiza hatagirea* (D. Don) Soo.	Hathpanja	3000-4200	5,11	Rt	H	Anti-coagulant bone fracture, and Wound healing.
75	*Goodyera repens* (L.) R. Br.		2200-3300	1,2	Lf	H	Stomach problem, antidote of snake bite, blood purifier.
76	*Platanthera edgeworthii* Hk.f. ex Collett		2500-3000	1,2,3, 8	Tu	H	Blood purifier.
	Oxalidaceae						
77	*Oxalis corniculata* L.	Mili-Molori	300-3000	1,2,4	WP	H	Stomach-ache, coughs, cold, cut, dysentery, fever, swelling, jaundice and skin disease.
78	*Oxalis latifolia* Kunth.	Molori	1900-3200	1,5,8, 11	WP	H	Cuts, insect bite, dysentery, stomach ache, skin disease, fever.
	Papaveraceae						
79	*Meconopsis aculeata*	Poppy	3000-3800		Rt	H	Analgesic, bone fracture.
	Phytolaccaceae						
80	*Phytolacca acinosa* Roxb.	Jharki	1500-3000	3,8	Rt	H	Root used for boils, body pain, young leaves as vegetables, Berries are poisonous.
	Plantaginaceae						
81	*Plantago himalaica Pilg.***	Isabgol	2500-3000	2,5,9	Sd	H	Dysentery, cough, cold
82	*Plantago lanceolata* L.	Isabgol	1600-3000	2,4,5	Lf	H	Boils.
	Poaceae						
83	*Cynodon Dactylon* (D) Pers.	Dhrubghas	1600-2200	1,2,4	WP	H	Headache, Menstrual problem, dysentery, sores, urinary

							complaint.
84	*Saccharum spontaneum* L.	Philoo	1500-2000	1,2,3, 5	Lf	H	Diarrhoea, asthma.
	Podophyllaceae						
85	*Podophyllum hexandrum* Royle.	Ban Kakri	2600-4500	2,3,4, 8	Rh, Rt	H	Blood purifier, cough, cut, wound, gastric, skin disease and kidney problems.
	Polygonaceae						
86	*Fagopyrum esculentum* Moench	Diha	800-2000	2,5	Lf,St	H	Leaves and shoot of flowering plant are used internally for the high blood pressure.
87	*Persicaria amplexicaulis* (D.Don) Ronse Decr.	Dora	2500-3000	1,2,3, 5,9	Rh, Rt, Lf	H	Boil, cough, dysentery and healing wound.
88	*Persicaria capitata* (Buch-Ham. Ex D.Don) Gross		1600-2400	1,2,3, 4,5,9		H	Insect sting
89	*Rheum australe* D.Don*	Chunkhri	3300-5200		Rh, Rt	H	Used in Boils, asthma, fever, abdominal pain, cuts, skin disease, dysentery, liver disorder, sprain, ulcer, swelling, eye disease.
90	*Rumex dentatus*	Bhed malora	1500-2700	2,4		H	
91	*Rumex hastatus*	Khatee-Mithee	700-2500	1,2,5	Lf	H	Bloody dysentery and wounds dizziness.
92	*Rumex nepalensis* Spr.	Malora	1300-2500	2,4	Lf	H	Crushed leaves are applied on wounds.
	Primulaceae						
93	*Androsace rotundifolia*		1500-3600	5	Rt	H	Eye disease.
94	*Primula denticulate* Sm.		2200-4300	2	Fl, Lf	H	Urinary ailments.
	Punicaceae						
95	*Punica granatum* L.	Daru	1600-2200	1,2,8	Fr	S	Stomach pain, vomiting.
	Ranunculaceae						
96	*Aconitum heterophyllum* Wall. ex Royle*	Patish	2800-4500	2,5	Rt	H	Fever, cough, Digestive complaints, vomiting and diarrhoea.
97	*Anemone obtusiloba* D.Don**		2500-3800	1,2,9	Rt	H	Cuts, burns.
98	*Anemone rivularis* Buch-Ham. Ex DC.	Carbini-mimiri	2200-3500	1,2,5	WP	H	Vomiting
99	*Clematis buchananiana*	Belwala Safed	1800-3300	2	Rt, Lf	C	Used for Toothache, cut, wound, skin disease, swelling due to inflammation, poisonous to cattle.
100	*Delphinium brunonianum*	Dudhi Mahura	4300-5500	2,3,4	Rt	H	Used for Boils and kill maggots in sheep wound.
101	*Delphinium denudatum* Wall. ex Hk. F. & Th.**		2700-3000	2,5,9	Rt	H	Root powder is used for toothache, ulcer.
102	*Thalictrum foliolosum* DC. **	Breugha	1500-2600	1,2,3	Rt	H	Indigestion, abdominal pain, blood purifier, luecoderma, boils, eye disease.

	Rosaceae						
103	*Agrimonia pilosa* Ledeb.		1600-2800	1,2,3, 4,5	Rt, Lf	H	Dysentery, abdominal pains, crushed leaves used for wound.
104	*Cotoneaster bacillaris* Wall.ex Lindl.**	Riush	2000-3000	1,2	Ft, st	S	Rheumatism, arthritis, tooth cleaning, scabies.
105	*Fragaria nubicola*	Bhumfer /Himalayan strawberry	1800-3800	2	fr	H	Digestion.
106	*Geum elatum* Wall. ex G.Don**		2200-3400	1,2,4	Rt	H	Dysentery, earache
107	*Potentilla argyrophylla* Wall. ex Lehm.		2000-3400	1,2,3	AP	H	Analgesic
108	*Prinsepia utilis* Royle	Bhekal	1200-2700	1,2,4	Sd Bk	S	Rheumatic pain, wound, cut, burns and Boils,.
109	*Prunus armeniaca* L.	Shadi Khumani	1000-2200	2,4	Fr,Sd	T	Fruit extract for Liver problem, seed oil is used for joint pain, hypothermia.
110	*Prunus cerasoides*	Paja	1200-2400	3	St, Bk	T	Used in Arthritis.
111	*Prunus cornuta*	Jamu	2100-3500	2	Fr	T	Stomach pain and fever.
112	*Pyrus pashaia*	Shegal	750-2600	12	Fr	T	Fruits used in digestive problem and pterygium disease to cure affected eyes of cattle.
113	*Rosa brunonii* Lindl.	Kujja	900-2500	5	Lf, Fl	S	Diarrhoea and wound.
114	*Rosa macrophylla* Lindl.**	Jangli Gulab	2400-3600	2,5	Fl	S	Stomach-ache, cough and cold.
115	*Rubus ellipticus* Don	Akhe	1200-1800	2,11	Rt, fr	S	Roots used in burn and wounds. Fruit is edible
116	*Rubus fruticosus*	Blackberry	1600	2,3	Fr, Lf	S	Intestinal pain and diabetes.
	Rubiaceae						
117	*Galium rotundifolium* L.		2200-3000	2,3,4. 5.11	AP	H	Insect sting
118	*Rubia manjith* Roxb. Ex Fleming	Kasoos	1200-2400	1,2	Rt, St	C	Leaf past is used to cure wounds and cuts.
	Rutaceae						
119	*Boenninghausenia albiflora* (Hk.) Reichb.	Pessumar	2000-2900	1,2,3, 4,5	Rt	H	Dysentery, cuts, wound.
120	*Skimmia laureola* (DC.) Zucc.**	Ner	2500-3500	1,2,5	Lf	S	Toothache and offering to God
121	*Zanthoxylum armatum* DC.	Timber	700-2400	1,5,8	Fr, Sd	S	Seed used for toothache and twigs for brushing teeth. Fruit paste is useful for scabies.
	Sapindaceae						
122	*Aesculus indica*	Khanor	900-3000	3	Fr	T	Stomach pain and menstrual problems.
123	*Sapindus mukorosii* Gaertn.	Ritha/ Khuaar	200-1500	6,9,10	Sd	T	Seed past is used for Tonsil and hair treatment.

	Scrophulariaceae						
124	*Picrorhiza kurroa* Benth.	Karoo	3000-4000	4	Rt, Rh	H	Anti- inflammatory, Anti-oxidant and digestion problems.
125	*Verbascum thapsus* L.	Ban tambaku	1200-2500	1,2,5	Sd	H	Leucoderma snake bite, leaves paste is used for boils and Veterinary disease.
	Sexifragaceae						
126	*Bergenia ligulata* Wall	Pashanbhed	1800-2800	2,5	Rh	H	Kidney and bladder stone problems.
	Smilacaceae						
127	*Smilax aspera* L.		1600-2600	1,2,8	Fr	C	Skin scabies, fever, stomach-ache
	Solanaceae						
128	*Nicotiana tabacum* L.		800-1800	5,8	WP	H	Wound, itching, toothache, veterinary disease
129	*Solanum nigrum*		1600-2400	2	Lf, Fr	H	Boils, wound, skin disease, toothache.
120	*Solanum virginianum* L Sch. & Wendl.	Kantakari	800-2000	1,2,5	Rt, Fr	H	Arthritis, Cough and fever.
	Thymelaeaceae						
131	*Daphne papyracea* Wall. ex Stued.**		1800-2800	1,2,3,	Lf	S	Fever
	Trilliaceae						
132	*Trillitium govanianum* Wall. ex D. Don**	Nag Chatri	2500-4000	2	Rh	H	Dysentery, inflammation, menstrual, boils antiseptic and wound healing.
	Umbellifereae						
133	*Selinum vaginatum*	Bhutkeshi	1800-3200	11	Rt	H	Analgesic, hypertension, wound healing, Toothache and rhizomes are used for fumigation to ward off ghost and spirits.
	Urticaceae						
134	*Pilea umbrosa* Blume		1800-2600	2,8	Lf	H	Wound.
135	*Urtica dioica* Jacq. ex Wedd.	Kungsh	800-2500	1,2,5	Rt, Lf	S	Roots in Boils, constipation and Leucorrhoea, headache, Sprain.
	Valerianaceae						
136	*Nardostachys grandiflora* DC.	Jatamansi	3000-4500	2,5	Rh	H	Stomach pain and Toothache.
137	*Valeriana hardwickii* Wall.	Nahanru	2000-3000	1,2,8	WP	H	Boils.
138	*Valerina jatamansi* Jones	Mushq-wala	1600-3600	1,2,3, 4	Rt	H	Head-ache boils cosmetic.
	Violaceae						
139	*Viola biflora* L.	Banaksha	2800-3000	2,8	Lf, Fl	H	Indigestion.
140	*Viola serpens*	Banaksha	800-2000	2	Lf, Fl	H	Flower and leaf are used for fever and wound.
	Zingiberaceae						
141	*Hydychium spicatum*Buch.-Ham. Ex Sm**	Ban Haldi	1500-2800	1,2,3, 4,5,8	Rh	H	Cough asthma, diarrhoea and dysentery, blood purification.
	Gymnosperms						

	Pinaceae						
142	*Abies pindrow* (Royle ex D. Don) Royle**	Tosh	2200-3000	1,2,3	Lf	T	Needles decoction is used to treat asthma, cough
143	*Cedrus deodara* G.Don	Deodar	1500-3200	1,2,3, 4	Bk, Wd	T	Lameness and itching in sheep and goat, decoction of wood is used to cure urinary disease, piles, kidney stone, diabetes, and fever.
144	*Pinus roxburghii* Sarg.**	Chil	800-2300	1,2,3, 4,5	Res	T	Boils, sprains
145	*Pinus wallichiana*	Kail	1200-3000	2,12	Bk	T	Bone fracture in Sheep and Goat
	Taxaceae						
146	*Taxus baccta* Linn. **	Rakahl	2500-3500	1,2,3	Bk, Lf	T	Common cold, cough, asthma, fever and bark used for cancer.
	Pteridophytes						
	Adiantaceae						
147	*Adiantum capillus*- veneris L.		800-2200	1,2,3, 5	Lf	H	Boils.
148	*Adiantum incisun*	fern	1300-2000	3,5	Lf	F n	Used for cough and cold.
	Aspleniaceae						
149	*Asplenium dalhousiae* (Hook.)		1300-2000	2,3	Lf	F n	Used for skin burn.
	Athyriaceae						
150	*Diplazium esculentum* (Retz.) Sw.	Lingad	1600-2700	1,2,5	Frd	F n	Constipation.
	Equistetaceae						
151	*Equisetum arvense* L.	Keltaghas	1800-3000	2,4	WP	F n	Bleeding wound.
	Pteridaceae						
152	*Pteris biaurita*	Baran	1600-2000	2,3,8		F n	Wound.

Abbreviations used: AR= Altitude Range, LF= Life Form, 1= Dry Forest 2= Shady moist forest, 3= Riverine, 4= Bouldary, 5= Rockey, 6= Land slide, 7= water coarse, 8= Camping site, 9= Degraded, 10= Alpine dry slope, 11= Alpine moist slope, 12= Shrubberies, H = Herb, S = Shrub, T = Tree, C = Climber, Fn = Fern, P= Parasite, Wd= Wood, Res= Resin, Lf= Leaf, Rt= Root, Sd= Seed, Fr= Fruit, Frd= Frond, AP= Arial Part, WP= Whole Part, Bk= Bark, St= Stem, Fl= Flower, Bulb= Bb, Tu= Tuber.

Discussion and Conclusion

In present study 152 species of Medicinal plant were reported from the Great Himalayan National Park. *Picrorhiza kurrooa* is most traditionally used medicinal plant species by the local peoples of the area for the stomach problems and leucoderma in Ayurveda. In Unani *Picrorhiza kurrooa* is used for treatment of leucoderma and piles (Kritikar and Basu, 1981). The recorded medicinal plant species are valuable for various ailments namely Stomach-ache, Fever, Piles, skin disease, cut, wound, boils, kidney and bladder stone, Asthma and other various disease. Over exploitation of Flowers, fruits, seeds, Barks, roots and tubers of most of plant species may lead to early extinction from the area. Therefore there is a need to make proper policy for the conservation. The most important thing is awareness

and training for local people for sustainable exploitation of medicinal plant and encouraged them to cultivate medicinal plant in their own land.

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Appendix 3

List of Trainings/ Workshops/Awareness Programs with details of beneficiaries

प्रशिक्षण कार्यक्रम (Training Programme)

नैशनल मिशन हिमालयन स्टडीज द्वारा ग्रेट हिमालयन नैशनल पार्क में नेचर लर्निंग सैन्टर कार्यक्रम के अर्न्तगत तीर्थन घाटी में टुअर गाइडस, युवाओं एवंअन्य क्षेत्रीय लोगों के विभिन्न प्रशिक्षण प्रदान किया गया है जिसमें कि ट्रेनिंग के साथ–साथ लाइव प्रदर्शन एव विस्तृत व्याख्यान भी किया गया।सभी प्रशिक्षण भाग लेने वाले उम्मीदवारों के लिए भविष्य में उपयोगी होगें।

S#	Name of Training	Stakeholder/ Participants
1.	Nature Guide Training	29 + 13
2.	Skill Development Training for communication skill, body language, etiquettes, role of tour guide.	30
3.	About World Heritage Site	30
4.	Forest Protection and Conservation	25
5.	Eco-tourism, Forest Protection and Conservation	22
6.	Forest Fire Management	32
	Total	**168**

जागरूकता कार्यक्रम (Awareness Programme) - Schools

नैशनल मिशन हिमालयन स्टडीज द्वारा ग्रेट हिमालय ननैशनल पार्क में नेचर लर्निंग सैन्टर कार्यक्रम के अर्न्तगत तीर्थन घाटी में विभिन्न संस्थानों में पर्यावरण संरक्षण एवं पार्कमेंपाए जाने वाले जीव जंतुओं के बारे में जागरूक किया गया । जिससे कि बच्चों एव अन्य लोगों मे भी पर्यावरण संरक्षण एव जीव–जतुओं के बारे मे रूचि एवं जानकारी भी प्राप्त हो सकें।संस्थान वार ब्यौरा निम्न प्रकार से हैः–

S#	Subject of Awareness	Place of Awareness School/Villages	Participants
1.	Polythene	GMS DoghriRopa	50

	HataoParyawaranBachao		
2.	Forest Fire, To Reduce the Use of Polythene	GMS Tinder	49
3.	Illicit Felling, Forest Fire, To reduce the use of Polythene Bag	GSSS Bathad	119
4	Forest Fire, To Reduce the Use of Polythene	GMS Ghaliyad	30
5.	Environment Protection, To Reduce the Use of Polythene	GMS Lapah	24
6.	Forest Fire, Environment Protection, To reduce the use of Polythene Bag	GSSS Shanghar	130
7.	Environment Protection, Forest Fire, To reduce the use of Polythene Bag	GMS Nahin	31
8.	Forest Fire, To reduce the use of Polythene Bag	GPS Gushaini	125
9.	Effect of Deforestation, Forest Fire,	GPS Faryadi	72
10.	Deficit of Polythene Use, Forest Fire, Illicit Felling	GPS Bathad	76
11	Deficit of Polythene Use,	GPS Shrikot	48
12.	Forest Fire, Deficit of Polythene	GHS Shrikot	84
13.	Forest Fire, Deforestation, Deficit of Polythene Use	GM S Majhali	40
14.	Forest Fire, Deforestation, Deficit of Polythene Use	GPS Majhali	58
15.	Deficit of Polythene Use, Deforestation, Forest Fire	GPS Ghalingcha	25
16.	Flora and Fauna in GHNP, COVID-19	MPS Banjar	17
17.	Flora and Fauna in GHNP, COVID-19	SVM School Banjar	20
18	Flora and Fauna in GHNP, COVID-19	GSSS Goshaini	11
19.	Flora and Fauna , COVID-19	GMS Tinder	14
20.	Flora and Fauna in GHNP, COVID-19	SET Model School Banjar	21
		Total	**1044**

जागरूकता कार्यक्रम **(Awareness Programme) - Communities**

S#	Subject of Awareness	Place of Awareness Villages	Participants
1.	Forest Fire, Deforestation	Goshti	21
2.	Forest Fire, To Reduce the Use of Polythene, Illicit Felling	Katwali	21
3.	Forest Fire, To Reduce the Use of Polythene, Illicit Felling	Beedashangarh	20
4.	Forest Fire, To Reduce the Use of Polythene, Illicit Felling	Madana	27
5.	Environment Conservation, Forest Fire, Illicit Felling	Dagarha	12
6.	Forest Fire, To Reduce the Use of Polythene, Illicit Felling	Kahna	16
		Total	**117**

03 Policies communicated & briefed to the Local Communities & Students

1. Samudayak Van Samvardhan Yojna
2. Van Samridhi Jan Samridhi
3. Vidyarthi Van Miter Yojna

जागरूकता कार्यक्रम (Awareness Programme) on Samudayak Van Samvardhan Yojna

S#	Subject of Awareness	Place of Awareness Villages	Participants
1.	Samudayak Van Samvardhan yojna	Goshti	21
2.	Samudayak Van Samvardhan yojna	Katwali	21
3.	Samudayak Van Samvardhan yojna	Beedashangarh	20

4.	Samudayak Van Samvardhan yojna	Madana	26
5.	Samudayak Van Samvardhan yojna	Kahna	16
6.	Samudayak Van Samvardhan yojna	Kharogcha, Shugcha, Dharan, Dhingcha, Kauncha, Galiyand, Barshagand and Dharali	199
		Total	**303**

जागरूकता कार्यक्रम (Awareness Programme) on Van Samridhi Jan Samridhi

S#	**Subject of Awareness**	**Place of Awareness Villages**	**Participants**
1.	Van Samridhi Jan Samridhi	Goshti	21
2.	Van Samridhi Jan Samridhi	Katwali	21
3.	Van Samridhi Jan Samridhi	Beedashangarh	20
4.	Van Samridhi Jan Samridhi	Madana	22
5.	Van Samridhi Jan Samridhi	Kharogcha, Shugcha, Dharan, Dhingcha, Kauncha, Galiyand, Barshagand and Dharali	199
		Total	**283**

जागरूकता कार्यक्रम (Awareness Programme) on Vidyarthi Van Miter Yojna

S#	**Subject of Awareness**	**Place of Awareness** **School/ Villages**	**Participants**
1.	Vidyarthi Van Miter Yojna	GSSS Shanghar	129
2.	Vidyarthi Van Miter Yojna	GMS Nahin	31
3.	Vidyarthi Van Miter Yojna	GPS Gushaini	125
4.	Vidyarthi Van Miter Yojna	GPS Faryadi	72

5.	Vidyarthi Van Miter Yojna	GPS Bathad	76
6.	Vidyarthi Van Miter Yojna	GSSS Bathas, Tindar Pachayat, GMS Mashiyar	204
		Total	**637**

NLC Nursery

NLC Compound Medicinal Nursery Sai Ropa 30 June 2019

S.No	Common Name	Botanical Name	Sowing Month	Total No. Of Plants
1	Mushakbala	*Valerina jatamansi*	May 2019	210
2	Aloe Vera	*Aloe barbadensis*	May 2019	20
3	Chora	*Angelica glauca*	May 2019	25
4	Wild Tulsi	*Ocimum tenuiflorum*	May 2019	140
5	Karoo	*Picrorhiza kurroa*	May 2019	400
6	Chirayata	*Swertia chirayita*	May 2019	126
7	Atish	*Aconitum heterophyllum*	May 2019	100
8	Vacha	*Acorus calamus*	May 2019	336
9	Ban Kakri	*Podophyllum hexandrum*	May 2019	20
10	Hathpanja	*Dactylorhiza hatagirea*	May 2019	130
11	Nag Chatri	*Trillitium govanianum*	May 2019	246
12	Ban Ajwain	*Thymus serphyllum*	May 2019	15
13	Thhuthh	*Salvia moorcroftiana*	May 2019	20
14	Pashanbhed	*Bergenia ligulata*	May 2019	20
15	Singli Mingli	*Dioscore deltoidea*	May 2019	10
16	White Musli	*Asparagus adscendens*	May 2019	13
17	Belladona	*Atropa belladona*	May 2019	10
18	Van Haldi	*Hydychium spicatum*	May 2019	30
19	Geranium	*Pelargonium zonale*	May 2019	18
20	Jatamansi	*Nardostachys grandiflora*	May 2019	350
21	Sarvguni	*Persicaria amplexicaulis*	May 2019	50
22	Kuthh	*Saussurea lappa*	May 2019	165
23	Banfasha	*Viola serpens*	May 2019	190
24	Rakhhaal	*Taxus bbaccata*	May 2019	1728
25	Ashwagandha	*Withania somnifera*	May 2019	15
26	Akarkara	*Anacyclus pyrethrum*	June 2019	10
27	Dhoop	*Jurinea macrocephala*	June 2019	35
28	Chukhri	*Rheum rhabarbarum*	June 2019	10
			Total	**4,511**

NLC Compound Medicinal Nursery

NLC Compound Medicinal Nursery Sai Ropa 31 December 2020

S.No	Common Name	Botanical Name	Sowing Month	Total No. Of Plants
1	Mushakbala	*Valerina jatamansi*	May 2019	180
2	Aloe Vera	*Aloe vera*	May 2019	9
3	Chora	*Angelica glauca*	May 2019	25
4	Wild Tulsi	*Ocimum tenuiflorum*	May 2019	90
5	Karoo	*Picrorhiza kurroa*	May 2019	0 Died due to climatic condition
7	Atish	*Aconitum heterophyllum*	May 2019	0 Died due to climatic condition
8	Vacha	*Acorus calamus*	May 2019	170
9	Ban Kakri	*Podophyllum hexandrum*	May 2019	10
10	Hathpanja	*Dactylorhiza hatagirea*	May 2019	5
12	Ban Ajwain	*Thymus serphyllum*	May 2019	9
13	Thhuthh	*Salvia moorcroftiana*	May 2019	12
14	Pashanbhed	*Bergenia ligulata*	May 2019	20
15	Singli Mingli	*Dioscore deltoidea*	May 2019	6
16	White Musli	*Asparagus adscendens*	May 2019	9
17	Belladona	*Atropa belladona*	May 2019	5
18	Van Haldi	*Hydychium spicatum*	May 2019	18
19	Geranium	*Pelargonium zonale*	May 2019	11
20	Jatamansi	*Nardostachys grandiflora*	May 2019	0 Died due to climatic condition
21	Sarvguni	*Persicaria amplexicaulis*	May 2019	46
22	Kuthh	*Saussurea lappa*	May 2019	2
23	Banfasha	*Viola serpens*	May 2019	170

NLC Compound Medicinal Nursery

NLC Dari Bihal Medicinal Nursery June 2019

S.No.	Commom Name	Botanical Name	Sowing Date	Total No. of Plants
1	Chirayata	*Swertia chirayita*	June 2019	2025
2	Karoo	*Picrorhiza kurroa*	June2019	720
3	Sarvguni	*Persicaria amplexicaulis*	June2019	141
4	Dhoop	*Jurinea macrocephala*	June2019	29
5	Chora	*Angelica glauca*	June2019	159
6	Vacha	*Acorus calamus*	June2019	57
7	Aamlok	*Diospyros japonica*	June 2019	715
8	Aadoo	*Prunus persica*	June2019	1520
9	Khumani	*Prunus armeniaca*	May 2019	780
			Total	**6,146**

NLC Dari Bihal Medicinal Nursery December 2020

Sr.No	Common Name	Botanical Name	Sowing Date	Total No. of Plants
1	Khumani	*Prunus armeniaca*	June2019	750
2	Sarvguni	*Persicaria amplexicaulis*	June2019	100
3	Vacha	*Acorus calamus*	June2019	80
4	Aamlok	*Diospyrous japonica*	June2019	540
5	Aadoo	*Prunus persica*	June2019	1450
6	Khumani	*Prunus armeniaca*	Jan 2020	800
7	Chirayata	*Swertia chirayata*	June2019	Died due to unfavorable condition
8	Karoo	*Picorhiza kurroa*	June2019	Died due to unfavorable condition
			Grand Total	**3,720**

NLC Dari Bihal Medicinal Nursery